education sciences

Decolonising Educational Technology

Edited by
Marguerite Koole, Matt Smith, John Traxler, Taskeen Adam and Shri Footring

MDPI

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About the Editors

Marguerite Koole

Dr. Marguerite Koole is an Associate Professor in Educational Technology and Design at the University of Saskatchewan. She has a Ph.D. in E-Research and Technology-Enhanced Learning from Lancaster University, UK, and a Master of Education from Athabasca University, Canada. Dr. Koole has worked in educational technology for over 20 years. Her commitment to equity, diversity, and inclusion (EDI) is ingrained in her academic and personal pursuits. Her research increasingly centres on social justice, focusing on systemic inequalities and advocating for under-represented voices. Locally, she works alongside community groups, advocating for accessible services for Deaf and Hard of Hearing individuals in Saskatchewan and collaborating on Indigenous language revitalisation projects at the University of Saskatchewan. Internationally, she has been engaging with groups in Afghanistan to promote education for women and girls through educational technology (which includes conceptualising systems, planning, and designing solutions). Dr. Koole is committed to advancing the well-being of individuals and communities who otherwise may not have access to or 'say' in the dominant power structures in their societies, focusing on culturally respectful services and the acknowledgement of their rights. These experiences have provided her with a broad and growing understanding of EDI and how technology can contribute in more positive ways.

Matt Smith

Dr. Matt Smith is Reader (Assoc. Prof.) in Digital Learning Contexts at the University of Wolverhampton. He predominantly works on mobile and digital learning, particularly in the Globalised South and with remote and/or marginalised communities; digital literacy; and decolonisation. He co-authored a major report for the Department for International Development's EdTech Hub on lessons learnt to support governments' digital responses to the educational crisis brought on by the COVID-19 pandemic. Amongst other internationally collaborative research efforts, Dr. Smith has worked in Palestine focusing on developing mobile technologies for supporting the teaching of English and in Brazil, supporting school populations to influence virus control through mobile applications. He was Principal Investigator on an Erasmus+ project with partners across Europe, creating a new online collaborative approach to textbook work. With Prof. John Traxler, Dr. Smith co-edited Digital Learning in Higher Education—COVID-19 and Beyond, charting the effects of the pandemic on digital learning across the UK higher education sector. He is the Coordinator for the UNESCO Chair on Innovative Informal Digital Learning in Disadvantaged and Development Contexts and is currently investigating the potential for leveraging GenAI to support remote and/or marginalised communities.

John Traxler

John Traxler, FRSA, MBCS, AFIMA, MIET, is a Professor of Digital Learning, UNESCO Chair in Innovative Informal Digital Learning in Disadvantaged and Development Contexts, and Commonwealth of Learning Chair for Innovations in Higher Education. He is Academic Director of the Avallain Lab and leads research on ethical and pedagogic aspects of educational AI. His papers are cited around 12,000 times, and Stanford continues to list him in the top 2% in his discipline. He has written over 40 papers and seven books and consulted for a variety of international agencies, including UNESCO, ITU, ILO, USAID, DFID, EU, UNRWA, the British Council, and UNICEF.

Prof. Traxler was a pioneer of mobile learning, starting in the 2000s with the issues of technology and pedagogy but, in the 2010s, more concerned with the impact and consequences on societies, cultures, and communities of mobility and connectivity and the impact on the nature of disadvantage. He is currently interested in the impact of AI on global and individual disadvantage and on the decolonisation of the digital technologies of learning and education.

Taskeen Adam

Dr. Taskeen Adam is a Co-Director of Open Development and Education, Senior Research Lead at EdTech Hub, and Research Associate at the University of Johannesburg. She has over 10 years of international education research and development experience. Her thematic areas of expertise are EdTech for low-resource contexts, justice-orientated inclusive education models, open educational practices, critical digital pedagogies, education data management, data for decision-making, EdTech testbeds, implementation science, tech-supported teacher professional development, structured pedagogy, and personalised adaptive learning. She completed her Ph.D. on 'Addressing Injustices through MOOCs' at the University of Cambridge. Her research highlights that historical injustices, cultural impositions, and economic dependence continue to play a pivotal role in education. Dr. Adam is pioneering a new strand of research on decolonising EdTech, which focuses on equitable, inclusive design and implementation approaches to EdTech interventions in the backdrop of geopolitical inequalities.

Shri Footring

Shri Footring is a freelance education consultant with over 20 years of experience working at a senior level with UK universities and colleges on their digital transformation strategies. Originally a computer scientist, Shri worked in technical and management roles in the IT industry before moving to teaching and leadership in the further education sector. Her work there included a strong focus on bringing the benefits of technology and digital skills to staff, students, and the wider community in an accessible and meaningful way. This led to her doing similar work for a national organisation, where she collaborated closely with leaders in further and higher education institutions, bringing innovation to teaching, learning, and research. Areas of expertise include data analytics, digital capabilities, leadership, strategy, product, and project management. For the past three years, Shri has been working on various projects, including Tawaw (www.tawaw.org) and researching the use of generative AI in higher education. In addition to her professional roles, Shri serves as an independent governor at Writtle University College.

Preface

This important volume brings together some key thinkers in various fields such as educational technology (EdTech), decolonisation, colonialism, neocolonialism, higher education, international education, and social justice. EdTech can be seen as both ubiquitous and hegemonic. At the same time, it can be seen as neocolonial and represents another example of how Western thought, languages, and technology pervade global educational contexts. The authors whose work appears in this Special Issue were invited to submit articles on these themes. We sought insights from across the globe and from experts in a range of fields. The articles we received cover topics such as (but not limited to) distance learning, social justice, education in crisis, education under oppression, open learning, and MOOCs. The various articles explore whether EdTech can be used to overcome the issues inherent in each of their respective contexts without necessarily promulgating 'Global Northern' thought and practice. Thought-provoking and timely, this Reprint seeks to stimulate further debate and discourse around these issues, and we hope that the readership responds positively to the wider questions that the articles raise. The articles confront and examine current key issues in education.

We would like to thank all of the authors who are featured in this Reprint, reproduced here in alphabetical order:

Katrina Barnes, Priyanka Bhatia, Leena Bhattacharya, Cristina Costa, Tim Coughlan, Chandan Dasgupta, Aime Parfait Emerusenge, Robert Farrow, Dennis Foung, Fereshte Goshtasbpour, Clem Herman, Dominic Kimani, Lucas Kohnke, Saalim Koomar, Caroline Kuhn, Haani Mazari, Hani Morgan, Nariman Moustafa, Mark Murphy, Sahana Murthy, Minu Nandakumar, Ana Lúcia Pereira, Beck Pitt, Asma Rabi, Magnus Ramage, Howard Scott, Jayshree Thakrar, Zoe Tompkins, Noor Ullah, Mary Warui, Shizhou Yang and Annette Zhao.

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Marguerite Koole, Matt Smith, John Traxler, Taskeen Adam, and Shri Footring
Editors

Editorial

Decolonising Educational Technology

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1. Introduction: Rationale and Background for the Special Issue

Educational technology (EdTech) has become commonplace in modern educational practice. It has been integrated across modalities spanning face-to-face, blended, and fully online environments. As such, it is important for researchers, scholars, practitioners, and communities to consider the role of educational technology has played in perpetuating colonial biases and reinforcing existing societal power imbalances [1,2]. This Special Issue invited authors from multiple and diverse perspectives to critically explore how to decolonise educational technology.

The words education and technology are both highly abstract concepts. Arthur defines technology as "a means to fulfill a human purpose" [3] (p. 28). He adds that a human purpose can refer to "a device, or method, or process" (p. 29). By this definition, technology can include everything from writing instruments to hardware, software, infrastructure, applications, and interfaces. 'Educational' technology, then, implies pedagogies, projects, programmes, research, structures, values, knowledges, and philosophies in which technologies are situated. Dron writes that "technologies are seldom if ever morally neutral" [4] (p. 157). An and Oliver add that as part of a relational triangle, technology is "an intervening factor in human activities and our understanding of world" [5] (p. 10). Technology both shapes and is shaped by human society. Technology is imbued with biases by those who design and develop it. It can privilege some forms of knowledge and practices while hindering others. What is important to educators and theorists is that "the social impact of technology depends on how it is designed and used" [6] (p. 83).

The motivation behind this Special Issue is based upon a desire to uncover biases and privileges in the pursuit of greater inclusivity and social justice in educational technology. While inclusivity is a noble goal, it is also an imperative. Communities around the world are interconnected in ways too numerous and complex to list. Socially, politically, economically, materially, and even spiritually, communities' activities can affect each other in both observable and subtle, less visible ways. Like the 'butterfly effect', the ripples from one community's actions can be far reaching and difficult to trace. Therefore, it is important to seek the voices of those 'others' who lack adequate representation in national and international systems.

As editors, we all work and reside in the Global North and have been strongly influenced by the Western European mindset. Through this Special Issue, we wished to open an academic platform to authors positioned within, advocating for, and/or working with diverse communities. We struggled with the word 'marginalised'; it connotes powerlessness and lack of agency. Although we occasionally use this word, our intent is to surface the underlying power, agency, and rich knowledge traditions of remote, less affluent, and/or less represented communities. By organising this Special Issue, we wished to elicit both problems and solutions within the local contexts of marginalised communities in relation

to educational technology. Not only do we seek a better understanding, but we also seek to share and preserve knowledge traditions. A potential outcome is to better understand how local wisdom can help us as a world community in working together towards sustainable solutions to global issues such as climate change, poverty, self-determination, and systematic oppression. As de Sousa Santos and Meneses state so clearly, "there is no global social justice without global cognitive justice" [7] (p. xv). With this understanding, our Special Issue was conceptualised to help uplift "alternative ways of thinking about alternatives" [7] (p. xv). Rather than attempt to overthrow scientific practices of the Global North, we seek instead to interrogate it, challenge it, augment it, and make space for different ways of thinking and diverse ways of being; that is, we wish to expand cognitive diversity in the field of educational technology by inviting the exploration of concepts, practices, perceptions, and considerations from those communities outside the dominant, hegemonic structures. "Being also a process of ontological and epistemological restitution, decolonisation is based on the acknowledgement of silenced knowledges and on the reconstruction of humanity" [7] (p. xxii). With this in mind, we wish to step away from our epistemic privilege.

This Special Issue grew out of the Tawaw (www.tawaw.org, accessed 15 May 2024) project, which aimed to explore the development of methods (i.e., tools and techniques) for digital learning research to empower, support, and work alongside Indigenous and marginalised communities in designing and building their own digital learning spaces. The project aspired to (1) explore the extent to which the methods, the ethics practices, governance and funding models of educational research remain fundamentally pre-digital, modernist, colonialist, and European in their origin and ethos; (2) question, whether, as a consequence, these methods are culturally appropriate or are, in fact, oppressive when exploring the educational and epistemic experiences, expectations, and norms of diverse, non-European cultures and communities—that we in western universities take-for-granted; and (3) assess whether we can collaboratively adapt, devise, and/or co-construct better tools and techniques, from within the communities, and also eclectically and inclusively from across the academic disciplines, that better match communities' worldviews, lifestyles, livelihoods, and environments [8].

In an earlier paper, Traxler and Smith tentatively documented the kinds of barriers that might exist between national and global mainstreams and the communities and cultures at their margins [9]. Their paper discusses the diversity of these barriers and the tools and techniques that might overcome these barriers. Some of these barriers include, for example, objective features like distance, sparsity, services, transport, infrastructure, coverage, mains, and buildings, whilst others might include language and literacy or capacity, knowledge, training, skills, status, stigma, and esteem. It is also the case that the most remote and excluded communities are often faced with multiple barriers, rather than just one. For low-income and developing countries, some of these barriers are consequences of ill-chosen research methods that are predigital, European in origin, and may still embody the legacies of colonial and crudely modernist ideas.

The decolonisation of educational technology necessitates the challenging and dismantling of colonial structures, perspectives, and power dynamics present in the current design and implementation of educational tools. Our editorial team recognises the need to break away from hegemonic Eurocentric paradigms to embrace diverse cultural knowledge systems into educational materials, curriculum, and delivery methods. Drawing on critical pedagogy and post-colonial theories, the articles in this Special Issue question these dominant narratives.

2. Description of the Articles

In their article, Decolonizing Technologies through Emergent Translanguaging Literature from the Margin: An English as a Foreign Language Writing Teacher's Poetic Autoethnography, Shizhou Yang focuses on the utility of translanguaging in the decolonisation of the English as a Foreign Language (EFL) classroom [10]. Yang explains that translan-

guaging recognises the creative and emergent nature of language as it is used by people who employ their "whole communicative repertoires" made up of the different languages, social norms, and cultural practices (p. 3). Through autobiographical commentary and poetic autoethnography, Yang reflects upon their own experiences and motivations as an EFL learner, and critically examines educational technology as a means for self-expression and its potential to support multivocality; however, the need for the decolonisation of educational technology remains essential, both in principle and application. Yang proposes a design approach that decolonises from both top-down and bottom-up; that is, technologies need to be engineered from an intrinsically decolonising perspective while instructors and students should be able to choose resources and pedagogical approaches that balance both "local constraints and global affordances" (p. 7). Yang also comments on and questions the dominance of the English language which perpetuates and extends colonisation. For Yang, an interesting way to think about decolonisation is through the Chinese character, 坐 (zuo), in which one person, 人 (ren), is equal to another person(s) (人 | 人). Along with the concept of translanguaging, zuo seems complementary to concepts such as Marshall's two-eyed seeing [11] and Bhabha's third space [12].

In the article, Digital Education Colonised by Design: Curriculum Reimagined, Costa, Bhatia, Murphy, and Lúcia Pereira take a critical theory approach in their discussion of 'curricular imagination' as a means of disrupting and examining technological colonialism [13]. The authors define decolonisation as that which "works to diversify educational experiences, opening the webs of valued knowledge beyond Euro-centric perspectives … a form of knowledge justice" (p. 6). In this conceptual paper, they argue that current educational technologies prioritise efficiency and profit ahead of more participative, relational, and affective ways of teaching and learning. They argue that current commercial educational platforms simplify educational processes by providing automation, surveillance, and ostensibly better security and privacy. They add that these platforms also target and constrain the pedagogical freedoms of "docile" users who passively accept and adopt technologies (p. 6). The authors consider educational technology as comprising three aspects: functions, organisation of teaching and learning, and philosophical approaches. The authors suggest that reimagining the use of technology needs to focus on creating spaces of empowerment, creativity, dialogue, social interactions, and collective creativity thereby fostering "unity within diversity" (p. 7). The article refers to Freire's [14] work and draws attention to the neo-liberal imperative to develop a skilled 21st Century labour force at the expense of nurturing well-rounded, thinking, caring, and participative members of communities.

Focusing on massive open online courses (MOOCs), Morgan describes a small empirical study. The article, Improving Massive Open Online Courses to Reduce the Inequalities Created by Colonialism, is based upon social reproduction theory and transformative learning theory [15]. Morgan conducted a document analysis exploring if and how MOOCs alleviate or maintain social inequality and how they might be improved to democratise education. Four themes emerged: (1) failing to meet students' basic needs, (2) ignoring students' language and culture, (3) how to meet students' basic needs, and (4) the importance of respecting language, culture, and knowledge base. Like Yang [10], Morgan also recommends taking both bottom-up and top-down approaches in the design of educational technologies. Similarly to Costa et al. [13], Morgan advocates that MOOCs should take a more Freirean participatory approach to instruction in which teachers collaborate with learners "with the goal of releasing themselves from "oppressive structures" (p. 3).

Smith and Scott's article, Distance Education under Oppression: The Case of Palestinian Higher Education, depicts how the Palestinian people use distance technologies to maintain access to education and to sustain linguistic and cultural identity [16]. The researchers interviewed twelve teachers using a Google Docs forum. The description of the methodology highlights how the researchers coped with potential ethical and safety issues while conducting their research. The participants' responses illustrate the range of impedi-

ments to accessing physical schools and how distance education tools and pedagogies have helped to sustain progress and continued learning. Like Yang [10], the study participants see language (Hebrew) as a tool of repression, colonisation, and erasure. But participants also see language (English) as potentially liberating. The ability to speak English, for example, provides a conduit for Palestinians to share their stories with the external world. In addition, English capabilities may open avenues for economic opportunities. Within the Palestinian context, educational technology means resistance as well as linguistic and cultural survival. The authors conclude with some positive findings—that the people have a tremendous determination, and that distance education can be a source of stability and hope.

Supported Open Learning and Decoloniality: Critical Reflections on Three Case Studies by Farrow, Coughlan, Goshtasbpour, and Pitt describes a retrospective study [17]. In Table 2 [17] (p.17), the authors use a conceptual framework composed of three categories, coloniality of being, coloniality of power, and coloniality of knowledge, which the authors juxtapose with the three main characteristics of (1) supported, (2) open, and (3) learning (SOL). Farrow et al. see educational technology as a "vector" (p. 1) of colonisation. However, they argue that well-designed open educational resources (OERs) can help to remove barriers to education and lead to a greater democratisation of knowledge. The case studies they describe involve projects in South Saharan Africa, Myanmar, and Kenya. The article examines each case in relation to the three types of coloniality. In their analysis, various kinds of barriers come into view such as barriers in infrastructure, such as access to networks and devices. Political and policy barriers also surface, particularly for credentialing practices, project funding, and project ownership. Like some of the other authors in this Special Issue, concerns surrounding language and cultural norms colonising forces also emerge. The article offers some approaches for the design of open, online learning platforms. The authors conclude by commenting on the need for transparent and less hierarchical organisation between partners. They offer valuable and critical reflections on the advantages and disadvantages of OERs.

"There isn't anything there to be decolonised!": Perspectives of Distance Students on Decolonising their Computing Curriculum: this title underscores the limited awareness among students and the broader society regarding the presence of hidden biases embedded within the tools they regularly employ [18]. In this article, Topkins, Herman, and Ramage discuss the non-neutral nature of technology and how race and gender are "inscribed" into technologies (p. 3). At the same time, the authors recognise that educational technologies often neglect the inclusion of Indigenous and local perspectives. Taking a critical sociotechnical approach, the authors developed and administered surveys with quantitative and qualitative questions designed to explore the attitudes of information technology and computer science students. Having analysed 394 responses, the authors arrive at six types of challenges to student engagement with decolonising efforts, along with four types of challenges for the staff and administration of the university. They conclude that there is a range of understandings of what decolonisation is and how it is relevant to the curriculum. The authors note that the students may not understand how their learning, at the individual level, relates to the world more generally, nor do they understand how developing and designing computer programs and systems can affect, positively or negatively, marginalised communities.

Kohnke and Foung introduce the topic of data colonisation in their paper, Deconstructing the Normalisation of Data Colonialism in Educational Technology [19]. The article is important because it reminds scholars and other users of technology that there are key ethical considerations surrounding the mass retrieval and analysis of student data by and through our educational systems. Although knowledge gleaned about the needs and activities of learners can be helpful in selecting, designing, and personalising learning interventions, from an ethics perspective, accessing learner data can become detrimental when informed consent and notification is neglected. Taking a post-colonial approach, Kohnke and Foung examined 22 studies in four, high-impact educational technology journals in-

dexed in the Web of Science and Social Sciences. They found that the ways in which the identified studies evidenced data colonisation was through (1) harvesting log files, (2) correlating log-based data with questionnaires and other data such as grades, (3) accessing data without any formal approval or with only institutional permission (i.e., without student knowledge), and (4) rationalising data collection based on ideological beliefs (i.e., for the greater good). The authors argue that access to data may be likened to a form of wealth which enriches researchers and institutions, and which can be "repurposed and exploited …without giving students a chance to refuse or informing them" (p. 7). The authors provide six potential remedies, three of which include decolonising ethical clearance processes, decolonising systems design, and informing and obtaining consent from students. Rather than seeing data mining and learning analytics as normal and inherently good, they argue that greater attention to personal privacy and improved ethical practices are warranted—especially moving into the AI era.

Barnes et al. provide a highly informative article of interest to educational technology designers and developers who are working in international development and/or with refugees: Designing for Social Justice: A Decolonial Exploration of How to Develop EdTech for Refugees [20]. In the literature review, the authors share important observations about internationalisation, the techno-capitalist agenda, and how these processes can lead to "intersectional injustice and digital oppression" (p. 24). The main thrust of the research was to engage with three focus groups of refugees located in two countries—Rwanda and Pakistan. Questions were derived from the three dimensions of the human injustices framework: material, cultural-epistemic, and political and geopolitical injustices. Like other authors in this Special Issue, Barnes et al. recognise that educational technology is not neutral and that there are times when it is and is not appropriate. The authors provide a robust discussion of refugees' underlying deference to technology, to those who create technology, and to tacit messages that they, as refugees, are "helpless without it" (p. 24). The article concludes with a summary of seven "decolonial, justice-centred" (p. 25) design principles to aid in developing educational technology with and for refugees.

Kitambaa: A Convivial Future-Oriented Framework for Kinangop's Learning Hub [21], written by Kuhn, Warui, and Kimani, provides a balanced and realistic description of the African context in which they acknowledge both the challenges and the richness of education. Based within a critical realist perspective, the authors allude to unsustainable and extractive approaches to 'development', often perpetrated by multinational companies. The learning hub project they describe is at a boarding farm in a small community in Kenya, Kinangop. The hub supports people in acquiring knowledge and skills relevant to the farm whilst respecting both cultural and ancestral practices alongside Western technical and scientific knowledge. In their "multi-epistemic" approach, the authors combine practices of conviviality [22] and speculative futures [23]. In doing so, the framework they implement supports community involvement in technological development and also invites them to envision how present activity can shape the future; that is, assisting the community in "(re)inventing their futures as spaces of possibility" (p. 9).

The paper entitled Shaping the Discourse around Quality EdTech in India: Including Contextualised and Evidence-Based Solutions in the Ecosystem [24] demonstrates a heightened awareness of the need for community voice in the selection and implementation of educational technology within the Indian school system. The authors, Bhattacharya, Nandakumar, Dasgupta, and Murthy adopt a justice-oriented design comprising a content quality dimension, a pedagogical alignment dimension, and a design dimension, which they used to develop the Tulna Index to help select and implement educational technology solutions. The researchers work within the already-existing educational system as both insiders (stakeholders, index design, and training design) and outsiders (less involved in implementation). The authors identify English as a colonising force, while also serving as a lingua franca permitting communication across India, a country with 23 official languages. There is a tension between the localisation of language and culture.

Adam's [25] paper offers an explicit axiological perspective. Striving for a more holistic approach, Adam brings to attention concepts such as the desecularisation of knowledge, embodied cognition, critical reflexivity, social justice, and decolonisation. The author presents an analytical framework called 'the dimensions of human injustice' (DoHI). The framework is depicted as a Venn diagram with three circles each representing ontological and epistemological injustices, material injustices, and geopolitical injustices. Adam then examines how educational technology exacerbates these injustices. The paper offers us an opportunity to question and reexamine how educational technology amplifies and accommodates the "rationalistic, secular, and neocolonial" (p. 20) tendencies of Western educational practices. The paper helps us consider how societies can move towards more holistic and human practices.

The final paper [26], again written by the editorial team, is a drawing together of the methodological insights from all the of the above articles contained within the Special Issue. We found repeated messages warning against the use of those methods and tools known to researchers without considering the needs and contexts of the research circumstances and participants, and the unconscious promulgation of the colonial hegemonies of language and thought that are embedded in such methods and technologies. However, we also found positive messages and aspirations: research projects seem to enjoy greater success and receive better support from participants where researchers collaborate with communities in culturally appropriate and reciprocal ways.

3. Contribution to the Field

As we stated in the invitation to the Special Issue, decolonisation describes the acts of recognising, confronting, and undoing the processes, structures, and concepts by which a more powerful country, culture or community oppresses another smaller one, either currently or historically, physically, or remotely. This oppression can operate through education, through its curricula, its pedagogies, its professions, its institutions, its theories, its research methods, and its language. Oppression also operates through the digital technologies by which education and learning are separately and differently accessed, delivered, and supported.

A significant outcome of this Special Issue is the identified list of criteria that describe the decolonisation of educational technology. Without oversimplifying the complexity of the papers, three main foci emerged: (1) empowerment and self-determination, (2) diversity in 'ways of knowing', and (3) social, cultural, and linguistic justice. Based on the collection of papers in this Special Issue, we suggest that the decolonisation of educational technology is a means to achieve the following:

- uncovering power dynamics embedded within educational technologies;
- addressing structural configurations of power to foster a more equitable and socially just digital educational landscape;
- empowering marginalised communities and challenges to Western hegemonic thought;
- valuing and promoting inclusivity, linguistic diversity, cross-cultural respect, and social justice;
- challenging Western hegemony;
- involving affected communities in the processes to mitigate potential harm caused by external research and development.

We argue that effective decolonisation would involve recognising and incorporating Indigenous and/or non-Western knowledge systems into educational technology and integrating traditional, local, contextual, societal, communal, and ecological knowledge, storytelling, and other cultural practices into digital learning experiences. Drawing on the contributions from all the articles in this Special Issue, the consensus is that educational technology must adopt inclusive design principles that address diverse cultural contexts, languages, and onto-epistemological approaches.

4. Conclusions, Future Directions, and Call to Action

This Special Issue remains as an invitation for future dialogue and critical analysis of the actors and systems perpetuating and reinforcing the values, worldviews, institutions, resources, and knowledge systems entangled with (neo)colonialist structures and practices. As is made clear throughout the articles in this Special Issue and elsewhere (e.g., [27]), the global discrepancy in technology access results in a continuum where factors such as availability, infrastructure, wealth, and language can either empower or disadvantage communities in the digital landscape. The decolonisation of educational technology has the potential to empower learners from diverse backgrounds and foster a sense of inclusivity and representation in educational materials. By challenging the existing power dynamics and established colonial and neo-colonial tools and techniques in education, decolonisation can support a more equitable distribution of authority and knowledge production.

In this issue, we invited submissions that were empirical, methodological, conceptual, evaluative, artistic, and/or novel. As Yanchar et al. write, "any method for studying the world will be based on assumptions and values regarding the target phenomenon …the logical extension of this basic insight is that a method will only produce findings that are consistent with its assumptions" [28] (p. 140). To move beyond the usual Western-style assumptions, we opened the call to authors who offered unique perspectives and who might lack representation within academic journals—that is, we hoped to attract practitioners, community members, early-career researchers, and scholars from different knowledge traditions. To some extent we succeeded; in other ways, we have not yet reached the voices that remain the most remote from our Western, Global North academic world.

There are some important limitations to this Special Issue. Every step and stage of academic research is problematic in that it perpetuates and normalises current Western practices. Although mindful of how the research publishing cycle reinforces systemic colonial practices, we admittedly still relied upon existing structures and processes for adjudication. Grydehøj et al. [29] write, "for all its liberatory promise, academia is subject to the same processes of dispossession, exclusion, and inequality as wider society and is just as apt to entrench injustices as to challenge them" [28] (p. 4). Academic publishing, they argue, is important not only for sharing knowledge, but also for creating networks, opening doors, and exercising power. Grydehøj et al. [29] raise several problems, of which this Special Issue is guilty, including the low acceptance numbers of non-Western authors and the dominance of English as the medium of communication. Furthermore, as editors, we examined each paper through our Western-trained lenses and asked the writers to conform to various language, methodological, and writing norms. To an extent, we are also caught in the publishing cycle in that, as editors, we must ensure the quality of the Special Issue—lest we be judged by our own gatekeepers. So, even though we intentionally sought diverse insights and endeavoured to expand our repertoires as guest editors, this Special Issue, and others like it, must do more. Grydehøj et al. [29] concluded that "even the best of editorial intentions is incapable of undoing the coloniality of Western academic publishing" (p. 12). Moving forward, we see the need to continue the search for innovative, creative, and different voices from 'marginalised' groups who can raise and examine different and seldom-questioned assumptions complicit in the digital colonisation of education and the dissemination of knowledge.

It is our contention here, and throughout the articles contained within this Special Issue, that the decolonisation of educational technology is an essential step towards creating a more inclusive and equitable educational landscape. By acknowledging and challenging colonial legacies, educators and technologists can contribute to a more just and diverse learning environment, as well as one that is more culturally and contextually relevant to learners around the globe, in all their varied situations. This ethical shift will require collaboration, cultural sensitivity, and a commitment to dismantling the underlying, taken-for-granted structures that perpetuate inequality in education. We have been heartened throughout our editorship of this Special Issue to see examples of how, through these efforts, educational technology can become a catalyst for positive social change. We now

issue a call to advance this crucial agenda for social justice, equality, and education; more work must be carried out.

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A Justice-Oriented Conceptual and Analytical Framework for Decolonising and Desecularising the Field of Educational Technology

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Abstract: Education systems globally are increasingly being shaped by the logics, assumptions and pedagogical underpinnings of educational technology (EdTech) products, services, programmes, policies, and systems. These often promote rationalistic, secular, universal, objectivist, (post)modernist, written, behaviourist, and individualistic ways of being, marginalising religious, spiritual, oral, subjective, critical, and communitarian ways of being. Given that technological ways of being have been propagated globally, these logics are no longer predominantly promoted by those in the Global North, but by techno-solutionists globally, although the core-to-periphery flows of ideology and funding are still prominent. This article develops a conceptual and analytical framework for decolonising and desecularising the field of EdTech. Concepts are drawn from various discourses: the desecularisation of knowledge to set the ontological framing; embodied cognition to set the epistemological framing; and social justice and decolonial discourses to set the axiological framing. From this, the article develops the Dimensions of Human Injustice Analytical Framework—covering material, ontological and epistemic, and (geo)political injustices—to assist policymakers, educators, EdTech developers, and international development practitioners in identifying and confronting coloniality in their EdTech. Acknowledging the complexity and contentions within decolonial thought, this article does not claim a unified stance on achieving justice but aims to offer a tool for deconstructing and questioning injustices.

Keywords: justice; decoloniality; desecularisation; educational technology; digital neocolonialism; conceptual framework; embodied cognition

1. Introduction

With increasing access to devices and connectivity, and the rapid adoption of educational technologies (EdTechs) during the COVID-19 pandemic, technology usage in education has become more established and has emerged as the north star for education institutions and governments. The pandemic has shown the many challenges that need to be addressed to effectively use EdTech, as well as the inequalities that its use can introduce [1]. Although EdTech is no longer seen through rose-tinted glasses, and indeed increasingly viewed with more caution as Generative AI (GenAI) in education becomes more popular, much of the discourse still firstly focuses on overcoming the barriers to access and use (e.g., devices, connectivity, skills, maintenance, design, and implementation) and secondly, consciously or subconsciously, assumes that the technologisation of education is the desired end goal [2].

As such, this article goes beyond looking at hardware and software (and its design, implementation, and cost-effectiveness) to question the embedded logics, knowledges, values, and philosophical underpinnings in the field of EdTech. Similarly, beyond looking at whether EdTech improves learning outcomes, the article interrogates the purpose of education decolonially. This article builds upon previous arguments that prevailing, neocolonial

ideologies, assumptions, and methods used in EdTech often marginalise religious, spiritual, oral, subjective, critical, and communitarian ways of being through their prioritisation of rationalistic, secular, universal, objectivist, (post)modernist, written, behaviourist, and individualistic ways of being [3,4]. It is suggested that this is because these hegemonic influences have shifted the purpose of education from something more intrinsic—focused on moral development, community, shared responsibility, and spiritual growth—to something more instrumental—focused on skill acquisition, employment, wealth generation, individualism, and development.

To date, there is no holistic conceptual framework to critically analyse the field of EdTech from a decolonial lens. The aim of the article is twofold. Firstly, the article draws on various discourses to develop a conceptual framework that reveals how the hegemonic technological way of being is being propagated globally in education [5], building on the existing neocolonial injustices in education. Concepts are drawn from the desecularisation of knowledge (Section 3.1), embodied cognition (including critical reflexivity) (Section 3.2), social justice (Section 3.3), and decolonial discourses (Section 3.4). Social justice and decoloniality in education are critically analysed to illustrate the complex, entangled, and contentious conflicting viewpoints.

Secondly, the article ties together these concepts to form the "Dimensions of Human Injustice" Analytical Framework (Section 4) which highlights three distinct yet overlapping and reinforcing injustices present in the field of EdTech, namely: material, ontological and epistemic, and geopolitical injustices. The article does not aim to speak from any homogenised standpoint in terms of how to bring about justice, and in fact, argues that this is a limitation of umbrella decolonial approaches. Instead, the purpose of this article is to assist researchers, implementers, and policymakers in gaining a critical consciousness through providing a tool that they can use to deconstruct, question, and critically analyse the field of EdTech.

The article begins by covering necessary background information about the origins of this research, the positionality of the author, the key terminologies used, and how these form the theoretical framings of the article in Section 2.

2. Background

2.1. Terminology

Terms can have different connotations when used by different groups, particularly when taking a decolonial approach. This section provides some initial definitions of how certain terms are used in this article, before further interrogation in Section 3.

- Educational Technology (EdTech)**:** This encompasses the hardware, software, products, services, infrastructure, applications, and interfaces [6].
- The field of EdTech: This refers more broadly to the projects, programmes, processes, policies, strategies, values, knowledge systems, and philosophies that EdTech are situated in [6].
- Global North and Global South: These terms are used to acknowledge the colonial and neocolonial influences of some regions over others and are, thus, geopolitical rather than geographic. These are used instead of economic groupings like "low-income countries" since the latter does not acknowledge the power dynamics in play, or the geopolitical injustices that led to some countries being wealthier than others. Occasionally, Western and Euro-American are used if the cited scholars use these terms or if epistemic roots of knowledge are being discussed. All these terms are used acknowledging they refer to the dominant modern systems of thought from those regions, and not the marginalised schools of thought (such as those from the indigenous groups in the Americas).
- Coloniality: This refers to the "long-standing patterns of power that emerged as a result of colonialism, but that define culture, labour, intersubjectivity relations, and knowledge production well beyond the strict limits of colonial administrations. Thus, coloniality survives colonialism. It is maintained alive in books, in the criteria for

academic performance, in cultural patterns, in common sense, in the self-image of peoples, in aspirations of self, and so many other aspects of our modern experience" [7] (p. 243).

- Decoloniality: This refers to "the dismantling of relations of power and conceptions of knowledge that foment the reproduction of racial, gender, and geopolitical hierarchies that came into being or found new and more powerful forms of expression in the modern/colonial world" [8] (p. 440).
- Technological way of being: This phrase is used at two levels. At a practical level, this phrase refers to how technology has permeated throughout our lives, shaping, for example, how we think, behave, communicate, socialise, learn, and work. This guides our values, behaviours, and experiences of and in the world. At a philosophical level, it is used in the Heideggerian sense to refer to a technological mindset that views the world (and human beings) instrumentally as resources to be utilised, optimised, and dominated, leading to exploitative engagements with the world [5]. Furthermore, this focus on productivity and efficiency leads to the forgetfulness of our intrinsic purpose and the questions of existence.

Further complex terms are discussed in more depth in appropriate sections.

2.2. Developing a Conceptual Framework

The definition of a conceptual framework varies depending on the purpose, research topic, and discipline(s), as does the process for developing one. The purpose here is to equip policymakers, educators, EdTech developers, and international development practitioners with the language, terminology, and tools to identify and confront neocolonial aspects of their EdTech. Conceptual frameworks tie together different concepts, theories, and/or variables related to the thing being studied to explain complex phenomena [9]. While a theoretical framework is more systematic, a conceptual framework describes the researcher's approach to addressing the topic. As such, the researcher's beliefs, personal interests, goals, social location, identity, and positionality inform the development of a conceptual framework and the selection of theories and the literature informing it [10]. Each concept that the framework draws on adds a unique dimension attempting to make the framework as holistic as possible. However, frameworks are models of reality, constantly evolving and contextual. Through making hidden assumptions and factors explicit, it helps to make the model more realistic and adaptable [11].

2.3. Origins of the Research and Positionality

This article builds upon the conceptual framework I developed in doctoral research addressing injustices in Massive Open Online Courses (MOOCs) in South Africa [12]. The literature and theorisation have since been revised to be more applicable to EdTech in general, as well as updated with newer literature and global occurrences.

My positionality as a South African, Muslim woman of Indian ethnicity contributed significantly to the conceptual framework development. While experiencing racial discrimination and marginalisation in certain ways because of my race and religion, it is not comparable to the experiences of Black South Africans. Due to Apartheid-engineered social stratification, Indians were given more benefits and rights, creating tensions and superiority complexes that still exist today; a legacy of divide-and-conquer colonial techniques. Furthermore, my privileges extend to studying and living in the Global North, which has given me a voice and platform that others striving for similar justice-oriented goals may not have. Thus, through experiencing both worlds, the hope is that my hybrid identity and multiple privileges give me a "double vision" [13].

Beyond my cultural and historical positionality, my religious standpoint as a Muslim guides my theoretical framing (Section 2.4). Firstly, my testification of one God as the ultimate reality and source of all existence guides an ontological stance of realism. Secondly, my testification of the Quran as Truth and a valid source of revealed knowledge guides my epistemological stance in terms of what counts as knowledge and how it can be known. While it is unconventional to acknowledge such standpoints in a journal article, many

researchers of faith experience cognitive dissonance when having to detach core tenets of their beliefs to fit into secular academic research. In a paper whose core purpose is the conceptualisation of decolonial approaches, it is imperative to mention this and how it foundationally impacts the conceptual framework proposed. Additionally, for those looking to use and adapt the framework based on their own ontological and epistemological stances, making these premises explicit assists in pinpointing where one might tailor the approach. Similarly, this article draws on several frameworks, approaches and ideas developed by thinkers that may take different ontological and epistemological positions; these are drawn on when useful provided they are reconcilable with the theoretical framing of this article.

2.4. Theoretical Framing

The ontological stance taken in this article is realism, and the epistemological stance taken is social constructionism. While seemingly a strange pairing, this research posits that social constructionism can be "at once realist and relativist" [14] (p. 63), [15]. This is because there is a distinction between realism and objectivism. Realism is "an ontological notion asserting that realities exist outside the mind" [14] (p. 10). Objectivism is "an epistemological notion asserting that *meaning* exists in objects independently of any consciousness" [14]. Crotty [14] (p. 10) asserts that "constructionism in epistemology is perfectly compatible with a realism in ontology". Constructionism can thus bring together elements of objectivity and subjectivity to emphasise "experienced reality" [14].

Constructionism is similar to what embodied cognition theorists call non-objectivism [16]. Constructionism is built upon symbolic interactionism and phenomenology, and became popular through the work of Berger and Luckmann [17]. Constructionism, according to Crotty [14] (p. 10), is the view that "knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context".

Constructionism emphasises interaction, interpretation, and intentionality, and differs from subjectivism which views that "meaning does not come from the interplay between the subject and object but is imposed on the object by the subject", implying a complete denial of any objective reality [14] (p. 10). This research approach thus differs from the strands of post-structuralist and post-modernist approaches that may take extreme subjectivist stances.

Building upon constructionism, social constructionism emphasises the social element in the meaning-making process; that is, the history and culture which "precede us" and to which we are "born into" and "embedded" into that function as "a publicly available system of intelligibility" [14] (pp. 52, 54), [15]. This epistemological stance thus strongly overlaps with embodied cognition theory that understands culture as guiding human behaviour.

3. Conceptual Framework

The selected discourses aim to reveal historical and current systems of oppression in everyday life, in the formation of knowledge and education, and in the realm of globalised digital education and EdTech. These four concepts were selected for their capacity to articulate and analyse injustces. Desecularisation and embodied cognition are first unpacked to lay the philosophical underpinnings of this research. Firstly, the desecularisation of knowledge expands on the ontological dimensions of knowledge, education, and justice, reincorporating the sacred that is often abandoned in materialist approaches.

Secondly, embodied cognition adopts an epistemological perspective asserting that knowledge is moulded by biological, environmental, contextual, and historical factors, while also maintaining a realist ontological position that posits the existence of a pre-existing world. Therefore, our situated knowledge guides our exploration of this reality. Critical pedagogy, which focuses on the political dimensions of knowledge creation, is

combined with embodied cognition to expose injustices where particular ways of being and ways of knowing are marginalised.

Subsequently, the conceptualisations of (in)justice, especially within the realm of education, are examined by critically analysing social justice and decolonial discourses, shaping the axiological dimensions of this framework. Although broad social justice and decolonial theories discuss some similar issues, they have traditionally been treated as distinct discourses due to their diverse intellectual origins and underpinnings; social justice originated as a concept in the Global North, while decoloniality emerged in the Global South.

Figure 1 illustrates how the various concepts drawn on fit together to form a conceptual framework for decolonising and desecularising the field of EdTech.
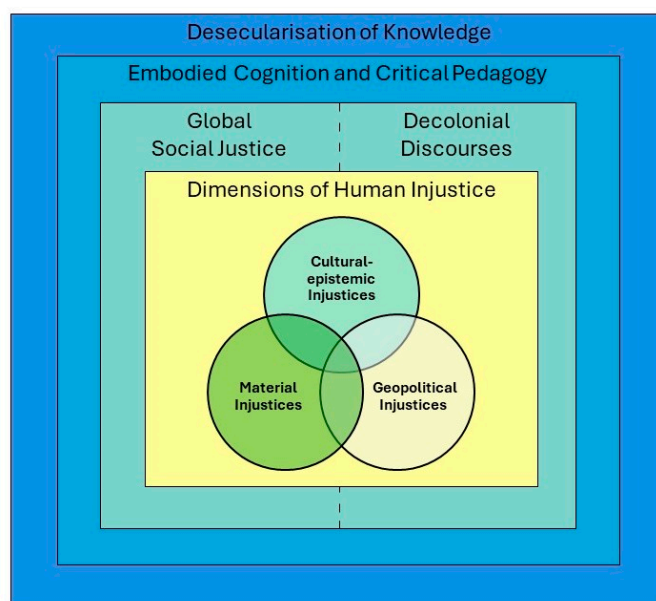
Figure 1. The conceptual framework for decolonising and desecularising EdTech.

The following section starts at the first principles to re-establish the purpose of education to later reset the framing in which EdTech is discussed.

3.1. Desecularisation of Knowledge

Secular refers here to something that is not religious, spiritual, or sacred. Secularisation is defined as "the loosing of the world from religious and quasi-religious understandings of itself, the dispelling of all closed worldviews, the breaking of all supernatural myths and symbols... [it is] man turning away from the world beyond towards this world and this time" [18] (p. 2). Mahmood [19] further argues that secularism is not merely a separation of religion and state but a means to manage, regulate and privatise religion which marginalises religious minorities through its homogenous frameworks. Desecularisation, understood as counter-secularism, is a response to the increasing trends and forces promoting secularism as a universal worldview [20]. While some discourses on desecularisation focus on debating religious decline versus incline theories, the aim here is to counter the spread of secular thinking as the only worldview, noting that the pervasive spread of secularism often adapts and/or amalgamates with religious, spiritual, or sacred worldviews in complex ways (e.g., the privatisation of religion) [21]. We are generally unaware of the secularising processes that penetrate into social norms (e.g., how we dress or eat), art, literature, and architecture [21].

While there are various scholars exploring secularism, they are mainly Christians from the West who discuss (and debate) the extent to which secularism grew out of Christianity, and how to respond to this [18]. This framework unpacks desecularisation and dewesterni-

sation jointly through the work of Al-Attas, who looks at secularisation's impact beyond the West and Christianity, and, in particular, on Islam [22]. Westernisation refers to the dominant, disenchanted, and modern Western values, cultures, philosophies, aspirations, aesthetics, ethics, laws, and aspirations that have proliferated throughout the world, noting that other non-dominant, diverse values have existed and continue to exist today in Western countries [22]. This modern Western civilisation grew out of "[A]ncient Greece and Rome; their amalgamation with Judaism and Christianity, and their further development and formation by the Latin, Germanic, Celtic and Nordic peoples" [22] (p. 134). While religion is often juxtaposed with rationality (i.e., a leap-of-faith narrative), the Quran and Islamic practise encourage reasoning, rationalising, and reflection (resulting in the Islamic world providing the foundations of scientific inquiry, mathematics, and medicine, to name a few) [23].

3.1.1. The Nature of Knowledge

Al-Attas argues that the greatest challenge that we now face is that knowledge has lost its purpose and "brought about chaos to the Three Kingdoms of Nature: the animal, the vegetal and the mineral" instead of peace and justice [22] (p. 133). Knowledge is not value-neutral. He differentiates between true knowledge and that which masquerades as true knowledge but has been interpreted through a prism and worldview of a civilisation (in our current globalised case, the Western civilisation), imbibing the character, personality, and pursuits of that civilisation. Discounting sacred knowledge, the secularised West depends on "man's rational capacity alone to unravel the mysteries of his total environment and involvement in existence", resulting in evolutionary morals and values to guide one's navigation through life. Yet, the Qur'an mentions three levels in which knowledge can be deemed certain (i.e., three epistemological approaches): certainty derived by inference; certainty derived by direct vision (including the spiritual vision); and certainty derived by experience [22]. The levels refer to the two types of knowledge: the transcendental knowledge of God as the Object of Worship, and the rational knowledge of accidents, attributes, relations, and distinctions to understand causes, uses, and purposes [22]. These knowledges are seated in the soul, heart and intellect [22]. The transcendental knowledge is "food and life for the soul" and is acquired through revelation [22]. The rational knowledge is pragmatic to assist man to live in this world; it is "acquired through experience, observation and research; it is discursive and deductive, and it refers to objects of pragmatic value" [22] (p. 146). The ordering of the knowledges is key as the first type of knowledge provides the "guiding spirit" for the second, without which, humankind is directionless and enmeshed in "the labyrinth of endless and purposeless seeking" [22] (p. 147).

3.1.2. The Purpose of Education

The pursuit of knowledge without purpose is meaningless. In a secular worldview, nothing is certain except uncertainty, and thus, the thirst for inquiry is never quenched as the original purpose of inquiry has been forgotten [22]. This material worldview results in a never-ending pursuit of "development" and "progress", which Al-Attas [22] (p. 137) describes as "humanistic existentialism".

Given the transcendental and rational knowledge in Islam, humankind's purpose and resultant actions and attitudes are made clear: to worship and obey God as well as serve responsibly as the vicegerents of God on earth. Thus, "the purpose of seeking knowledge is to inculcate goodness and justice in man as man and individual self, and not merely in man as citizen" [22] (p. 148). Following the purpose of seeking knowledge, the aim of education is "to produce a good man" [22] (p. 150). This means striving for excellence in character through enriching the soul, intellect, and heart. This goodness relates to both the spiritual and the material life of an individual.

3.1.3. The Meaning of Justice

According to Islam, as humankind is entrusted with the responsibility to rule according to God's Will, Purpose, and Pleasure, humankind needs to do this justly, and thus knowledge and justice are inextricably linked. Justice is defined as "the harmonious condition or state of affairs whereby everything or being is in its right and proper place—such as the cosmos; or similarly, a state of equilibrium, whether it refers to things or living beings" [22] (p. 149). Justice and injustice are connected to the soul which has two natures: the higher rational soul that knows God and the lower animal soul that is inclined to worldly desires. For one to strive for justice both inwardly and outwardly, the rational soul should rule over the animal soul [22]. Note here the difference between a secular worldview where rational is associated with only empirical knowledge, and an Islamic worldview where the higher-order rational soul is the one that knows and is in obedience to God. Obedience to God is an action that is just, where the just action itself is a form of worship.

Al-Attas explains that justice in Islam is not primarily concerned with the outward sociopolitical sphere, determined by and for relationships between different parties and people. Rather, it is more inward and for the individual's soul as it obtains closeness to God [22]. Striving for justice within results in justice externally with others, for example, the curbing of greed, gluttony, pride, and anger. Wisdom is the application of knowledge that causes the occurrence of justice, and requires the application of logic and emotional control [24].

In summary, using Al-Attas' desecularised conceptualisations of education and justice at the ontological level, the frame in which we discuss education can be reset. Firstly, teaching and learning happen with and through the heart, soul, and intellect; thus, solely intellectual pursuits should be avoided as they result in a deficient education. Secondly, the purpose of education is to produce good and just human beings; thus, this should be front and central in curricula. Thirdly, justice is not merely an outward act but starts inwardly curbing our animal soul; thus, character development should be a critical component of education. With this reframing, we can begin to assess the extent to which the EdTech we use can achieve such aims.

3.2. Embodied Cognition and Critical Pedagogy

Following Al-Attas' critique of the dualistic nature of the secular West and the separation of the body, soul, and intellect, embodied cognition expands on their interconnectedness at an epistemological level.

3.2.1. Embodied Cognition

The term embodiment loosely describes the connection between the mind, the body, and the world [25]. Embodied cognition theorists differ from the classic accounts of cognition that focus predominantly on internal cognitive processes which overlook environmental factors. Varela et al. [16] (p. 173) highlight two main facets of the term embodied cognition: "[f]irst, that cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological, and cultural context". The first facet deals with the first kinaesthetic angle of embodiment such as learning through dance, movement, sports therapy, or ventriloquism, whilst the second focuses on the biological, psychological, cultural, and historical contexts that influence cognition, learning, and knowledge production [25].

Embodied cognition aims "to expose the inadequacies of the objectivist philosophical tradition in its rigid separation of the mind from the body, cognition from emotion, and reason from imagination" [26] (p. abstract). Rather, the body and its sensorimotor capacities are inextricably linked with memory, emotion, language, and life experiences (ibid.). On the one hand, there is the "inward" empirical scientific notion of a pregiven world that is understood and recovered through one's senses [16] (p. 173). On the other, there is

the "outward" notion, whereby the perceiver's mind constructs and projects the world (ibid.). Embodied cognition aims to find a middle way between these two positions, a "mutual specification", whereby the world and the perceiver specify each other and evolve together (ibid.).

Varela et al. [16] (p. 149) argue that "knowledge depends on being in a world that is inseparable from our bodies, our language, and our social history—in short, from our embodiment". Johnson [26] (p. 14) emphasises this role of the social sphere: "Our community helps us interpret and codify many of our felt patterns. They become shared cultural modes of experience and help to determine the nature of our meaningful, coherent understanding of our world".

This is not only in the present, but due to a cumulative cultural evolution [27], whereby the "environment in which the human mind develops has a history itself; and this history owes its form to the activities of human beings, which are in turn conditioned by the development of mind" [28]. McDowell [29] (p. 126) describes this as "second nature", highlighting that human beings develop their cognitive capacities through initiation into language and tradition, which stores "historically accumulated wisdom about what is a reason for what". McDowell [29] (p. 126) further argues that it is "a standing obligation" for the inheritors of a tradition "to engage in critical reflection" as "part of the inheritance".

3.2.2. Embodiment and Critical Reflexivity

While embodied cognition theorists strongly emphasise the role of the environment, the body, and culture, it is often spoken of apolitically. Drawing on Freire [30], critical pedagogy brings together the concepts of embodied cognition, with the recognition of imbalances in social orders, to set out a praxis that uses these concepts to strive for social change. This pedagogy involves constantly developing a "critical consciousness" which is "learning to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality" [30] (p. 17).

An important aspect of critical pedagogy is "critical reflexivity" which "recognises the embodied nature of the practitioner's response to the world" [31] (p. 88). Door argues that educational practise cannot be separated from the "essential nature of the practitioner"; thus, continuous reflexive critique is needed by the practitioner on the interrelatedness of the self and the world (ibid.). Through this, Freire [30] argues that one can change one's practise through conscientization with the aim of mutual humanization. Critical reflexivity requires practitioners to critique the socio-cultural world and its external impositions on them, as well as to critique themselves. This requires a critique of one's embodied transactions [31].

Door [31] (p. 90) highlights that both our thoughts and actions can be "habitual and embodied" such that "the way we really think is revealed in our actions". Using critical pedagogy as an educational process, Freire [30] argues that when one takes a conscious stance to investigate one's positionality in the world in relation to others, the process of mutual humanization takes place, whereby both the oppressor and oppressed are transformed. While we are initiated into the world through the enculturation of a second nature, these views can be critiqued and changed when we reach a state of critical consciousness.

In summary, embodied cognition argues that we come to know things through our bodily experience, as well as through our environment; thus, learning environments should engage all the sensorimotor capacities and harness the knowledge developed from cumulative histories. Critical reflexivity illustrates that the embodied cognition of teachers and learners need not stifle their growth if they are critically conscious and reflexive. With this understanding of how teaching and learning happen, we can begin to assess the extent to which the EdTech we use can support embodied learning.

Sections 3.1 and 3.2 have covered the ontological and epistemological framing of this conceptual framework outlining the nature of knowledge, the purpose of education, the seeking of justice and goodness through education and the way in which knowledge

is generated/accumulated and learning happens. This requires spiritual development, character development, and critical reflexivity both individually and societally. However, justice has many contesting conceptualisations. The following sections delve deeper into justice and decolonial thought.

3.3. Social Justice

Social justice discourses are sometimes not the most relevant to the contexts of the Global South. This section illustrates that while the Global North theories of justice are designed from and for their contexts (Section 3.3.1), some recent theories of global social justice have begun to take a holistic approach (Section 3.3.2), acknowledging geopolitical inequalities, focusing on human dignity for all rather than those with a particular citizenship, and surfacing issues of recognition and representation for marginalised peoples globally [32,33].

3.3.1. Dominant Global North Theories of Justice

The dominant understandings of social justice applied globally today are developed from debates and discourses from the Global North, promoted through global institutions like the United Nations. While there are many contesting conceptualisations of justice within the Global North discourses, they draw on a similar intellectual history which sets the framing of the debates. Additionally, they are developed from their own evolving worldviews and contexts. This is true for all the theories rooted in particular regions, contexts, and frames, but it is the dominant Western theories of justice that are often applied universally, and it is these dominant theories of justice that have often overlooked (or justified) global injustices such as slavery or colonialism. Four main schools of thought can be said to have emerged from the debates between these Western scholars (and others) on justice: utilitarianism [34,35], libertarianism [36], Kantianism [37,38], and Aristotelianism (along with neo-Aristotelianism [39,40]).

The work of Rawls, an American philosopher, is expanded on as his work is a precursor to the social justice theories used to build the analytical framework. Rawls [38] opposed utilitarianism and revived a Kantian version of social contract theory with his theory of justice as fairness. He conceptualised the veil of ignorance where one should conceptualise a society where one's own gender, race, ethnic identity, level of intelligence, physical strength, quickness, stamina, etc. is unknown. With this approach, Rawls argues two basic principles: "equality in the assignment of basic rights and duties" and that "social and economic inequalities, for example inequalities of wealth and authority, are just only if they result in compensating benefits for everyone, and in particular for the least advantaged members of society" [41].

Rawls's work has been extremely influential on the conceptions of justice in the US and other English-speaking countries [41]. A few contemporary scholars have challenged his work, offering alternatives. Nozick [36], a libertarian, was opposed to the compromise of individual liberty for the sake of socio-economic equality and promoted as little regulation as possible. Nielsen [42], a socialist, was opposed to both Rawls and Nozick and considered equality to be of greater importance than individual liberty. Sandel [43], a communitarian, argues that the wellbeing of the community takes precedence over individual liberty, and views that Rawls does not place enough emphasis on community and community values. Pogge [33] takes a globalist stance on justice, extending Rawls's egalitarian view on justice, which seemed to only work intranationally, to make it more globally applicable.

As we can see, Western thought cannot be homogenised into one point of view. However, all these theories build upon and interact with each other and the norms and values of the evolving contexts, setting the frame of the discussion. For example, the emphasis of justice in relation to property rights, individual rights, or liberty may not be of central concern in the conceptualisations of justice in non-Western societies.

3.3.2. Global Social Justice

Building upon Rawls, Nancy Fraser [32], an American critical theorist, has produced a comprehensive framework that responds to the contemporary problems of globalisation and identity politics in relation to justice. Fraser highlights that we can no longer look at justice in a territorial way considering transnational corporations, international currency, international non-governmental organisations, mass media, and the internet, among other global forces. She discusses the concepts of distributive justice and recognitive justice in her earlier works [44], and then brings representative justice into her later works [32]. The key concept in Fraser's work on justice is participatory parity which views social justice as that which is required to make it possible for all the participants to be on an equal footing in social life [32].

3.3.3. Social Justice in Global South Education

In the past 15 years, the social justice theories from the aforementioned Global North social justice scholars have been applied to analyse injustices in the Global South education systems and have birthed a pool of social justice literature specifically relevant to such contexts [45–48].

One example is that of Pendlebury and Enslin [48], who draw on the work of Young [49] and others to emphasise how political injustices and educational injustices are inextricably linked. They argue that redistributive justice alone is insufficient in light of domination and oppression that function to exclude people. Beyond justice *outcomes*, justice needs to focus on *procedures* such as the "discriminatory practices commonly built into the institutional procedures for school admission" [48] (p. 33). Their work highlights the structural inequalities in South Africa such as the difference between external exclusion (such as apartheid) and internal exclusion, which is the "pretence of inclusion" whereby the previously excluded "remain on the margins of deliberation, silenced or ignored" [48] (p. 32). Drawing on this, they argue that "educational exclusion—both external and internal—serves as a barrier to genuine political inclusion and participation, as well as to self-development" [48] (p. 47). From this, we see social justice concepts being applied and built upon locally, making explicit issues of power, domination, and exclusion as well as calls for decolonising education as a core social justice concern and making explicit epistemic injustices [47,50,51].

Drawing on the notion of epistemic injustices, Hodgkinson-Williams and Trotter [47] build upon Fraser's [32] global justice framework (which does not explicitly mention epistemic injustices) to develop a social justice framework for understanding Open Education in the Global South. Fraser [32] highlights three levels of justice: redistributive justice, recognitive justice, and representational justice. The opposite end of redistribution is maldistribution, whereby people are inhibited from participating equally due to economic and class structures, for example, inequalities in infrastructure, education, and health care [32]. The opposite end of recognition is misrecognition, whereby hierarchies of status deny people equal respect and opportunity, for example, based on race, gender, sexuality, religion, or nationality [32]. The opposite end of representation is misrepresentation and misframing, whereby frames prevent the marginalised from challenging the forces that oppress them [32]. Fraser [32] outlines misframing as the defining form of injustice in the age of globalisation, whereby international corporations and transnational organisations are shielded from democratic control.

In all of these dimensions, Fraser [32] differentiates between *affirmative responses*, which push the boundaries of the frames but essentially accept them, and *transformational responses*, which question the frame-setting itself. Hodgkinson-Williams and Trotter [47] expand on each with ameliorative and transformative responses. At the level of *redistribution*, they place a strong emphasis on addressing the root causes of *maldistribution* with a call to *restructure* economic models. At the level of *recognition*, they explicitly mention epistemic injustices through what they term *re-acculturation*: "which would respect alternative epistemic positions and acknowledge alternative authorities on what is considered to be worthwhile knowledge and dispositions" [47] (p. 207). Additionally, drawing on Luckett and Shay [50]

whose work, in turn, has been influenced by the student protests for decolonised education, Hodgkinson-Williams and Trotter [47] use Luckett and Shay's [50] (p. 12) concept of *reframing*, beyond *representation*, to highlight the need to "democratis[e] the process of frame-setting itself". Although all three dimensions are interrelated and reinforcing, they are not reducible to each other and thus stand as their own dimensions [32].

3.4. Decoloniality

Decolonial discourses have evolved from Global South scholars and/or traditions and aim to dismantle global power imbalances, including injustices regarding whose and what knowledges count [52–56]. Decolonial theories were born in contestation with the universalisation of the Euro-centric frameworks of human values. For example, whilst Wronka [57], in alignment with the United Nation's [58] articulation of social justice, argues that *human rights is the bedrock of social justice* principles, decolonial discourses *seek to decolonise such human rights* frameworks [59–61].

This section explores the origins of decoloniality and decolonial-like movements, decolonising education, and decolonising technology. Further, it provides critical perspectives on decolonial concepts. While African and Latin American decolonial works are outlined, other notable works in counter-hegemonic and decolonial thinking include Connell's [52] Southern Theory, Santos' [55] Epistemologies of the South, and many others that are often not captured in the written literature.

3.4.1. Overview of Decolonial Thought

Decolonial discourses arose out of various "ex-colonised epistemic sites" such as Latin America, the Caribbean, Asia, the Middle East, and Africa [54] (p. 489). While often under differing names and banners, they highlight one central theme: colonialism is not simply an event in history that has passed. Rather, it is part of a broader and long-lasting project. In this broader understanding, decoloniality speaks from sites that have experienced "the slave trade, imperialism, colonialism, apartheid, neo-colonialism, underdevelopment, and neo-liberalism including Washington Consensus and structural adjustment programs" from the sixteenth century to date [54]. Decolonial movements argue that despite political emancipation in the late 20th century, "domains of culture, the psyche, mind, language, aesthetics, religion, and many others have remained colonized" [54] (p. 485).

In Africa, and within the African diaspora, decolonial-like movements have existed separately under various banners such as "Ethiopianism, Garveyism, Negritude, Pan-Africanism, African Socialism, African Humanism, Black Consciousness Movement, and African Renaissance" [54] (p. 488). Nkrumah [62,63] is known for coining the term "neo-colonialism" in his book "Neo-colonialism: The Last Stage of Imperialism". While scholars such as Rodney [64] and Amin [65] focused on underdevelopment and dependency, i.e., the economic strand of coloniality which had been the main focus after political freedom, scholars like Thiong'o [56] focused on the psychological, epistemological, cultural, and linguistic manifestations of coloniality [54].

Although the early African scholarship has been largely disparate, Latin American decolonial scholars such as Quijano [66], Mignolo [67], Maldonado-Torres [7], and Grosfoguel [53] have been highly influential in formalising decoloniality as a school of thought. In particular, the term coloniality was coined by Quijano, and further developed by Mignolo and Maldonado-Torres as defined in Section 2.1.

Since decoloniality refers to the *process* of the removal of colonial legacies rather than the historical *period* in which colonial rule collapsed, colonialism cannot be decoupled from "the broader wave of Euro-North American-centric modernity that radically transformed human history" [54]. The three main concepts in decoloniality are the *coloniality of power*, *coloniality of knowledge*, and *coloniality of being*.

Coloniality of power refers to "global hierarchies" of "sexual, political, epistemic, economic, spiritual, linguistic and racial forms of domination and exploitation" [53] (p. 217). These hierarchies are intersectional and entangled, in particular, "the racial/ethnic" and

"Euro-American/non-Euro-American" divides which "transversally reconfigure" all power relations (ibid.). Mignolo [67] (p. 155) refers to this as the "colonial matrix of power".

Coloniality of knowledge focuses on epistemic hegemony, particularly "the politics of knowledge generation, as well as questions of who generates which knowledge and for what purpose" [54] (p. 490). It assists in understanding "how endogenous and indigenous knowledges have been pushed to the barbarian margins of society" (ibid.).

Coloniality of being emphasises "the effects of coloniality in lived experience and not only in the mind" [7] (p. 242). It refers to the ontological dimension of coloniality "expressed partly in Western civilization by the West's philosophical discourse's monopoly on the meaning of Being, or to be more precise on its exclusive possession, control, and exercise of the philosophy on existence" [68] (p. 7).

Thus far, I have expanded on the (de)coloniality definitions adopted in this article; however, it is important to understand this alongside other decolonial-like schools of thought not adopted here. The first is anticolonialism. Ndlovu-Gatsheni [54] (p. 488) outlines that anticolonialism became "largely an elite-driven project" where the black elite sought to take the place of white colonial powers under the guise of nationalism or Africanisation. Decoloniality involves challenging racial hierarchies and asymmetrical power relations, whereas anticolonialism seems to only address the former. Grosfoguel [53] (p. 212) highlights that decoloniality "is not an essentialist, fundamentalist, anti-European critique. It is a perspective that is critical of both Eurocentric and Third World fundamentalisms, colonialism and nationalism. What all fundamentalisms share (including the Eurocentric one) is the premise that there is only one sole epistemic tradition from which to achieve Truth and Universality".

The second distinction is between decoloniality and postcolonialism. These theories share similarities but diverge in key points. Both critique the colonial experience beyond a political and economic lens, dealing with themes of culture, identity, and modernity. The first difference is that postcolonialists begin their critique in the nineteenth century, whereas decolonialists mark the unfolding of modernity/coloniality in the sixteenth century when the domination and exploitation of non-Western people began and transformed over time [53]. The second difference is that postcolonialists tend to focus on metanarratives, whereas decolonialists focus on the "questions of power, epistemology, and ontology" as the fundamental questions [54] (p. 491). The third difference is that decoloniality claims to trace its foundations to thinkers from the "underside of modernity", i.e., coloniality [69], whereas postcolonial scholars draw on poststructuralist and postmodernists, i.e., Western scholars (albeit those that are self-critical of the West) [54] (p. 491). This third point can be contested. Many decolonial scholars have also in fact drawn on Western scholars, and it would be difficult to envision that these Western scholars have never influenced their work, even if to highlight contradictions. Furthermore, to not engage with crucial and relevant work from the West, such as the Critical Theory from the Frankfurt school, merely because of its social location, can be counter-intuitive to countering hegemony. Mbembe [70] warns against self-ghettoization, whereby only those who are native to a place are permitted to produce knowledge. Linking with embodiment, decolonial scholars such as Grosfoguel [53] (p. 213) make explicit the "bodypolitics of knowledge", whereby one speaks from "a particular location in power structures". He highlights "the locus of enunciation, that is, geo-political and body-political location of the subject that speaks", is in juxtaposition to the "Western myth" or "the disembodied and unlocated neutrality and objectivity of the ego-politics of knowledge" (ibid.). Further, Grosfoguel [53] highlights that being socially situated on the oppressed side does not automatically result in thinking from a marginalised epistemic perspective as the modern/colonial world-system strives to get individuals in the oppressed side "to think epistemically like the ones on the dominant positions".

One shortfall in Grosfoguel's [53] hierarchies is that it often poses dualities; one is either from one epistemic location or another. However, colonialism has left a legacy of confused and intersecting identities and cultures. It is useful to draw on the postcolonial scholar, Bhabha [13], who argues that the colonised subject is neither self nor other, but

rather a hybridised identity of otherness of the self. He emphasises that cultures continuously evolve and are not fixed to one period. The notion of fixity in culture is a result of stereotyping by colonialists. Hybridity happens at the level of race, language, literature, culture, and religion and occurs in various intensities and forms. Fanon (1961) [71] similarly highlights that precolonial practises have been lost or warped, and that identities today are a combination of our experiences. He asserts that new present-day identities be formed for the current hybridised being. Singh [72] argues that hybridity lies on a spectrum of influence; while some are actively pursuing the culture of the colonisers, others unknowingly adopt it. A critical consciousness is needed to become aware of the colonisation of the mind and ingrained colonial logic. As present-day identities are hybridised, this brings in new questions of what a decolonised education looks like.

3.4.2. Decolonising Education

A key feature of decolonising education is liberating the mind; conscientising the marginalised that the Renaissance Man—the enlightened, refined, civilised, cultured man—is not the ideal and universal archetype that they have been taught to believe [73]. Through this process, the attitudes of the colonised changes to wanting to reclaim their identities and lost humanities. For Fanon [71] (p. 159), a liberating education involves "opening their minds, awakening them, and allowing the birth of their intelligence...in the end everything depends on the education of the masses, on the raising of the level of thought". However, what constitutes a decolonial education remains under debate. This subsection discusses these debates, drawing on the works of foundational decolonial thinkers and contemporary critical thinkers as well as the decolonial movements in South African universities.

Between Local Relevance and Epistemic Diversity

A decolonial education problematises who decides what knowledge is, what is put into the curriculum, what is left out, and what is hidden [74,75]. There are, however, a variety of approaches in striving for a decolonial education. Jansen's [76] analysis is useful in understanding different approaches. The first approach argues for an absolute replacement of European knowledge by local and/or indigenous knowledges. This extreme stance allows for marginalised knowledges to be reclaimed but runs the risk of nativism and fundamentalism [77]. The second argues for the decentring of European knowledge and the recentring of local and indigenous knowledges. The caution with this is romanticising local and indigenous knowledges as infallible [78]. The last stance argues that knowledges are entangled and inseparable in a way that is not regional, but rather travelling across space, and evolving with time, such that knowledges are better engaged with thematically rather than regionally. The risk of this approach is that the knowledges of the dominant will feature more than marginalised knowledges. Scholars continue to examine considerations around these approaches.

Drawing on Fanon, Dei and Simmons [79] argue that marginalised students and their communities are disjointed from their education which is set by the dominant powers, in the dominant power's language, with the purpose of furthering the dominant's agenda. Thus, a decolonial education should be locally and culturally relevant. It should meaningfully connect with the students' daily lives and needs and address the "spiritual and emotional harm" that schooling can cause to the oppressed through the negation and "amputation" of parts of themselves [79] (pp. 9, 16). Furthermore, the assessments used need to provide students with "options and opportunities to display their brilliance, talents and educational excellence" [79] (p. 12).

As language is a repository of knowledge and culture, a decolonial education needs to recognise the voices, groups, methods, and epistemologies that have been excluded through language [56,80]. Thus, a decolonial education deals with social and epistemological recognition that lies at the intersection between knowledge, power, and identity [81]. Drawing on the work of Honneth [82], Lange [81] argues that recognition is important for self-confidence, self-respect, and self-esteem and defines the ethical society. Applying

the concept of recognition in practise, however, is complex. In relation to the student movements in South Africa, Lange [81] (p. 91) cautions against nativism whereby "the call for recognition operates simultaneously at the ontological and epistemological level and that the conflation between knowledge and identity tends to focus the discussion about curriculum on Africanisation". Lange argues more strongly that Africanisation is "episte-mologically and politically isolating". Furthermore, there is no unanimous understanding of what African is. Bearing in mind the thousands of languages and cultures, African knowledges should not be romanticised as being beyond critique [83].

Lange [81] (p. 95) argues instead for "a pedagogy and a curriculum of presence" that affirms "the students and their blackness, of their selves, their bodies, their identities and in particular their direct and indirect (intergenerational knowledge) experiences of the world". This approach decentres Euro-centric knowledge and makes room for engaging with a plurality of epistemic traditions and their entanglements, particularly those in the Global South. Through a focus on institutional culture and the learning environment, i.e., factors surrounding content and curriculum, emphasis is placed on revising the language of instruction, pedagogy, assessment, and the assumptions of student autonomy. Here, the factors that impact the ability of a student, such as historical inequality, home backgrounds, and socio-economic standards, are emphasised.

Regarding plurality, the difference between diversity and *epistemic diversity* is noted. Despite the existence of black lecturers and a growing black student population, the institutional culture has been inhospitable to black identities [81]. In the calls for decolonisation in South Africa, black students and academics highlighted that they had to assimilate into a culture that was alien to them [84]. In "transformation" processes over the last few years, cosmetic changes have been made in universities such as African print graduation gowns, a few more black academics in senior positions, and the renaming of sites to African heroes; however, the institutional structures, cultures, and administrative functioning has remained largely the same [81]. As Makgoba and Seepe [85] (p. 22) argue, diversity is not about multi-racialism but about a "reorganisation of power and privilege". This needs to embrace different ways of knowing and ways of being.

From Local Relevance to Global Excellence

Mamdani [86] (p. 16) argues that while local relevance is important for African universities to decolonise, they also need to strive for global excellence to counter and decentre dominant Western thought presented as universal: "The challenge in higher education, in Africa and else-where, is to be both responsive to the local and engaged with the global". He highlights that the problem with excellence is that the standards which indicate rigour have largely been formulated in the West. African universities may be in Africa, but have been and are shaped by the institutional form, intellectual content, and research method-ologies of the colonial and Enlightenment experience [54,56,86]. Mamdani [86] contends that the strength of a theory lies in its comparisons; Europe is the bastion of theory because, in their mission to conquer the world, they compared, categorised, classified, mapped, and ordered everything. However, they theorised everything from their 'superior' colonial perspective, with the West as the reference point. The West have created theories that the rest of the world now follows.

Thus, knowledge has become institutionalised by hegemonic powers. As Lange [81] (p. 93) highlights, "knowledge itself has a history and the history of disciplines and fields of study are shaped by power relations that are themselves born in historical contexts". Dei and Simmons [79] (p. 9) similarly discuss the need for "decolonisation at the level of discourse" that problematises the "Eurocentric prisms" through which discourses are framed, making it difficult to oppose inbuilt "hegemonic form, logic and implicit assumptions". A part of decolonising education is affirming and validating local experiences and epistemologies, such as oral traditions or religious lenses, where a plurality of voices, experiences, histories, and knowledges can be legitimised, claimed, and celebrated.

Drawing on Mamdani [86], local experiences should not only be validated in isolation, but interact with other epistemologies (including Western ones but more specifically South-

South relations that decentre the metropole) to make comparisons and build theory with the strength of multiple reference points for a more holistic overall picture. This is in line with Fanon [71] (p. 164), who expressed the need for South–South interactions: "What we want to hear about are the experiments carried out by the Argentinians or the Burmese in their efforts to overcome illiteracy or the dictatorial tendencies of their leaders". Mamdani [86] further asserts that in building theory, it is unavoidable to be subjective as we see the world through the lenses that we know and understand. Thus, aligning with critical pedagogy, one needs to be conscious of one's subjectivities and critically reflect on one's position. Emphasising knowledge exchange between different epistemologies serves to make explicit one's own subjectivities, thereby strengthening the global knowledge base.

The work of Hoadley and Galant [87] pushes the discussion on validation even further, highlighting the lack of dialogue on the evaluation of decolonial content. In recognising that knowledge has become institutionalised through a Western perspective, they further enquire how "intellectual validity of what passes as decolonised knowledge" is established, if it should be at all [75] (p. 9), [87]. While decolonialism is more of a process than an end goal, the multiple complex and conflicting interpretations of it lead to varied outcomes. Without an evaluative framework, it is hard to engage with the practise of carrying out decolonisation. This disjoint between high theory and practicalities remains a hotbed of debate [50].

Neoliberalism in Education

This section focuses on neoliberalism in education, from the institutionalisation of knowledge to the corporatisation of knowledge. African education systems today are a historical product of the remnants of precolonial traditions, and colonial, exploitative educational models, as well as a new imposition of neocolonial policy borrowing [88]. These neoliberal policies, for example, structural adjustment policies set by the World Bank and the International Monetary Fund, turned higher education in many developing countries into a private good and aligned its goals with industry needs rather than a pursuit of knowledge [86,89]. As outlined by Baatjes [90] (p. 1), higher education institutes in South Africa "cannot escape the onslaught of neoliberal militancy that claims to provide the revolutionary solutions to social problems in a country still heavily stained with the deeply rooted legacies of apartheid".

Thus, as important as discussions on historical injustices are, they should be analysed in conjunction with the neoliberal agenda of the commodification, capitalisation, and industrialisation of education models presently affecting the entire globe [88]. Auerbach et al. [91], in their experience of trying to set up a decolonial programme at a pan-African neoliberal university, reflected that "the logics of neoliberalism are just as potent a politicising force as any". Highlighting neoliberal forces, Mbembe [92] (p. 30) states the following: "Universities today are large systems of authoritative control, standardization, gradation, accountancy, classification, credits and penalties. We need to decolonize the systems of access and management insofar as they have turned higher education into a marketable product, rated, bought and sold by standard units, measured, counted and reduced to staple equivalence by impersonal, mechanical tests...".

Auerbach et al. [91] and Soudien [93] highlight that attempts by academics to decolonise their courses and faculties are often stifled when this comes into conflict with the institutions' neoliberal aims or their public image. Lange [81] argues that to gain institutional support, mobilising a critical mass of concerned academics is needed to "deauthorise" it from within.

Material Realities

Thus far, the discussion has mainly theorised decolonisation in terms of the coloniality of knowledge and power. A shortfall in decolonial discourses is little mention of their entanglements with material inequalities. However, the 2015 and 2016 Rhodes Must Fall decolonial student movements in South Africa highlighted that material injustices be dealt with as well as epistemic injustices. They brought to the fore the socio-economic struggles they face such as travel costs from the townships to university, cost of textbooks, and poor

living conditions [84,94,95]. Whilst the students' voices were from the university, their demands included broader societal aims such as the rights of workers and solidarity with trade unions [95].

However, discourses that have been taken up by institutions, conferences, and peer-reviewed journals tend to theorise students' calls for decolonisation as solely a call to address epistemic injustices in the curriculum, which is decoupled from the need to address socio-economic problems at the societal level. They (e.g., Jansen [76]) locate calls for decolonisation within the university space, and particularly in its curriculum. The multi-layered background of the student movements thus needs to be kept in mind to not exclude the voices of marginalised university students that do not always end up in peer-reviewed journals. Decolonial thinking seeks to go beyond merely addressing material and economic injustices to address the colonisation of the mind; however, many works on decolonisation seem to now largely focus on the epistemic injustices and overlook material injustices. Furthermore, epistemic injustices are focused on with the university as its locus (as the institutionalised place of knowledge production) without looking at the broader system. Within universities, there is a narrowed vision of decolonising at the level of curriculum, and in some cases, simply decolonising reading lists. This narrowing can exclude other sites of knowledge production, and in a way reifies the university as the only place of knowledge production. Figure 2 depicts a non-exhaustive attempt to illustrate the broader movement of decolonial thought and the different levels at which it is discussed.
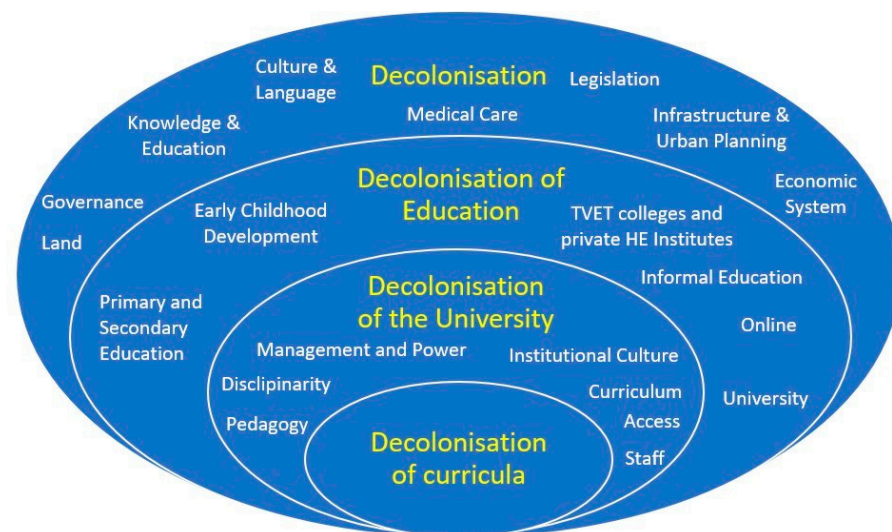
Figure 2. Levels of decolonisation.

3.4.3. Decolonising Technology and Development

Whilst vast amounts of the literature focus on who is left out by the digital divide, the big data divide, and the new AI divide, adverse incorporation into these 'global' systems receives far less attention. Here, adverse incorporation does not only refer to when inclusion actually amplifies economic, social, or political inequalities of the marginalised, but also refers to their epistemological marginalisation. Heidegger [5] warned of a time when calculative thinking might someday come to be the only form of thinking, and we can see this with the rise of technocracy. Technology is changing what we know, as well as how we come to know it [96], which leads to the amplification of epistemic injustices for knowledges that are not or cannot be digitised.

Technology is often considered synonymous with 'progress' and 'development', both of which became uncriticised goals set by the United Nations in the christening of 'the under-developed' world in 1949 [97]. Through idolising Western progress, the democratisation of access to technology has become an urgent necessity without questioning the essence of technology itself: "democratization without a corresponding ontological trans-

formation will just end up replicating and reifying the technological understanding of being" [98] (p. 67).

Decolonising technology aims to destabilise hegemonic, capitalistic, and neoliberal practises embedded in technology through subversively turning it into tools for resistance and liberation. Discourses problematising inequalities embedded in information technology include decolonial computing, critical software studies, and critical algorithm studies. Using critical race studies, feminist theory, and decolonial perspectives, such discourses push beyond simply isolating the problems to its use and content, to the discussions of who creates information technology, who it is designed for, and the "embeddedness of coloniality—that is, the persistent operation of colonial logics" [99] (p. 1). These critiques focus on who has power, who has agency, and whose agendas are promoted through analysing how information technology is developed, distributed, and capitalised [100].

Similarly, digital neocolonialism is defined as "the use of technology and the internet by hegemonic powers as a means of indirect control or influence over a marginalised group or country" [4] (p. 370). In digital neocolonialism, hegemonic powers need not be a nation state, as in colonialism, but could be a corporation or institution. Digital neocolonialism is a form of economic, social, or cultural hegemony exercised through the internet and technology [101]; it attempts to control a community, exploit it economically, and erase its identity [100]. Similar discourses include *cybercolonialism/cyber imperialism* centred around the dangers of forced dependence on information technology from digitally advanced countries [102], and *data colonialism* focusing on ethics in the collection and use of data [103]. *Technology colonialism* [104] and *techno-capitalism* [105] (p. 3) focus on "corporate power" and the "exploitation of technological creativity" in the contemporary knowledge economy. For example, the ubiquitous impact of *platform capitalism* via companies like Amazon, Google, Facebook, Ali Baba, Uber, and others have captured the market share and formed monopolies, using mergers and the acquisitions of smaller companies to feed their data needs and to eliminate competition. Such platform models have an insatiable need for more data and will go to lengths to obtain it, infringing on privacy or workers' rights [106]. Economic motives are often masked as charitable actions such as Facebook Free Basics which aimed to expand data acquisition into untapped areas [107].

The level at which technology should be used in decolonial futures varies widely between scholar-activists, ranging from seeking a re-envisioning of the uses of technology in our lives through radical reform to taking a more weary anti-technology, beyond-reform stance [5,108]. The increasing presence of (generative) AI across fields further raises concerns for the epistemic marginalisation of concepts, practises, beliefs, and traditions that are not online, and the solidification of hegemonic discourses.

4. Analytical Framework for Decolonising Educational Technology

This section draws on the aforementioned concepts to form the Dimensions of Human Injustice (DoHI) Analytical Framework for educators, researchers, practitioners, implementers, and policymakers to use to critically analyse EdTech and the field of EdTech. The DoHI Analytical Framework is rooted in the concepts of the desecularisation of knowledge, embodied cognition, and critical reflexivity, and ties together the strengths of social justice and decolonial concepts to build a more robust and holistic approach. While frameworks from social justice and decolonial discourses exist, the social justice frameworks do not emphasise the epistemic injustices dimension aptly, and likewise, the decolonial discourses do not emphasise the material injustices dimension aptly. The framework in Figure 3 highlights three intersecting and reinforcing dimensions: material, ontological and epistemic, and (geo)political injustices.
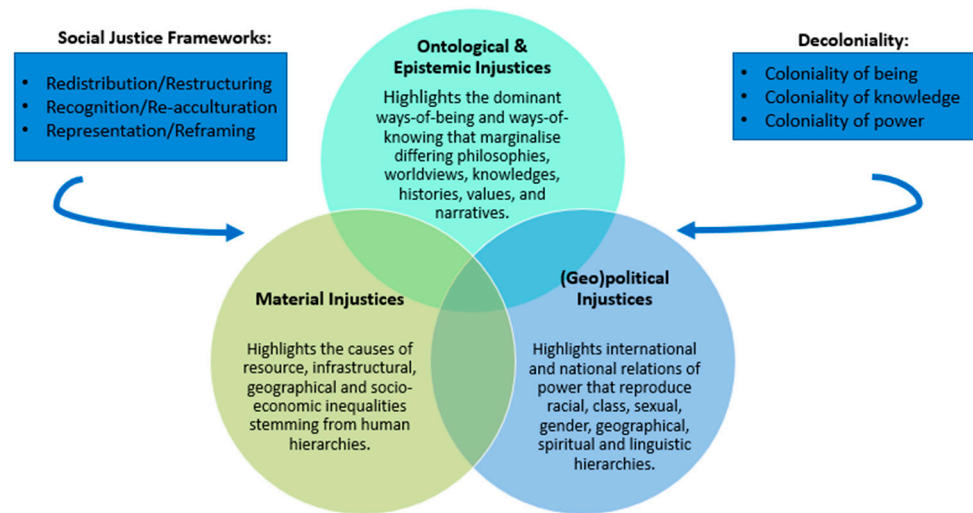
Figure 3. Dimensions of Human Injustice Analytical Framework.

The following sections describe each dimension, its links to the notions discussed in the conceptual framework, and its application to critiquing injustices in EdTech. These critiques are non-exhaustive and -illustrative as every EdTech is nuanced (e.g., a MOOC versus a personalised learning platform versus a national EdTech strategy) and should be analysed with its unique design, implementation, levels of human engagement, and context in mind. While designed to critically analyse the field of EdTech, the framework can be used to analyse inequalities in other fields such as health or social protection. This is due to the conceptual framework going back to the root causes of coloniality that impact all aspects of life.

4.1. Material Injustices in EdTech

Material injustices highlight the causes of resource, infrastructural, geographical, and socio-economic inequalities stemming from human hierarchies. This dimension primarily draws on Fraser's [32] and Hodgkinson-William and Trotter's [47] notions of redistribution and restructuring, and on the Rhodes Must Fall decolonial student movements highlighting the socio-economic struggles marginalised students face within and outside education institutions [84].

Material injustices in EdTech are often described as the digital divide. A study from South Africa looking at barriers in EdTech uptake breaks this down in terms of the ability to access, use and equitably benefit [109]. Access relates to adequate physical infrastructure, electricity, network coverage, connectivity speeds and data costs, among others. Effective use requires digital literacy, critical digital literacy, and opportunities to utilise as well as overcome socio-technological barriers such as the distrust or fear of technology, low technical support, maintenance (costs), and privacy concerns. For equitable benefit to all, personal and socio-economic factors need to be addressed, such as gender, age, employment, educational background, neighbourhood, and household income [110]. A UNICEF report highlights the impact of these material inequalities during the COVID-19 pandemic, where those from lower socio-economic backgrounds were further disadvantaged [1]. From an educational institution perspective, low-resource settings lack the funds and training to effectively implement and maintain EdTech. For example, this was the case in the implementation of open educational resources in the Global South where resource limitations stifled local adaptation [78]. Often, public or donor funds for essential educational services and infrastructure improvements get used to purchase EdTech that quickly becomes obsolete. Furthermore, the push for EdTech can lead to the privatisation of education, with private companies profiting from selling EdTech. This can be seen through the increase in venture capital investment from USD 500 million in 2014 to USD 20 billion in 2021 [111].

Addressing these material injustices requires ensuring that the most marginalised are not further disadvantaged by the proliferation of EdTech.

4.2. Ontological and Epistemic Injustices in EdTech

Ontological and epistemic injustices highlight the dominant ways of being and ways of knowing that marginalise differing philosophies, worldviews, knowledges, histories, values, and narratives. This dimension draws on Al-Attas' [22] desecularised understanding of knowledge, holistic ways of learning, broadened purpose of education, and description of justice as both inward and outward. It also draws on decolonial thought regarding the coloniality of being and the coloniality of knowing [54]. From social justice, re-acculturation is key to embracing a plurality of perspectives [32]. Furthermore, the concept of embodied cognition underpins this dimension [16], with critical reflexivity argued as key to addressing epistemic injustices [31].

Ontological and epistemic injustices in present-day education (highlighted in previous sections) can be further amplified in EdTech, particularly in EdTech platforms like MOOCs that claim to serve global, diverse populations at once [4]. EdTech often prioritises the intellect components of education (that can be automated) and reduces the heart and soul components (e.g., empathy, compassion, ethics, virtues, humility, spiritual growth, connection to a greater purpose, and service to humanity), thus offering a substandard education comprising merely of information exchange. By disregarding the spiritual and cultural dimensions of education, EdTech can propagate cultural assimilation and homogenisation into Western ways of being. This can lead to spiritual and emotional harm as well as cognitive dissonance when the education received is incongruent with one's worldview.

In EdTech models where a learner independently completes lessons, exercises, and assessments until a predetermined set of content and skills is mastered, the role of the teacher and peers can be minimal, as highlighted in a study by UNICEF reviewing 40 personalised learning platforms [112]. This reduces opportunities for human engagement and epistemic exchanges. While such EdTech is usually designed to augment in-person teaching, it is often used as more of a replacement, particularly in low-resource settings with limited or underqualified teachers. For example, in Malawi, low-cost tablets with personalised learning software to teach literacy and numeracy are changing the role of the teacher to be the supporter and facilitator of the EdTech (instead of the EdTech supporting the teacher) [113].

EdTech and GenAI have the potential to encourage critical thinking, rhizomatic learning, and Socratic engagement, but only if used intentionally for such a purpose. For example, Khanmigo guides the learner to discover the answer for themselves instead of providing the answer [114]. GenAI can also exacerbate epistemic inequalities due to its supposed value-neutral, factual, and objective responses built by Western-centric training data in colonial languages [2]. This further marginalises knowledges that are not online or are not in colonial languages to the extent that what is not online may no longer be counted as knowledge; similar to how written sources are now seen as more rigorous than oral sources. AI also lacks embodied cognition, limiting its ability to truly empathise, care, nurture, or use intuition, which are essential qualities of good educators. With human characteristics acknowledged as a crucial aspect of education, a further risk is the commodification of human connections, whereby automated parts of learning are free for the masses to access, and connection to human educators is commodified as the unbundling of education increases [115]. Addressing ontological and epistemic injustices requires examining whether EdTech strives to provide an education that produces good and just human beings, embracing pluralistic ways of being and ways of knowing, and recentres human connections in the embodied teaching and learning process.

4.3. Geopolitical Injustices in EdTech

(Geo)political injustices highlight international and national relations of power that reproduce racial, class, sexual, gender, geographical, spiritual, and linguistic hierarchies. This dimension draws from Freire's [30] foregrounding of the politics of knowledge, Pogge's [33] and Fraser's [32] emphasis on the need for global social justice, and on Mignolo's [67] colonial matrix of power.

Geopolitical injustices in EdTech occur when EdTech products, programmes, policies, and/or strategies are asserted from the Global North to the Global South, setting the agenda and promoting the priorities of international donors and corporations. Regarding techno-capitalism and digital neocolonialism, Big EdTech can monopolise by merging with or acquiring smaller EdTech companies that arise in the Global South, gaining access to previously unattainable data sets, stifling home-grown solutions, and reinforcing economic dependence. With international development, the adoption of national EdTech strategies and policies can be strongly suggested for development funds to be released. Often, international development EdTech programmes—focused on scale and cost-effectiveness—are implemented in the Global South, while they would not be accepted by parents, educators, or education departments in the Global North.

In terms of the innovation, funding, design, and development of EdTech, this occurs largely in the Global North (or Global North proxies in the Global South) and trickles down to the Global South. As these products are designed for their context, hidden contextual premises are baked into the design, making EdTech not only less effective in other contexts, but possibly detrimental when large sums of (public) funding are spent to purchase EdTech. Some assumptions include that the product will be used with good connectivity, augment quality classroom teaching, or that learners have the requisite digital literacy. Surface attempts to adapt and localise—such as changing names and skin colour—fail to address the Western-centric ways of being rooted in the design. This core-to-periphery transfer is problematised by the fact that "localised" is a term mostly used when talking about adapting from the Global North to a Global South country, and rarely the inverse. With the increasing technologisation of education in schools and education systems, opting out is often not a choice (especially if learning through EdTech is the only option available), leading to adverse incorporation. This is strongly linked with data colonialism, whereby learners' data are taken without clear consent or benefit to them. To address geopolitical injustices, funding and support are needed to develop and implement local EdTech solutions, local educational needs and goals need to be prioritised above international strategies, and marginalised groups need to shape both local and global agenda-setting.

5. Conclusions

With education being continually reduced to rationalistic, secular, and neocolonial logics, ubiquitous EdTech use in education may seem the logical next step for education systems. However, further scrutiny is required to determine whether the EdTech is supporting a holistic teaching and learning experience through the heart, intellect, and soul. All education, including learning through EdTech, should encompass and centre character development, encouraging learners to be good and just, and not merely developing instrumental skills. Human connections are key to achieving this holistic education, and even the latest EdTech advancements in GenAI lack the embodied cognition required to empathise, care for, and nurture learners.

Drawing on social justice discourses and decolonial discourses, the Dimensions of Human Injustice Analytical Framework developed can assist educators, researchers, practitioners, implementers, and policymakers to critically analyse EdTech products, services, programmes, interventions, strategies, and policies. Through critiquing the field of EdTech through the dimensions of material, ontological and epistemic, and (geo)political injustices, crucial issues surface These include inequitable benefit due to different socio-economic factors, the commodification of human connections, adverse incorporation into digitalised education, bias towards Western-centric knowledges and cultures available online, the

marginalisation (and even extinction) of knowledges that are not online or cannot be portrayed digitally, spiritual and emotional harm, and data colonialism. As EdTech continues to evolve, some of the injustices it creates or exacerbates may be reduced and others may be amplified. Of critical concern, though, is the promotion of a technological mindset in education such that education risks being confined to what can be understood and pursued through a technological way of being, thereby potentially limiting holistic educational approaches and losing sight of the intrinsic purpose of existence.

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Article

Decolonizing Technologies through Emergent Translanguaging Literature from the Margin: An English as a Foreign Language Writing Teacher's Poetic Autoethnography

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Abstract: Many scholars have portrayed technological advances as conducive to English language teaching and learning, without questioning their possible colonial assumptions about languages and literacies. Drawing on critical pedagogy and Global South epistemologies, I reconceptualize decolonization as a humanizing project in the contact zones between English and non-English languages. This poetic autoethnography, informed by my memories of my own experience as an English as a Foreign Language (EFL) learner in China, alongside a wide range of artifacts from a senior seminar course in an international college in a Thai private university, illustrates how educational technologies can be decolonized by producing (and publishing) emergent translanguaging literature that repositions teachers and students from marginalized backgrounds as co-creators of new knowledge about languages and literacies in the global context.

Keywords: decolonization; technology; writing education; poetic autoethnography; translanguaging

1. Introduction

This poetic autoethnography recounts, analyzes, and interprets my own experience, first as an English learner in China and then as an English writing teacher at a private university in Thailand. My goal is to explore ways in which technology-sustained colonization can be disrupted by frontline English as a Foreign Language (EFL) writing teachers together with their students in a Global South context. My central question is: How can technologies be decolonized in an EFL writing classroom? In the rest of this article, I will first discuss key concepts. I will then explain my process of producing a poetic autoethnography. Next, I will present my poetic autoethnography about a shared monolingual bondage and liberation through emergent translanguaging literature. Lastly, I will discuss the significance of my exploration and conclude a way forward in decolonizing technologies.

As a writing educator who actively sought to implement critical pedagogy and translanguaging in EFL writing classrooms, I formed communities of practice with my students by writing with them; engaging them in reading, discussion, and peer review; and encouraging them to experiment with their linguistic and cultural resources. I taught them by using a dialogical and process approach, expecting them to produce quality work at the end of the semester through multiple rounds of revision. After each week's teaching, I wrote fieldnotes to record memorable moments such as my confusions, decisions, and breakthroughs. The course in focus is senior seminar, which I first taught as a new instructor from August to December 2020. Due to COVID-19 pandemic restrictions, I could not travel to Thailand, so I taught the course online. The main educational technologies that I used were an institutional version of Microsoft Teams (Version 1.6.00.24078) (64-bit) (as required by my university), a free version of Zoom (version 5.14.8) (16213), and Google Docs. With my former students' written permissions, after they had all graduated, I accessed a wide range of class artifacts such as their online portfolios, recordings of some

class sessions, and chat records. These artifacts and the memory of my past language learning experience informed all but one poem used in this poetic autoethnography, through which I argue that emergent translanguaging literature from the margins can be used to decolonize educational technologies.

2. Poetic Autoethnography, Decolonization, and Translanguaging

A review of poetic autoethnography needs to first consider Poetic Inquiry and autoethnography separately. The last decade has witnessed a surge of poetic literature as an arts-based research method, often known as Poetic Inquiry [1–3]. Poetic inquirers seek to foreground human experience by knowing it intuitively, representing it artistically, and sharing it telegraphically [4]. They use poetry informed by data to challenge self-detached research and writing practices that follow natural science conventions [5]. Therefore, poetry as a research method helps to capture what typical academic prose tends to leave out: rhythm, sound, imagery, as well as the intense emotions and voices of the participants, especially those from marginal backgrounds [6].

In contrast, autoethnographic researchers often use the self as a vantage point to understand self–other relationships, particularly in a cultural sense [7,8]. "Autoethnography addresses the need and desire to make the human sciences more human by writing in ways that are more poignant, touching, vulnerable, and heartfelt" [9] (p. 8). Like Poetic Inquiry, autoethnographies often foreground the experiences, emotions, and perspectives of marginalized groups such as female sociologists in a male-dominated academia [8], indigenous scholars in a West-dominated discipline [10], and multilingual professionals in Teaching English to Speakers of Other Languages (TESOL) [11,12]. Therefore, an autoethnography is more than storytelling; it creates and critiques cultural meanings behind the narrated experiences [7].

Poetic autoethnography is a combination of Poetic Inquiry and autoethnography. Hanauer defined it as "the use of written poetry to explore the writer's own experiences" [13]. Poetic autoethnography allows the writer to transverse between poetry and prose, lived experience and artistic expressions, rigor and intuition [3], and most importantly, to challenge normalizing practices. As Hanauer argued:

> When done diligently, honestly, and professionally, the meanings which emerge [from a poetic autoethnography] present a picture of the process of contending with the ways in which powerful discourses impose their meanings, in the attempt to erase the contextualized individuality and positionality of each person. [14] (p. 38)

Poetic autoethnography is thus a powerful cultural tool for the marginalized. As I have argued elsewhere, poetic autoethnography joins two historically practiced epistemologies of the Global South—Poetic Inquiry and autoethnography—and thereby allows the marginalized to speak against the culturally dominant other with their own voices [15]. They do so through self-authoring in cultural fields [16] or contact zones [17], which are filled with imbalanced power relations. For this reason, poetic autoethnography can contribute much to decolonization, including that of technologies.

Whereas colonization has initiated, sustained, and expanded its sphere of influence globally, the decolonization of technologies provides a critical lens through which cultural meanings are both made and contested. I associate decolonization with Global South scholars, both those located in the geographic south [18,19] and those who embrace Global South epistemologies [6,20]. It systematically counters the historical processes and the effects of colonization on the colonized, with various ill effects on local economies, politics, and global relations. Ocheni and Nwanko concluded that Europe's colonization of Africa established "a dichotomy between the centre and the periphery nations" [21] (p. 53). Decolonization, in contrast, disrupts this center–periphery relationship in pursuit of better alternatives. It requires formerly oppressed groups and individuals to wrestle with the historically shaped hegemonies to "regain their humanity" and restore humanity in their oppressors; according to Freire, the act of oppression also deprives the oppressors their

humanity [18] (p. 44). The university, which sustains a Eurocentric system, is reimagined as a pluriversity to enable "knowledge production that is open to epistemic diversity" [22] (p. 19). During this counter process, formerly marginalized individuals and groups can begin to reimagine "I" as an epistemological [15] and dialogic agent [23] to both create and communicate new knowledge [24].

Another ally in this counter process is translanguaging scholarship. A translanguaging perspective emphasizes multilinguals' flexible and creative language use as informed by their whole communicative repertoires, which extends beyond identifiable languages or modalities [25,26]. Due to its political emphasis on language as a practice [27] and critical stance toward monolingual ideology, translanguaging is viewed by some scholars as a decolonization project [28]. This project requires teachers to engage with their learners' "experiences and practices" [29] (p. 179). Both poetic autoethnography and translanguaging can thus help to mobilize dormant resources for reimagination. I propose that we decolonize technologies by producing, and if possible, publishing emergent translanguaging literature through poetic autoethnography.

My proposal is based on the following considerations. First, to date, two main ways of decolonizing technologies have been proposed: top–down and ground–up [30]. The top–down approach requires engineers to embrace a philosophy of design that transcends colonial thinking. Das suggests that this approach is limited in that it can reach only a small group of engineers. In contrast, I believe this approach's greatest limitation lies in that it requires great reflexivity by the engineers. As for the number of people it can reach, I do not think the engineers themselves should be the main concern. Instead, we should consider to what extent existing structures, including technological structures and ideologies, allow decolonizing designs to emerge, propagate, and be utilized in language teaching.

The other option, a ground–up approach, is preferred by Das [30]. It requires engineers to collaborate with practitioners, hear their voices, and design technologies with their interests in mind. This seems a promising way to prevent colonial worldviews from sneaking into design. Nonetheless, I view it as an idealized scenario and a call that may remain unanswered. As an EFL writing teacher for over twenty years, I have never been approached by any engineer to seek my view on technologies, nor invited to comment on any existing technologies. Nonetheless, a ground–up approach should consider frontline writing teachers' experiences, preferences, and concerns. Furthermore, being an EFL writing teacher entails a heavy workload that would discourage people like myself from seeking or welcoming opportunities to work with engineers, even if anyone were interested in a collaboration. Moreover, there is a huge number of English learners worldwide. A real ground–up decolonizing design of technologies should not leave the needs and voices of the learners unconsidered. To reiterate, this is an impossible mission, for the moment at least.

My proposed approach systematically takes a "Zhongyong" path or middle road between the two extremes [31]. There is a top–down design in the sense that the writing teacher should embrace a decolonization mindset, which shapes material choice as well as ways of teaching. At the same time, the writing teacher should also work at the ground level, in the specific classroom, to facilitate the production of emergent translanguaging literature by using available technologies, thus disrupting the normalizing effects of colonial thinking and practices. In this way, collaboration occurs between the writing teacher and the students locally. Ripple effects of colonialism such as Eurocentric ways of thinking about the "mother tongue", "native speakers", and "academic writing" can be recognized, challenged, and expanded. Counter-discourses in the form of emergent translanguaging literature can begin to inform participants' subjectivities and classroom practice and produce their own counter effects on the cultural field within and beyond the classroom. My approach is also systematic. I believe that neither poetic autoethnography nor translanguaging should be approached in isolation. For me, they are a part of the systematic undoing and remaking that occur at the ground level in each English writing classroom. Whereas colonial epistemology naturalizes decontextualized and self-detached ways of

knowledge making and communication, decolonization will inevitably involve more contextualized and relational practices. Therefore, I approach my students' writing from a classroom writing ecology perspective, as proposed by Canagarajah [32]. More specifically, using slightly changed terminology, I view each piece of writing as a type of cultural product, which interacts with participants (teachers and peers), processes (how a text comes to be), and parameters (structural constraints such as institutional policy and curriculum) [15]. Furthermore, I view translanguaging as an integral part of my classroom writing ecology that shapes all participants' subjectivities and texts [3,15,33].

3. Context, Materials and Methods

This poetic autoethnography is part of a larger autoethnographic study approved by the human ethics committee of a Thai private university. I used classroom artifacts to "provide additional perspectives and contextual information" (Chang, 2008, p. 103) as I explore decolonization in my classroom. I taught the course in focus, senior seminar, completely online in 2020 due to COVID-19 restrictions. There were seven international students in the class, all bilingual or multilingual speakers. Their non-English languages include Korean, Chinese, Japanese, German, Pennsylvania Dutch, Karen (an ethnic language in Myanmar), Burmese, and Thai. However, as common in Asian international education, English has been the default language of instruction in the International College [34]. In fact, the International College advertises that all its programs "are fully taught entirely in English" (college website).

My students participated in creating new knowledge in three ways. First, they drafted and revised their literacy autobiographies, as informed by autoethnographic research, which I aided through guidance during the 15-week semester. Their research, together with class activities such as presentation and discussion yielded autoethnographic texts, which index their experiences and evolving subjectivities about self, language, and literacy.

Second, my students participated in creating new knowledge by writing for publication. As I wrote in my syllabus:

> You are getting ready for your senior projects and work, which call for different ways of positioning yourself in the world, no longer just as a knowledge consumer, but also a contributor and communicator of new knowledge. […] To best prepare you for these prospects, you are expected to explore your own experiences, emotions and dreams related to academia and work. At the end of the semester, each of you is to contribute a polished chapter to a self-published book in PDF, whose working title is: *Literacies, Cultures and Identities from International Students' Perspectives*. […] The draft of your chapter should be ready by the 9th week and you are encouraged to submit your draft to *MEXTESOL Journal* as a non-refereed article to benefit from the journal's free mentoring service.

Ultimately, the aim was for my undergraduate students to publish their literacy autobiographies. This goal extends beyond the colonial way of using participants only as data providers [32]. Through my teaching and research activities, I aimed to see my students grow as emergent scholars.

Third, my students participated in the creation of new knowledge by allowing me to use their artifacts to inform my poetic autoethnography. Their literacy autobiographies and other artifacts helped me to cross-verify my findings and speak, albeit indirectly and under pseudonyms, through some of the poems I crafted. More details are provided below about my research process.

Poetic autoethnographies, however, have their own pitfalls. First, the quality of poetry can pose a problem. As Faulkner [35] pointed out, poetry in Poetic Inquiry needs to be aesthetically appealing and demonstrate critical engagement with knowledge making. Second, autoethnography can also be misused. According to Chang (2008), these include too narrow a focus on the self, a lack of critical analysis and cultural rendering, an over-

reliance on personal memory, unethical research practices, and an unfit use of the term autoethnography.

To avoid these pitfalls, I composed my poetic autoethnography by following a similar process of moving from personal to social to reflective levels, which I adapted from Hanauer's [14] study. More specifically, the process includes the following phases:

Composing and revising poems based on memory. During this process, I used the self as a vantage point for autoethnographic research and Poetic Inquiry as an ongoing process of engaging with mundane details of my lived experience as an EFL writing teacher. Inspired by other multilingual writers [36–38], I experimented with translingual poetry, which draws on my heritage language, Chinese. For consistency, I used 50 words for each poem that I wrote.

Composing and revising translingual poems by using artifacts. Artifacts are important in autoethnographic research [7]. In my case, these artifacts include firstly my teaching documents, textbooks, writing samples, and fieldnotes, which do not require others to provide consent. Moreover, once I obtained informed consent from my former students, I accessed, downloaded, and analyzed their course-related artifacts such as writing samples, written questionnaires, class video recordings, chat records, semester reflections, etc. As I examined these artifacts, I composed and revised poems to embed their words, metaphors, and images so as to approximate my students' voices—a practice adopted by other poetic inquirers [3,15,33].

Drafting and crafting the poetic autoethnography. I treat writing as a process of inquiring into reality differently [39], whether in the form of poetry or prose or both. Thus, I constantly sought the best way to document, represent, and interpret my lived experience. To improve the quality of my writing, including poems, I read poetry books such as *A Life with Poetry* [40], watched poetry videos, and practiced poetry writing every day, sometimes in English, sometimes in Chinese, sometimes translingually. This process has helped me to sharpen my poetic intuition to craft the poems in this poetic autoethnography so that they can at least qualify as emergent translanguaging literature.

Contextualize and critique the poems through prose informed by artifacts and scholarly literature. Autoethnographies should provide not only reliable accounts of one's lived experience, but also cultural interpretations [7]. Therefore, in this poetic autoethnography, I used the abovementioned artifacts whenever possible to validate, contextualize, and explain the meanings of my selected poems. I then linked my discussion with critical theories, especially regarding decolonization and translanguaging, to produce cultural insights.

Seek feedback from others, particularly the student participants, and revise the poetic autoethnography accordingly. Once the draft was ready, I sent it to scholars and my student participants and revised my draft based on their feedback. I then submitted my revised poetic autoethnography to a journal and engaged in another round of revision. Throughout the process, my goal was to produce a truthful, evocative, and inspiring poetic autoethnography that illustrates clearly how producing emergent translanguaging literature can contribute to the decolonization of technologies.

As described above, I began intuitively in my creation of translingual poems. Gradually, I expanded my inquiry by delving into artifacts, contextualizing my poems, and collaborating with important readers. The result is the following poetic autoethnography, an example of emergent translanguaging literature, with my translingual poems for artistic expression and critical reflection, and prose for theoretical exploration and cultural interpretation.

4. Emergent Translanguaging Literature

4.1. Bonded by a Monologic Vision

Microphone and Speakers

Microphones and speakers

—Are simple but powerful technologies
That taught me to sing patriotic songs
To love China, our great motherland
The infallible Leader
And hate foreign "devils"
Even as I learned ABC
And as I wrote my diaries in English
I pursued my English-filled Chinese dream
By forgetting Chinese.

This poem was based on my memory of my formal education in China, both in the countryside and in the city. At first glance, this poem does not involve any translanguaging. A closer look, however, shows a double vision, and thus a case of covert translanguaging, hinted at but not spelled out. For example, I used to "sing patriotic songs" such as "我的中国心" (My Chinese Heart) because patriotism was an important part of my Chinese school education, promoted through singing contests held every year on National Day, 4 May (Youth Day), and 1 June (Children's Day). Similarly, writing and speaking contests were frequently held on the subject of patriotism.

I remember that while in high school in the countryside, I was once selected by my teacher to participate in such a speech contest. I struggled. It was my first time presenting a speech. Furthermore, the topic was simply impossible. What can I say about my love for my country? In a culture that does not encourage verbal expression of love, even between parents and children, I found it ironic that we had to express love so verbally, openly, and artistically as in singing through a microphone, "我爱你中国, 我爱你中国!" (I love you China, I love you China). Should I disregard my mixed feelings about its history of burning books, binding women's feet, and in the early 1950s, bonding my grandfather for execution under false accusation? I remember my then brother-in-law, a Tibetan doctor, who suggested to me (in a Southwestern Chinese dialect): "Just give a speech on your hometown. That's another way to show patriotism". I suppose the cultural logic was that if I do not love my hometown, how can I love my country? But I just could not bring myself to do it. I could not give a speech about loving my hometown either. I disliked its drinking, gambling, and gossip culture. To say the least, I was ambivalent toward its culture. On one hand, of the multiple local cultures, I sided most strongly with the dominant Tibetan culture. On the other hand, the stories of my mother and aunt running for their lives when "guzong" (the old term for Tibetan bandits) robbed houses, raped women, and burned the township always haunted me. To say that I loved my hometown over the microphone, however popular it might be, was too disingenuous. My first Chinese speech turned into a fiasco.

Amidst the dominant discourse of patriotism, I was speechless. My experience, emotions, and imaginations were incongruent with the words expected of me. Consequently, I spoke only two lines from a Chinese classic poem: "前不见古人, 后不见来者, 独怆然而泪下" (None before me, none after, alone, I shed my tears). I began to understand that speech making is not simply a matter of language (of course, growing up speaking the Southwestern Chinese dialect, I struggled to speak Mandarin properly, unable to distinguish even to this day the second and the third tones). It is also a matter of ideology. It concerns whether the dominant discourse allows the marginalized group to speak with their own voices.

Unfortunately, educational technology can be used not only to instill a blind patriotism, but also to demonize the cultural other. In a college in Southwest China, I had to learn Japanese as my second foreign language. I never put my heart into it. Not surprisingly, I hardly learned any Japanese. Upon reflection, I believe one reason was that I had been taught, both openly and implicitly, to hate the Japanese. Growing up in rural China in the 1980s, when television was just entering our community, I watched TV series featuring heroic Chinese soldiers, including the much-celebrated "xiaobin zhang ga" (little soldier Zhang Ga) fighting the Japanese. In history books, Japanese were referred to as *wo kou* or dwarf bandits. Once, a retired teacher taught us to sing, with accompanying movements

of using a broadsword to behead the Japanese, "大刀向鬼子们的头上砍去" (hack the head of the [foreign] devils with our broadswords). We sang the song for the National Day singing contest. I do not remember if we won any prizes. All I know, in hindsight, is that we were committing some "symbolic violence", a habitual way of not recognizing the cultural other as equally valuable humans [41]. In history, such misrecognition legitimized the ill-treatment of anyone foreign, as in the case of the Boxers, who murdered missionaries and their families in the 1900s. Reflecting on this part of my educational experience, I felt that the decolonization of technologies must be accompanied by a process of externalization. I must face the internalized truths about cultural others, regardless of the specific technologies used to promote such truths.

English, in contrast, gave me a life between local constraints and global affordances. This liminal space was filled with multiple discourses about the new foreigner, typically romanticizing the English-speaking "other". By the time I was born in 1977, a great void had been left by the ten-year Great Cultural Revolution (1967–1977). The great leader whose "thought wins at every battle", as was still written in big red characters on the wall of my elementary school, had died. The once-favored "Russian Elder Brother" fell out of favor for his mean ways of responding to China's famine. Dr. Kissinger visited China. The national policy of reform and opening (to the West) began to change the school curriculum, students' hair styles, and way of thinking. The decade-long-debunked College Entrance Exam system was restored. English was again taught at school.

Hardworking but taciturn as a student, I remember some of my teachers predicting that I would "不鸣则已, 一鸣惊人"—that is, I would eventually sing, after a long silence, like a quiet bird, to surprise all. In the meantime, I remained speechless, not able to say much in Mandarin Chinese. "Who cares", I comforted myself. "My dream is to leave these big mountains behind. I want to study abroad as my aunt in Hong Kong and my farming father once said". "If I cannot speak Mandarin well, I will study English well", I decided; "After all, Karl Marx learned English by forgetting his German, as the high school English textbook says. I too will forget Mandarin, my dialect Chinese, and my mother's ethnic Naxi language". My English teachers' words also impacted me: "You should study English as your major. Once you learn English, you can find a job easily". Little did I realize, through public education and mass media, I had already subscribed to a monolingual ideology. Misguided by this ideology, I classified people into three kinds. Those who spoke English were rich, open-minded, and knowledgeable—the civilized species. Next down the line were speakers of Mandarin Chinese, followed by those like me who spoke a dialect of Chinese. At the bottom of the ladder were people like my mother, ethnic minorities who spoke an unintelligible language not used in schools and who had never attended schools themselves. My life sat in between my rural upbringing with its biases and a hope for geographic and upward social mobility that only the language of the West could bring. My inner scale was measuring the worth of each language based on the social evaluations of these languages.

Facing the Devil in Me

I must confess I am not a master
Of English, or an owner.
How can I?
For over three decades now
I have given my every day and breath
To speak and live my dream
By learning it, teaching it,
Marrying it
And I thought I was better
For it.

In this poem, I did not yet mention technology. Nonetheless, technology lies in the background of all that I did with English-related learning, teaching, and living, nor does the poem exhibit any overt translanguaging. However, translanguaging is a matter of degree, and its specific configurations depend on individuals, conditions, and contexts [15,25,27]. First, I will deal with two foreign concepts—"master" and "owner"—before I discuss technology and translanguaging. This is made necessary because decolonization requires a close examination of Global North concepts that assume a universal currency [42].

The concept of "master" is foreign to me. It is true that I worked hard to learn English as early as middle school. As I wrote elsewhere [43], I committed English grammar rules and vocabulary, even extensive English passages, to memory. I majored in English. I read through an English dictionary. I spoke English every day with my roommates in college. I even read the English Bible, long before I became a Christian, "to really learn English well", following the advice of a stranger. I also passed advanced national and international English exams. Yet I could not "master" English. I soon realized that even though I was motivated to become like a native speaker of English, I could never be one. My face betrays me. My accent betrays me. Even the international English tests I passed could not change the fact. After I had passed the TOEFL exam (托福 in Chinese, which meant to me "托英语的福"—by the grace of English), I wrote an email to my Chinese Canadian teacher, Mr. Hew. He wrote back: "Congratulations! But remember, it's just an English proficiency test!" Indeed, as I would read in critical literature [44] and experience throughout my life, proficiency never delivers the status of a native speaker. One can only be born with such a status. Consequently, I wanted to master English but was instead mastered by it, so much so that I labored for it with all my efforts, even at the cost of distancing from my own heritage.

The other problematic word, "owner", is often referred to as "ownership" or "to own" by other scholars. Some scholars consider it possible for EFL learners to "own" the English language, "redefine the target language community, and develop unique forms of intercultural competence" [45] (p. 5). Somehow, I felt this conclusion was an ill-fitting suit for me. It was ridiculous to "own" a language in a Chinese context, where even all land is owned by the state. Individuals and families can only use it like a tenant. Thus, I often felt betrayed by the word "ownership", which simply means to me, "You can have it temporarily; it belongs to me [the state] only". If even owning a plot of land is impossible for an individual, how much less to own a language! After all, no constitution, national or international, is there to protect the ownership of a language. Consequently, I began to shift my relationship with the English language. Perhaps, instead of talking about ownership, I should consider myself but a living organism: a tree, a fish, or a human in need of air. Everyone knows the importance of air, but it is ridiculous to claim that we own the air, or that the air belongs to a nation-state, as a language is often mistakenly labeled, and its location demarcated on the map. Perhaps, the English language, with its humble origin as a regional dialect on the British Isles, cannot really be owned by any individual or state. It is only to be shared like the air we breathe to contribute to the human potential of "living creatively" [46]. By learning someone else's language, we may be less susceptible to living in the world of a uni-versity and more likely to experience pluri-versity [22].

Putting master and ownership aside, we can now examine pragmatically the three hidden characters behind my poem: technology, ideology, and translanguaging. I consider them at the same time because the use of each technology often foregrounds certain modalities and linguistic resources while putting others in the background, as supported and normalized by the ideology I held. My four decades of life have witnessed considerable technological advances and mixed experiences with English language use. I first started learning English in middle school in rural China. As with my peers, my main approach then was to recite, drill, and remember. Day after day, we copied white-chalked grammar rules from the blackboard. We read aloud the dialogues in the textbook. Occasionally, we would listen to some tapes. Regardless of the technology used, we were

positioned only to reproduce. We were praised for reciting passages from our textbooks and scolded for not being able to remember. The English we learned was good for taking exams but not for communication. Once my friends and I saw a foreigner in our remote countryside. We said, "Hi!". He turned around, evidently happy that in the deep mountains in Southwest China, someone greeted him, and started walking toward us. But we all ran away. "Hi!" was the only thing we could say, not to mention that deep in our hearts, a foreigner is like a devil, not to be approached.

While in college (1995–1999), I began to have access to more advanced technologies. Like my classmates, I used a short-wave radio to listen to news from the Voice of America (VOA) and British Broadcasting Company (BBC) every day. By using a Panasonic Walkman, given by a cousin of mine, I listened repeatedly to a tape of American conversations, great speeches in English, including my favorite, "I Have a Dream" by Martin Luther King Jr., and New Testament stories in English. As English majors, we also had listening comprehension classes in a listening lab with Japanese-made sound systems. Day and night, I immersed myself in English. Motivated by my dream of studying in the USA, I invested all that I had in learning English. Nothing else mattered to me. Learning English and becoming proficient in it, as evidenced by the tests that I passed and the fluency in speaking that I developed, transformed me. I was reconfigured, reinvented, and reimagined from a shy country boy into an outgoing, optimistic, and successful English learner. I felt superior to others who did not learn English well and far superior to those who could speak only a Chinese dialect or a minority language. A monolingual ideology or a myth about English as better than any other languages became my yardstick to measure my own and others' worth. It was transmitted, sustained, and naturalized through all the English-teaching and -learning technologies that I was exposed to, be they a textbook or a handheld short-wave radio.

A similar mindset was shared by my students, whose language and literacy journey echoed a monologic worldview through international education in Thailand. Take Jessica as an example. Based on her artifacts, I composed the following poem:

My True Mother Tongue

I am half Thai, half German, and half English.
International schools are my other mother
Who taught me English
And it immediately became my mother tongue.
I then began to respond to my Thai-and-German parents
Only in English, my favorite L1
Placing on the altar Thai—my true mother tongue.

However, we should not let individuals' ideology take all the blame. Individuals' ideologies, from a dialogical perspective [23], refract social perspectives, which in this case concern the ongoing promotion of English in the Thai society and educational system, especially through programs that use English as the medium of instruction [47]. This is especially telling in Jessica's case. Jessica's father is Thai, and her mother is German. Her parents spoke their respective languages to her at home. Nonetheless, as soon as she began to attend an international nursery, her language alignment changed: "English immediately became my favorite language, my mother tongue". The main reason, as Jessica explained in her literacy autobiography, was that she was always taught "in an international environment"—all through to college—that English, as the official language of instruction, systematically pushed Jessica's other languages to the background. For a long time, Jessica felt that her high proficiency in English gave her an advantage, without realizing that her lowered and non-native-like Thai was not helping her either. The technologies used by international schools, sophisticated or not, are coupled with a monolingual ideology that surrounds English with an aura of modernization, mobility, and internationalization [48]. Colonized by such an ideology, Jessica was, like me, becoming a willing investor in En-

glish while at the same time distancing herself from her other linguistic backgrounds. To decolonize technologies, in our case, inevitably causes us to face the devil within us: an internalized and romantic view of the English language and English-speaking other, and eventually the self as well, as reinforced by diverse English-favoring technologies.

4.2. Translanguaging to Freedom

In this section, I foreground the roles played by emergent translanguaging literature to set us free from limiting monolingual visions and engage in a process of decolonizing technologies. I will use both my education experience in China and my senior seminar class as examples.

A Marriage of Language(s) and Technologies

Technologies are
Invented tongues and voices
To extend human words.
They speak like my dad, a life-long erhu player
Who, pressing two strings and drawing a bow
Made music
Even when his voice was cut
By a surgeon's scalpel.
Erhu sings with a hybrid sound.
Technologies speak with firing tongues.

It is tempting to view technology as inherently good or evil, or to see technology in isolation. But in my teaching of English writing in Thailand, as in China, I found that technology and language use are always intertwined. Textbooks, PowerPoint slides, Microsoft Teams—each of the technologies I used always contained someone's words, voices, and perspectives, as expressed through language(s) and designs. What is written in the technology was written by people in positions of power: engineers, teachers, and cited scholars. They claim a status of truth, demand agreement, and may give feedback to the other side of the technology and inform our behaviors. Therefore, to me, technologies are extended human voices who "speak with firing tongues".

Similarly, translanguaging is not inherently just. In one simple case of mixing technologies with languages, I witnessed in my third year in college in China one of my most humiliating experiences as a language learner. It was in a traditional blackboard-and-chalk classroom even though the building name of "dian jiao lou"(Audiovisual Education Building) suggested something more technological. We were studying "Advanced English". My professor asked a student to read a paragraph in English and paraphrase it. Angered by my classmate's ungrammatical English and accent, my professor spewed out a chain of criticism:

"这种水平还能去教英语?" (Mandarin: How can you teach English with this level?)

么么! (Local dialect: exclamation of surprise)

You should go back and study your high school English textbooks again!

The classmate was one of the many who ran outside the classroom with tears. Although in his criticism, the professor was most definitely translanguaging, translanguaging could not redeem his hurtful words. Culturally speaking however, the professor could still be regarded as a good teacher, a "严师" who is strict and intolerant of students' mistakes. Arguably, native speakerism [49] was at the core of my English teacher's identity to justify his angry comments. It essentially assumes the superiority of the White native speakers found common in English language teaching [50–52].

My students in Thailand also succumbed to this myth of English. As Hayma, a Burmese student in my class, wrote in a reflection:

I once thought that English is white people language and they were born with the nature of knowing English. Until now, I still have the belief form [from] the Thai lens, that White people speak better English because their mother tongues have the same roots and their speaking muscles are easier to adapting and speaking in English than Asians, which are from a very different language roots. (6 October 2020)

Myths like this about English are residues of colonial thinking. Fortunately, by drafting their literacy autobiographies weekly, engaging in related research, and learning about translanguaging, my students began to expose and challenge the myths they had lived by. Nancy, my German student in her forties, for instance, began to adopt a translanguaging identity [32]. Drawing on the final draft of her literacy autobiography, I composed the following poem:

I Am a Student*in*

How frustrating it is
To have to call Angela Merkel
—our Bundeskanzlerin—
"A female counselor"
And not to have a single word "student*in*"
To describe myself
a female student
I hope that one day
I, a German woman
can show academic knowledge
without the strict corset
of the English Academia

In this poem, by using the word "student*in*" (which Nancy coined after the German way), I tried to recapture her point that academic writing in English is dominated by male language and a monologic vision. In its stead, she imagined new possibilities of diversity through a translingual lens. As she wrote:

There must be a way to look beyond sentence structures and grammar to acknowledge the original ideas behind the writing. I understand that all languages must follow specific rules to be readable and understood. However, these rules should not be the determining factor of evaluating a paper, an article or any other research in any academic field. The answer to these problems may lie in accepting translingual approaches. (Literacy autobiography)

Nancy's translanguaging expression "student*in*" thus manifests her embrace of "translingual approaches" and her agency "to preserve [her] German voice as well as female identity in English" academic writing. Like me, she also produced her own translanguaging literature through her literacy autobiography.

Emergent translanguaging literature, such as that produced by me and my students, allowed us to enter a "self-authoring" space [16]. The space was not monologic but dialogic. It involved crossing between our past experiences and the current literacy activity, between a lived world and an imagined possibility. It featured "border regions" critical to decolonial thinking and knowledge making [53] (p. 11), [54]. Within this space, we humanized both the self and the other through stories told, written, shared, commented on, and revised, from multiple cultural, linguistic, and epistemological perspectives. We engaged in translanguaging acts autobiographically, socially, and critically to index our ongoing identity work from our own marginalized positions. Such "serious translinguistic work", according to Pratt, "is an essential tool of decolonization because it becomes a source of the new social visions decolonization requires, visions that can and must come only out of the conflicting but intersecting histories that produced the colonial encounter" [42] (p. 121).

During this decolonization process, educational technologies were not used to reproduce or romanticize any colonial way of thinking and relating. Rather, they were used to mitigate the colonial influences in our own educated lives to widen the decolonial cracks [53].

Reflecting on my own and my students' literacy autobiographies, I composed the following poem to address epistemological injustices.

A 坐 (zuo) Approach

What if we—人 and 人—
Both 坐 (zuo) sit
You on this side, I, the other
Bonded by the cross and other technologies
As equals—
Not one of us lifted higher
Nor lowered by illusions of each other's languages—
Let our shared humanity and humility
Be the ground__
Leveled.

Through this translanguaging poem, I reimagine the relationship between Global South and Global North epistemologies from a dialogical perspective. More specifically, I propose a "坐" (zuo) approach. The character "坐", drawing on a Global South linguistic system of Chinese, speaks volumes about epistemological justice. Epistemologies, whether originating from the South or the North, are embodied by each of the "人" (ren) or person. They are to be equals; neither "人" dominates the other "人", thus removing or reducing the other's humanity and, indirectly, the humanity of the self as well. Furthermore, this character also visually represents both the endowed vision and inevitable limitation of each "人". This is illustrated by Bakhtin, as explained by Holquist [55], in simple terms of gazing at each other:

> If we return for a moment to the situation of two people facing each other, we remember that although they share an external space and time (they are physically simultaneous), inside his or her own head each sees something the other does not. [55] (p. 34)

Humans thus need dialogue, or "the simultaneous unity of differences in the event of utterance" [55] (p. 34), for a synergic vision, which Holquist interprets to mean "the surplus of seeing". I seek this possibility by combining what this "人" and that "人" uniquely present. That is one meaning of "+", which can serve as the mathematical symbol, "plus". It is like the six blind men who felt the elephant with their own hands. If they opt to accept their own blindness and the limitations of their own experiences, and if they opt not to take what they know to be the whole truth and combine each other's interpretations, they would be more likely to achieve a holistic understanding of what the elephant is really like.

However, I also advocate a moral aspect of "+" as a cross to invite the ethical use of technologies in language and literacy education. The Bible tells a story of Jesus being crucified, which the cross often stands for. I first listened to this story on my Walkman in 1998 when I was a junior in college, majoring in English. I was shocked to hear, "But they kept shouting, 'Crucify, crucify him!'" [56] (Luke 23:21). I was applying to join the Chinese Communist Party back then and, by the Party's decree, should have taken a strict atheistic stance. Nonetheless, I could not help thinking about the meanings of life and death. Marxist philosophy and Chinese communism left in me a void that Christian literature began to fill. The crucifixion story awakened in me a strong sense of human injustice. "Jesus did not do anything wrong. Why should he suffer like this?" I wondered. I also noticed a shared theme between my family history and Jesus's life. My grandfather was killed by the powerful other, who had the power to first label him as a class enemy and then legally remove his humanity and life. Similarly, the religious leaders of Jesus's time had the power to

label Jesus as a blasphemer and crucify him by using one of the cruelest and most humiliating human technologies. For a scholar growing up in an atheistic environment, the cross challenged my former worldviews, as well as my monologic valuing of English at the cost of my heritage languages. I began to question my all-out investment in learning English because the Bible says, "If I speak in the tongues of men or of angels, but do not have love, I am only a resounding gong or a clanging cymbal" [56] (1 Corinthians 13:1). I began to see people who speak less prestigious languages as equally valuable as those who speak dominant languages, for all will be "standing before the throne and before the Lamb" [56] (Revelation 7:9). My monologic worldview and language ideology began to give way to a more cosmopolitan vision; or more precisely, a heavenly vision of all humanity as a united family.

Additionally, the cross symbolizes forgiveness and redemption. On the cross, Jesus prayed, "Father, forgive them, for they do not know what they are doing" [56] (Luke 23: 34). That prayer greatly baffled me in my college years. I just could not, from my Chinese mind, imagine anyone so forgiving. Chinese tradition taught us, "君子报仇, 十年不晚" (A gentleman will avenge himself, even if it takes him ten years). Therefore, I think my father must have wrestled between revenge and forgiveness in much of his life. On the day his own father was executed due to false accusation, he and his twin brother had to perform songs on their erhu—praise songs for the violent other. Yet, he never expressed hatred in his life. In fact, he did not want me to hate either. By delaying his relating of this part of the family history until I was an adult, my father kept me from developing hatred and turning into a bitter person. In this way, he kindly avoided destroying my relationship with a friend whose father had played a part, perhaps unwittingly, in my grandfather's death. My acceptance of Christianity in 2000 and my father's conversion in 2008 both attest to our own journeys of salvation through faith. Our visions of self and the world were expanded beyond what a singular bounded cultural tradition could provide.

I believe this story of expanded visions is important for literacy educators to consider as we explore ways to decolonize technology. A technology, whether as sophisticated as ChatGPT or as crude as a cross, can be used either to induce or to reduce social injustice. It is a matter of whose vision, voice, and values are magnified through the chosen technology. In other words, to decolonize technologies is not simply to remove anything external that bears colonizing features or resemblance. To do so is to pay only lip service to a more radical mission of restoring humanity to the "人" on both sides of the cross. The colonizing ways typically oppress, exploit, and misrepresent the cultural and linguistic other as less than humans, turning them into slaves and forcefully removing them from their home(lands) [57,58]. The main strategy entails demonizing and objectifying the other. In research, it can be translated into positioning marginalized individuals and groups only as data providers and consumers of knowledge. The decolonizing ways, in contrast, are honoring, sharing, and collaborating [32]. The core strategy is dialogue and that which links the self and the other together as equally valuable and contributing partners. Although power differentiations will always exist, it is distributed to humanize both as agents for better alternatives.

5. Decolonizing Technologies through Emergent Translanguaging Literature from the Margins

A wide range of technologies were mentioned in this poetic autoethnography: from microphones to Google Docs. Although neither I nor my students helped to decolonize any of the technologies from the engineering end, we decolonized them through emergent translanguaging literature, i.e., our translingual poems, stories, and reflections. For instance, in my teaching of senior seminar, I decolonized technologies such as Microsoft Teams and Google Docs by using them to facilitate my students' writing and sharing of their literacy autobiographies. Such translingual writing [32] from a Global South context defies colonial relations. It documents how my students and I wrestled with, externalized, and challenged colonial views of the self and other, saturated with monolingual ideolo-

gies. Our emergent translanguaging literature disrupted the ongoing dominance of our mind by the English language and English-speaking other. Together, we began a process of shattering the shackle of monolingualism in our lives and turning to a translanguaging vision of ourselves. The in-house publication at the end of the semester signaled my students as co-contributors of new knowledge about language, literacy, and identity in a classroom setting. The refracted poems in this poetic autoethnography is another step to publish emergent translanguaging literature. One successful publication by one student in *MEXTESOL Journal* showcases multilingual students not as data providers but independent researchers and authors. Several students' submissions now under review will continue that process. Moreover, I hope to publish another book with my students' literacy autobiographies featured under their own names. To decolonize technologies, in essence, is to allow students of English language to develop a fuller capacity for life-enriching and self-empowering identities by producing and possibly publishing such emergent translanguaging literature. By producing such literature, we "the condemned" are turned into "the epistemological and political subject capable of forging such a [better] world" for all [59] (p. 18). Our emergent translanguaging literature illustrates how EFL writing teachers can turn an online EMI class into a translanguaging space [60] where we—both the teacher and the students—can "grapple with language ideologies that marginalize [us] and to voice [our] translingual sensibilities" [36] (p. 298). Through this emergent translanguaging literature, we are no longer voiceless; we have raised our collective voice under a translanguaging banner to reconsider multilinguals as knowledge makers.

A writing teacher can thus play an important role in decolonizing technologies by taming them with a translanguaging mindset. As I reflect on the senior seminar course, I feel relieved that I did not insist on a monolingual pedagogy as I used to when I first started teaching English in a Chinese university about two decades ago. I have changed. I no longer regard language and literacy education as a modernizing tool, devoid of sociopsychological involvement of the learner, as positioned by official dictum, nor did I treat the dominant language as a magic wand for personal upward social mobility. I have come to see English language and literacy education in its true nature: with both its colonizing baggage and a decolonizing prospect. By embracing a translanguaging perspective of languages as fluid, tempered by a dialogical deliberation, I have developed my own "坐" epistemological position toward the self and the other. I have also come to see my students, and their experiences, linguistic and knowledge traditions, not only as relevant, but as critical to my writing class. They serve as the powerhouse for innovative research and academic writing. I have thus responded to the call to embrace a political aspect of translanguaging by turning my own and my students' "rich and diverse and social experiences and practices" as new centers "to provide alternative points of reference, horizons, and perspective for knowledge production and at the same time to transform [our] subjectivities" [29] (p. 179). This is a ground-level as well as a ground-leveling project.

As Tyler wrote, in conclusion to her ethnographic study of bilingual science learning in the multilingual South Africa, "We need a vision of *decolonial learning*—where students draw on their full semiotic repertoires to confidently make their voices heard in the borderlands and lend these to shape future knowledge creation" [53] (p. 146, emphasis in original). Hopefully, emergent translanguaging literature from the margins, like that shared in this poetic autoethnography, may increasingly widen the "decolonial cracks" [53]. May it illustrate a zhongyong approach to decolonizing educational technologies. Lastly, may it contribute to the ongoing project of rethinking language [61], teaching [6], and knowledge making in the global context, but particularly from the Global South perspective [19].

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Article

Digital Education Colonized by Design: Curriculum Reimagined

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Abstract: This paper enlists Paulo Freire's work to explore the interplay between technology and pedagogy from a decolonial approach, thus stressing the importance of adopting a critical stance to the facilitation of digital education experiences. It starts by denouncing digital education as entrapped in digital capitalism, contending how curricular practices are likely to be subjugated to technological function. Through such a conceptual lens, digital curriculum design is explored from a perspective of learning solidarity, aiming to disrupt the instrumentalization of education and creating educational experiences that cater for a humanizing process of education. The paper aims to contribute with ideas towards a framework of critical digital education, deeming the interactive and creative side of technologies as well as the socio-affective dimension of education crucial to the decolonization of different ways of (curricular) knowing.

Keywords: digital education; educational technologies; decolonization; curriculum imagination; Paulo Freire

1. Introduction

The 2019 pandemic highlighted that education globally was ill-prepared to move its provision online. Hiding behind the excuse of 'emergency education' [1], digital educational experiences concentrated largely on access of 'expert' knowledge as the pedagogical solution and curriculum design of choice. This shows a lack of digital cultural knowledge [2], of how the digital world works. Additionally, it evidences an increased absence of curricular imagination when it comes to the diversification of digital practices for educational purposes. In this conceptual paper, we argue that this should not come as a surprise as formal education systems supported by digital technologies have become increasingly colonized by digital capitalism [3], something the pandemic has come to exacerbate on a global scale. This seems to encourage a far more functionalist approach of education to suit commercial interests than promoting a diversity of educational experiences as reflective of a critical understanding of digital technologies and digital cultures.

The purpose of this paper is to tackle these issues by placing critical theory at the service of curriculum (re)imagination. In doing so, we aim to relate the longstanding curriculum crisis debate (see [4]) to digital education, especially regarding how splitting the relational inquiry of 'what is taught' from 'how it is taught' [5] (p. 245) may influence how technology is understood in the context of education and curricular design.

We start by asserting that digital forms of education would benefit from further exploration—empirically and theoretically—to bridge the gap between curricular and technological designs, focusing less on technology-centric tendencies [6] and more on the complexities they unveil. We contend that to evade a functionalist trap [7] implies a curriculum re-imagination that privileges understandings of education as a dimension of (digital) social practices [8], with its own logic [9] while able to question the structures

that support or condition it. Curriculum imagination is therefore herein meant to conceive of curriculum design as transcending taken-for-granted ways of connecting technology with teaching and learning processes by privileging alternative ways of knowing that are conducive of contemporary digital practices. In this paper, curriculum imagination is explored with regard to how digital technologies have the potential to mediate experiences of learning as solidarity and anchored in practices of knowledge creation and participation as tangible acts of knowing. This points towards the experience of education as a relational enterprise with collective meaning and purpose [8] (p. 94).

In this vein, it is proposed that digital curriculum considerations center their concerns beyond the organization of content and the individualization of learning to explicitly recognize where, how, and with whom knowledge is experienced as key to a dialectics of teaching and learning. This implies a conception of curriculum as enabling the social creation of knowledge and enacting different forms of agentic capacity [10] as co-existing, co-interacting, and co-producing meaning. Such a perspective anticipates an intersubjective dynamic and a sense of social cohesion that is not always highlighted in the standard features of commercial educational technology. Crucial to this may be the fomenting of the idea of learning in solidarity. This has the potential to connect understandings of collective identity with interpersonal recognition [11]. Through such a conceptual lens, digital curriculum design is explored from socio-affective perspectives, aiming to disrupt the instrumentalization of education and fostering educational experiences that cater for a humanizing process of education [8] rather than its automation. This becomes an ever more pressing need in light of recent artificial intelligence developments that seem to be threatening conventional modes of education as well as learners' autonomy to foster their own understandings of the issues they are exploring.

The proposal of the decolonization of education technology featured in this paper thus relates to considerations of a digital pedagogy that is not only critical of the structures that bind it but also strives to be inclusive of different ways of (curricular) knowing.

2. A Contextual Overview of Digital Technology and Education

Understandings of the colonizing effects of digital education are linked to recent developments in digital technologies, drawing out entanglements between education, societal changes, and economic developments.

Digital technologies have seen rapid changes since the early 2000s with the developments of online tools and applications for personal and collective use, unveiling, in theory, a range of possibilities for education via user-centric designs [12]. These developments seemed akin to critical pedagogical ideas alongside social-constructivist approaches [13] in that the focus is on the development of individuals' inquisitive minds through deliberative practices assisted by dialogue and explicit acts of knowledge creation, thus emphasizing education as a socio-cultural practice [14]. These ideas are still prominent when rethinking pedagogy for a digital context [15] but seem to find less resonance in the features technologies adopted by educational institutions as evidenced, for example, in the default settings of Virtual Learning Environments (VLEs), a key technology used in education. This observation is not new, but points towards a contradiction that somehow has largely managed to go uncontested. It brings to the fore a disjuncture between technological development (what functions the technology offers), curricular design (how teaching and learning can be organized), and pedagogy (the philosophical approaches to teaching and learning), as if these were separate entities within digital forms of education. In this article, these separations are regarded as part of the colonizing effect the technology industry is having on the education sector, with the former imposing on the latter. This imposition is largely possible because educational technologies are increasingly commodified as a symbol of sophistication, wrapped into an ideology of 21st century skills and connoted as competitive advantage [16].

On the surface, the introduction of digital technologies in education may have been interpreted as a clear departure from traditional forms of distance education that were

often seen as relying on access to specialized knowledge, and therefore more individualistic and instrumentalist in nature. Despite this over-simplification of distance learning, the idea that digital technologies could renovate teaching and learning practices was linked to ideas of humanizing the education process via digital cultures, with a clear emphasis placed on the participative nature of digital technologies [17]. This approach has, for example, been demonstrated via the work of Albuquerque Costa who highlighted a key difference between learning *through* technology and learning *with* technology [18]. Learning with technology means to harness technology for the transformation of educational experiences, i.e., to create something new and/or additional to what is already available, while learning through technology casts technology as a mere conduit of enhancing what is already there, for example replacing a book with a pdf document or a classroom lecture with an online talk. This perspective on technology, supported by Costa's former website (Alburque Costa's website was founded in 2002 https://blogue.rbe.mec.pt/aprender-com-tecnologias-1467247 which ran until 2012 (please see archive here: https://arquivo.pt/wayback/20080312062257/http://www.fpce.ul.pt/pessoal/ulfpcost/c/) (accessed 28 August 2023). The website featured practical ways of linking "free-to-use" technology to educational practices, connecting it to curriculum thinking, i.e., how content and learning relationships are organized and 'animated', respectively, to support the creative process of knowledge construction) finds resonance with communities that seem to be more pedagogically inclined than technologically oriented [19]. The issue then appears to be less of a north–south divide and more of an education-technology dilemma and how it is mediated by curriculum design. This concern of technology domination over curriculum think has also been expressed, for instance, via the techno-philosophical developments conducted by Dias Figueiredo, who explored platform designs that catered for learning contexts [20]. Such an approach considered how epistemological and ontological questions influenced technological design. At the core of this inquiry was a question regarding the balance between content and context [21], i.e., established knowledge and knowing practices, respectively. These discussions aimed to conceive of digital technology use as an everyday practice with educational value, understanding knowledge production and meaning making as an organic, learner-led endeavor of reality building. These ideas have somehow assumed an 'indie' character, reflecting the domination of the platformization of education and the instrumental discourses that accompany it regarding learning personalization and innovation (see [22]). Testimony to this is that almost 20 years since these ideas were proposed, technologies developed for and endorsed by formal education remain generally restrictive of user action, largely limiting their spaces of creation while fulfilling institutions' administrative purposes. This presents a disjuncture between the use of digital technology within and outside formal education, thus creating a gap between education and the (digital) society it aims to serve. Most importantly, it can restrain the role of students as key actors in their own and others' learning processes, including encouragement towards their participatory responsibilities as crucial to active manifestations of intellectual engagements beyond performative acts.

The years following the inception of social media may have given educators who were keen to experiment with digital technology a certain sense of freedom and creative empowerment. Examples of this emerged through communities such as the Webheads in Action [23], who fostered curricular ideas as a community practice via a culture of experimentation [24]. This was possible given that concerns over datafication, privacy, and commercialization were not yet regarded as major issues [25]. Notwithstanding, such approaches have remained at the margins of educational developments, in part because of its do-it-yourself (DIY) approaches that lacked a sleek look or institutional support [26], and in part because of the technological and/or infrastructural limitations of approved technologies. This is in spite of counter-movements such as the Open Education Resources (OER) community or the Hybrid Pedagogy group that contribute to a wider curriculum reimagination, but which often find resistance in official educational settings. Fundamentally, such initiatives are conducted at an individual not institutional level, thus lacking structural support to ensure their legitimation and sustainability [27].

Digital technologies have always been entangled in such contradictions, caught between practices they may make obsolete and those they may enhance or transform [28]. In education, this is often likened to a lag between educational policy, curriculum renewal, and digital experience [29]. Most importantly, it is also seen as a reflection of economic, socio-political, and cultural conditions that tend to give technology a particular function. This phenomenon has grown more prominent the more technology has become an established presence in education and where its creative use can at times be 'enmeshed with the techno-imperialist discourses' [30] (p. 2103) of efficiency and productivity. What happened during the pandemic is a good example of this, given that technological availability [31] was at times placed above concerns of pedagogical agility [32], thus downplaying the role of curriculum design in transforming and/or diversifying educational experiences [33]. Technology companies' interest in the education sector seems—especially since COVID-19—to be more geared towards profit expansion [34] than pedagogical innovation. This increased influence of the technology market on education is worth questioning, particularly in relation to the risks it may present to the stifling of curricular imaginaries. From an intellectual perspective, this can also be regarded as a form of technological colonialism.

3. The (Re)colonization of Digital Education by the Educational Technology Market

The monopoly of the Educational Technology (Edtech) market has been referenced in the literature as intensifying a banking education model [35], both in the contexts of higher [36] as well as compulsory education [37]. In such cases, educational proposals that imagine the explicit application of values such as solidarity, learning responsibility, and creativity, i.e., acts of (knowledge) creation [38] key to a critical education approach as proposed by Paulo Freire, are likely to side-line education proposals of learning *with* technology [18] and elevate practices of teaching and learning *through* technology, as discussed above. This phenomenon can be understood as subjugating learners to becoming 'mere recipients of packaged knowledge' [38] (p. 33). Such perspective grants digital technology a key role in knowledge distribution, but in turn gives marginal importance to inter-communicative and participative forms of teaching and learning. This opposes a critical educational approach that aims to use content as a starting point for dialogue and opinion formation, opposing technological interpretations of education productivity and efficiency.

At the center of these issues is the commercialization of the digital sphere that sees in education a profitable market to be exploited via a neo-liberalized version of education. While questions of an ethical nature are raised by the growing influence of commercial technology in education—especially pertaining to concerns over data protection and privacy—these questions ironically play further into the hand of digital capitalism by presenting itself also as the remedy, or the digital pharmakon [39]. Such concerns further cast a shadow on DIY digital approaches and justify the re-situating and re-shaping of educational practices to fit with technical and safety features. The capitalization of educational technology thus presents considerable downfalls for digital education [40,41] in that it commodifies educational technologies as symbols of sophisticated solutions with minimum regard to pedagogical and curricular principles. Such perspective delivers on the imperatives of the platformization of education, which, prized for its surveillant, automated, and risk-controlled virtues [42], conveys a logic of consumer faced services as EdTech companies' trademark [43].

Given the globalizing effect of technology and the techno-scapes it creates [44], there is no denying that tech companies are a growing influence in the digital solutions procured by educational institutions. The issue is that these solutions can often be misinterpreted as state-of-the-art curriculum designs [2] without apparent input from pedagogical expertise. This trend has only increased during the pandemic, with, for example, web-conferencing tools adopted for lecturing purposes [1], focused on the functionality of synchronicity and neglecting key aspects of unstructured communication and sociability before, during, and after official class time. Institutions such as UNICEF [45] have also reported about

such phenomenon, denouncing misalignments between the quality of (taught) content and the quality of (learning) experience Such techno-curricular disconnection overlooks the key attribute that Freire [46] endows to technology: that of human creativity and expression as essential to the education process. In practice, this is a missed opportunity to bring technology and curriculum design practices together in a coherent way, evidencing a power imbalance between the EdTech market and the education community. It also reflects an archaic conception of curriculum as a contained activity (planned content) within a temporal container (timed period of study) [47]. This is especially so in the context of a so-called digital society. The creative reach of curriculum design runs the risk of limiting itself when over-influenced by technical questions [48]. From a critical perspective, however, this highlights the importance of reconceptualizing how technologies can support a wider range of intellectual inquiries [49], especially those that aim to promote a critical pedagogical approach.

This is not to say that digital technologies are the sole sources of educational problems, but rather that it is worth evaluating and resisting its capitalist effects [50] when exploring the pedagogical side of technologies and how they fit with the design of curricular proposals. Such an approach may find inspiration in addressing curriculum imagination in relation to digital cultures [51] and critical pedagogies, while also catering for the dearth of critical digital literacy as an embedded practice in education [52]. Additionally, beyond delivering the skill needs of a digital knowledge society, a critical reading of digital education may also empower those involved in such educational processes to question the digital conditions under which they teach and learn. This becomes ever more important when the capitalization of digital education finds legitimation in the rationalization of digital technologies as tools for educational efficiency and productivity. This is exemplified by developments in learning analytics, artificial intelligence, and algorithmic approaches that encode education experiences as data.

It is in this context that the EdTech market presents itself as a colonizing force within education, in that it creates the illusion that technology can be reified as both a means and an end to education, leaving little space for alternative educational experiences that highlight the human side of education. This is a question of curriculum design, i.e., how education activities can be organized to promote learning as an empowering and transformational experience. In this respect, this can be seen as a classic example of the (educational) lifeworld submitting itself to the system [53]; a form of technological imperialism that affects educators, but also influences learners' learning habitus [54], i.e., how each party interprets their role in the educational process and adjusts their practices to thrive in it. A byproduct of such reading (of digital education) is a dislocation of digital practices from their contexts of origin by, for example, isolating the education experience, not only as a 'safe' and individualistic digital activity but also as a more hierarchical one. This may lead to the interpretation that digital forms of education are meant to be isolated experiences, rendering practices of intersubjective learning and communicative action [55] unimportant.

Focusing on what the key educational principles of digital education are is what is at stake here. This is different from idealizing everyday digital practices as inherently inclusive, interactive, and sociable. As Han [56] argues, digital technologies can help the corrosion of civil society through the disappearance of the 'other', the absence of listening, and the emergence of individualized selves in digital crowds. Yet, the same technologies can be(come) incredibly empowering, creating instances of learning and voice for different communities [57]. The use of technology is associated with the interpretations and meanings we attribute to it, and education can have a role—and perhaps an obligation too—in shaping such meanings. Fulfilling such an objective is to resist the instrumentalization of education and the technological stance that supports it.

More concretely, education is well placed to (re)imagine—rather than repress—digital technologies for education, tapping into the potential they represent: experiences of collective thinking, dialogue, and creation of knowledge manifested via a dialectical digital experience of being and learning with others. It is through such processes that the socio-

affective element of education can emerge and grow. Han recognizes that digital technology is a 'medium of affect' [58] (p. 3), in that it can bring people together. The issue is that online affect can easily turn into affectation, evidencing the disaffected state of digital communication. This is a global phenomenon that alienates the 'we' [59] (p. 10) and elevates the 'I'. It is also a question of how digital users can feel empowered or disempowered through the digital literacies they have attained or not. Both these issues can be addressed through a decolonial lens, questioning the oppressive side of technological function and exploring the potential of curriculum in promoting ethical digital learning and citizenship.

The (re)colonization of digital education has become a global phenomenon, which by and large seems to be led by a for-profit market. Its focus on technological functionality tends to overlook the importance of 'curriculum relevance' [7] (p. 36) to a critical digital education project. It is therefore argued that in devising processes for the decolonization of educational technology, a bridge between a logic of digital education practices and curriculum imagination is needed. We propose the work of Paulo Freire as an important theoretical bridge to such a process. This focus goes beyond the types of knowledge that are imparted or valued—a classic concern of the decolonization of curriculum movements—to also discuss the ways in which educational technologies may homogenize ways of knowing. This is a form of hidden curriculum worth exploring from a critical perspective.

4. Decolonizing Digital Technology and Curriculum Imagination: An Interconnected Issue

Decolonization can be broadly understood as a call and an action to unveiling power dynamics that are likely to obstruct the course of social justice. In the context of education, decolonization works to diversify educational experiences, opening the webs of valued knowledge beyond Euro-centric perspectives. The point is to acknowledge a wider range of sources of knowledge creation as well as its processes. Decolonization as a form of knowledge justice is also related to acts of social and interpersonal recognition [59], invested in disturbing the monopoly of legitimate knowledge [60] as well as of its knowers. It is also an epistemological redistribution which Fraser [61] would contend to be key for 'participatory equality' in liberal societies.

This aspect of participation is important to consider both in terms of curriculum and technological designs as engendering learning relationships and creating spaces for the construction of knowledge and acknowledgment of different forms of knowing. This is key to a dialectical process of learning that renders visible an individual's and others' social experiences. Participation is equally a key trait of philosophies that deal with power issues. This is, for example, a key message that runs across Freire's pedagogical work. It is also one that other authors in the field of decolonization studies have addressed when tackling issues of knowledge production, including questions of subjectivity and heterogeneity of subaltern voices [62]; the struggles of anti-imperial, non-geographical south(s) [63] against epistemic injustices; or debates about the position of the knower not only as a receiver but also as a producer of knowledge, understood as a 'central human capability' [64], amongst others (see [65] for a comprehensive discussion). Whereas for decolonization, there is an underlining understanding that participation can act as a conduit for intellectual freedom, when planning for digital education, participation is often guided by perceptions of digital risks [66]. Such approach can be circumvented by regarding digital curriculum design through critical pedagogical principles that aim to dismantle the role of learning actors as mere knowledge receivers—what Freire calls 'docile listeners' [67]—to highlight their role as knowledge creators 'in dialogue' (p. 81). From a technological design, this means to democratize the power of participation and digital production via symmetrical user rights. From a curriculum design perspective, it means to contextualize and enable educational formats that inspire action-reflection, valuable instances of creative and discursive inputs as clear guides of critical education. Such approach would align educational practices with contemporary forms of digital use as well as with critical education premises of decolonizing not only knowledge but also ways of knowing (for Freire, education is not

only an act of knowledge (conhecimento) but also acknowledgement (reconhecimento) that reality is subjective and contingent to understanding the experiences of others. Knowledge is never static and as such, any content provided is regarded as key to reformulation) [67]. This places an emphasis on the actions of everyone involved in the educational process as 'working for knowledge' [68] (p. 10), casting education as a shared social responsibility that aims to develop out of solidarity and as an antidote to 'competition engendered by individualism' [37] (p. 35). This proposes a model of human socialization that is built on intersubjective relationships among active learners who, while bound by the goal of education, bring diverse views and experiences to it via their digital engagements. Highlighted here is the importance of participating in learning to 'experience the power and value of unity within diversity' [8] (p. 90). The role of technology is then one of humanizing education through a perspective of learning relationships, instead of aiming to instrumentalize it in the name of effectiveness, which is what proposals that focus on access to knowledge/content mainly produce, intentionally or not.

To do so would be to address curriculum as interlinking 'what is taught' and 'how it is taught' [5], with 'where it is taught' without falling into determinist tendencies of positioning technology at the service of, or against, the educational project [69]. It is this stance and not just the technology itself that requires examination. Digital technologies as enabling spaces for and of education would thus benefit from being understood as a cultural locus, with a distinctive logic of practice. The separation between what, how, and where knowledge is created leads to certain types of educational practices becoming pivotal irrespective of where they are situated. Decolonizing this approach (re)focuses the debate on the contexts of application and invites reflections on the relational nature of learning, with a particular emphasis on the role of the learner and the place they can occupy both in curriculum and technology designs.

5. The Logic of Digital Education: A Critical Perspective

From a critical perspective, education is a dimension of social practice [37] (p. 71) that aims to endow learners with intellectual freedom by focusing on processes of knowing that find significance in dialogic and dialectical relations. In this regard, education is perceived as a cultural action that seeks to develop the conscious mind, in opposition to its standardization. Such a goal of transformation finds in Freire's work an association with technology which he deems natural to both the creative process and the contemporary world, but which should not obstruct the development of learners' conscientização, whose main purpose is to encourage individuals to appraise both the conditions on which their education is based as well as its contents through a lens of social justice that encourages the humanization of the social world [70], not its instrumentalization.

The dialectical relationship of education with the world also finds resonance in the original purpose of participative technologies which aim to instill a culture of collective creativity [17] as a form of knowledge liberation. Although the democratic goal of digital participation may find challenges in infocratic approaches [71], creativity as an act of knowing and be(com)ing is an essential literacy in a mediated world. In this vein, we propose that digital education—especially of a critical kind and aimed at decolonizing the role attributed to and by technology—is best conceived of through concepts of dialogue, creativity, curiosity, and problematization as actions fostering learning and critical consciousness [70]. As mentioned above, this logic can at times be distorted by the marketization of digital technologies both within and outside the education field, placing more emphasis on individualization than on practices of (learning) intersubjectivity [72]. This is something that would be worth rescuing as a form of establishing a logic for digital education that is focused on cultivating learners' inner lives collectively. Such logic also aims to express an interest in the affective side of educational practices [73], i.e., how individuals are affected by not only what but also how they learn as a form of critical consciousness. This may imply that students are prompted to develop an awareness of what role educational technology can play in their experiences of learning and also what

purpose they attribute to it. Establishing the meaning students give to technology as part of their education will help identify what type of learning experience they aim to foster, one that is critical or more instrumental. Whereas neither is wrong, each approach helps deliver a different interpretation of what education is/can be with the support of technology.

When it comes to a proposal of critical digital education, education cannot be achieved by the mere action of obtaining new knowledge. Above all, education is foreseen as developing out of the interplay between reasoning and practice whilst also bringing into question the conditions under which one learns. These are learning actions that impact the self and other as engaged learning relationships [68] (pp. 19–22) with a collective purpose. This is proposed as the essence of a logic of critical digital education; one that relies on learning solidarity. In this regard, technological and curriculum designs would benefit from influencing each other to enable collective action where the *I* and the *we* can be learning partners, not opponents or competitors. From such logic, this would mean to make available technical features and curricular activities that blend dialogical instances with opportunities to foster curiosity and creativity, i.e., digital expressions of learning that evidence the autonomy of the student in constructing knowledge, and not in learning on their own. Whereas dialogical features are often available in educational platforms, these are not necessarily paired with others forms of knowledge creation that evidence contemporary digital practices that can be appropriated for educational purposes. From a decolonization perspective—and also in response to generative artificial intelligence that will further obfuscate the critical role of education—there are opportunities to revive learning experiences that encourage engaged selves. This is the hidden curriculum of emancipatory technology. A technology that empowers is one that allows for tangible knowledge contributions, and in turn, a curriculum that assists it is one that caters for learning processes that support the intellectual liberation of the student. From such a prism, curriculum and technology are entwined, casting education as an intersubjective action and pointing towards a conception of learning as relational [74]. What is being underlined is an understanding of digital technologies as empowering students, as digital actors, with the freedom and also responsibility of authorship, something that captures the essentiality of digital cultures. It also delivers on the imperative of critical education as a form of action-reflection. From this perspective, the alignment of critical curriculum principles with technological features becomes essential for the materialization of education as a student-owned practice.

Freire hoped that digital technologies could serve the purpose of intellectual liberation because of (1) their communicative features, seen as key to the problematization of education; and (2) as a form of teaching and learning that places emphasis on individuals' contributions, as an expression of learning commitment and the development of understandings regarding the self and other [74]. Such proposals for collective inner enrichment, however, may find resistance in online spaces where 'interiority of assembly' is missing [56]. This is not just a problem of a technical nature, of how the technology works. It is mostly an issue of how teaching and learning relationships are perceived, organized, and mediated when situated online. It is thus a question of curriculum design as well as the (digital) literacies it aims to foster.

By highlighting the importance of the theoretical understanding of digital education as centered on inter-relational, inter-subjective, and inter-affective experiences, the aspect of human relations and solidarity is brought to the fore of curricular discussions. To do so is to contest the instrumentalization of education and resist the bureaucratization of the mind [8] (p. 99), which tends to incarcerate the pedagogical self into imagined curricular constraints and/or technological designs. The risk being highlighted here is one of 'ideological separation between text and context' [8] (p. 47), with technology often used to simplify education rather than to problematize it. It is therefore not surprising that Freire expected education to 'announce what technology will be' [8] (p. 93) rather than letting technology dictate what education ought to be. Thus, in contestation to the

technisization of education, a logic of critical digital education is proposed as focused on harnessing technologies for digital engagement and creative action.

Meaningful digital engagement finds incentive in affective links [24]. The focus on affection is however not to be confused with emotive reactions that are typically associated with digital behaviors deprived of reasoned approaches. Affection is used in this paper to connote ideas of care and impact to one's and others' learning. Digital education combining creativity with affection aims to cater for 'the sensation of having a voice (opinion), proximity (presence) and forms of knowledges (learning)' [75] (p. 6), generating not only educational but also collective value for those involved. From this prism, digital education is conceived of through practices of reciprocity. Far less emphasis is placed on 'received' knowledge as a one-directional form of education. Rather, curriculum design following a critical digital education logic aims to cater for a relational approach [72]. Such approach inevitably demands of educational technologies features that are flexible and focused on creative inputs by their users as learners. From a decolonization viewpoint, this means to consider the digital education modus operandi via a curriculum of lived experience where individuals' agency is made an essential condition for the education process to occur. Such proposal centers active participation as a binding and explicit commitment to learning, aiming to bypass experiences of passiveness [68] or individualization [56] that digital technology may inspire, while encouraging learning as an exercise of co-responsibility and collective significance. This shifts the attention of the decolonial project from the explicit curriculum—what knowledge is taught—to a hidden curriculum of knowing, exploring different forms of savoir vivre vital to the socio-affective formation of individuals.

The emphasis would therefore be on forms of interpersonal recognition [59] and not on echo chamber effects [53]. Yet, it is here too where critical digital education meets its greatest technical and curricular challenges, and where its logic highlights a key difference with more standardized ways of 'doing' digital education. On the one hand, fostering a sense of belonging is key to critical digital education. This requires time and effort for collective consciousness to mature, something that contemporary study programs find hard to cater for given their set formats. On the other hand, achieving coherence when a range of perspectives co-exist asks from educators and learners shared intellectual investments as interlocutors working through ideas as part of (informed) opinion formation. Adaptation to such an education culture should not be taken for granted nor confused with agents being technically literate. A critical approach to learning is expected, with individuals benefiting from being inducted into the terms of the type of interactions that underpin such educational experiences. This demands of technological features and curricular practices a close attention to the spaces that are available for learner initiative and collective interactions. Curriculum design is key here in inspiring variation in pedagogical as well as technological developments rather than validating the instrumentalization of both. Essential to the logic of critical digital education is therefore the question of how curriculum and technology are (re)imagined as working inter-dependently.

6. Towards the Decolonization of Digital Education

The decolonization of digital education can be achieved by adopting a critical stance to both curricular and technological designs as inter-liked practices. The purpose of bringing Freirean conceptions of critical education to debates of educational technologies and digital education is to emphasize the importance of education as a humanizing process of learning with others.

In the context of education, the decolonization movement has placed many of its efforts in destabilizing normative understandings of knowledge, focusing on the type and sources of content that is taught and the learning that derives from it. Less emphasis has been placed on another key aspect of (the hidden) curriculum, that of learning interrelationships, processes of meaning making, and the sense of self-realization that can derive from one's educational experience. This is relevant for all forms of study, but of key importance for digital education experiences that can only be embodied symbolically [76] through

manifestations of presence, voice, and content production. This is the risk and benefit of digital education. The benefit of digital education is in making explicit the essentiality of experiences as a communicative act; the risk lies in such approaches being threatened by sedentarism. The risk can be addressed by placing intersubjective, communicative, and creation-based learning approaches at the heart of curriculum activities and technological settings as explicit and intermeshed design features.

Curriculum imagination focusing on engendering participation and creation thus becomes essential in "activating" learning experiences. In this sense, it is important to note that it is not just technology that may convey a more functionalist interpretation of education. Educators and learners are also likely to have their educational practices adjusted to a neo-liberalized education system, in that the transmission, acquisition, and validation of explicit knowledge may be considered more important than learning relationships. This is a challenge—if not the key challenge—for digital education.

The disconnect between education studies, design of technology, and curriculum imagination thus merits critical re-examination. Vital to such stance is an awareness of the nature of digital practices that find its pulse in digital cultures as a global phenomenon [77]. This can help overcome the temptation of a content-driven approach and what Paraskeva calls the 'functionalist trap' [7]. While technology is not neutral, its application can also not be said to be apolitical. The use of digital technologies in education has been a preoccupation of globalized economies invested in digital skilled workforces. While the pandemic has come to accelerate this need worldwide, the monopoly of digital technologies for education—with some exceptions—rapidly infiltrated education. However, it brought to the fore an ideology of learning efficiency, which, driven by a disaster capitalist approach [78], placed far more emphasis on knowledge as a product than on knowing practices as processes. This raises questions of a decolonial nature regarding the roles and actions attributed to the practices of teaching and learning through the mainstream technological features on offer, and which role digital education aims to serve when framed in such a way.

Yet, much like Freire, we reject the fatalistic idea that the effects of globalization and neo-liberalization of digital education cannot be undone [8] (p. 43). Rather, we provide a counter-proposal that realizes the influence of EdTech companies on education as the first step towards informed change. Critical understanding of digital education can offer an opportunity to re-think curricula in relation to inter-communicative features and affective and collective experiences that digital technologies can mediate. To do so is to deconstruct educational technologies and their restrictive designs as a re-colonizing influence on curricular thinking.

Finally, the value of digital education lies in fostering 'meetings of the minds', making education an intersubjective and meaningful experience beyond the acquisition of expert knowledge. In other words, digital education is perhaps best understood as affecting the learning process rather than providing effective education. A form of digital critical education is possible, but the decolonization of technological design in conjunction with curricular thinking may need to precede it. Diverse educational practices will then follow suit, enacting a much needed critical ontological and epistemological stance for digital education.

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Article

Improving Massive Open Online Courses to Reduce the Inequalities Created by Colonialism

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Abstract: Many nations that were once colonized continue to suffer from the economic effects of the colonial period. People in countries with high levels of poverty may benefit from taking massive open online courses (MOOCs) because these courses are broadcast for free or for considerably less than the cost of enrolling in traditional classes. However, these courses have been criticized for maintaining the inequalities created by colonialism. This study focuses on exploring whether MOOCs create inequalities toward people living in the Global South. It addresses how language, access to technology, and economic insecurity may make these courses less beneficial for people from low-income families than for those from more privileged backgrounds. It begins with a discussion of how colonialism impacted many nations in the world. Although many nations became free of colonial rule, colonialism led to economic instability, much of which persists to the present day. The findings indicate that MOOCs contribute to inequalities in several ways. One of these ways is by not providing enough support to help people from low-income families complete these courses. Another relates to the cost associated with having a strong internet connection and the other resources needed to submit work on time. The findings offer ideas on improving MOOCs. These ideas include offering MOOCs in the native languages of people living in the Global South and avoiding offering these courses according to the xMOOC model.

Keywords: colonialism; massive open online courses; educational inequalities

1. Introduction

Although the colonial era is over, many nations that were once colonized continue to suffer from the economic effects of this period. To deal with these effects, students from low-income families living in these nations may take massive open online courses (MOOCs). Such courses may benefit people in countries with high levels of poverty because they are broadcast for free or for considerably less than the cost of enrolling in traditional classes [1]. But critics argue that rather than benefiting people suffering from the effects of colonial rule, the offering of MOOCs maintains the inequalities created by colonialism [2].

Colonialism was practiced by ancient empires. Civilizations such as ancient Greece and ancient Rome conquered new areas over three thousand years ago. The colonies they created provided them with more power. This power was achieved by exploiting the people who were conquered [3].

Modern colonialism began in the 15th century. During this period, Portuguese explorers conquered a town outside of Europe. Other European nations, like England and France, began to conquer parts of the New World. When most countries in the New World gained independence, European nations focused on areas in Africa. Attracted to these areas for their natural resources, European nations established colonies they would control until a period of decolonization, which started around 1914 [3].

Although many nations became free of colonial rule, colonialism led to economic instability, much of which persists to the present day. In Africa, colonial rule was based on a system designed so that the colonizer could take the wealth away from the colony [4]. European rule also led to new borders based on colonial conquests. These borders led to

instability because they caused divergent groups to live together under one colonial power. This unnatural way of dividing people harmed sub-Saharan Africa, leading to geopolitical crises that have lasted into the 21st century [5]. These crises have contributed to poverty, repression, and ethnic civil wars that have prevented nations in this region from thriving.

Africa is not the only area where people still feel the effects of colonialism. Across the Americas, colonialist practices have contributed to the poverty that members of Indigenous communities continue to experience [6]. In recent years, Indigenous people across North and South America protested against the social inequalities that still exist and the horrifying treatment perpetuated on their communities during colonial rule. In Chile, protesters tore down statues of Spanish conquistadores, and in Columbia, similar protests occurred. In Cali, Colombia, protesters toppled a statue of Sebastián de Belalcázar, a Spanish conquistador and the founder of the city [6].

Any aid that would alleviate the disparities in education and living standards caused by the effects of colonialism would be beneficial for people living in these areas [7]. This study focuses on whether the offering of MOOCs has provided underprivileged people in the Global South with more chances to reduce the effects of Western dominance. It also offers ideas on how MOOCs can be improved to alleviate the inequalities people in the Global South experience.

Characteristics, Origins, and Types of MOOCs

In addition to being free or nearly free, MOOCs attract more students than traditional classes. These courses are also open to anyone who wants to enroll. Many MOOCs can be observed by anyone, but some require a password. Although MOOCs are online courses, many have a face-to-face component. Shortly after these courses were created, they were offered for free, but some institutions have charged a fee for students who want to earn college credits [8].

There is evidence that because MOOCs can be offered in any area with an internet connection, these courses can benefit people in developing countries. In 2013, the *New York Times* published an article about a gifted teenager from Mongolia who earned a perfect score in a MOOC class offered by MIT. It was a sophomore-level class called Circuits and Electronics. This example showed how MOOCs can make high-quality education more accessible and affordable to more people. Performing well in this course proved that this student had the ability to succeed at MIT. This example illustrated how MOOCs may allow universities to find qualified students regardless of where they live. The student from Mongolia who earned a perfect score in Circuits and Electronics later attended MIT [1].

MOOCs were first offered in the 21st century. The term *MOOC* was used for the first time to refer to Connectivism and Connective Knowledge, a course offered in 2008 and designed by George Siemens and Stephen Downes [9]. MOOCs became more popular in 2011 when Stanford offered Introduction to Artificial Intelligence. Sebastien Thrun and Peter Norvig announced that this course would be offered on the internet for free, and soon after, over 160,000 enrollees were planning to participate. This was a significant project in the development of MOOCs because of the number of people who had enrolled in the course. Other universities that have been involved in MOOCs include MIT, Harvard, and the University of California, Berkeley [8].

MOOCs have often been classified according to the extent to which they focus on online collaboration. cMOOCs were developed to promote collaborative online learning, allowing participants to contribute and learn with minimum centralized control. These types of MOOCs are usually smaller, and participants blog frequently and create projects [8]. One criticism associated with cMOOCs is that they encourage participants to provide too much information, making them highly unstructured and chaotic [10].

In contrast, xMOOCS were created with an emphasis on content mastery through repetition and testing. Although classifying MOOCs using these two terms has been influential, this approach is simplistic because these courses can be developed in ways that do not fit well with either category [11].

2. Theoretical Framework

Two theories provided the lens for interpreting the data collected for this qualitative study: social reproduction theory and transformative learning theory. Social reproduction theory is based on the idea that educational institutions perpetuate inequalities rather than promote equal educational opportunities. The argument offered by reproductionist scholars is that these institutions reinforce the existing cultural order. Previous studies with conclusions supporting this theory focused on how educational institutions perpetuate economic, linguistic, and cultural inequalities [12]. Scholars have generally focused on how schools reproduce inequalities. However, it is believed that the higher education system perpetuates similar inequities [13].

Paulo Freire's theory of transformative learning focuses on providing learners with the ability to analyze situations so that they can take action to liberate themselves from oppressive practices. This form of learning emphasizes raising awareness of the structures that contribute to inequalities [14]. Freire rejected the passive exchange of knowledge that exposes learners to content disconnected from their experiences. Such an approach promotes a power imbalance between teachers and students. Instead, he advocated for an education that requires teachers to collaborate with learners, allowing them to gain the knowledge needed to free themselves from oppressive structures [15]. Freire's ideas were originally implemented in Latin America and Africa. These ideas have spread to other parts of the world [14]. Figures 1 and 2 show some of the concepts associated with social reproduction theory and Freire's theory of transformative learning, respectively.
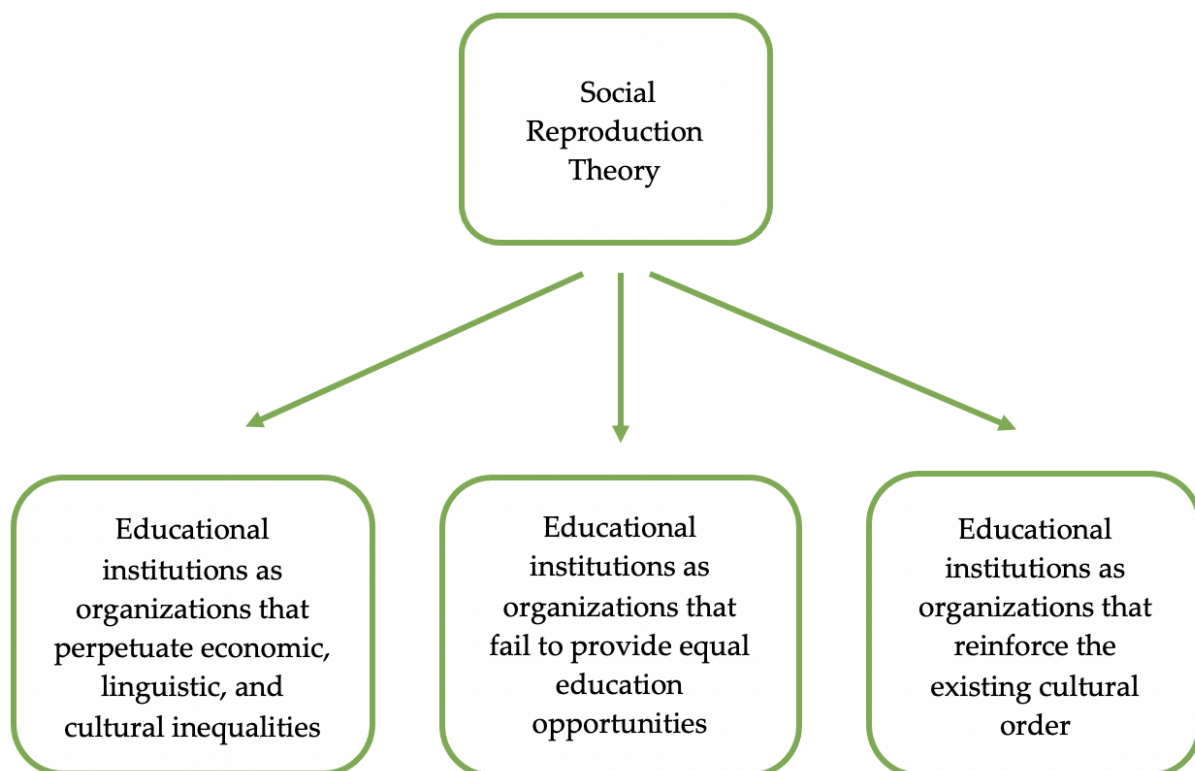

Figure 1. Concepts associated with cultural reproduction theory. Source: Collins [12].

These two theories guided this research because they matched the research questions this study aimed to answer. As noted in Section 3, the research questions focus on whether MOOCs promote inequalities or create opportunities for reducing them.
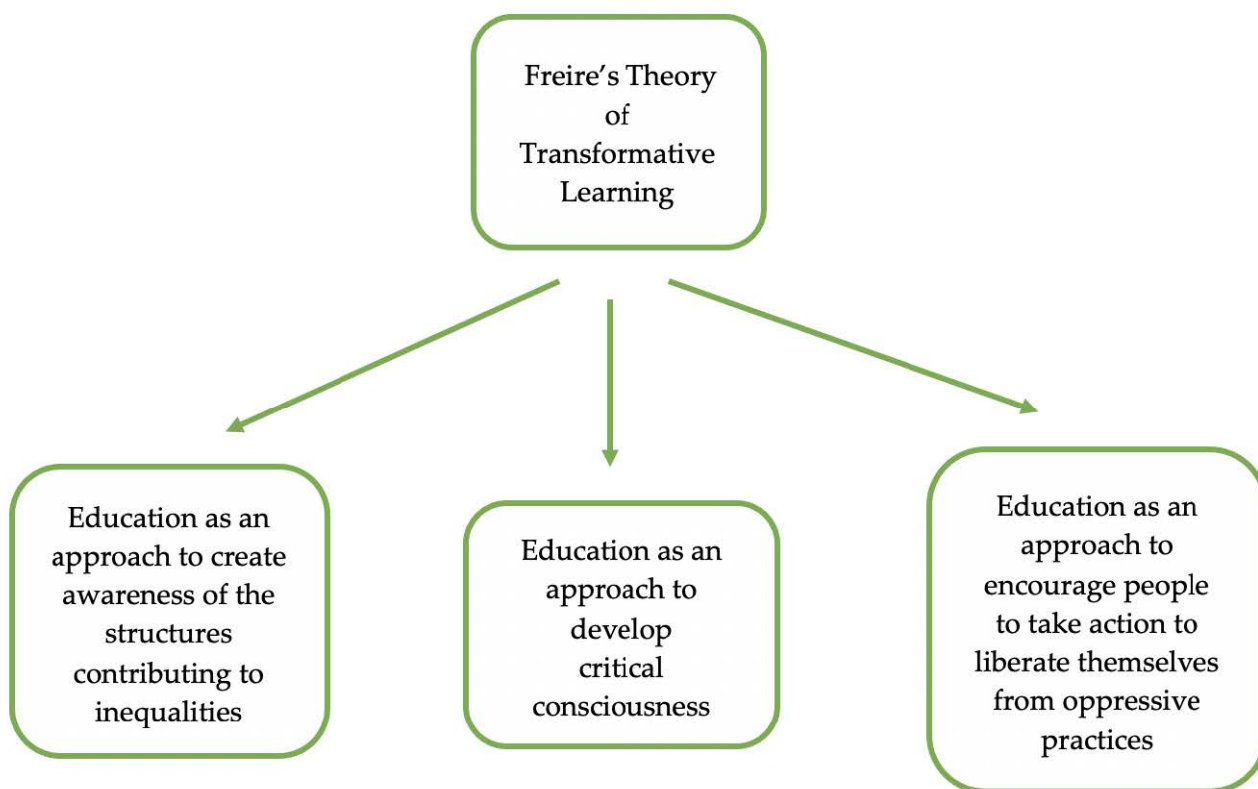
Figure 2. Concepts associated with Freire's theory of transformative learning. Source: Dirkx [14].

3. Research Method and Research Questions

This study consists of an analysis of documents that were collected and analyzed using qualitative methods. Different types of data were collected from magazines, academic journals, books, newspapers, and websites. Using different types of data sources is a form of triangulation. Researchers use this form of triangulation based on the belief that a conclusion will be more credible if different types of data lead to the same conclusion [16].

3.1. Research Questions

This study focused on addressing three research questions:

1. Do MOOCs alleviate or maintain the inequalities caused by colonialism?
2. How do MOOCs alleviate or maintain these inequalities?
3. How can MOOCs be improved to democratize education?

3.2. Selection and Retrieval of Documents

Three documents were initially selected in an effort to learn the most about the topic being researched. Selecting a sample strategically to answer the research questions being investigated is frequently referred to as purposeful sampling and is a common sampling strategy for qualitative studies [17]. Many types of purposeful sampling exist. In fact, Patton [17] described 40 purposeful sampling strategies. Of these 40, redundancy sampling is the one that best describes the sampling strategy used for this study. This approach allows researchers to add to a sample until they cease to learn anything new.

The three publications originally selected provided details on topics related to how MOOCs may alleviate or maintain inequalities. The first document was a paper entitled "Digital Neocolonialism and Massive Open Online Courses (MOOCs): Colonial Pasts and Neoliberal Futures." The second was a book chapter entitled "Envisioning Post-Colonial MOOCs: Critiques and Ways Forward." The third was a paper entitled "MOOCs as Neocolonialism: Who Controls Knowledge?" These documents introduced ideas that

created a need to find more details to develop a comprehensive understanding about the topic.

The documents were collected electronically by using various databases. The databases available at the University of Southern Mississippi's library were used to access some of the peer-reviewed journal articles. Other articles were retrieved through Google Scholar. Content from magazines, newspapers, and websites was collected by using search engines on the internet.

3.3. Inclusionary and Exclusionary Criteria

Two factors were used for considering whether a document would be included for analysis. First, each document needed to provide data relevant to the research questions. In other words, each document had to provide content about how MOOCs may alleviate or maintain inequalities. Second, the documents were checked for authenticity by ensuring they were produced by reputable authors, organizations, magazines, journals, and newspapers. Only those from authentic sources were considered for analysis.

Documents were excluded for two reasons. Some were excluded because they contained redundant content. Others were excluded because they contained content unrelated to the research questions.

3.4. Coding Process

The documents selected for this study were coded to develop themes. The coding recommendations for conducting a reflexive thematic analysis were followed. This approach to coding is based on an iterative process in which coding is not determined prior to examining the data. This method emphasizes interpreting the data to tell a story [18]. In reflexive thematic analysis, coding is a process that depends on how the researcher makes meaning from the data. The coding process is not considered right or wrong because it is based on the subjective nature of reflexive thematic analysis. The normal way of coding when using this method is for only one person to code [19].

Codes were created to develop insights relating to the research questions. As the data were read, text that addressed the research questions was tagged with a label. The next step involved collating similar codes with their corresponding data into clusters of meaning to describe a component of the dataset. For example, the different codes relating to the obstacles that may prevent students in the Global South from completing a MOOC were placed together. Some of these codes involved insufficient support and the expenses associated with successfully completing a course, such as being able to pay for a strong internet connection. This process led to the identification of the first theme, which focused on failing to meet students' basic needs.

Although the coding and theme development of this study are consistent with the methods many qualitative researchers use, researchers who replicate this study using the same sources may identify different themes. This outcome is a possibility because in reflexive thematic analysis, different coders interpret text in different ways [19]. Quantitative researchers would consider the strong chance that a different researcher may identify different themes to be a limitation of this study. However, the importance of repeating a study to find out if it will yield the same results is usually unimportant for qualitative researchers. Such researchers often work under an interpretive paradigm and do not conduct research based on the idea that there is a single reality that can be understood through research that yields the same results. As Merriam and Tisdell [20] explained, if replication of a qualitative study does not produce the same findings, it does not mean a particular study should be discredited. More important for qualitative researchers is whether the data are consistent with the results.

4. Findings and Discussion

Four themes were identified after the coding process was completed. Two of these themes focus on how MOOCs exacerbate inequalities, and the other two highlight how

MOOCs can be improved to reduce the inequalities identified. Although MOOCs have often been viewed as courses that would reduce socioeconomic inequalities, recent studies have revealed that they can exacerbate them in several ways. MOOCs can exacerbate inequalities toward underprivileged groups by failing to meet their basic needs and neglecting students' languages and cultures. These courses can be improved by using methods to address these aspects of providing instruction and by creating more opportunities for people in the Global South to collaborate in developing MOOCs. Themes 1 and 2 focus on how MOOCs can exacerbate inequalities. Themes 3 and 4 address how MOOCs can be improved to reduce inequalities.

4.1. Theme 1: Failing to Meet Students' Basic Needs

One of the ways MOOCs increase inequalities relates to the inferior learning opportunities they provide for socioeconomically disadvantaged people. Students from low-income families usually need more support to succeed academically than their more privileged peers [21]. To describe how MOOCs lack the support underprivileged students need, Bali and Sharma stated that these courses are disconnected with global students' learning needs: "The massiveness of xMOOCs glosses over learner differences—in terms of access, preparation and support needs" [2] (p. 32). Since as many as tens of thousands of students typically enroll in a MOOC, instructors cannot provide the level of attention they normally do when teaching classes with fewer students [22].

One of the problems of using MOOCs to democratize education is that students from low-income families usually do not have the skills needed to excel in online courses. To succeed in these courses, they need to have strong time-management and study skills. Vulnerable students often take college courses to develop learning skills rather than use these skills to excel in online courses [23].

In addition to not helping many students learn at an optimal level, MOOCs often fail to address underprivileged students' needs because completing a free MOOC may not allow these students to be hired for jobs that pay more. Although the MOOCs that lead to certification can create opportunities for students to earn more, these courses usually require students to pay a fee. Compared to how much regular courses cost, this fee is small. However, for many students in the Global South, this fee is unaffordable. Students from low-income families in these countries may also need to pay additional fees for internet access and supplementary course content [2]. Even if students can afford internet access, they may have weaker connections than wealthier students have, making their assignments more difficult to complete and submit on time [2].

Studies on learners who tend to complete MOOCs provide evidence that these courses frequently fail to meet the needs required for underprivileged students to benefit from this approach to education. Hansen and Reich [24] discussed that students who enroll in MOOCs frequently have a college degree. Their research showed that students from wealthier areas earned certificates at higher rates than other students. They also wrote that free "learning technologies can offer broad social benefits, but educators and policymakers should not assume that the underserved or disadvantaged will be the chief beneficiaries" [24] (p. 1247).

Other evidence showing that MOOCs usually benefit wealthier students rather than those from poorer households comes from data revealing the countries where students who enroll in these courses live. Data on where students taking MIT and Harvard MOOCs live revealed that most resided in highly developed countries. In 2017–2018, this data showed that over two-thirds of enrolled students came from these countries and that a considerably lower percentage of the students who took these courses came from countries rated lower in human development [25].

Educators should be skeptical of the idea of offering MOOCs to better meet the needs of learners in the Global South also because these courses are associated with more problems than traditional classes. One of these problems relates to the low percentage of students who complete MOOCs. For example, in 2014, Reich indicated that out of all students

who register for a MOOC, the number of those who earn a certificate range from 2 to 10 percent [26].

Another concern involves the extent to which employers value the completion of MOOCs and MOOC certificates. Completing these courses may not increase students' opportunities of being hired for a job because of the widespread cheating associated with participating in a MOOC. Such cheating may cause employers to doubt the competency of someone hoping to obtain a position after completing MOOCs. Some professors who taught MOOCs complained that students were collaborating on exams, emailing answers to peers, plagiarizing essays, and posting answers online [27].

Although some MOOC providers have responded to these concerns, many problems remain. For example, several companies started to proctor exams. However, this solution can cause problems for students from poor families in developing nations for several reasons. First, if students need to go to a testing center to take an exam, the expenses for such a trip may be unaffordable. Second, some companies proctor exams without requiring travel to a test center by having students place an identification card so that a proctor in another country can see it before students take the exam. However, many students in developing countries may not be able to afford an internet connection strong enough for their webcam to work well. This method is problematic also because a student can have friends sitting in a location where the proctor cannot see them so that they can provide answers to the student taking the test [27].

4.2. Theme 2: Ignoring Students' Language and Culture

In addition to failing to meet many students' basic needs, MOOCs are usually taught without respect for the cultures and languages of many groups living in the Global South. This neglect occurs because the majority of MOOCs are produced in English [10]. In 2014, it was estimated that 80 percent of MOOCs were taught in English [28]. Producing a MOOC for people living in the Global South in a language other than their own is detrimental for several reasons.

First, English is a barrier for many people living in the Global South. People in the Global South who speak English are more likely to come from wealthier households. The ability to communicate well in English, like stable access to the internet and the digital skills needed to complete MOOCs, is a marker of socioeconomic privilege. Offering MOOCs in English to people in the Global South may bring high-quality education to areas that previously did not have it. However, delivering it this way is likely to benefit people from privileged backgrounds rather than those from low-income households [29].

Second, disrespecting the language of Indigenous peoples occurred during the colonial era. Showing this disrespect again can easily be perceived as continuing an oppressive practice rather than democratizing education. One of the ways European powers dominated the areas they conquered was by forcing the people in these regions to speak a European language. Colonizers were able to use language to control other people because language is a tool that reflects values and beliefs, allowing a powerful group to dominate another group [30].

Language is often considered part of culture. In fact, Barone [31] stated that culture cannot exist without language. Language allows people to share knowledge, experiences, and perceptions. Language is so powerful that it may cause people who speak distinct languages to view the world differently. This is a possibility because each language is based on structures that shape a person's perceptions [31].

Requiring a group to be educated without using their native language can also cause their language and culture to become extinct. The residential school system in Canada provides an example of how colonizers suppressed the languages of Indigenous peoples to the point of putting their cultures in danger of becoming extinct. This school system operated for many years and focused on cultural assimilation [30]. The schools punished Indigenous children severely for speaking their native language. Parents did not share their native language with children because they were afraid the children would experience

the same consequences the parents endured. Consequently, much of their culture was not transmitted between people of different generations [30].

In addition to having a way to control the people they colonized, Europeans forced people to use a different language because they felt their language and culture were superior. When Europeans arrived in America, they viewed the original inhabitants of the land as culturally inferior. For instance, Christopher Columbus considered them as empty vessels that needed to learn the religion and language of European nations [32].

According to some scholars, Eurocentric ways of perceiving the language and culture of a given group of people still exist. Critics of MOOCs sometimes argue that because these courses are often taught in English, they are being used to dominate people in developing countries in a similar way to how these people were treated before their nations became independent. For example, Adam described the failure to provide MOOCs in the native languages of people living in the Global South as epistemic violence: "With this epistemic violence through language loss, the potential for a pluralistic global knowledge base vanishes to a handful of dominant languages and cultures" [10] (p. 373).

The process of neglecting native languages implies that the cultures of Indigenous populations are inferior. It also leads to the possibility that these languages will become extinct. Western languages have been reported to dominate certain parts of Africa to the point that parents no longer speak to their children in their native language, causing the children to lose the ability to speak this language [30].

Some languages did in fact become extinct after colonial rule in Africa. Many hunter-gatherer groups in South Africa spoke a variety of languages which became extinct after European colonization. During apartheid and colonialism, some Indigenous groups were not allowed to speak their native languages [33]. People even became ashamed of speaking their language because it was considered inferior. Because of the forcible assimilation of African people, an identity problem occurred, causing Indigenous people to prefer Western names instead of native ones [30].

MOOCs are criticized for being Eurocentric also because they are usually produced in non-Western nations. Some students are critical of MOOCs, suspecting that they could subvert their country's culture. A study conducted with students in Turkey, for example, showed that some students distrusted MOOCs and associated them with imperialism. One student in the study discussed how Western nations did not respect non-European countries and referred to how these Western countries have mistreated non-Western nations [34].

4.3. Theme 3: Meeting Students' Basic Needs

Since MOOCs are often criticized for failing to meet the basic needs of underprivileged students, one way to make them more democratic is to create them specifically to fulfill this goal. Fortunately, research has been conducted on which needs should be addressed to produce more favorable outcomes for these students. Lambert [35] conducted a systematic review of the components of MOOCs that were found to be associated with positive outcomes for underprivileged students. Some of Lambert's findings are consistent with the obstacles previously discussed that prevent these students from completing a MOOC.

Since it is difficult to provide underprivileged students with the extra attention they need because of the large numbers of students who enroll, MOOCs that offer more support would likely benefit these pupils. Lambert [35] discussed that one of the ways this support could be offered includes offering MOOCs in different languages so that learners can use their mother tongue to better understand the content. As previously noted, English is a barrier for many people in the Global South.

There is evidence supporting that when people in less developed nations are offered MOOCs in their native language, more of them will participate. When a MOOC on the philosophy of science was offered in Portuguese, for example, the percentage of students enrolled in Brazil rose by 50 percent [29]. Thus, one of the methods major providers of MOOCs can use to make these courses more democratic is to offer incentives with

partner institutions to create MOOCs using the local language [29]. For instance, a partner institution in Africa can offer a course in an African language.

Community partnerships can be formed to help students deal not only with the language barrier but also with other factors that may prevent underprivileged students from completing MOOCs. Lambert [35] discussed that community-based health and education organizations can provide important support. This support can consist of volunteers and tutors who facilitate online forums in culturally appropriate ways. Partnerships with equity group communities can provide information on developing more effective courses and strategies for alleviating Indigenous and gender inequalities [35].

Research on the importance of forming partnerships indicates that they can be useful for understanding the needs of underprivileged students. Lambert [35] stated that the most successful programs included various types of support and partnerships that provided insights on addressing the needs of the learners.

In addition to research that provides information on how MOOCs can be improved, some experts on this topic have provided their insights. For example, Rene Kizilcec, a co-author of a large study on MOOCs, advised instructors to focus on addressing the specific challenges that prevent certain groups of students from completing a MOOC [36]. Since some researchers, such as Ma and Lee [37], discussed that one of the challenges students in less developed countries face when taking an online course is lack of internet access, this obstacle needs to be addressed. Creators of MOOCs and policymakers need to find ways to ensure that students in less affluent countries have reliable internet access if they expect these courses to democratize education. Over 3 billion people, most living in developing countries, still have no internet at home [37].

In addition to unreliable internet access, people in the Global South frequently experience other obstacles involving technology, such as not having the computers, smartphones, or tablets needed to participate in MOOCs [37]. Organizations genuinely interested in creating MOOCs for helping people in the Global South need to address these obstacles. A considerable percentage of people in developing countries do not have a computer with broadband access. MOOCs are designed to work using these resources [38].

4.4. Theme 4: Respecting Language, Culture, and Knowledge Base

Offering MOOCs in students' native languages may not only offer a way to meet the basic needs of many underprivileged people in developing countries but also show that MOOCs are not created to dominate these nations. Unfortunately, as discussed earlier, the majority of MOOCs are produced in English. Since language and culture are closely connected to each other, ensuring that MOOCs are offered in students' native languages would likely reduce how often they are criticized for being Eurocentric.

However, many more improvements would need to be made to prevent skeptics from criticizing MOOCs for being Eurocentric. Simply offering a course in a student's native language is insufficient because translating content into another language does not change which ideas dominate an academic institution. Since most MOOCs are developed in Western countries, translating them to the language spoken in a country in the Global South will not prevent European ideas from dominating people in less wealthy nations. Because MOOCs are often implemented to teach ideas that originate in the West, they are often criticized for continuing the domination of nations in the Global South. Altbach stated that they "threaten to exacerbate the worldwide influence of Western academe, bolstering its higher education hegemony" [39] (p. 5).

One of the ways to prevent this hegemony is for less wealthy nations to create their own MOOCs. Regrettably, few countries in the Global South participate in MOOC production [10]. One reason this happens involves how costly this process is, making it an impossible option for less affluent universities. In a paper published in 2014, Altbach wrote that "Udacity, an American MOOC provider, estimates that creating a single course costs $200,000, and is increasing to $400,000" [39] (p. 6).

Unfortunately, when universities in poor countries form partnerships with those in the Global North, they often do not contribute equally to the knowledge base and become consumers of Western knowledge. This outcome occurs because these universities frequently rely on funding from those in the Global North, making it less likely for them to make changes in the knowledge base [10]. Without democratic partnerships, skeptics will likely continue to criticize MOOCs. Western universities may create a MOOC about Africa without having a partnership with an African institution. Creating a MOOC this way increases the chances for the content to be stereotypical because of the lack of collaboration by African people in the production process [10]. Although MOOCs may create learning opportunities for people in the Global South, critics view them as a source that may ignore the importance of culture and local academic content [39].

To prevent this outcome, more focus needs to be provided to develop MOOCs through a bottom-up approach rather than one that is top-down. This means that if Western universities are genuinely interested in reducing the effects of colonialism toward the Global South, they need to respect the languages, cultures, and contexts of the people who live in less developed nations. To achieve this goal, countries in the Global South need to be provided with opportunities to collaborate in the creation of MOOC content. Creating MOOCs this way would allow education to be implemented using a pedagogy more similar to the kind Freire suggested than the approach that is more common today.

Another strategy for implementing online courses according to Freire's approach is to minimize offering MOOCs according to the xMOOC model. xMOOCs tend to neglect the importance of student participation. Because of this one-way transmission of instruction, xMOOCs give the impression that people in the Global South do not possess valuable knowledge [10]. This type of instruction is the kind Freire advocated against because it silences the voices of marginalized people. Instead of the passive exchange of knowledge that xMOOCs promote, Freire advocated for the exchange of knowledge between teachers and students that is more likely to occur with a participatory approach to instruction.

5. Conclusions

Although colonialism created conditions that have caused people in the Global South to suffer, some researchers have hoped that MOOCs could alleviate the inequalities resulting from the colonial era. Unfortunately, regarding the first research question on whether MOOCs maintain inequalities, this study revealed that these courses do so in several ways. Concerning the second research question on how MOOCs maintain inequalities, this study showed that one of the ways MOOCs contribute to this effect is by failing to provide enough support to help people in the Global South complete these courses. Another relates to the costs associated with successfully completing a course, such as being able to pay for computers and adequate internet connections. This study also revealed that MOOCs often ignore the importance of the cultures and languages of people in the Global South and that these courses often benefit people from the Global North more than those in the Global South. People in wealthier nations are more likely to complete a MOOC because they have the resources needed to complete them and fewer obstacles that prevent them from taking such a course.

Regarding the third research question on how MOOCs could be improved to democratize education, this study revealed that this goal can be achieved in several ways. One way is to increase how often these courses are offered in the native languages of the people living in less wealthy nations. The knowledge bases of people in the Global South need to be respected as well. This goal can be achieved by creating more opportunities for people in less wealthy nations to be involved in the creation of MOOCs that better reflect local knowledge. To implement such an approach, offering MOOCs according to the xMOOC model should be avoided. This model gives the impression that people in the Global South do not possess valuable knowledge. In contrast, providing MOOCs that encourage student participation and minimize the passive exchange of knowledge will likely lead to more

democratic outcomes. Such an approach is consistent with the kind of education Freire recommended for ending oppressive practices.

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Distance Education under Oppression: The Case of Palestinian Higher Education

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Abstract: This paper draws from both empirical research on an EU-funded project in Palestine and from the lived experiences of Palestinian HE educators. The geopolitical situation is precarious at the best of times in Palestine, where Israel monitors and controls the Palestinians' right to travel, live and work—even more so if they wish to accomplish these activities abroad—and their access to the internet is never free from surveillance. In these circumstances and under these conditions, distance education has played a crucial role in supporting Palestinian students to develop a global voice. This paper captures some of the educational challenges encountered by Palestinian students and teachers generally in their daily contexts and, more specifically, in their experiences of learning and teaching, and the methods used to overcome these barriers. It draws on multiple sources and on studies recently carried out in the field by Palestinian colleagues and will discuss the challenging aspects of learning online from a range of perspectives in each of these studies before offering conclusions and recommendations/implications for other areas of study in situations of oppression. Initial findings indicate that distance education enables a form of continuity in regions exposed and accustomed to extreme and regular disruption. We were also inspired to see throughout responses the values attributed to pursuing education by Palestinian educators and their students. The persistence and perseverance reflect a determination that underlines the importance of education as a fundamental human right, national identity and sovereignty, personal source of hope and strength, and opportunity to open one's world. In our conclusions, we argue for the importance of digital literacy among educators to facilitate the continuity of distance education and finish with some recommendations as to how technologies can ease disruption to ordinary educational service.

Keywords: oppression; Palestine; education under oppression; Middle East; distance learning

1. Introduction

The historical and contemporary geopolitical situation in Palestine and Israel is one of enormous complexity, with partisan views entrenched in ideology, national identity and religious faith. This paper does not aim to contribute a socially just verdict on that history, nor to present a critical interpretation of the discourse and events. Our intent, however naive, is to provide an illustration of the general experiences of access to higher education through impediments to physical and face-to-face (f2f) interaction and via the amenities, barriers and opportunities for distance education drawn from educators' accounts within Palestine. "Lived experience" enables outsiders to gain insight into a country in Palestine whose nationhood is colonised and occupied. While lived experience may be perceived to lack objective neutrality in this tense interplay between two states, we perceive that an ethical responsibility exists in empowering the disenfranchised and oppressed to share their worldview. Moreover, this paper seeks to provide a depiction of the means by which distance education perseveres through technologies, skills and overall hope and determination, and through a dual decolonial paradigm: being done by Palestinians for Palestinians, and with ever a mind to escaping from the literal colonisation by Israel. This

was achieved through collaboration with co-authors and colleagues on a long-standing EU-funded project, the TEFL-ePal project, which from 2019 to 2022 sought to stimulate innovation in TEFL ("teaching English as a foreign language") teaching across Palestinian Higher Education Institutes through the integration of digital technologies.

In writing, two of the authors are very aware of our own outsiderness as Europeans. We do not wish to present what may be construed as a biased account of a complex situation which we have extremely limited knowledge of, but in writing we insist on giving voice to local educators, as participants, and with our Palestinian co-authors. Therefore, we take the view that "we must always take sides. Neutrality helps the oppressor, never the victim. Silence encourages the tormentor, never the tormented" [1] in presenting the situation as we have recorded it from participants whose voices are otherwise absent. This forms part of our methodology, the focus of which explored the ways in which technology can support distance education, when means of f2f learning have been disrupted or prevented. Naturally, as part of this, teachers' perceptions of education generally and life under occupation were investigated. These insights were collated from Higher Education Institution educators within Palestine, with questions posted to Googledocs and responses generated from representative educators in language learning at ten partner institutions.

Names have been withdrawn for confidentiality, as have the names of the institutions for whom our participants work. Actually, it is difficult to even discuss ethics and "harm" (physical or psychological) in a situation that is so far removed culturally, geographically and politically from UK and global Northern research norms: none of our usual procedures seem to cover the possibilities. We are used to discussing emotional difficulties, but not to the idea that being discovered as having participated in a survey may lead to imprisonment or worse. We have, therefore, been overcautious. We were given permission by several respondents to use their names but have chosen not to. We have even, reluctantly, agreed on the difficult choice to remove two of the paper authors' names for the same reasons, even though this may deprive them of the academic status and satisfaction that publication would otherwise bring.

2. Literature Review

We begin with a customary literature review that surveys the ways in which education has been impacted by continual disruption throughout Palestine's West Bank. We wish to make readers aware that this is designed and written to give context for the country and the place in it for education generally and for technologies to facilitate remote learning.

Using a search engine with the terms "Israeli soldiers Palestinian students" brings up over 24 million hits. We performed this exercise on 12 May 2022, and the key verbs from the headlines of the first ten hits were: "detained, shot, target, storm (a building), arrest, detain, raid, storm, raid, attack". In each case, the Israelis were the subjects of the sentence, enacting the verb on the Palestinians. A case in point is the Palestine Technical University-Kadoorie (PTUK), in the city of Tulkarem, where the segregation wall is only 500 m from the campus and where trouble often erupts, with Israeli military raids onto the campus and the capture, shooting and even deaths of students (see, for example, MiddleEastMonitor.com from April 2022 [2] for a recent example). As we write the final revisions in June 2023, there have very sadly been further scenes of tensions across much of the Palestinian territories.

Defense for Children International–Palestine [3] further substantiate this, noting that Israeli soldiers, police, and private security staff are deployed to protect settler populations throughout the occupied West Bank, and that many Israeli settlers have armed themselves for fear of Palestinian reprisal. This creates a "hyper-militarized environment" [3] resulting in "disproportionate physical and psychological violence against Palestinian children". DCIP documented 134 violent incidents by Israeli forces between 20 August 2019 and 6 March 2020 alone (i.e., just before the COVID lockdowns were imposed), which they claimed impacted at least 9042 students and teachers. Traxler et al. [4] report that tanks parked outside schools are familiar sights to teachers, and it is not even uncommon for schools themselves to be demolished by them. Scott and Jarrad [5] observed that where

photographs left on empty chairs commemorate the death of a murdered student, then teaching and learning must confront that reality, whether that is in the curriculum located in the physical classroom or in distant form: Palestine's education system reflects its own world and aspires to talk to the wider one.

Shraim and Khlaif [6] described how the Palestinian educational system has been severely affected by closures and restrictions, particularly since the second *Intifada* (which means "uprising" in Arabic) in September 2000. Shraim and Khlaif, drawing on Nicolai [7] specify that this has been "exacerbated by the separation wall constructed by Israel since June 2002, cutting through a number of cities and villages, creating a barrier to movement and separating teachers and students from their education institutions" ([6], p. 159). This is supported by Ramahi, describing the intensified military checkpoints and segregation wall from 2000: "The effect on Palestinian education has been devastating. The Wall effectively deprived entire villages from access to schools and learning centres" [8]. That this is still the case is evidenced by, e.g., Amnesty International [9] and UNICEF [10].

The Palestinian Ministry of Education and Higher Education (PMEHE) Education Development Strategic Plan noted in 2008 [11] that the wall meant that teachers were relocated to schools closer to their homes, which grossly distorted the distribution of qualified teachers among schools, especially in the fields of mathematics, science and English. Worse, dropout rates among students were reported due to difficulties in getting to school safely. Several other problems were articulated at the same time, including–briefly–that girls are disproportionately affected since parents are especially anxious that they should not have to spend so much time travelling to and from school or be subject to humiliation by Israeli soldiers. School schedules were interrupted; attendance rates had dropped amongst students and staff; more time was needed to be spent physically travelling around these barriers; dropout rates increased due to staff shortages; and many students engaged in private education, which reinforces social gaps due to being unaffordable for many. We posit that in the present time, these problems persist.

In the report on its website, DCIP [3] explain that students living under Israeli military occupation "commonly face arrest, detention, violence, and harassment at the hands of Israeli soldiers and settlers" in the occupied West Bank. They also describe how additional barriers in or near Palestinian communities such as checkpoints, military infrastructure and Israeli-only roads all present additional impediments to the enjoyment of their right to a safe learning environment in accordance with the United Nations Convention on the Rights of the Child (CRC), which was ratified by Israel in 1991.

In 2020, more than seven thousand Palestinians south of the city of Hebron in the West Bank lived without communication lines or landlines during the Corona pandemic. Moreover, most families do not have computers, which increases their children's suffering in distance education due to the Corona pandemic. Sixteen villages are located south of Hebron in an area classified as "C", and the Palestinian Telecommunications Company is not allowed to connect the telephone network to these areas. Area C is under full Israeli security and administrative control under the Oslo Agreement signed in 1993 between the Palestine Liberation Organisation and Israel.

Education for the Palestinians, after losing the land, constituted an essential pillar and an important tool in the battle of steadfastness and survival. In most countries, there is a target state, usually the former colonial state; Libyans travel to Italy and Algerians to France. However, the Palestinian student has a goal, not a target country, and is ready to travel to any country until they complete their education in good conditions and achieve their dream. After their education, they return to their homeland to serve their country and their people: a unique opportunity for respect.

Life and education at all levels are affected: "the prolonged settler colonial reality impoverishes, controls, and destroys Palestinian society while building a secular state and ethos in Israel . . . For decades (however), Palestinian higher education has countered and resisted colonial control and has supported the steadfastness of society" [12] This reality has reinforced the role of education as a tool for securing socio-economic mobility for the

Palestinian people, and as a means of redressing the impact of national exclusion [13]. Ramahi notes that "Award-bearing formal education was a means to survival, which may account for why for many years Palestinians have had the highest rate of participation in education in the Arab World" [8]; see also [14].

3. Methodology

Our research was undertaken as part of the TEFL-ePal project, where we were tasked with building capacity in technical and pedagogical knowledge and skills, as well as to develop a research culture across the collaborating partner countries. From this, we designed a GoogleDocs forum, which intended to uncover opportunities and challenges in teacher innovation. This was designed into successive questions posted on a bi-weekly basis across 10 weeks (five questions, once every 2 weeks) with invitations sent to all ($n = 25$) teaching practitioners involved in the project. These invitations contained explanations that we sought to understand the context in which teaching happens and that respondents could respond freely and anonymously. This second point was important because, in some cases, the 12 teachers who finally responded were sometimes critical of their organisations and we were duty-bound to treat their responses with confidentiality. We also anticipated the sensitive nature of the responses where geopolitical commentary would be posted. As such, we are unable to identify the participants, though we know that these broadly cover the different types of HEI and that they are exclusively classroom teachers (we use this term instead of HE lecturers as a catch-all, as we assert that "teacher" carries more professional credit in terms of pedagogical knowledge than the term lecturer, which can primarily be associated with subject knowledge), rather than management or leadership. The responses were able to be edited by whoever made them, so care could be granted to be precise with wording and reflections, and we could also ask follow-up questions where we wanted to elicit further information.

Ethical guidelines were followed with the consent provided by participants willing to give answers, and all participants were able to withdraw and remove their answers at any point. Ethical permission was established by the respective HEI ethical committees of the researchers, which themselves are guided by the BERA ethical guidelines.

We attempted to circumvent potential bias in the language of the responses by inviting participants to respond to our questions in Arabic for free expression, with our co-authors from Palestine helping to translate the responses. However, in the event participants responded in English, which may be considered a limitation of the study given they were responding in a second language, but we recognised their right to choose, their expertise as language teachers and their freedom to edit responses for accuracy. Following the initial 10 weeks of the five questions, we then left the respondents to allow edits and changes to be made for a month before returning to them and treating responses to interpretivist analysis between the four researchers (two UK-based and two Palestinians).

Questions were established in advance, and it was decided that there would be no more than five that explored 1. General everyday experiences of life under occupation, 2. Attitudes towards education among teachers, 3. Experiences of education during occupation, 4. How distance learning can enable continuity, and 5. The lessons learnt about distance education that can be shared with others. We proceed in the paper to outline the responses, collated in the boxes presented. Our analysis is provided through discussion of those responses.

Q1. Our first question was "What are your experiences of living under the Israeli occupation?" Responses included:

- Being deprived of our freedom, privacy, respect, and humanity.
- Instability due to strikes, checkpoints, killing, imprisonment, closure.
- Any area that's under occupation will surely suffer many obstacles among which are those on education. like the challenges of travelling to the educational institutions, the cut off of study because of institutions' closure, physical barriers, etc.

- Every person must resist in order to reach his dreams.
- We are raided by the Israelis often. Sometimes our students protest by throwing rocks near the so-called separation wall, but they invade our campus and shoot our students. We have many martyrs.
- My brother and my father were arrested by the occupation authorities. We lived through very difficult moments in the Israeli displacement.
- I had an experience two months ago when Israeli forces blocked all of the internal roads of ***** Town because Palestinians kept raising the Palestinian flag in the town, so I could not go to my workplace and teach my students due to the roadblocks. The next day I had to take a long road. Yesterday, similar experience happened to me. This time, I was taking my newly born baby to the town's clinic, but roads were blocked again for the same reasons. Thus, it took me 45 min to get to the clinic whereas it usually takes seven minutes

Among the wider issues described above, the impact on education in the third bullet point is familiar to everyone globally who experienced the sudden closure of educational facilities due to the pandemic. That this happens routinely, and often without reason or justification, in Palestine may be revelatory to all of the parents, teachers, pupils and everyone else affected by the pandemic. It reminds us of the crucial role that technologies have to play in educational provision and access during periods of disruption, illustrated starkly in the final response above. Another response, translated from the Arabic, gives a somehow even more violent insight: "Among the policy of the occupation is ignoring the Palestinian people, cancelling the Palestinian culture, obliterating the Palestinian identity, fighting heritage and stealing it. All segments of the Palestinian people have suffered from violations and the practices of the occupation against them, for example, the continuous deployment of barriers to dismember the Palestinian people geographically and socially".

Barriers here, whether the separation wall or checkpoints, refer to the physical. But we must also understand them as symbolic of permanent disruption, and yet not for the first time in our responses, we found a determination for education to persist. Education will persevere as it enables the "fragmented existence" [15] of Palestine to maintain a semblance of sovereignty and also everyday normality, even though, as our participant declares: "These practices also affect the psychological state of students and teachers and hinder studies, whether in universities and schools, especially among female students".

For those of us in the global North, much of this is scarcely comprehensible: the inability to travel freely, the possibility of being shot dead, of imprisonment, of the sudden removal of internet access, of the closure of schools and universities at the whim of an occupying force. But this is commonplace in Palestine (see, e.g., [16,17]), even if somewhat avoided or underexplored in the research literature. A recent paper has sought to demonstrate how "this gap in the research in relation to Palestine . . . has left unresolved the problem of how to explain the continuation of the Israeli settler regime beyond its unequivocal overt and superior mechanisms of legal and brute power" [18]. Shipler [19] noted how Israel has incrementally taken more and more of Palestine to create "an archipelago of disconnected enclaves separated by checkpoints of soldiers bent on reminding Palestinians who's in charge". Royle [20] noted the immediacy and relevance of Foucault's discussion of power and agency in this context. All aspects of life in Palestine are under constant surveillance; indeed, Ilan Pappé described Palestine in 2017 as the "biggest prison on Earth" [21].

Ujvari's [22] paper demonstrates how Israel's "overt" and "brute" power extends through all aspects and facets of Palestinian life: how even something as simple as road signs in Palestinian areas still have "Hebrew placed on top, followed by Arabic and English, respectively, giving Hebrew greater dominance compared to the other languages in these areas", (p. 378) and "despite the fact that Palestinian towns outnumber Israeli settlements, signs that refer to Israeli settlements are three times more than those that refer to Palestinian towns and cities" (p. 380). Often, the Arabic name is merely left off signage, especially in Jerusalem. As Ujvari notes, this can be interpreted as an attempt to uproot the city's

Palestinian identity (see also [23]). This draws on Bourdieu's "symbolic power" and demonstrates the "spatial exclusion of the Palestinian memory through various visual and linguistic manipulations, tactics, and mechanisms" [24].

Alongside these small but overt glimpses of the machinations and abuses of the Israeli regime, there are also enormous disenfranchisements of the Palestinian people. Of these, it is their education that this paper is most concerned with, and we now turn to this crucial aspect, and focus in particular on the necessity for digital and remote learning. As stated at the beginning, this (remote access) is particularly acute in a nation that faces intensive disruption to normal everyday life that others take for granted: hostility and authoritarian aggression at checkpoints, road closures, the undermining of energy supplies and bandwidth—all furnishing Palestine with a continual turmoil to an inverted hierarchy of needs, where education cannot flourish. However, still we discover that educators and students' determination to learn persevere through any means. One such mode is for teachers to utilise tools that empower students with the autonomy that goes hand in hand with distance education. Teachers report their use of design platforms such as Canva and Prezi, or using YouTube or H5P. One teacher from Institution 3 described the necessity for organisations and teachers to "make my profession more adaptive and responsive to the changing conditions" [of the world]. Innovation in teaching under occupation has become a norm, and distance a fairly routine challenge.

Q2. Our second forum question asked specifically about the importance of education to Palestinians:

- It is our window to the world, our source of strength and dignity, and therefore an obligation.
- Palestine is a country that is well-known for its care about education
- It gives us human capital
- Palestinian attach great value to education and this cannot be viewed separately from the situation after 1948. Education is a weapon to show the reality and convey the real picture to the whole world and understand our history and rights
- It is our long-term weapon
- Palestinian people in general value education over anything else. That's why there are over 20 universities and colleges.

It can be seen from these answers that education is generally viewed as vital, indeed, as a weapon against the oppressor. Again and again during our visits to Palestine on the Erasmus+ project we worked on, students and staff pressed on us the urgency of the development of English language teaching as a means of articulating their story to a global audience: the plight of the Palestinian people. This can be recognised in the response above about the value of "human capital", which could have various connotations: the quality of being human in a regime where the oppressor dehumanises the population. Alternatively, it may signify human agency: education as developing capabilities to act upon the world—to be emancipated, to become skilled, or to speak to the world. Other, somewhat inspirational, responses above again reinforce the perseverance of the oppressed for education: it gives Palestinians a "weapon". Education is a source of strength and a defence to those who are oppressed, an expression of which we saw painted on a wall in Nablus: "Resist to Exist".

The many and varied problems all indicate, as Shraim and Khlaif stated, that educational reform to "enhance the learning process is a priority, and eLearning has become a necessity rather than a luxury to improve access to quality education for all Palestinian students" [6]. They note that substantial investment, mainly from international organisations, and considerable efforts have been made to develop distance education in Palestine; however, as Baalousha et al. [25] have shown, there is a lack of infrastructure and qualified staff in formal settings alone, while DE arguably requires rich pedagogical methods, drawn from teacher experience and knowledge. We have written about one such project at length

elsewhere [26], and we will draw on it to illustrate some key points later.

Q3. Our next question focused on distance education: its uses in overcoming the challenges of occupation. The first of these, "How has distance education helped you overcome the challenges of occupation?" elicited responses such as these:

- It opened many closed doors and gave us the chance to represent our country in workshops and conferences. Distance Education also helped us to make up for any missed classes due to the pandemic and political situation.
- It has a fruitful hand on my education as it was enough to contact professors online especially during the pandemic
- Keep in touch with my students and continue the teaching
- Help student and teachers to get rid of the barriers that prevented them or made it difficult for them to reach educational institutions
- There were positives to the development of technology, its use and investment in education during the closures, and the prevention of the access of lecturers and students to universities and schools, where universities and schools were able to volunteer technology. Therefore, there was ease in communicating with students during the closures, raising educational materials for them, making lectures and providing some exams through the use of various technological programs such as zooming and facilitating the process of communication between the student and the teacher. Thus, Palestine succeeded in completing the school years on time, despite the obstacles and challenges faced by our Palestinian people.
- It helps in situations mentioned in Question 1. When getting to the workplace is not an option due to roadblocks, it becomes crucial to have a distance learning platform.

Notable among the responses above is the stability technology represents. In a nation with omnipresent disruption or at the very least its ongoing threat, the notion of continuity must be of significant value. Norms are established via online practices to the best of educators' ability, whether this is due to the pandemic or the closure of transport routes and campuses. More excessive disruption (such as the arrest of educators, student activists such as Layan Nasir, or the confiscation of teaching equipment by soldiers) cannot be alleviated by online provision, but technologies can provide an essence of continuity and stability where these factors impact provision. This resonates with earlier points made from the literature about education as "survival". It is often said that education is about transformation, growth and change, but here there is a sense of holding on and sustaining something precarious and vulnerable: of staying in contact, of succeeding to complete a year, and of education giving strength. This is profoundly felt: distance education enables continuity and contiguity when physical interaction is disrupted. It is fluid and allows obstacles to be temporarily overcome. This notion of education as survival is against the continual trauma of life in Palestine, noted by Alfoqahaa [27], who writes that "the universities of the West Bank and Gaza have never given way to Israeli hegemony. Palestinian universities have encouraged young people to be Palestinians through endless cultural strategies".

We have noted previously [26] that educational practice in HE is still situated mainly within the conservative and traditionally hierarchical Palestinian society, but that many tutors are now "looking to augment the didactic approach as the commonest experience of language teaching in Higher Education with more active, social-constructivist student-centred practices" (p. 400). This was shown by a participant, who explained how, for them: "Capacity-building means preserving effective, traditional practices and continuing to develop and support them with what's new". We noted that "younger teachers have a readiness and confidence with innovation that enables learning to be assimilated more easily into the everyday Arab culture outside of the institution—in the home, the community and the wider social context", ([26], p. 401) but we caution that many still feel constrained by institutional and cultural traditions and practices. However, we celebrate the decolonial

aspects of this: being determinedly Palestinian in nature but using educational technology to teach, maintain and honour their heritage.

The digital ecology noted above reflects a repertoire of apps and platforms in common educational use around the globe: mainly conferencing and messaging tools that enhance communication between and among students and teachers, knowledge exchange and—to a lesser extent—assessment. Whilst much of this seems to support widening participation, much of this still mainly stems from the teacher's direction. However, there are also tools for "outside the classroom learning" and the beginnings of the use of the flipped approach (see e.g., [28]). Our Palestinian colleagues on an Erasmus+ project have had great success in transferring some of their in-class learning to remote, or distance, educational activities, especially in the realm of language learning (e.g., [29]). Itmeizah, Khalil and Smith [30], as another example, describe a project where students conduct interviews with people in English, which they video record on mobile phones. These are then submitted to an online platform and are reviewed by both peers and tutors. All of this can be done remotely and asynchronously, allowing for it to happen even when educational settings are closed.

Q4. Our fourth question was "What lessons have been learned from distance education (including during the pandemic)?" and we were looking specifically to draw out an understanding of this within the context of oppression and occupation.

- Where there is a will there is a way. Knowledge can be obtained in many ways and distance education can unlock many closed doors for Palestinians.
- First of all, computer and internet skills, then the importance of distance learning as a vital solution and alternative for traditional education
- Addressing problems regarding our situation in Palestine because of occupation not only for the pandemic
- Time-saving
- Effort-saving
- Saving money
- Technology has been well invested [in] during the crises we went through, whether from the occupation or during the pandemic, but the results were not the best, as we sometimes had to use distance education completely, and the infrastructure was not fully prepared for its use, whether in terms of rehabilitating staff and students or in terms of owning equipment.
- Not all students have access to electronic devices, electricity, and the Internet, all of which has a negative impact on their use of technology and obtaining the best results, in addition to the fact that distance education completely does not enable us to get to know students closely and refine their personalities, so it is better to combine distance education with face-to-face education. But if we talk about lessons learned, we can say that we have been able to challenge crises and adapt technology and invest in it as much as possible.
- We should develop our e-learning system to be an essential and primary tool for teaching
- We need to be more prepared.

Even from these brief responses, it is evident that HE teachers see digital and remote learning as crucial, as pointed out by a number of respondents: "it can unlock many closed doors"; "vital solution"; "essential and primary tool". From this, it appears that technologies help to address and redress problems arising from the occupation of Palestine that most educators only experienced in a diluted fashion through the pandemic. There is a growing body of literature (see, e.g., [31]) describing the ramifications of the abrupt shift to online teaching in HE in the global North. This current special edition is usefully filling in some of these other areas. However, it is also clear that digital learning is not a panacea. In our report for the UK EdTech Hub on the global digital response to COVID-19 [32], we discussed many of the necessary preconditions for optimal use of remote learning, including: effective local partnerships [33,34], using pre-existing technologies rather than investing in

new ones [35]; the use of consistent and well-curated educational resources [36]; governments and educational institutions working with providers to make data and bandwidth more available and more affordable [37]; and—crucially—an understanding at institutional, educational and individual levels that online content alone is not enough. We can add to this from the insights above that educators see the limitations of distance education and recognise that it is better augmented with f2f contact where possible. This is because of the apparent lack of sociability in distance education and how personalisation and interpersonal dynamics between students and between teacher and students is best experienced in a face-to-face context. It is also vital that educators have the digital literacy to make use of the content in order to learn, and that this digital literacy is quickly developed in learners, especially as so much remote learning is, or can be, achieved with no teacher presence [37]. Above and beyond this, we can see from both the pandemic and the closures so ordinary to everyday Palestinian life that investment in bandwidth, equipment and infrastructure is paramount.

It is by no means certain that all of these preconditions exist in Palestine, where there is widespread poverty (physical and digital) and where Israel controls the bandwidth and can—and does—switch off the internet when it deems it necessary. We may view the shutting down of bandwidth and internet access as aligned to the forced closure of HE campuses in recent history, with Birzeit University for one closing over 15 times and once for up to four years [38,39] has further outlined the extent to which the occupation and military impairs Palestinians' right to education under Article 26 of the Universal Declaration of Human Rights, whether through curfews, roadblocks, checkpoints or prohibited admission to Israeli universities for Palestinians in East Jerusalem, or simply through the spiralling costs of education itself.

It is plausible to argue that with so much continual disruption and such barriers, an informal means of teaching and learning through DE and using different channels, such as social media, remains the only option for Palestinians to fulfil their right to education. We now explore what is needed for that to be realised, whether skills, knowledge, technical infrastructure or a complete overhaul of the notion of what education is and is for.

Q5. Our final question asked participants to describe what they felt was needed in terms of next steps. We did not specify anything more than that, so they were free to include anything they felt necessary.

- 1. Continuous training for teaching staff; and 2. Being up-to-date with new teaching strategies
- Computer experts, MOOC Courses, cost- effective technology tools
- Changing Faculties beliefs and training them to use suitable e-teaching and e-learning methodologies
- Check in with your students regularly.
- Help your students' families get connected.
- Choose tools that are mobile friendly or can be used offline.
- More awareness over teachers and students
- Qualifying and enabling students and staff to fully use technology, in addition to rehabilitating the infrastructure and equipping it with electricity, the net, computers, and support programs for all students and teachers to make the educational process successful.
- Decent internet speed, training workshops for teachers and students.

All of these seem sensible and effective with obvious advantages. As we have argued previously, there is a clear need for continued investment in staff development—perhaps even online teaching qualifications in an acknowledgement of the importance of digital tools for teaching and learning. Faculty development programmes are needed to train teachers to design and use online teaching effectively. The use of shared/open platforms and shared open/resources, and developing habitual sharing of best teaching practices that "exemplify the teaching of culturally relevant, curricula-aligned content using student-centred

pedagogy and technologies will help to shape a community of professional practice" [30]. This "cascading" of information has been a feature of the Erasmus+ funded TEFL-ePAL project the authors worked on, with all four institutions describing how the digital pedagogies and technologies they developed with European partners have been shared beyond the original English learning departments that participated. This is also a feature of further work in Palestine—see, e.g., [40].

As noted by our respondents, it is also vital for Palestine to generate the infrastructure to support mass online learning. Shraim and Crompton [41] agree, arguing that the Palestinian Ministry of Education would do well to turn away from spending millions on textbooks and instead invest in digital textbooks, interactive materials, mobile apps and open educational resources that can be adapted by teachers to the individual and contextual needs of their students (see also [42]).

Another factor that was noted by several respondents was the importance of student–teacher relationships and of teacher presence in learning, even where this is remote. These concerns are reflected in [37,43]. Shraim and Crompton [41] draw on these same ideas, noting that "teachers must open a social presence through social communication tools to maintain and possibly enhance the lost spontaneous student–student and student–teacher interaction" (p. 8). However, an underlying factor is noted in the responses, with a response stating that the attitude of faculty itself needs to be challenged and shaped potentially by progressive teachers, who see different values in education than simple qualification. Distance education, where it becomes the norm over f2f environments, may need to posit an alternative vision of "curriculum" from content delivery of outdated and foreign sources to a curriculum that upholds students' existing knowledge and acknowledges their autonomy, while promoting collaboration to eradicate the separation enforced between them.

4. Limitations of the Study

The major potential limitations of this study are listed below. For each, we have demonstrated how we have tried to mitigate the effects:

(i)   Lack of generalizability: the results of our study may not be representative of the full population of Palestinian Higher Education teachers, but we present these findings as truly representative of the views of those who participated in the project.

(ii)   Some responses were given in Arabic and were translated by our Palestinian co-authors. Although this has the potential for bias, we see no reason to doubt the accuracy of the translation.

(iii)   Limited technology access: the sample may not fully represent diverse groups of people with varying access to technology, which is particularly true in Palestine, but we believe we reached a good cross-section of HE teachers.

(iv)   Cost and time constraints: conducting a larger-scale study would be time-consuming and expensive, which was not feasible for this unfunded research, but we believe that our convenience sample of participant responses is credible for this study and its conclusions.

5. Discussion and Conclusions

Amongst all of the difficulties, privations and the risks to education, freedom and even life that we have described, the Palestinian belief in the power of education is steadfast. Through a decolonial lens, the use of technology to retain the nature of being Palestinian is both fascinating and powerful. Using the same ed tech tools and pedagogies in the face of oppression is decolonial in its truest sense. In the light of the geopolitical realities on the ground that have "devastated Palestine's infrastructure, fractured the economy, fragmented the integrity of the State of Palestine, and overwhelmed service providers" [44], it is clear that work needs to be done on the infrastructure to support distance education, and more pedagogic and technical training given to support teachers' use of remote and mobile learning, but it has the potential to be transformative. We say potential, because of the numerous contextual challenges, including poverty, digital poverty, lack of access, Israeli

control of bandwidth and others, as described. But we have also noted how asynchronous use of videoed materials, the use of well-curated open educational resources, and social messaging have all enabled students and teachers to allow education to continue in the most difficult situations.

Indeed, Palestinian colleagues in HE continue to teach and conduct research through all of their hardships: our respondents informed us that they have been working on such disparate fields as Massive Open Online Courses (lecturers see these as a supportive tool, but do not wish them to replace their normal lectures), policies under emergency, the quality standards of e- courses, and the challenges and solutions of the public budget of Palestine.

These two hopeful and positive findings—the determination for education to flourish despite the challenges and the provision of distance education as enabling some stability in life—are hallmarks of our experiences in Palestine, and characteristic of the determination of our colleagues to ensure the best possible life chances for their students.

Whilst these traits are not obviously generalisable from, nor directly transferable to other contexts where occupation by a hostile force is or may be in operation, we hope that distance education and the possibilities it brings to continue to deliver future opportunities and to allow the oppressed a "weapon" against their oppressor on a global stage will be utilised to the fullest. This will, however, require policymakers in politically volatile regions to futureproof their infrastructure and to provide technological and pedagogical training to teachers. In order to be used to the best ability, it will also require the physical hardware for remote and oppressed communities and individuals to access learning materials, none of which is simple to create or provide. Many other lower-tech solutions exist [30,45], such as maildrops, the use of radio, even dedicated TV channels, but these are essentially top-down and one-way transmissive forms of education. Distance education as discussed in this paper allows for dialogue, collaboration and transformative education, and it is our hope that oppressed peoples find ways to engage like this, free from colonial expectations and open to the world whilst maintaining and celebrating their heritage.

We finish, in solidarity with our Palestinian colleagues, with the hope of freedom from oppression and the best wishes of the academic community to all who strive for a better education under these circumstances.

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Supported Open Learning and Decoloniality: Critical Reflections on Three Case Studies

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Abstract: Open education has been highlighted as a route to social justice and decolonisation. This paper presents reflections on decolonisation processes pertaining to three educational technology projects conducted in Sub-Saharan Africa, Myanmar and Kenya, each of which featured contributions by The Open University (UK). Through recognising the importance of under-represented Global South perspectives, we consciously and critically reflect on our cases from a Global North framing to assess the extent to which the Supported Open Learning (SOL) model for engagement supports decolonisation and related processes. We use the categories of coloniality of being, coloniality of power, and coloniality of knowledge to structure our reflections. As open educational practice (OEP), the SOL model can offer a practical approach which emphasises equity and inclusion. SOL involves both an ethos and a set of pedagogical practices. This can support meaningful critical reflection and exchange while offering a pragmatic approach to the delivery of educational technology initiatives. In conclusion, a framework mapping features of SOL and their relation to decoloniality is offered.

Keywords: supported open learning; decolonisation; decoloniality; open educational resources; open educational practices; critical reflection

1. Introduction

In this paper, we critically reflect on the application of the Supported Open Learning (SOL) approach undertaken in a series of education interventions involving The Open University (UK) (which is our home institution). We provide background and context for both the concept of SOL and its potential relationship to decoloniality. The cases presented all involved collaboration with different partners in the Global South (namely, the Pathways project in Sub-Saharan Africa (2020–2021); the Transformation by Innovation in Distance Education project in Myanmar (2018–2021); and the Skills for Prosperity project in Kenya (2020–2023). These initiatives all focused on the delivery of educational technology initiatives in the Global South, and share commonalities in the challenges presented and the strategic use of open approaches to collaboration. There are structural similarities between the cases chosen as well as important contextual differences. All three of the projects were affected by the disruptions of the COVID-19 pandemic [1,2].

Acknowledging and challenging historical legacies is crucial for fostering decolonized educational practices that respect and empower marginalised communities. Historically, education and educational technology have acted as a vector for colonial processes. European colonisation often involved the intentional replacement of native languages with the languages of the colonisers. This linguistic assimilation aimed to erase indigenous cultures and identities, reinforcing the dominance of colonial powers. Educational systems played a central role in this process by implementing policies that prohibited or discouraged the use of indigenous languages in schools, favouring the imposition of European languages as mediums of instruction [3]. Didactic pedagogies, characterised by a one-way transmission of knowledge from teacher to student, have been pervasive in colonial educational systems.

Such approaches prioritise rote memorization and passive learning, discouraging critical thinking, creativity, and indigenous knowledge systems. These pedagogical practices perpetuate power imbalances and hinder the development of students' agencies and their cultural autonomy [4]. It is not surprising, therefore, that there is much interest in the possibility of leveraging education systems to arrest, ameliorate or reverse colonisation [5–8], or extend the process of decolonisation to the Global North [9,10]. This is especially apparent in the critical tradition stemming from Freire [3] and Illich [11]. Education is increasingly understood as having an important relationship to social justice [12] and open education is regularly highlighted as a promising route to social justice and decolonisation.

Open education and open educational resources (OER) provide opportunities to diversify the curriculum and challenge the dominance of Eurocentric and Western knowledge. OER are educational materials that are in the public domain or released on an open licence that permits forms of reuse. This means they can be created, shared, used, and repurposed freely. This allows educators and content creators to incorporate a wider range of perspectives, voices, and knowledge systems from different cultures and regions of the world, thereby fostering a more inclusive and decolonized approach to education [13]. Open education and OER promote the democratisation of knowledge by removing barriers to access and participation in education. This accessibility may allow marginalised communities and individuals who have been historically excluded or underrepresented in formal education systems to engage with educational resources, contribute their knowledge, and challenge dominant narratives from Western-centric discourse. In this way, open education may empower marginalised groups and support efforts to decolonise. Open education encourages the active participation and collaboration of learners, educators, and communities in the creation and sharing of knowledge. This approach values the importance of local knowledge, indigenous knowledge systems, and community-based knowledge production [14]. By recognising and incorporating more diverse forms of knowledge, open education can contribute to decolonising education by challenging the hegemony of Western knowledge and acknowledging the value of alternative knowledge systems [15]. Open education is thus increasingly seen as a route to promoting social justice [16–18].

Such claims about the potential of open approaches to support decolonisation processes must be tempered by considering critiques that have been made of this position. Open approaches to education have themselves been described as a form of neo-colonialism. For instance, OER may be freely available, but they are typically encoded with unacknowledged cultural, pedagogical, and institutional elements [19]. It has been suggested that open access publication can render academic labour invisible [20]. It is larger and more well-established institutions that have the capacity to produce OER, while effectively implementing and using OER requires a certain level of infrastructure, including reliable internet access and OER repositories. This means that OER is not a "magic" [21] technocratic solution to structural inequality or the legacies of colonialism. The literature on openwashing shows that at least some of the initiatives using the branding of "open" do not meet the criteria that most open education advocates would advance [22,23]. In the interest of retaining a critical perspective, it is fair to ask in whose interest "openness" operates [24]. At the least, we must be circumspect about grand claims of decolonisation through OER. The ambition of this paper is not to arrive at a final judgement but to explore the extent to which the affordances of SOL can support decolonisation processes as a specific style of implementation.

The cases discussed below all used SOL as a way to approach the delivery of educational technology initiatives. SOL combines the principles of open education with structured support systems for learners. It aims to provide learners with the flexibility and openness of self-directed learning while also offering guidance, resources, and mentoring to ensure their success. SOL recognizes the importance of learner agency and self-directed learning while acknowledging the need for support structures to enhance learning outcomes. It combines the benefits of open education (such as access and flexibility) with the scaffolding and guidance required for successful learning experiences that are meaningful

to the individual learner. SOL has a long history at The Open University (UK) and can be considered an expression of institutional knowledge gained through supporting atypical higher education learners as well as introducing many educators to the concept and use of OER.

SOL is an emergent approach rather than a prescribed doctrine. For distance education pioneers since the late 1960s, supporting adult learning at a distance has been a central focus during a period of rapid change in information and communication technologies. Bell and Lane [25] identified SOL with "policies toward co-learning, access to learning, quality standards and the authorship of educational material" as a key part of a paradigmatic focus shift from teaching to supporting learning. In a historical review, Ison [26] detailed four key aspects of SOL: high quality, multimedia teaching materials; locally based tutorial support; quality research and scholarship; and highly professional logistics (e.g., administration and feedback at scale). McAndrew and Weller [27] discussed how learning design can be successfully integrated into SOL. They argue that the surfacing of design elements presents opportunities to improve learner experience while open licensing encourages sharing and supports future iteration. This is perhaps the first attempt to transplant the essence of SOL as an ethos for learners to other educational technology contexts using OER as a medium. SOL was used in this way in the influential Teacher Education in Sub-Saharan Africa (TESSA) project since 2005 in collaboration with many institutions from eight African countries to provide flexible OER for educator development [28,29]. TESSA increased the transferability and formalisation of the SOL approach outside of the UK and informed the design and development of the OpenLearn repository of OER [30]. The approach also inspired a sister project, TESS-India, which localised the same OER for an Indian audience and found that open aspects facilitated this [31]. Reflecting on the TESSA and TESS-India projects, Buckler et al. [32] found that OER is a key part of supporting knowledge partnerships and cultural exchange while offering a route to addressing hierarchical power structures. Gosling and Nix [33] explored SOL in the context of work-based learning and found that the model facilitated collaboration and involvement from a wider range of stakeholders. A further route of application for SOL has been in targeting educational inequality in Western contexts. These included Bridge to Success, which leveraged OER to improve retention rates on community college courses in the USA [34], and Bringing Learning to Life, which was funded by the UK Department for Education to offer functional skills courses in English and mathematics to UK in-work learners through OpenLearn [35].

These examples suggest that the use of open educational resources (OER) has been an increasingly prominent aspect of SOL as it is employed in more diverse contexts and in new configurations. SOL is not generic or prescriptive in that it acknowledges the different and potentially diverse needs of learners which can vary according to context. In SOL, learners have access to educational resources and learning environments where they can explore and engage with the content at their own pace and according to their individual learning needs. They have the freedom to choose what, when, and how they learn, and they are not bound by traditional classroom settings or rigid schedules. SOL is thus distinguished by its combination of support mechanisms to assist learners throughout their learning journey. This support can come in various forms, such as the following:

- *Mentoring and Guidance*: Learners may have access to mentors, tutors, or facilitators who provide guidance, answer questions, and offer personalised support. These mentors help learners set goals, develop learning plans, and navigate learning materials.
- *Peer Collaboration*: SOL often encourages community, collaboration, and interaction among learners. Peer networks and online communities can be established to foster collaboration, discussion, and knowledge sharing. Learners can engage in peer-to-peer learning, exchange feedback, and collaborate on projects or assignments.
- *Learning Resources and Tools*: SOL may provide learners with curated resources, learning materials, and tools that support their learning process. These resources could include textbooks, videos, interactive simulations, online quizzes, and more. Learners are

guided to relevant and reliable resources to enhance their learning experience. Where applicable, OER fall under this category.

- *Assessment and Feedback*: SOL incorporates assessment and feedback mechanisms to evaluate learners' progress and provide constructive feedback. This can be performed through self-assessment, peer assessment, or feedback from mentors. Regular feedback helps learners identify areas of improvement and adjust their learning strategies accordingly. Increasingly, analytics from virtual learning environments are used to support this process.

In addition to these generic forms of support (which have their origin in the SOL model as used in UK higher education), we can also understand SOL as having a certain distinctive ethos and being itself a form of OEP. Pragmatically, the flexibility of OER and related OEP can support collaboration and implementation. More ideologically, SOL offers a route to the incorporation of concepts like diversity, equity, inclusion, and social justice into educational practice.

2. Materials and Methods

Since our concept for this study is retrospective, reconstructive, and reflective, the primary data that we consider come from existing project documentation and our experiences as researchers and educational technologists. We are highly aware that we present this as a perspective from the Global North, and this invites possible criticism for not including the reflections of our collaborators in the Global South. This is partly down to the pragmatics of coordinating input from historical collaborators when projects and funding have ended. There are significant constraints on the time available for post-project analysis, which is typically an underexplored area of research [36]. Our aim here is not to provide a comprehensive account of decolonisation processes for all (or even just the most important) stakeholders but to present our perspective as part of dialectical and dialogical sharing from those who worked across several such projects. There is very little literature reflecting on decolonising processes in educational technology from a Global North perspective. This may be attributable to the idea that it is usually seen as preferable to prioritise voices from the marginalised Global South. We qualify the present contribution as being consistent with the need for "a heterogeneity of conceptual, strategic and practical approaches to taking up the decolonial project" [5] and "embracing diverse possibilities for connecting and aligning changes with decolonising aims" [37]. The approach we take to our critical reflections is necessarily grounded in acknowledgement of our positionality and privilege as researchers [38], pp. 17–19, and a belief that this kind of sharing constitutes a form of open educational practice. We offer reflections on our perspectives of decolonising academic practice [10,39,40] alongside the caveat that it is not the complete picture and ours are not the only nor most important perspectives.

Decoloniality is a complex and contested concept, which has been defined as "the dismantling of relations of power and conceptions of knowledge that foment the reproduction of racial, gender and geopolitical hierarchies that came into being or found new and more powerful forms of expression in the modern/colonial world" [41], p. 440. The overarching ambition of decoloniality is more ambitious and transformative than what can be achieved within the context of a time-bound educational intervention. The scope of our framing question for the study reflects this: "To what extent (and how) can SOL facilitate or support decolonisation processes as part of collaboration in the provision of technology enhanced learning?" Within this concept of SOL, we include both pedagogical provisions and actions taken in support of community building and knowledge exchange as well as the ideological commitment to social justice, sharing equity, and working towards diversity and inclusion. The decision to present the outcomes of this study as a collection of linked case studies is guided by the sentiment that this is the approach most suited to exploratory and contextual theory formation [42].

We present three case studies [43] that are linked by their use of the SOL approach to delivery but vary in their countries and contexts. None of the projects were primarily

focused on 'decolonisation' per se but there were extensive considerations of context and attempts made to adhere to the principle of primarily being supportive. Bringing a conceptual lens to (de)coloniality within the case studies is complex. Coloniality is central to decolonial theory. The concepts of coloniality of being, coloniality of knowledge, and coloniality of power describe the enduring effects and structures of colonialism that persist beyond the formal end of colonial rule [44]. Understanding the relationship between these concepts is crucial for investigating and addressing the legacies of colonialism.

- *Coloniality of Being*: Coloniality of being refers to the ways in which colonialism has shaped and continues to shape individual and collective identities. It refers to the deep-seated psychological and ontological impacts of colonialism, including the construction of racial hierarchies, cultural inferiority/superiority, and the marginalisation of indigenous and non-Western ways of being. Coloniality of being encompasses the lasting effects on subjectivity, self-perception, and the ways individuals understand themselves and their place in the world [45].

- *Coloniality of Power*: Coloniality of power refers to the persistence of power structures and systems that perpetuate colonial relations and inequalities. It encompasses the economic, political, and social mechanisms that continue to uphold and reproduce colonial hierarchies and oppression. Coloniality of power is concerned with the ongoing subjugation of colonised peoples, the exploitation of resources, and the maintenance of systems that perpetuate racial, cultural, and socio-economic inequalities. Coloniality of power has a strong association with the epistemological foundations of colonialism [46–49].

- *Coloniality of Knowledge*: Coloniality of knowledge refers to the ways in which colonialism has influenced and continues to influence knowledge production, dissemination, and validation. It highlights the power dynamics embedded in knowledge systems, where Western epistemologies and ways of knowing are privileged, while indigenous and non-Western knowledge(s) are often devalued or marginalised. Coloniality of knowledge exposes how Western-centric knowledge has been imposed as universal and authoritative, erasing and suppressing other knowledge traditions and ways of understanding the world [50,51].

As shown in Figure 1, the three concepts are interconnected and mutually reinforcing [52]. Coloniality of power underpins and enables the coloniality of knowledge, as power structures determine which knowledge is legitimised and which is marginalised or excluded. Meanwhile, the coloniality of being reinforces and is reinforced by the coloniality of power and knowledge, as power relations and knowledge systems shape individual and group identities and self-perceptions through cultural intersubjectivity and labour relations [41,53]. In the cases below, we use these categories to structure our reflections. Here, we used the coloniality of being, power, and knowledge to structure reflections. Our rationale is that these are key elements of decoloniality which afford a flexible yet relevant focus for the differing contextual features for each case. To meaningfully scope this study, a corpus of different outputs from across the three projects formed the basis for our reflections on the relationship between SOL and decoloniality. The materials used as the basis for our reflections are collections of research outputs from the projects [54–66].
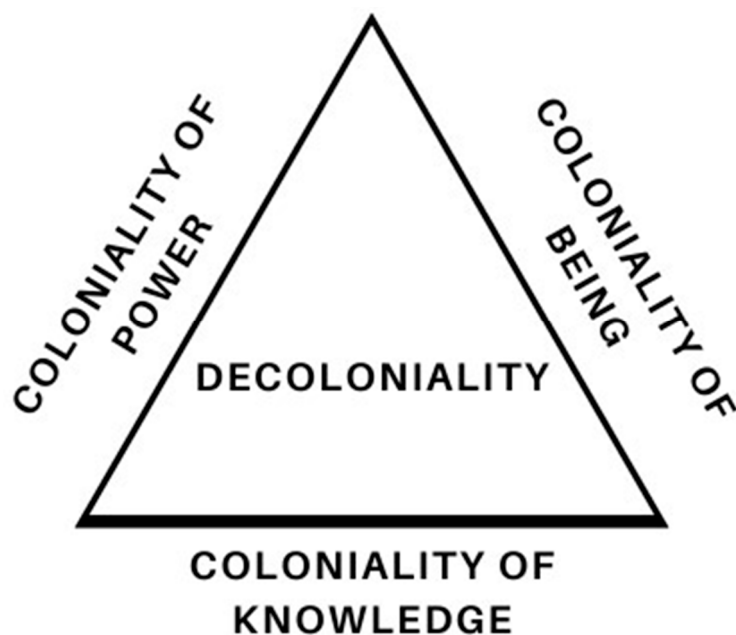
Figure 1. Decoloniality Case Study Conceptual Framework.

3. Results

3.1. Case Study 1: Pathways to Learning (Sub-Saharan Africa)

3.1.1. Background and Context

Pathways to Learning was devised as a response to the COVID-19 pandemic lockdowns and the appetite that quickly arose from this for professional development in teaching online. The OU UK had existing OER courses to draw on, and experts who could provide some time to support the endeavour. Through collaboration with the African Council for Distance Education (ACDE), two programmes were presented over six weeks in July and August 2020. The programmes were aimed at (1) Tertiary Educators in any role or subject area, and (2) Teacher Educators as a particular audience where upskilling was valued and resources were readily available from existing projects. (While 'Sub-Saharan' is a widely used term, some have criticised this language as being colonial since it condenses distinct cultures and countries into a homogeneous grouping. We use the term here as a geographical description and note that there were no restrictions on participation from anywhere in Africa).

3.1.2. Key Goals, Activities, and Challenges

The programme format was devised through discussions with ACDE and followed a common approach where existing OER courses (Take your Teaching Online [67] and Making Teacher Education relevant for 21st Century Africa [68]) were taken in their existing form without modification, and wraparound guidance, activities, and webinars were provided each week (Figure 2). Due to the desire for a rapid response, modifying the courses to suit the particular needs of the learners was not considered feasible. Instead, accommodations were made once the project was live in response to consultation with the partners. The wraparound support and activities provided opportunities for the programmes to become a better fit to the African audiences. This included some webinar sessions led by ACDE members (e.g., on quality assurance), which provided a local perspective, and a Telegram group which became a popular space for networking and discussion among participants, largely managed by ACDE members with some prompts for discussion related to course topics facilitated by staff from The Open University (UK). Priority topics of interest and need were identified in collaboration with ACDE. In some cases, these did not fit the existing content of the OER course. For example, designing assessments online was raised

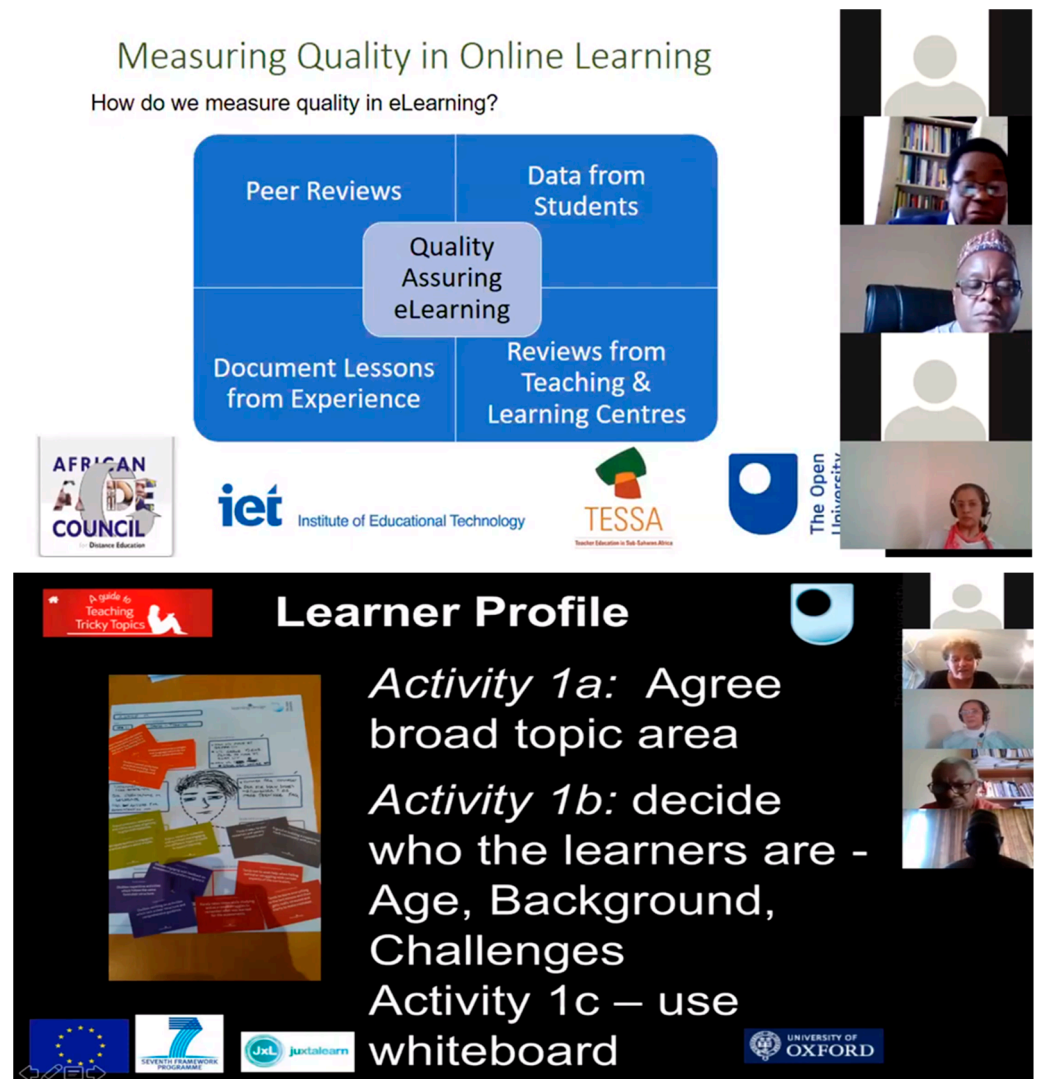as a key issue, and two webinars were focused on this topic because it was not strongly featured in the OER.

Figure 2. Tertiary Educator programme webinars (Pathways).

There was a keen interest expressed from African partners in providing recognition for completion of the course. While The Open University (UK) could not agree to provide formal credit for this open course, learners were awarded Badges and Statements of Completion.

3.1.3. Outcome(s), Impact, and Evaluation

Over 750 learners engaged with the Tertiary Educator programme and over 500 engaged with the Teacher Educator programme. These participants came from at least 16 African countries. Kenya and Nigeria had by far the greatest representation, accounting for 75–83% of participants in the introductory webinars and surveys. This may have been reflective of the networks through which the programmes were advertised. English was also the only language used in the programmes, which potentially restricted engagement. Evaluation surveys and interviews were used to gain insights into the participants and their experiences on the programmes. A total of 37% (287/771) of all those who registered interest in the Tertiary Educator course completed it. Furthermore, 66% (287/437) of those who completed week 1 went on to complete the whole course. These figures are relatively high when compared with most open online study. The evaluation showed that the cost

and lack of access had been barriers to professional development that these free and open opportunities for development were addressing. There were, however, evident barriers to participation for many, such as limited internet access and electricity in home environments.

3.1.4. Reflections from the Perspective of Decoloniality

Coloniality of Being

The aims and content of the Pathways project assume that The Open University UK was an authority with valuable expertise to share, not only in the specifics of online learning, but in wider areas of pedagogy and assessment. This can be viewed as a reflection of the position the university holds with a long history of teaching online and as an originator of the open model that—with different implementations—several institutions in Africa have adopted. But it could also indicate an untested assumption of superior understanding which could resolve pandemic-related challenges in African contexts, despite substantial cultural, political, and practical differences. There were efforts to foreground African perspectives, for example a session to share the ACDE's Quality Assurance Toolkit, but this was a minority of the content. Working entirely remotely, with lockdowns impacting on all the individuals involved, relationships had to be established and decisions made quickly and wholly virtually. Time constraints and a need to focus on action limited opportunities to negotiate ownership and roles.

Coloniality of Power

Discussions related to power among participants in the Pathway activities highlighted institutional and national issues more often than explicit issues of power between the western and African partners on the project. For example, participants lamented their own national government policies that restricted assessment to in-person exams. Issues such as the inability to award Open University UK academic credit for completing the programmes could be seen as instances where power was held in The Open University (UK). The funding coming from the UK GCRF and the proposal being led from the UK led to much decision making occurring within the UK. The rapid nature of the project limited opportunities for co-creation; for example, there was no opportunity for African partners to suggest changes be made to the OU UK-produced course materials. There was some sharing of ownership over aspects of the project, with a Telegram group being managed by the ACDE leads and acting as an important platform for discussions of the course.

Coloniality of Knowledge

Project evaluation was led from The Open University (UK) and while there was engagement in this from African colleagues—for example, when conducting interviews with participants—the design, management, and reporting were all directed from the UK. As noted above, the majority of knowledge and expertise represented in the project was from The Open University UK.

3.2. Case Study 2: Transformation by Innovation in Distance Education (TIDE), Myanmar

3.2.1. Background and Context

The UK Aid-funded Strategic Partnerships in Higher Education Innovation and Reform [69] programme's Transformation by Innovation in Distance Education (TIDE) project aimed to improve the quality and perception of distance education in Myanmar. TIDE had a holistic approach, working with a range of governmental, national, and local stakeholders to support policy and institutional change whilst developing and delivering capacity building for educators, senior management, and technical, librarian, and support staff. TIDE had a particular focus on environmental science topics and co-creating OER around the theme of environmental management; Myanmar was second on the list of countries most impacted by climate change from 2000 to 2019 [70]. The TIDE project ran for 3.5 years until its premature closure in May 2021, following the military coup in February. The project engaged with 40 Arts and Science universities across Myanmar, and directly with more

than 650 educators and technical, library, and support staff [71]. At the time of the TIDE project, a majority studied at a distance, with around 500,000 students [69], p. 145, [72,73]. The Open University acted as expert lead regarding both OER and the implementation of SOL.

3.2.2. Key Goals, Activities, and Challenges

Prior to early 2021, TIDE took place within the context of a previously isolated country transitioning to democracy following decades of military rule. TIDE aligned with and supported Myanmar's National Education Strategic Plan (NESP) 2016–2021 [74] and, as the project developed, also provided support for new strategies such as the one campus: two systems model that sought to devolve distance education provision [63,73]. TIDE also responded to the impact of rapid technological changes in Myanmar, including rapid increased access to the internet and mobile devices from 2013 onwards, suggesting how these could be harnessed for educational purposes as well as supporting digital literacy capacity building [63].

The use and development of OER were central to TIDE [73]. As shown below in Figure 3, the two-year capacity building programme for both academics and technical, librarian, and support staff was structured both to raise awareness of open education whilst supporting the collaborative creation of OER through a staged series of activities. These programmes were delivered using a cohort model, with ten universities beginning the programme each year. The two-year cycle of training was delivered face-to-face at residential schools and online outside of these twice-yearly week-long events.
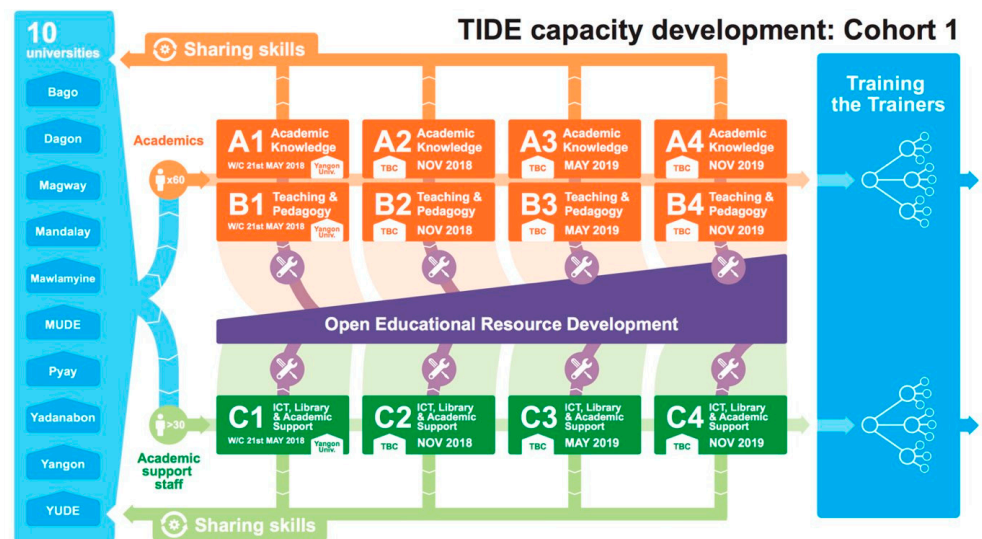
Figure 3. TIDE Capacity Development.

Site visits and the delivery of workshops and other activities face-to-face were also key. The project also produced a large range of legacy OER [75].

TIDE was heavily impacted by COVID-19 and the project underwent two pivots as a response to the emerging pandemic. First, face-to-face activities, such as the residential schools, were redeveloped for online delivery. Second, the two-year cycle of capacity building was streamlined and redeveloped for later cohorts. A further, critical challenge for TIDE was the military coup in February 2021. TIDE's model of stakeholder collaboration, which involved close collaboration with the Ministry of Education, was no longer possible. In addition, with the safety of colleagues being paramount, and university staff across Myanmar being involved in the civil disobedience movement, it became impossible to continue collaboration.

3.2.3. Outcome(s), Impact, and Evaluation

Given the early and unexpected end to TIDE, opportunities to evaluate and understand the project's impacts were curtailed, having already been disrupted by the COVID-19 pandemic [73]. Although formative evaluation had been completed prior to the military coup, no further data collection was subsequently possible, and the summative evaluation was limited to project team members and the analysis of student online course feedback [73].

As noted above, TIDE provided direct capacity building training for more than 650 educators, with an estimated 3000 further staff benefiting from cascade training, which was supported by OER. In total, 88% of educators participating in the TIDE programme "...reported applying approaches to support the development of 21st century skills for their students." [76]. TIDE also developed online open courses for students in both Myanmar and English languages and these were accessed by more than 12,500 students with 95% of learners saying they had developed new skills as a result. The project had other notable outcomes including contributing to the planned future NESP and providing support for a new open university in Myanmar [76].

3.2.4. Reflections from the Perspective of Decoloniality

The TIDE project took place within the context of the legacy of colonial rule (by the United Kingdom until 1948) and decades of military rule from 1962 onwards, before the National League for Democracy (NLD) were elected in 2015. Myanmar's transition to democracy was halted by the military coup of February 2021.

Coloniality of Being

In both the instance of British colonialism and military rule, the education system and that of higher education was developed and maintained (or not) to support certain ideologies and needs. Lall, for example, describes how British colonialism introduced "modern HE" to Myanmar, before its quality "deteriorated sharply" after 1948, particularly due to military intervention and the control of HE post-1962 [72]. Similarly, Fink outlines the lack of investment in education more widely and how education was centralised, organised, and developed to support military rule and suppress dissent [77].

A key example of this within the context of TIDE was the dominance of distance education in HE, the prevalence of which was deliberately designed to ensure limited contact between students and consequently limited opportunities for organising against the regime [77]. An outdated curriculum and centrally produced materials, a rotation system that resulted in lecturers moving institutions regularly [72], the structure of HE and staff engagement and motivation [78], and the perceived standard and applicability of courses to the job market were all challenges to be addressed [66]. Providing examples of and demonstrating alternative pedagogical approaches including more critical approaches, highlighting openly available resources, training, and curricula that could be utilised, and making use of more collaborative approaches to amplify the voices and experiences of colleagues in Myanmar (e.g., through workshops) were all aspects of TIDE that countered these approaches. The project also encouraged and provided a selection of courses, materials, and activities that were optional and potentially enabled exploration beyond TIDE's core curriculum. The cohort approach that was deployed supported a training of trainers model but also resulted in sustained engagement from our first cohort (2018–2019), members of which continued to engage and contribute to the project in different ways, including the co-development of open courses.

At the time of the project, Myanmar still retained many colonial-era laws. Within the context of OER, the context initially was one in which an outdated law (The Copyright Act of 1914) was still in place, with a new Copyright Law enacted in May 2019. Understanding current practices with regards to the use of existing resources and how to frame and introduce the idea of open licensing within this context was therefore key.

Coloniality of Power

TIDE was led by the OU UK in partnership with two UK universities, who provided environmental science expertise and had existing research connections to Myanmar, and three key Myanmar universities, with in-country support from the Myanmar-based Irrawaddy Policy Exchange (IPE). The project was the result of a period of discussion and engagement, in which developing relationships with and support from Myanmar stakeholders was key [63]. Collaboration with the Ministry of Education was essential throughout the project, both in terms of agreeing and progressing all aspects of the project but also in ensuring engagement from universities in project activities. IPE played a particularly important role in TIDE, providing day-to-day support and ensuring appropriate engagement and communication between the ministry, universities, the UK-based project team, and other stakeholders. Myanmar-based IPE staff were Myanmar nationals and had a vital role in understanding and navigating the complexities of protocol and context and enabled the project to effectively navigate existing hierarchies and structures whilst enabling consensus around the project's work.

Coloniality of Knowledge

Over 100 different languages are spoken in Myanmar and TIDE resources and activities were largely delivered in English. English is the official language of HE delivery in Myanmar, following its reinstatement in 1982 after twenty years of Myanmar language replacing it during military rule [72], p. 132.

In practice, English language levels varied across the project's participants [79] (see [73]). Although TIDE initially engaged with participants primarily in English, as the project progressed, TIDE adopted a different approach, prioritising translation support where it was most needed, e.g., for support, technical, and librarian staff or students. Live translation by Myanmar nationals was introduced to support the delivery of residential schools, other face-to-face activities, and online sessions and to enable meaningful discussion and engagement between UK and Myanmar colleagues. In addition, outputs, materials, and OER produced for the project were translated into Myanmar language. However, even translation into Myanmar language does not mean the material is immediately accessible; due to the number of different languages spoken and the political complexities regarding the dominance of Myanmar language, further work to understand participant needs, particularly as the project moved to engage with later cohorts, who were often based in more remote regions, would have potentially been beneficial.

3.3. Case Study 3: Skills for Prosperity, Kenya

3.3.1. Background and Context

This project was originally set as a part of a bigger programme (Skills for Prosperity) in nine middle-income countries in South East Asia, Latin America, and Africa with the aim of supporting the government of Kenya in establishing the National Open University of Kenya. However, due to the COVID-19 pandemic and changes in the government's priorities, it focused on developing higher education capacity and expertise to deliver quality digital education (online and blended). To support the government of Kenya in addressing the gap in such expertise, The Open University (UK) designed and delivered a 2½ year nationwide capacity development programme in partnership with 37 public universities in Kenya as a part of the Skills for Prosperity Kenya project (funded by UK Foreign, Commonwealth and Development Office) [80].

3.3.2. Key Goals, Activities, and Challenges

The project had two stages and aimed to develop and enhance existing digital education capacity for public universities and to introduce staff to the principles of effective, inclusive, and accessible online and blended education. To design the programme, a comprehensive needs assessment with the main stakeholders and based on JISC Digital Capabilities Frameworks [81] was conducted to identify staff skills and knowledge gaps

and to define the learning outcomes for the programme after desk research, and liaison with the relevant stakeholders in order to attend to national, local, and learner needs. In addition to the needs assessment, several co-design workshops and touchpoint meetings (n = 24) with a selected number of universities were held to promote a cooperative way of working, making minimal assumptions about universities' working context and to ensure the programme supports participants in meeting their institutions' strategic priorities with regards to digital education. Following the needs assessment, a two-staged programme based on the SOL model and using an existing openly licensed course [67], as shown in Table 1, was developed.

Table 1. SFPK Capacity Development Programme.

Online Education (Stage 1) Baseline Capacity Development	Digital Education (Stage 2) Mastery Capacity Development
• Level 3 training-advanced • 29 public universities • Eight-session self-study online course, requiring 30 h of study • Wraparound webinars • Online community of practice	• Level 3 training-advanced • Eight public universities • Eight-block online self-study course with moderated discussions • Expert webinars with moderated discussions • University projects supported by expert mentors • Online community of practice • Mastery programme required 72 h of study • Thought-leader training (150 h of postgraduate microcredential) [82]

Both stages of the programme involved engaging with some self-study learning material and wraparound expert and general webinars and discussions in an online community of practice (a closed Facebook group); however, the mastery programme had a mentoring scheme where university teams designed and developed digital projects based on their institution's priorities and were mentored by experts from The Open University [83]. This was an opportunity for both the OU and universities to share their practices.

In developing the programme, issues of limited and unreliable connectivity, limited access to digital devices, participants' time constraints to engage with the programme, the needs of participants with a disability, and the uncertain and difficult time of the pandemic required specific design and delivery considerations to ensure supported open learning. These included the following:

- *Flexible scheduling* with a self-paced delivery mode relying mostly on asynchronous activities to recognise participants' needs and enable them to engage with the programme at their own pace, fitting study around work and other commitments.
- *Offering downloadable content in multiple formats* since accessing online content with unreliable Internet is difficult, learning materials were available in multiple formats that could be downloaded and accessed via a mobile to a tablet. This meant offering more control to participants over their learning as they could download learning resources at times when they had Internet access, and then work on them offline.
- *Accessible learning material* meaning all learning content met international accessibility standards (e.g., images and diagrams were accompanied by alternative text for screen readers) to support participants with special learning needs and to be as inclusive and accommodating as possible.
- *Distributed award system* where a distributed award system of specialised digital badges (e.g., Online Assessment Badge; Learning Design Badge) and a certificate of completion was considered to motivate and encourage participation and to meet recognition expectations.
- *Local support:* In addition to the UK-based technical and academic teams, an online community of practice, a dedicated mailbox for individualised learner support, and a Kenyan coordinator dealt with inquiries and tasks that could not be addressed remotely.

As well as dealing with local issues, the coordinator identified cultural and contextual factors that might otherwise have limited accessibility, inclusion, and diversity.

3.3.3. Outcome(s), Impact, and Evaluation

In total, 337 participants enrolled on the programme and 233 completed it, becoming digital education champions at their institutions. Some also contributed to the formation of The Open University of Kenya. A multi-stage and longitudinal (over 18 months) evaluation of the programme based on King's professional development impact evaluation framework [84] showed that the programme had positive immediate and short-term impact on participants in terms of learning new conceptual knowledge and skills or enhancing the existing one(s) and creating changes in "product" (e.g., digital content, policy, new partnerships), "processes" (e.g., teaching, creating learning content, and assessing students), and "staff outcomes" (e.g., change in perception, critical use of EdTech, and new forms of collaboration) levels.

3.3.4. Reflections from the Perspective of Decoloniality

Coloniality of Being

The Open University as the project lead had authority and power over the programme structure, design, and content mainly due to being known as experts in digital education including open and scaled distance, and online and blended delivery. The authority of The Open University is rooted in their role as one of the pioneers and main experts in the field and having extensive experience in the area. Thus, the OU having a position towards the top of hierarchy had more to do with their knowledge and experience than the West and Africa historical and political discussions. This being said, the programme aims and scope were determined by the Ministry of Education in Kenya, taking into account the needs and priorities of higher education institutions, and the ministry influenced many major decisions.

In addition, throughout the projects, there were efforts to foreground Kenyan perspectives. This is mostly evident at the early stages of the capacity development, i.e., participant recruitment and the programme design through minimising social classification, gendering, and professional hierarchisation. The project specifically aimed at developing the capacity of females and persons with disabilities, who are often given fewer development opportunities, and participating universities were requested to prioritise nominating these two groups. In addition, by emphasising the inclusion of three staff groups, i.e., educators, managers, and support staff, the project tried to minimise the hierarchy of roles and status. Moreover, as the project covered the majority of public universities (37 out of 39), it reached most of the counties (*n* = 31), 19 of which are classed as low to middle economic class [85]. Thus, attempts were made for inclusive participation in capacity development at individual and regional levels.

Moreover, when the learning content and OER was localised for the training, the Kenyan perspective was heavily consulted. Co-identifying relevant content, co-developing the illustrations with a sample of participants and a Kenyan educational consultant (Figure 4), including images and examples that represent a variety of ethnicities, genders, and age groups, and using local lexis (e.g., matatus) were a few strategies used.

Coloniality of Power

This is the most complex unit of decolonial thinking and practice to reflect on due to the involvement of different stakeholders, such as the funder (FCDO), the Kenya Ministry of Education, the SFPK consortium lead (the disability support charity Leonard Cheshire), and the Vice Chancellors of participating universities. Although The Open University led the project, many decisions and activities were heavily influenced by systems, structures, and invisible norms within which other stakeholders functioned, and it was necessary to adapt the work around them. Funder decisions about the focus of project, Ministry decisions about the number and type of universities to be involved, vice chancellor influence,

universities' internal policies about who to attend the training or lead university teams, and participants' decisions about the type of award are examples that show that power was distributed, although not equally and fairly. For each element of the project, one or two stakeholders were directing the decisions and actions mostly due to their positions and status.
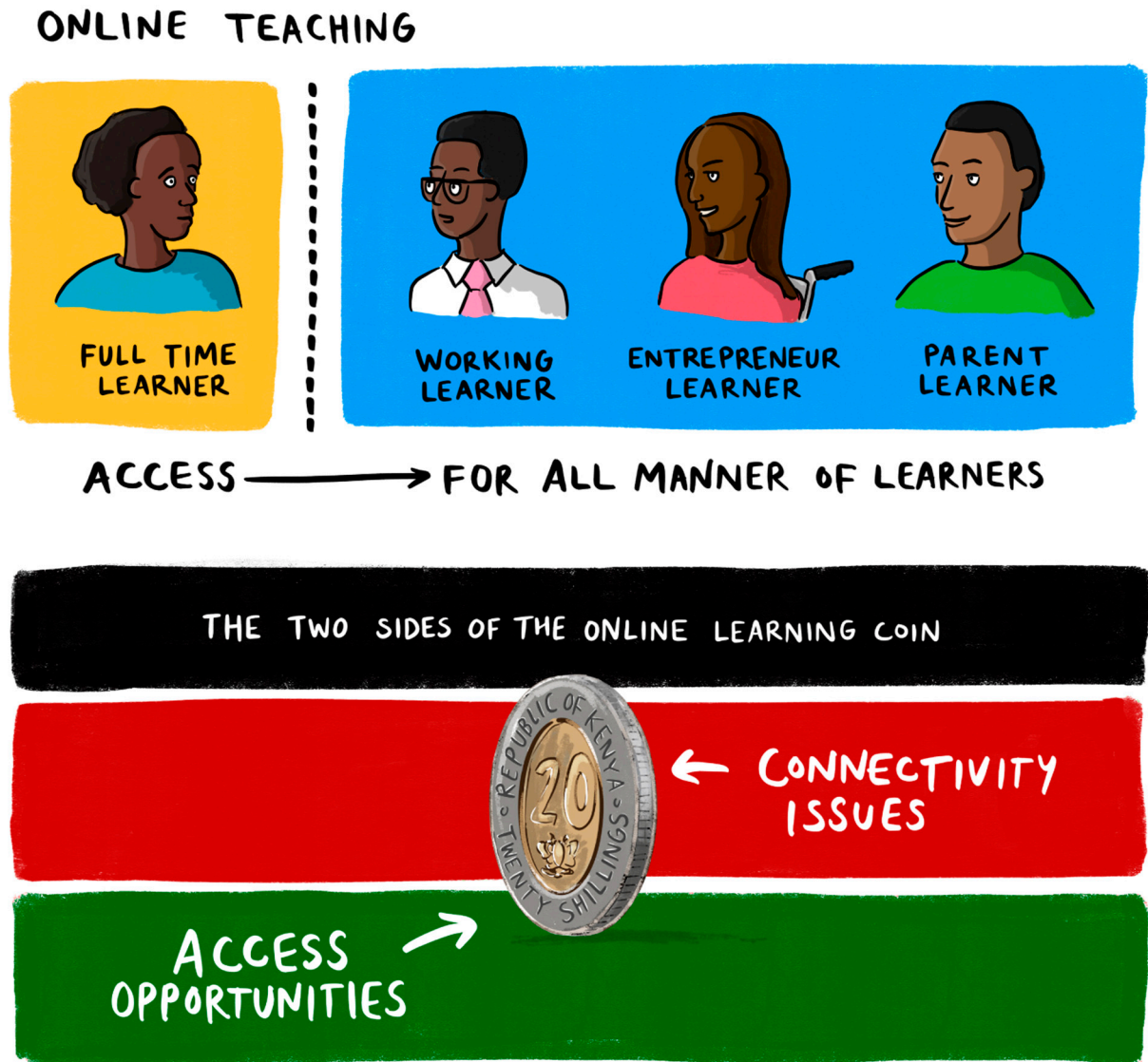
Figure 4. Examples of co-developed illustrations for learning content.

Coloniality of Knowledge

A small degree of decolonising practice in relation to knowledge was observed in the design and delivery of the programme. The knowledge of OU as leading experts in online education was dominant when providing the baseline digital competencies and skills, although the decisions about what to cover and develop was informed by what participants already knew and what they identified as their needs and preferences through a needs assessment and a series of co-design workshops. Those who attended the mastery programme had full control over the type of knowledge they wanted to learn about or enhance through setting institutional practical projects. Thus, the knowledge of the participants was not fully undermined, but was only maintained and valued in certain elements of the programme.

4. Discussion

In each of the three cases presented in this paper, The Open University (UK) was involved in the delivery of transformative digital education services as a subject expert. This meant that there was always a sense in which the UK involvement was to represent and share a particular form of expertise. The SOL approach was present throughout both the subject matter and the forms of collaboration that were employed in the projects. It is also worth noting, however, that the reality of delivering initiatives like these is highly complex in practice and often involves various degrees of compromise and accommodation. The COVID-19 pandemic, changes in government, and, in the case of TIDE in Myanmar, a military coup, meant that these projects were conducted during challenging circumstances. (In the case of Pathways, the pandemic itself provided the rationale for a project focused on digital transformation.)

When acting as an expert partner, a key challenge, therefore, is avoiding overly paternalistic attitudes and practices. Open practices and transparency in process can support a more horizontal and less authoritarian understanding of power. This can confer greater opportunities for personal freedom, agency, expression, and creativity [23,86,87]. However, this ethos can come into conflict with pre-existing structures of power in the contexts of application, some of which may be directly influenced by colonial history and heritage. Since The Open University led both the management of the project and acted as subject experts, there is a delicate balancing act to be struck between providing leadership in a particular domain and respecting the autonomy and self-determination of the collaboration partners. Sometimes, this is largely a matter of process and ongoing dialogue, but cultural differences can lead to complexity. Openness cannot be used to enforce a particular political or organisational agenda, but it can be used to demonstrate alternative forms of activity and promote cooperative ways of working. In most cases, though, the requirements of the projects mean that the focus is on the delivery of something other than 'decolonization'.

Another significant challenge relates to the dominance of English as the language of international collaboration which can disadvantage non-native English speakers [88]. All three projects were conducted in English, and this can lead to the uncomfortable situation where the language of the 'decolonising' force and the language of the colonising force are the same. Beyond highlighting this as an example of Anglocentrism and Western privilege, it is also important to note that this adds cognitive load to the non-native English speakers and increases the possibility of miscommunication. There is no obvious solution to this issue. It is feasible that automatic translation services could soon reach a point where instantaneous and reliable rendering would allow all parties to use their most familiar or most comfortable language. However, this kind of technology is not yet in place and lesser-used languages in the Global South will undoubtedly be the last to be integrated into such systems should they become viable.

Short-to-medium term interventions, like those described in this paper, are typically focused on the pragmatics of delivering what they are funded to do. Indeed, decolonisation was not an explicit aim for the projects discussed here and we have been reflecting by reading this theme back into our research activities. None of the OER used was 'decolonised' or otherwise reviewed for suitability before these projects started, and the review of materials was conducted in collaboration with project partners.

As an ambition, decolonisation is an incredibly complex concept and even more heterogeneous and multi-faceted in practice. Therefore, it is necessary to be circumspect about what can actually be achieved by educational technology interventions. This is especially the case with regards to things that happen within the timeframe of a project. It may well be that the longer-term impact can support meaningful economic, cultural, or social change, but the restrictions of the funding cycle entail that, by this point, the expert researchers will typically be focused on a new initiative. One contribution this paper tries to make is showing how ongoing reflection may be of benefit, but there is also a case for longer-term funding scenarios that could support more detailed research and evaluation over time

being more effective at supporting decoloniality. As Nusbaum [89] contends, there is no evidence that OER are any better than commercial texts at addressing issues of diversity, equity, and inclusion, but in the longer term, the diversification of curriculum—and making it easier to influence the curriculum—can reinforce or support these ambitions. It is also worth some caution here, however, since influence over the curriculum can also be misused or exploited. Some of the nuance of the SOL model can easily be supplanted over time by a more generic or neoliberal offer of technology-enhanced learning which does not emphasise OEP or the same degree of contextual support for learners. Adapting the approach to the context and the specific needs of learners and other stakeholders is a strong advantage of SOL but also makes it relatively resource intensive. Furthermore, the potential inconsistency of human support can lead to variations in learner experiences which may be undesirable [27]. A lack of ongoing support is thus a power dynamic that may inhibit the progress made towards decoloniality through research and implementation projects like those discussed above.

We do not claim that our reflections in these cases can be an exhaustive account of what is important for decoloniality, not least because we only present a particular and limited perspective on such issues. Hodgkinson-Williams and Trotter [16] describe how both ameliorative responses (redistribution of resources, recognition of identity, and representation) and transformative responses (economic restructuring, re-acculturation, parity of rights) are possible. However, this kind of transformational change is well beyond the remit of the kinds of interventions discussed in this paper. This begs the question: what kind of aspirations are reasonable within educational technology research projects? If decolonisation is too lofty or complex, what is a more reasonable ambition? Our answer here is that decoloniality can be foregrounded as part of the discussion with stakeholders, though in practice, it is unlikely to be prioritised unless it is specifically deliverable as part of a project. The SOL approach is procedural, and so more an ethos and a way of doing things than a clear goal. This leaves some hostages to fortune but can also be understood as an attempt to empower without specifying the exact path that should be followed. This can lead to an ambiguous relationship between acting as an authority and encouraging self-determination for the partners in the Global South. OER can be a route to greater control over curriculum and the more effective localisation of knowledge, but making OER central to the delivery of education typically involves sustained effort over a timeframe longer than most projects.

To provide a focus on decoloniality, we have used a simple framework structured around the coloniality of being, power, and knowledge. This conceptual framework can accommodate a wide range of relevant factors such as justice, equity, diversity, inclusion, pedagogy of care, embodiment, tradition, cultural knowledge, relation to environment, and technological infrastructure. However, its categories are also quite abstract and philosophical. Our reflections are necessarily reductive and interpretive, which should be understood as a limitation of this study. However, the flexibility of the framework means it could also be explored with other, similar projects or alternative collaboration models. Another obvious way to use the framework would be to complete it together with (or in parallel to) the collaboration teams from the original projects. This could bring to light any differences of perception and facilitate coming to a shared understanding about the potential for improvement in the future. This must be tempered with the understanding that what applies in one context need not apply in another: the temptation to create an orthodoxy or template for decoloniality should be resisted. Coloniality is a persistent force [42] which must continually be re-engaged with. SOL offers a route to this through its sensitivity to context and its recognition of the need for openness and dialogue, but this should not be mistaken for implying that the use of OER is a panacea for dealing with issues around coloniality. As Adam [90] notes, openness can be a route to addressing injustice but does not itself necessarily address injustice.

5. Conclusions

This study has compared the affordances of the SOL approach across three case studies. From our perspective as researchers at one of the world's leading distance education institutions—and with the caveat that we do not imply our voices are the only or the most important—we have argued that SOL, while being relatively resource intensive, confers several ways of supporting decoloniality. There is no easy solution to decolonisation, but SOL is an approach that can be taken by scholars and practitioners in Global North to work towards shared understanding and empowerment in context. Table 2 shows how features of the SOL model—while still somewhat abstract—can adhere to some contours of the conceptual framework used in this study.

Table 2. Relating SOL to the Categories of Decoloniality.

| | Decoloniality | | |
	Being	Power	Knowledge
Supported	• Recognising authentic human needs • Practising empathy • Tailored or individualised support	• Acknowledging differences in privilege • Acting to equalise and democratise power • Amplifying marginalised voices	• Co-creation of knowledge • Sharing of expertise • Pedagogical support • Learning design
Open	• Commitment to diversity, equity, and inclusion • Sharing practice • Emphasising transparency	• Recognition of colonial history • Engaging with the legacy of colonialism • Sensitivity to context	• Use of OER • Co-creation • Promotion of open licences • Encouraging adaptation of curriculum
Learning	• Making minimal assumptions about people or contexts • Openness to dialogue and perspective sharing • Engagement and negotiation as a route to understanding	• Avoid transactional mindset in favour of co-creation and collaboration • Expand opportunities for sharing knowledge and expertise	• Construe diverse stakeholder activity as (co-constructed) learning • Being prepared to calibrate approach depending on feedback and experience

Ultimately, investigating the coloniality of being, coloniality of knowledge, and coloniality of power requires critical reflection, engaging with diverse perspectives, and amplifying the voices, bodies, and knowledge systems that have been historically marginalised. Our reflections in this study recognise the ongoing effects of colonialism and the importance of working towards decolonial praxis that challenges and transforms these structures.

Conflicts of Interest: The authors declare no conflict of interest.

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Article

Perspectives of Distance Learning Students on How to Transform Their Computing Curriculum: *"Is There Anything to Be Decolonised?"*

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Abstract: Recent years have seen a growing momentum within UK Higher Education institutions to examine the colonial legacy entanglements of teaching materials and knowledge production, as institutions explore what it means to 'decolonise the curriculum'. While the movement began in the University of Cape Town, South Africa, in response to a student call for the statue of Cecil Rhodes to be removed, elsewhere this has become a top-down imperative from institutions themselves. In 2014 University College London hosted a panel discussion 'Why Isn't My Professor Black' building on the previous year's video asking, 'Why is my curriculum white'. By 2020 the #BlackLivesMatter movement once again illuminated the need to rebalance the power of who decides the 'facts' with a call for a transformation of knowledge production. Arts and Humanities curricula have been more easily adapted in response to this call, but the argument for decolonisation of STEM subjects in general and computing in particular have been more difficult to articulate. Moreover, the decolonisation shift has been largely confined to bricks and mortar universities, with little exploration of online and distance learning. This paper reports on an initiative in a British distance learning university to decolonise the computing curriculum, with a focus on students' perspectives and what barriers might be encountered. A survey of just under 400 undergraduate computing students revealed multiple understandings about decolonisation, and reactions ranging from hostility and resistance to strong support and endorsement. Students identified several challenges to student engagement including structural and practical concerns which should inform the computing education community in taking forward this agenda.

Keywords: decolonising/decolonizing; distance learning; students responses/voice; computing curriculum

1. Introduction

The movement to decolonise curriculum has gathered momentum across UK universities in the past few years. This has largely been actioned in Arts and Humanities where identifiable actions to redress legacy coloniality in teaching content have been implemented. However, initiatives to examine Science, Technology, Engineering and Mathematics (STEM) disciplines have so far been fewer and present a challenge for educators both in terms of curriculum content as well as pedagogy.

The context of this study was an exploratory project within the School of Computing and Communications at a large distance education university, The Open University (OU) in the UK. The project brought together a small group of academics in the School (the current three authors plus four other academic colleagues) to examine how decolonisation might apply within our own field, both as theory and in practice. This was enabled through resources set aside within our faculty for the scholarship of teaching and learning [1].

If, as Tuck and Yang propose, decolonising is not a metaphor [2], then there are four considerations. Firstly, how do we understand and engage meaningfully with the

decolonising movement so that our efforts are not tokenistic. Secondly, how do we influence change within the teaching and researching of a highly technical subject such as Computer Science which is rooted in 'facts'. Thirdly, the Open University is an online institution, located in the UK across four nations, that is already positioned as inclusive and open to all. Finally, how do computer science students understand this concept and how can we engage them in taking forward necessary changes to their curriculum?

The trajectory of this project differed from decolonisation initiatives happening at other universities—it was not a response to student-led protests, nor was it part of a university-led top-down initiative. The Open University has been delivering open and distance learning for more than 50 years and is a world leader in using digital technologies and online methods for remote learners. Alongside this, researchers based at the OU have pioneered new fields such as learning analytics and been at the forefront of Massive Open Online Courses (MOOCs), Badged Open Courses (BOCs) and other online teaching phenomena over the past two decades. The recent COVID-19 pandemic saw a pivot by many traditional brick-and-mortar universities to online teaching, resulting in increasing interest in online pedagogies and technology-enhanced learning. This brings with it new challenges, for example how to ensure that online teaching and learning can respond to other movements for change within the sector, including decolonisation.

Hanesworth suggests it is imperative that those involved in curriculum development (academic or otherwise) consider 'our own identities, biases and backgrounds in the creation of curricula and teaching experiences in order to develop our understanding of how these impact on student learning experiences and how we should adapt our teaching appropriately' [3] (p. 16). We thus began by considering our own and collective positionality in relation to this project. The reality of doing this positionality exploration was complex and challenging, considering the varied backgrounds and identities of team members, although united by our commitment and academic interest in social (in)justice and equity [4]. For the authors involved in writing this paper, we acknowledge that as three white British academics, our views could be seen to reflect a Eurocentric 'white saviour' perspective.

Coming to this with a wide range of disciplinary backgrounds, over time we developed a common perspective on the issues we wanted to explore. We agreed that 'Computing' in this context should refer to the study of IT systems and related disciplines rather than the narrower field of Computer Science only. This necessarily then entails a fundamentally *sociotechnical* perspective on computing [5].

In our initial scoping document for the project, we specifically advocated for the adoption of a *critical* sociotechnical approach, which '*considers the entanglement of human, organisational, and technical components in a systemic assemblage as well as the* material infrastructure *of computing systems, both hardware and software, along with design, development, deployment, and regulation . . . analysing structural configurations of power and their differential impacts*' [6]. Decolonising would thus entail embracing the 'decolonial option' as a form of compensatory ethics, '*attempting to think through what it might mean to design and build computing systems with and for those situated at the peripheries of the world system*' [7] (p. 21).

2. Theory and Literature Review

The second part of our title reflects the viewpoint that some of our students expressed when we carried out our survey about attitudes to decolonising the computing curriculum. Mustafa Ali, who led the overall research project of which the work described in this article forms one part, summarises this position, common among many computer scientists, as '*surely it is somewhat of a stretch to describe computing as "colonial", especially since colonialism as a phenomenon tied up with imperial structures of domination and settlement is a thing of the past*' [7] (p. 16). Ali disagrees strongly with this position, arguing that computing "*is founded upon, and continues to embody aspects of, colonialism*" [7] (p. 21).

Shahjahan et al. [8] reviewed literature on decolonising curriculum and pedagogy in higher education, undertaking a critical analysis of 207 articles and book chapters. They divide the literature into three themes (decolonising meanings, actualising decolonisation

and challenges to actualisation) through which we now explore the existing research on decolonising the computing curriculum in particular.

While decolonisation should be distinguished from other movements to redress inequity and increase diversity and inclusion, it is worth recalling the past challenges to knowledge systems in science and technology. Feminist Science and Technology Studies have long been critical of the design and architecture of computer systems which overwhelmingly represent the perspectives and voices of one group of people, namely men, and where users in the imagination of the designer are presented as 'everybody' [9]. Authors such as Sandra Harding alerted educators of the need to examine the standpoint of those involved in scientific knowledge production [10] and as Haraway has argued, '*"subjugated" standpoints are preferred because they seem to promise more adequate, sustained, objective, transforming accounts of the world*' [11] (p. 584). Indeed, technology itself is never neutral but is co-constructed with race and gender. Gendered meanings and attributes are inscribed into technologies even if the creators and users are not aware of this [12]. These are also mutable and subject to change over time. Computing culture only became inscribed as masculine in the UK from the 1970s onwards after initially being considered 'women's work' [13], a phenomenon observed in the US and elsewhere too. There are numerous, now well-known, examples of technologies and innovations that have been gendered by design [14], as well as studies showing how algorithms including search engines, can contribute to ongoing inequities [15,16]. Critical race perspectives have also highlighted the racism inherent in technology design, for example, as Buolomwini has illustrated, in facial recognition technologies and AI, leading to the ongoing replication of historic racial injustices [17,18].

Taking the notion of co-construction further, an increasing body of work has looked at what Amrute and Muillo [19] describe as Computing in/from the South, using this as both an empirical and a methodological framework. As well as feminist epistemologies, this brings the contributions of non-Western and queer knowledge systems to the examination of computing worlds [19]. A number of decolonisation interventions are focused on redressing gaps and absences to bring Indigenous knowledge and belief systems into STEM education more generally [20]. This includes challenging unsustainable extractive practices that underpin computing technologies by the introduction of ancestral knowledge into computer science education [21,22]. Building on traditions of using ICT for development (ICT4D) as well as the historical use of ICTs by progressive and social justice movements, many decolonising initiatives are using technology to support marginalised and Indigenous communities to bring their knowledge online [23], including online spaces such as Reddit to build resilience among Asian American and Pacific Islanders [24]. In Aotearoa/New Zealand, a decolonising project focuses on supporting the empowerment of Maori people to shape ICT education and professions through '*seeing Indigenous knowledge as the context for computing, a basis for deeper learning, or even a reason for learning*' [25] (p. 1101), while in Guatemala, a project co-designed with the Ixkoj Ajkem Council in Xenacoj, offers '*a novel re-imagination of computational modelling for teaching and learning about complex systems that is grounded in Mayan traditions of garment weaving*' [26].

This view from the South extends to scholars and/or migrant communities in the global North. Wong-Villacres and colleagues [27] present the perspective of a group of Latin American students of HCI in the US, who challenge the universalising assumptions of the knowledge and teaching approaches in this subdiscipline. Roldan et al. suggest that involving youth from nondominant communities as design partners in computing education can contribute toward decolonisation: '*Inspired by a decolonizing imaginary framework (decolonization as a theoretical guide), we aim to transform the inherited world of computing as being historically for White cis-men by restoring the subjugated knowledges of youth who have been marginalized*' [28].

Stressing the importance of a sociotechnical approach, Alvarado Garcia and colleagues have developed a framework for approaching decoloniality within the subdiscipline of Human Computing Interaction (HCI) that can support researchers '*to investigate their own practice and the spaces of sociotechnical research and learning they inhabit*' [29]. Their framework

is based on five pathways for HCI researchers and practitioners: '*Understanding The Why*' (reflecting on the colonial histories of knowledge production), '*Reconsidering The How*' (understanding the colonial roots of methods and tools), '*Changing the For Whom*' (refocusing criteria around 'good' research to make it more relevant to participants), '*Expanding The What*' (embracing multiple frames of references and cultural perspectives) and '*Reflecting on The What For*' (unpacking and resisting existing power dynamics in the field) [29].

There is a growing awareness of the racist history of some of the foundational knowledge behind scientific disciplines, much of which underpinned the emergence of Computer Science and modern computing practice more widely, for example the association of early statistical methods with eugenicists such as Francis Galton. Engineering educators have also begun to question the knowledge that underpins several engineering disciplines based on the imperative for resource extraction that drove the colonial and imperialist expansion of the 18th and 19th centuries [30].

Eglash et al. point to specific examples of race-positive design in developing CS curriculum including the 'application and assessment of African fractals, Native American bio-computation; urban artisanal cyborgs and other hybrid forms' [31]. In some cases there is an explicit move to connect to the IT industry: for example, a framework based on SFIA (an international skills and competency standard, standing for 'Skills Framework for the Information Age'), which was developed in South Africa, was based on an 'understanding of requirements as set out by the South African ICT industry and to this extent, address the need for a decolonized ICT curriculum' [32].

Following the calls for decolonisation of universities originating with the Rhodes Must Fall activists in South Africa, where lived legacies of colonial systems are physically visible and ongoing, and in the wake of the global Black Lives Matter movement that grew after the death of George Floyd, a number of British universities have more recently embarked on projects aiming towards decolonising the university [33]. Initiatives have involved whole institutions as well as focusing on specific areas of curriculum.

There are a range of challenges faced by HE institutions in carrying out decolonising curriculum initiatives, notably that 'a decolonising education is one that might arouse opposition, incredulity and even outright hostility. It interrupts the perceived order of things' [34] (p. 198). Challenges include student resistance, as well as the context, such as the institution type and specific disciplinary differences. Other institutional barriers are leadership support or lack of it, as well as resource availability such as staff, knowledge, or funding. The final challenge, again relevant within the context of this study, can be the lack of specific Indigenous knowledge that could replace or supplement existing curricula [8].

Three examples below show how individual universities have been addressing decolonisation within the Computing field.

(a) Beginning in 2020, a prestigious UK university initiated a university wide project of Decolonising the Curriculum through re-framing established values in their module review and update process. By 2022, the focus moved to college-level discussions on a broad range of topics including diversity, EDI and decolonising, with the aim to raise an awareness of what decolonising is about via workshops and enabling inclusive behaviours. These activities have been further developed through an incubator approach with outputs such as a 'decolonising STEM' blog with four case studies for module leaders. In the summer of 2023, the cross-university team presented a re-imagined tool kit on their experiences over this four-year period 'Encompassing and decolonising STEM in our learning and research'

(b) A post-92 university (former polytechnic) has been supporting curricula decolonisation through signposting to external podcasts, videos, articles and resource lists. Internally there are also discipline-specific resource lists including lists from the School of Science and Technology. Critical questions support the process of curricula decolonisation and the library is running a 'Hidden Voices' campaign to find voices who have not been previously heard.

(c)   A university in the US has developed a module called Critical CS1 that teaches Computer Science through feminist and critical race theory. The module includes critiques of power and of algorithmic decision-making ... '*highlighting how diverse ways of knowing are supported or resisted through epistemologies of computer science, and by introducing racial and gendered marginalization to students as both a political and epistemological problem*' [35] (p. 301).

We have already shown how computing should be seen in its wider sociotechnical context in order to begin addressing colonial legacies and possibilities for decolonisation of curriculum. This necessitates foregrounding social justice and addressing continuing colonial dependencies within the computing and IT world ecosystem [30]. As the field of computing and related subjects rapidly expands, subdisciplines within computer science are developing their own explorations and perspectives on decolonisation, for example, in HCI [27,36–39] and Artificial Intelligence [40,41], as well as in Science and Technology Studies (STS) and digital media [42]. The teaching of ethical values within computer engineering education are considered necessary for creating professional capabilities for the future, curriculum that can support '*students' development as engineers who are respectful of people and the planet*' [30]. Educational technology itself may also be become a barrier when it comes to decolonising curriculum, as the medium may constrain the efforts of educators who want to incorporate more critical reflection and inclusivity rather than merely functionalist approaches to curriculum delivery [43]. Indeed, online and distance education was noted by Shahjahan et al. [8] as a major gap in the literature and recommended further research as more and more universities have adopted remote learning practices, especially during the COVID-19 period.

Student engagement with decolonisation varies across locations and can become a barrier to, as well as an enabler of, this process. As noted above, original decolonising movements, for example those in South Africa, have been sparked by student protests. Within the UK, student-led calls for decolonisation, built on the Rhodes Must Fall protest at the University of Oxford, converged via the National Union of Students. In 2014, University College London students produced a video 'Why is my curriculum white?' with protests in 2015, at Warwick and the London School of Economics, and in 2016, at Bristol, Birmingham and Manchester, which were also student led. Student counter-spaces for activism around anti-racism, as well as decolonisation, often exist in parallel to the formal curriculum and teaching which rarely have explicit support from academic departments [44]. However the subsequent strategic initiatives of many universities to address the decolonisation agenda have potentially led to '*institutional co-option, incorporation, and the dilution of the radical message of decolonising*' [45]. Meanwhile, formal diversity efforts and policies are not adequately addressing the concerns of racially minoritised students who feel a sense of alienation from predominantly white universities [46]. Moreover, there is a call to move away from a focus on individuals (both as role models and in efforts to support individuals) which can '*superficially appear reformatory*', and instead focus on systemic barriers [47].

The involvement of students becomes vital for those projects that are aiming to include Indigenous voices and communities in knowledge production. Ancestral Computing for Sustainability (ACS), an initiative in four US universities, draws on Indigenous methodologies and Participatory Action Research, using 'storywork' with students as co-researchers to reflect on wider issues of ethics and sustainability. They outline how for African American and other Indigenous/earth-centred communities, '*their ancestral knowledge may be embedded in the daily lived experience and cultural aspects of life such as foodways (family recipes, food stories/ethnographies; farming and food growing practices); language (expressions, sayings, idioms); childrearing and family socialization practices (family reunions, oral histories); and religious/spiritual aspects (dreams, visions, baptismal and tent revival stories); and other dimensions of shared family knowledge.*' [22] (p. 437).

Many researchers have noted that student resistance was the biggest barrier to engaging in decolonising the curriculum and pedagogy, with majoritised student groups expressing resistance to challenging mainstream knowledge [8].

3. Methods

The data reported in this article come from two principal sources:

- a large-scale survey of undergraduate students;
- a series of online workshops with some of the students who had answered the survey.

We opted to use a mixed-method survey of undergraduate students through a survey instrument and submitted and received approval from the OU Human Research Ethics Committee. The university's student survey panel undertook the sample selection and participants were selected in a non-random way. Module chairs were first asked to 'opt in' to the survey and internal policy ensured students were not over surveyed, for example, students were excluded if they had previously been invited to complete a survey that month and/or had received four surveys invitations that year. A survey invitation was subsequently sent to 3695 undergraduate students, across 17 different modules. Of these, 399 participants completed the survey, of whom 394 consented to the use of their data—a pleasingly high response rate of 10%.

While survey participants were self-selecting and were not asked for demographic details, we were given access by the university to the demographic characteristics they had disclosed on their registration records, including gender, religion, ethnicity, disability and age. We maintained the anonymity of respondents throughout our analysis (as required by the ethics committee and guaranteed to respondents), with strict controls over who had access to the demographic data.

We used these demographics to check that the population of respondents was broadly similar to that of our whole student cohort in the School of Computing and Communications. In summary, the gender balance of respondents (21.3% female, 78.7% male) was broadly the same as the student population; the ethnic balance likewise was similar (86.3% white, 4.3% Asian, 3.6% Black and the rest from other groups); the respondents were a bit older than the student population; and rather fewer respondents (13.2%) had a declared disability than typical students (around 20%). Although religion is an interesting factor in relation to decolonisation, most students did not declare this to the university—35% had chosen 'prefer not to say', and 41% had chosen 'none'. Further details of the demographic characteristics are in an earlier paper about this project [45].

The survey was carried out using the onlinesurveys.ac.uk tool, provided for the UK academic community by JISC, and ran for four weeks in June 2022. The survey consisted of 17 questions: 12 quantitative questions using a five-point Likert scale and 5 qualitative questions using a free text box (along with an 'any other comments' box). Of the quantitative questions, 9 were taken from an instrument that was developed and validated by Thomas and Quinlan, the Culturally Sensitive Curricula Scales [48]. The other three quantitative questions, plus the five qualitative questions, were developed for this survey. Full questions for the survey can be found in Table 1.

Table 1. Survey questions.

Likert-Scale Questions (Choice of Five Options, from 'Strongly Agree' to 'Strongly Disagree')
1. The curriculum raises critical questions about power and/or privilege that are usually taken for granted
2. The curriculum encourages students to challenge existing power structures in society
3. The curriculum encourages students to critique unearned privilege
4. The curriculum encourages students to connect learning to social, political or environmental concerns
5. The curriculum encourages students to take actions that fight inequity or promote equity
6. The curriculum features people from diverse backgrounds
7. People of diverse ethnicities are represented as researchers or professionals not just as participants in research, clients, consumers, customers, etc.
8. The curriculum respects that different cultures may have different understandings, skills and/or philosophies
9. The curriculum addresses problems that are of concern to marginalized people/communities

Table 1. *Cont.*

Likert-Scale Questions (Choice of Five Options, from 'Strongly Agree' to 'Strongly Disagree')
10. Do you see yourself reflected in the module materials?
11. How well do the materials value/appreciate difference?
12. Does the module allow your lived experience to be drawn upon?
Free-text questions
13. What does decolonising mean to you?
14. What do you think it means to decolonise the computing curriculum?
15. How do you think we can start to decolonise computing at the OU?
16. It is important to engage students as partners in decolonising activities—how best could this be done?
17. What challenges do you foresee?
18. Any other comments?

The quantitative data from the survey were analysed in two ways. First, we obtained an overview of the questions about which respondents felt strongest, through a tallying method; second, we analysed through SPSS whether question responses varied by demographic characteristics, using two-tailed *t*-tests. We identified statistically significant differences (at the 95% confidence interval) according to three demographic factors, gender (female/male), ethnicity (white/non-white) and religion (religious/non-religious). We acknowledge the flaws of using binary gender for these calculations, which is the way we received gender demographics, and for grouping together all non-white respondents into a single group, which was due to the relatively small number of any single non-white ethnicity. Religion is not reported in this paper given the high numbers of respondents who had not declared a religious affiliation.

The qualitative data open-text responses were analysed using inductive coding. Two members of the project team took the qualitative question with the most responses (*n* = 270), which asked the question 'What does decolonising mean to you?', coding all responses individually and then combining their codes. We tested this with the team for intercoder reliability, by coding a sample of comments across the team [49,50]. This produced a set of 13 broad codes, showing views of decolonising computing from the very positive to the very negative, which were in turn applied to two further qualitative questions.

These codes were then grouped into three broad categories, reflecting the positive, neutral or negative stance of the response (see Table 2).

Table 2. Categories and codes used in qualitative coding.

Position	Code
Positive	Accurate history
	Global perspective
	Inclusive perspectives
	Independence
	New ways of thinking
	Removing privilege/bias
	Undoing colonisation
Neutral	IDK (I don't know)
	No response
Negative	Irrelevant to Computing
	Not needed
	Rewriting history
	Woke Marxism

The final two qualitative questions were thematically coded differently (see below). As well as collecting data on our students' views, we used the survey to obtain participant consent for the qualitative student workshops. A total of 54 students agreed and were

invited to be part of the workshop; of these, 18 students expressed an interest and eventually 9 students took part across two different online workshops in October 2022.

4. Findings

This paper is principally concerned with responses to the qualitative questions, and specifically those around student engagement. After a brief discussion of the quantitative data and the early parts of the qualitative data, this section will consider the way that student engagement was understood by respondents, both in terms of ways to engage students and in terms of the challenges to engagement, and will specifically focus on the voices of Black and Minoritised female students in the survey.

The full analysis of most of the Likert-scale questions is beyond the scope of the paper; more details can be found in our earlier paper [51]. However, we include here brief details of the key results of these questions, to inform later discussion.

Table 3 contains the 12 Likert-scale questions ranked by the percentage of all respondents who answered, 'strongly agree' or 'agree'. In six out of the twelve questions, *t*-tests showed a statistically significance difference according to gender or ethnicity, and the nature of that difference is reported.

Table 3. Key results from Likert questions.

Question No.	Question Summary	% Strongly/Agree	Statistical Significance	Details of Difference
6	People from diverse backgrounds	52.1	Gender: $t(114.269) = 2.389$, $p = 0.019$	Males (M = 2.40, SD = 0.890) agreed more than Females (M = 2.71, SD = 1.104)
4	Social/political/ environmental concerns	50.5	None	-
7	Diverse ethnicities shown as professionals	46.9	Gender: $t(119.732) = 2.446$, $p = 0.016$	Males (M = 2.45, SD = 0.923) agreed more than Females (M = 2.76, SD = 1.060)
12	Own lived experience	46.5	None	-
8	Different cultural understandings	46.4	None	-
10	Self reflected in module materials	41.0	None	-
11	Materials value difference	35.8	Gender: $t(123.744) = 2.255$, $p = 0.026$	Males (M = 2.67, SD = 0.866) agreed more than Females (M = 2.86, SD = 0.866)
9	Problems concern marginalized people	29.5	None	-
1	Critical questions regarding power/privilege	24.1	Ethnicity: $t(374) = 2.184$, $p = 0.030$	Non-white respondents (M = 2.87, SD = 1.191) agreed more than white respondents (M = 3.22, SD = 1.001)
2	Challenges existing power structures	20.5	None	-
5	Encourages actions to promote equity	19.2	Ethnicity: $t(374) = 2.088$, $p = 0.038$	Non-white respondents (M = 2.98, SD = 1.170) agreed more than white respondents (M = 3.31, SD = 0.994)

Table 3. *Cont.*

Question No.	Question Summary	% Strongly/Agree	Statistical Significance	Details of Difference
3	Encourages students to critique privilege	17.2	Ethnicity: $t(374) = 2.231$, $p = 0.026$	Non-white respondents (M = 3.02, SD = 1.225) agreed more than white respondents (M = 3.37, SD = 0.980)

Turning now to the free-text questions (labelled as Qu. 13–17 in Table 1), these fell into two groups. Questions 13–15 covered how respondents saw the nature of decolonisation and its relationship to Computing; Questions 16 and 17 covered issues around student engagement in decolonising the curriculum.

For context we will summarise briefly the responses to Questions 13–15 with Table 4 showing the number of responses for each question (as not all respondents answered all questions), along with the proportion which were coded into each of the three categories of positive, neutral and negative. This shows a broadly positive view, though becoming less so as the questions progressed. It is worth emphasising again that all of our respondents are distance-learning students based across the whole of the UK, and that all were mature adults, with the single greatest age group being 30–39 year olds (39%), followed by 40–49 year olds (26%).

Table 4. Categorised responses to Question 13–15.

No.	Question	Responses	Positive	Neutral	Negative
13	What does decolonising mean to you?	267	65.9%	16.1%	18.0%
14	What do you think it means to decolonise the computing curriculum?	251	57.8%	18.7%	23.5%
15	How do you think we can start to decolonise computing at the OU?	243	46.1%	22.6%	31.3%

To illustrate the three categories of responses, the following are representations of what decolonising computing means to student participants:

- Positive responses: "to rethink and revise the curriculum so that it takes a broader view rather than just the European or Euro-centric". "Not focusing on white people white men as the only way".
- Neutral responses: "I have no idea, too many fancy words going on." "Honestly, before now, I had never heard of the word."
- Negative responses: "Nothing, this is a computing course not critical race theory". "'Decolonisation' is part of the insane woke ideology, which [has] no place in academia, least of all in a STEM subject such as computing or IT."

4.1. Student Engagement in Decolonising the Curriculum

We will now focus specifically on the responses to Questions 16 and 17, concerning the engagement of students in decolonising the curriculum. One of the underlying objectives for this project was to engage with students in shaping ways to bring decolonisation as a concept and as a practice into the curriculum and pedagogies of teaching computing. In a two-part free-text question we asked students how best to engage with them to achieve this and what challenges they might foresee in putting this into practice. Responses in this section are not framed in terms of positive or negative views, but rather in terms of the way students thought about the issues, and were categorised through a loose form of thematic analysis [52].

Out of the 394 total respondents, there were 225 responses to Question 16, and 208 responses to Question 17. The demographics of respondents to these specific questions

were very similar to respondents who answered any questions, though there were slightly fewer female respondents to these questions (19%) compared to all respondents (21% female), and slightly fewer white respondents to these questions (83%) compared to all respondents (86% white), with somewhat more respondents who were either Asian or Black.

Student responses to the first question, namely how best we could involve them, fell into three main categories, which we have labelled as Explain, Engage and Extraneous (see Figure 1), which are described below:

- *Explain*—communicate, examples, fiction readings, new curriculum examples, new learning materials.
- *Engage*—consult, co-create, include, inclusive perspective, involve. Possible methods suggested for this include: focus groups, surveys, workshops, newsletters, debate, forums, emails, included in development, co-creation, online discussions, previous and currents students, industry, social media, student panels, questionnaire, webinar, working groups.
- *Extraneous*—these responses expressed either do not know, not needed or irrelevant.
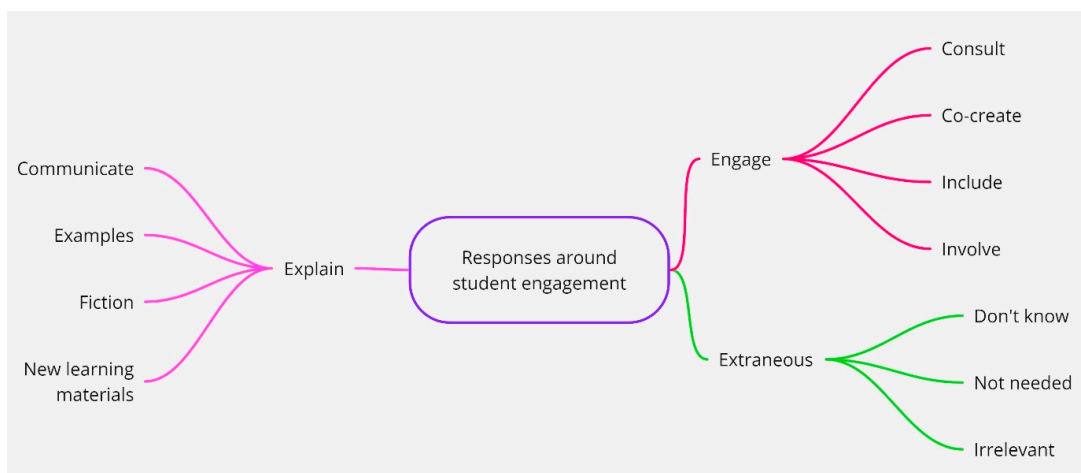
Figure 1. Categories of response around student engagement.

4.2. Challenges to Student Engagement

The second question asked 'What challenges do you foresee?' This was left quite open, although the implicit meaning was what challenges did they foresee *in engaging students as partners in decolonising activities*. However, some also interpreted this as challenges about decolonising the curriculum more widely, and the responses here are described in those two broad categories. They are summarised in Figure 2.

Figure 2. Responses to challenges.

We found six types of challenges that students anticipated regarding student engagement.

1. **Engagement of marginalised students**: These responses were concerned both with how it was possible to engage marginalised students, partly due to the smaller numbers of such students, but also pressures on their time and ener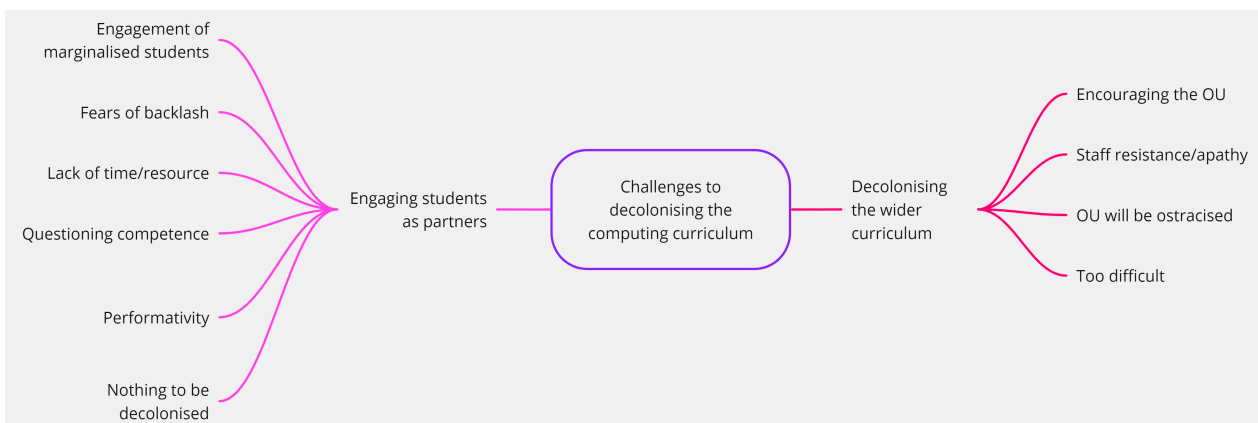gy, and also with whether it was ethically appropriate to ask marginalised students to do such work. Example responses included the following:

   - *The challenge I foresee is how to promote the participation of the marginalised participants.*
   - *Because this is a mostly UK based university, getting diverse input from students might be difficult.*
   - *But also marginalised people should not be forced to educate their peers on this topic when they have come to an environment to learn and be treated as an equal.*

2. **Fears of a backlash**: A number of respondents were concerned about how others may respond in terms of its effects on the university, and whether participating students may receive more hostility. These were not framed as hostile comments in themselves, rather as concern for others' hostility. Example responses included the following:

   - *bigoted students being unwilling to participate, creating a hostile environment for others participating.*
   - *This will cause protest, and anger, and cost the students.*
   - *I think some individuals may feel like diversity is a forced thing. Or woke culture. I think it's important to recognise the issue, but others may feel attacked.*
   - *Additionally forcing students to engage in these activities could result in bigoted harassment or comments that might not be properly handled by staff.*

3. **Lack of time/resource**: By contrast with concerns for the time of marginalised students, these respondents were concerned about the availability of time or resources for decolonising the curriculum, for both students and staff:

   - *Students are busy. Many of us work alongside our courses and are likely to have very little time to spend on this.*
   - *Already hard-pressed staff having the time and support available.*

4. **Questioning competence**: Some respondents doubted the ability of students to engage and educators to respond appropriately. In some cases, this was a judgement on competence, in others it was seen as arising from a lack of knowledge and/or awareness which prevented effective engagement. Examples included the following:

   - *Issues like these are difficult to address, and as such, students may not know how they would address these issues, so their input may be haphazard, politically motivated, or ineffective. Educators may struggle to distil concrete proposals from suggestions that are able to be implemented.*
   - *Students may not know what is decolonisation of a curriculum and why is it important. Not being able to understand this may prevent them from giving their opinion on the subject.*

5. **Performativity:** These respondents felt that, while there might be plenty of rhetoric in favour of decolonising the curriculum, in practice this manifested as empty gestures and there was little chance of actual change. As one respondent commented with the following:

   - *[Students] do not feel that what they say will actually be actioned. Too often the Government has asked for input and then ignored it and done what it wants to while citing that they 'engaged with the group affected'.*

6. **Nothing to be decolonised:** There were also several responses that reiterated the positions already identified in other questions, e.g., ridicule, insults, denial there is an issue, the irrelevance of decolonisation to computing, or just simply unsure/do not know. These were summed up in the response from which this article takes its title:

   - *The major challenge here is how you'd do it in the first place since there isn't anything there to be decolonised!*

Four further sets of challenges were identified, which related to more general issues around decolonising the curriculum.

7. **Encouraging the university**: There was a feeling among a number of respondents that the university might struggle to rise to the challenge of decolonising, but that the institution needed to be encouraged to do so:

    - *This will cause protest, and anger, and cost the students. But, that does *not* mean it is the wrong thing to do—far from it, in fact. The university has an opportunity to be a leader in equality, diversity, inclusion, and decolonisation—all of which are, I would say, at the heart of what it stands for. It's important not to let the vocal majority who are losing their privilege stop them doing the right thing.*

8. **Staff resistance or apathy:** Some respondents perceived that the challenge of decolonising the university and/or its computing curriculum arose from issues around staff unwillingness to change more generally:

    - *how could this be implemented when the tutors only mark assignments.*
    - *There is no appetite in the module teams to change material or accept responsibility for what they present*

9. **The university will be ostracised:** This extended the concerns in the earlier set of responses around a backlash. Some respondents also feared that there could be a significant impact upon the university as a whole, in terms of its standing with the current government:

    - *Another challenge is that the university may be cancelled by UK structures of power if they promote a more equitable and less biased view on current world issues that relate to computing and IT.*
    - *Right wing political parties will call this indoctrination and attempt to cut funding.*

10. **It is too difficult**: The final challenge was around the complexity of the process, and whether it would prove too difficult in conceptual and academic terms, notwithstanding other issues:

    - *I think there will be a lot of varying inputs, a lot of disagreements and restructuring of the curriculum of course is not an easy task, it also may be hard to come to a consensus that is equal and fair to everyone. If certain material also needs restructured this could prove difficult while still holding to the truth while lending less bias. Providing more opportunities for minority professors and less discrimination is also a difficult task as well as for students in the curriculum. In the end there is many difficulties to face, too many to list here.*

4.3. Amplifying the Voices of Black and Minoritised Female Students

As we saw earlier, a significant strand of the decolonising computing literature argues for the inclusion of Indigenous knowledge and/or a 'view from the south'. Although we were unable to target our sampling in the survey to Black and Minoritised students, we did analyse the responses by ethnicity and gender as given in student registration records.

During Black History Month in October 2023, which in the UK had the theme 'Saluting our Sisters', one of the present authors (Tompkins) wrote an online article, internal to the university, discussing the survey results coming from Black, Asian and Mixed heritage women. There were only seven women identifying as such, meaning the results could not be considered statistically significant, but we felt it was important to amplify the voices of this highly marginalised group, through looking at their responses to the five qualitative questions.

These students called for a shift in knowledge production via a 'decolonial turn' [7,34] through the acceptance of different and diverse forms of knowledge, to '*rethink the curriculum with new ways of delivery*' and so to produce a combination of knowledge and pedagogic transformation. It is through deeper thinking that the adaptation of curricula is possible, but how to remove the legacy of colonisation is a challenge—as illustrated in the words

of one respondent by acknowledging that to begin decolonising requires '*unpicking the ideologies that are creating colonisation in the first place*'. Dennis calls for '*free decisions made by free people*' [34] (p. 201). The use of the word 'freedom' was expressed by these female voices as they wanted to bring in their lived experience so that the curriculum did not just celebrate difference but normalised it, referring to: '*freedom to be able to apply personal learning . . . into the workplace*'.

This was further supported by a call for a global perspective through representation and chimes with Thomas's view [53] that it is through representation that one's existence is acknowledged. If one views decolonising as a transformation, then this change must not be tokenistic. One participant captured how a decolonised curriculum would represent everyone and perhaps suggests a wider focus than just celebrating difference, but also to normalise diversity: "*Don't just focus on culture, consider lived experience too*".

These Black and Brown women believe in allyship and seek opportunities for enhanced student collaboration through "*offering students the ability to engage with each other more*"; and a strong dialogue with students and alumni across the world: "*Keep in touch with students; not just in the UK, but worldwide*". To conclude the views of these students, perhaps the pertinent starting point for decolonising the computing curriculum is not just what is being done, but also the way it is done: "*Who is doing this work... do they reflect and support decolonisation of this subject?*"

5. Discussion

Our findings show that computing students have a range of understandings and perspectives on decolonisation as it applies to their curriculum. Some are curious to know more, others contend this is irrelevant to them and the subject discipline, and some are downright hostile invoking tropes such as 'wokeness' to describe these efforts. But many students identified suggestions about how to engage with the student community despite acknowledging the constraints and difficulties within a large distance education university.

Shahjahan et al. [8] (p. 95), whose work we have drawn on earlier, noted five challenges often faced by universities undertaking decolonising efforts:

(a)   '*student resistance*,
(b)   *context (institutional type and culture and/or disciplinary context)*,
(c)   *systematic/structural barriers (policies, lack of leadership support)*,
(d)   *lack of access to resources (knowledge, funding, and staff), and*
(e)   *finally, a major challenge was the recognition that there was no pure local or Indigenous knowledge and that all knowledges were entangled with each other, particularly in postcolonial and White settler contexts.*'

It was interesting to note how closely these challenges mapped onto the responses from our students, as they imagined decolonisation of their own computing curriculum, as these illustrative quotes show:

(a)   Student resistance: "*finding something to decolonise*"; "*history is written by those who won. No matter how hard you try you won't please everyone so please don't try*".
(b)   Context (culture): "*the language in this sector is so ingrained and habitual. The vast majority will see no harm and therefore find it difficult to justify the time to change*".
(c)   Structural barriers: "*red tape*"; "*how to engage the proper people. As a subject we have a small number of passionately involved people but also a large number who may be indifferent. Finding a proper balance will be difficult*".
(d)   Lack of access to resources (knowledge): "*misunderstanding of what the goal is*" (there was minimal comment by respondents on funding and staff).
(e)   No Indigenous knowledge: "*acceptance that colonisation exists amongst the student base*"; "*identifying issues that actually represent a colonial mindset*"; "*I'm not sure it is a good idea, all knowledge has a bias somewhere, would be difficult to reference specific aspects of study without having a reference*".

The position of "*There isn't anything to be decolonised*" expressed by some students may also reflect the type of institution and discipline specific context of our study. We noted above that Costa et al. argue that many educators have adopted a '*functionalist approach of education to suit commercial interests [rather] than promoting a diversity of educational experiences as reflective of a critical understanding of digital technologies and digital cultures*' [43] (p. 1). This seems to be the expectation of those students who have articulated a 'what has this got to do with computing' stance. We could therefore conclude that the distance teaching and learning model, which makes heavy use of online learning through our Virtual Learning Environment (VLE), is perhaps antithetical to the adoption of Friere's call for a '*critical educational approach that aims to use content as a starting point for dialogue and opinion formation*' [43] (p. 1).

We have noted above that the first of Shahjahan et al.'s five challenges was student resistance [8]. The idea of resistance to change is one that is often explored in management literature. For example, Repovš et al. argue that '*resistance to change addresses two important aspects: resistance as behavior and resistance as attitude*' [54] (p. 309).

Insofar as decolonisation was essentially presented as hypothetical in the survey—we were not proposing a specific programme of decolonising the computing curriculum—it can perhaps be argued that attitudinal resistance is more relevant to consider than behavioural resistance. We certainly did observe resistance in some respondents' attitudes, as we have noted above in the 'negative' categories in the earlier free-text questions and the responses to some of the challenges. However, this is offset by the larger proportion of 'positive' responses (see Table 4), and the openness of a significant number of respondents in favour of decolonisation. That some of these respondents also had questions and concerns was seen by the various challenges which were identified, but it would be inappropriate to characterise the negative responses as principally ones of resistance to change.

There are, however, undoubtedly institutional tensions and challenges to overcome in relation to decolonising the curriculum within universities similar to our own. Our university's reliance on large-scale modules whose materials are developed over time and then locked in place (either in print or in a VLE whose materials are overseen by media professionals) makes for an inflexibility which means we can only decolonise materials and pedagogy gradually. Our commitment to open distance learning, unquestionably a great strength, also makes student engagement difficult, as some of the challenges identified in Section 4.2 of this article shows.

Then there are challenges that arise from the tensions between work in Equality, Diversity and Inclusion (EDI) and decolonising of the curriculum. Many universities, including our own, have a deep commitment to EDI work, at both the institutional and departmental level, especially in the areas of gender and racial equality, through accreditation exercises such as the Athena Swan gender equality charter and the university's recent Inclusive Curriculum Tool [55]. All three of the authors of this article have been involved in this work at school, faculty and university level. However, there is an argument to be made that EDI work can get in the way of radical change, allowing universities to pay lip service but not challenge fundamental ways of working and knowledge production [46].

Lastly, there are practical issues around decolonisation of the computing curriculum. We have discussed the importance of a sociotechnical approach to computing at the start of this article. Such an approach necessarily draws on methods and concepts from social sciences and humanities [56]. It is unclear how far can this go in an undergraduate degree which is essentially conceived as technical by students and educators—there have been sociotechnical approaches to computing for many decades, but their teaching has often fallen by the wayside in UK universities since the introduction of high student fees. Moreover, as Malazita and Resetar argue, '*though many CS students become interested in practicing ethical coding, they also construct their technical competency as split from the social, political, and ideological world*' [35].

As a highly professionalised field, computing education is subject to a range of forms of external accreditation. In the UK, these include the British Computer Society (BCS), the

SFIA skills framework and the increasing use of standards for degree apprenticeships; the School of Computing and Communications makes use of all of these frameworks, as well as being assessed by various government agencies. Each has many benefits for establishing the nature of a computing professional and assuring employers of the appropriateness of our curriculum. However, they create an inflexibility to the decolonising process. Both the BCS and the degree apprenticeship frameworks, for example, require a specific form of adherence to a particular understanding of legal, ethical and professional skills. Nevertheless, while these can sit badly with decolonising the computing curriculum, they also present opportunities if these frameworks evolve; the most recent Subject Benchmarking statement on computing from the UK's Quality Assurance Agency explicitly mentions decolonising, suggesting that education providers could consider 'acknowledging and addressing how divisions and hierarchies of colonial value are replicated and reinforced' [57].

6. Conclusions

This article has particularly focused on how to engage students in decolonisation of their curriculum and universities. Historically, this was student led and in response to global movements; then universities started their own initiatives, but there are inevitable constraints on how far that can go. As we have observed, there is some overlap and blurring of mission with EDI efforts, which can provide impetus and a platform to go further but can also put constraints on how deeply things can change.

The data we have presented in this article have shown that students are well aware of the complexities and challenges of such changes, and many are open to widening their understanding, although some are additionally resistant and hostile. Subject knowledge is always changing and under review so perhaps this is no different to previous 'turns' in academic knowledge production.

One of the strengths of this study is that there have been few previous studies of decolonising computing education within distance learning. However, this also means it is not typical of the rest of the sector. To make links with colleagues in other UK higher education institutions with similar interests, members of the project team have been therefore been involved in two further projects.

First, a small grant was obtained from the Council of Professors and Heads of Computing to organise a workshop bringing together scholars from across the UK interested in decolonisation of computing education. This was held at the University of Leicester in May 2023. Discussion was held covering the nature of decolonisation, technologies and pedagogies to which decolonisation is particularly applicable, and methods for decolonising the computing curriculum. A summary is available on our research group's website [58].

Second, a further scholarship project, funded through our STEM scholarship centre (eSTEeM) and led by one of the authors of this article, has started to look at decolonising activities in computing and IT departments across the UK. Starting from the Quality Assurance Agency benchmark cited above, this project intends to 'investigate UK universities which have begun to transform their curriculum along related lines by mapping the terrain of decolonial activity', both through examining public-facing websites and through interviewing computing practitioners at a variety of universities [59]. The focus is on the process of decolonisation rather than the outcome, with the aim to provide an overview of the emerging trends in the decolonisation of Computing at HEIs, e.g., what this entails, the challenges and obstacles being encountered, and will provide suggestions on how to advance the decolonisation of the Computing and IT curriculum. If indeed there is a best practice or benchmark against which we can drive our decolonial agenda, then we need to know what this looks likes. Initial findings illuminate a range of activities within STEM including toolkits, podcasts, blogs, articles, working groups, poetry, international partnerships, awards and physical hubs. An early theme of the analysis indicates that the work underway is linked through the commonality of a collaborative approach to change, be that within a school, across departments, interdisciplinary, linking with the library or

linking with the student union or also outside the university, connecting with museums and with other universities internationally.

The results of our survey offer unique insights from the student perspective of what it means to decolonise the computing and IT curriculum within a large distance learning provider, and the affordances and constraints of engaging students in this process. Regarding decolonisation as a gradual process rather than an outcome, we acknowledge that it is both complex and continuous as dominant Western forms of knowing, and knowledge, are questioned. We hope that these results will inform computing educators about the need to shift practice in order to dismantle traditional hierarchies by enabling new perspectives to be heard, to create space for new knowledge, and for new learning to be encouraged. In doing so we must all check our privilege and be brave in asking difficult questions of those holding power.

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Review

Deconstructing the Normalization of Data Colonialism in Educational Technology

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Abstract: As learning analytics and educational data mining have become the "new normal" in the field, scholars have observed the emergence of data colonialism. Generally, data colonialism can be understood as the process by which data were considered "free" to take and appropriate. Building on this theoretical understanding, this study aims to contextualize data colonialism in educational technology by identifying and reviewing learning analytics studies that adopted a predictive analytics approach. We examined 22 studies from major educational technology journals and noted how they (1) see data as a resource to appropriate, (2) establish new social relations, (3) show the concentration of wealth, and (4) promote ideologies. We found evidence of data colonialism in the field of educational technology. While these studies may promote "better" ideologies, it is concerning how they justify the authorities capitalizing on "free" data. After providing a contextualized view of data colonialism in educational technology, we propose several measures to decolonialize data practices, adopting a postcolonialist approach. We see data colonialism not only as a privacy issue but also as a culture that must be challenged.

1. Introduction

Over the past three decades, the field of educational technology has expanded significantly and continually promised to transform education [1]. However, the "wow factor" associated with new technologies (e.g., radio, CD-ROMs, interactive whiteboards, virtual/augmented reality) often overshadows the actual needs of learners and leads to their uncritical acceptance or "normalization" [2]. Some digital technologies have even become as ubiquitous as traditional tools such as pens and paper [2]. Scholars have also begun to consider how the "normalization" of technology impacts both students and teachers.

Artificial intelligence (AI), which has existed for many years, has recently experienced a resurgence in popularity and interest due to the emergence of generative AI tools, such as ChatGPT. It has the potential to reshape teaching and learning once again [3,4] by optimizing face-to-face, blended, and online learning [5,6]. AI can retrieve large amounts of data from various sources, identify patterns, and cluster/predict these patterns; this constitutes its "intelligence". Furthermore, software engineers deploy these patterns to perform human-like actions, which makes it "artificial". AI-powered tools can assist educators in identifying and utilizing effective pedagogies based on learning data, generating teaching materials and assessments, and issuing grades and feedback automatically [7].

In education, the term "learning analytics" (LA) is typically used to describe the use of data to inform teaching. LA can be defined as the "measurement, collection, analysis, and reporting of data about learners and their contexts, for the purpose of understanding and optimizing learning and the environment in which it occurs" [8]. Using data to produce actionable insights has become a key goal of utilizing AI in education.

Nevertheless, the integration of AI and LA programs in education raises significant concerns related to the use of educational data. It prompts questions about the "normalization" of technology in education and its impact on culture and values [9]. Previous studies have explored privacy concerns related to learning data, specifically considering students' perspectives. Ifenthlaer and Schumacher [10], for example, found that students are not willing to share their personal information or the records of their behaviour online. Other studies have investigated how to respect privacy while deploying educational technologies and LA [11]. While this research offers important insights, studies on educational technology have yet to catch up with general AI research and the theory of "data colonialism", which highlights the problematic nature of the massive retrieval and capturing of data.

The concept of "data colonialism" was introduced by Nick Couldry and Ulises Mejias, two scholars in Communications and Media Studies, and expounded in various publications, such as [12,13]. Working with other scholars (e.g., [14]), they identified similarities between colonialism and the data extraction practices of recent years. Under colonialism, natural resources were considered "free" to take and appropriate, which was supposed to bring about a new social order and a better world. Similarly, "data colonialism" treats user data as a natural resource, justifying the process by introducing new social relations and ideologies.

In a macro sense, Couldry and Mejias [12] draw on examples from major technology companies, such as Facebook and Amazon, which retrieve and privatize transaction data to connect user behaviours with personal attributes (i.e., social relations) and promote a more "personalized" purchasing experience (i.e., "a better world"). This leads to significant financial gains for these corporations and can convince customers to offer up more of their data (i.e., "free" resources). Even though critics such as Mumford [15] see this as a matter of data ownership, which could be addressed through regulations, the concept of data colonialism explains how companies are using seemingly "free" data for economic benefits.

Unfortunately, educational entities are not immune to such practices. Zembylas [16] has attempted to further contextualize how AI and LA can introduce data colonialism into higher education. In the context of educational technology, learning data are commonly used to generate value (though not always profit) for institutions and promote personalized learning experiences. Moreover, users are not always aware that their data have been appropriated. Thus, the concept of data colonialism in this context deserves further exploration.

Even though data colonialism is an important notion that has raised concerns in the academic community, to date, only a few conceptual discussions (such as [12,14,17,18]) have emerged. Little research has put data colonialism in context or examined how data are being appropriated. This study aims to provide a preliminary review of the realization of data colonialism in the field of educational technology. It is not intended to provide a comprehensive and in-depth synthesis but a general overview.

In addition, this preliminary review will not immediately provide solutions or identify how to "decolonize" educational technology. However, in response to Zembylas [16], it represents the first step of this process. By providing context and evidence, it can initiate a conversation about adopting "decolonized" practices in educational technology.

2. Methodology

This study aimed to review the existing body of literature on data colonialism by reviewing articles from impactful journals on educational technology. After choosing four journals, we conducted an initial search to select articles that related directly to our discussion. We then examined how the following four key features of data colonialism are being realized: (1) appropriation of resources; (2) establishing social relations; (3) concentration of wealth; and (4) promotion of ideologies. This allowed us to provide an overview of the topic.

2.1. Search Strategy

We chose "predictive analytics" as our search keyword because there are many studies on LA using educational technology, and this is one of the core research areas [19]. Using LA to predict student success—with the help of educational technology products and other solutions offered by vendors—is commonplace in higher education [20,21]. This keyword allowed us to identify many articles about LA.

We narrowed our focus to impactful journals by identifying the top five journals about educational technology on Google Scholar and Scopus, as well as all educational technology journals indexed in the Web of Science Social Science Citation Index (SSCI). When we examined these three lists, four journals appeared twice: *Education Technology & Society, International Journal of Educational Technology in Higher Education, British Journal of Educational Technology, Educational Technology Research and Development*, and *Australasian Journal of Educational Technology*. Therefore, we focused on articles published in these journals. Figure 1 presents details regarding how studies were included and/or excluded throughout this process.
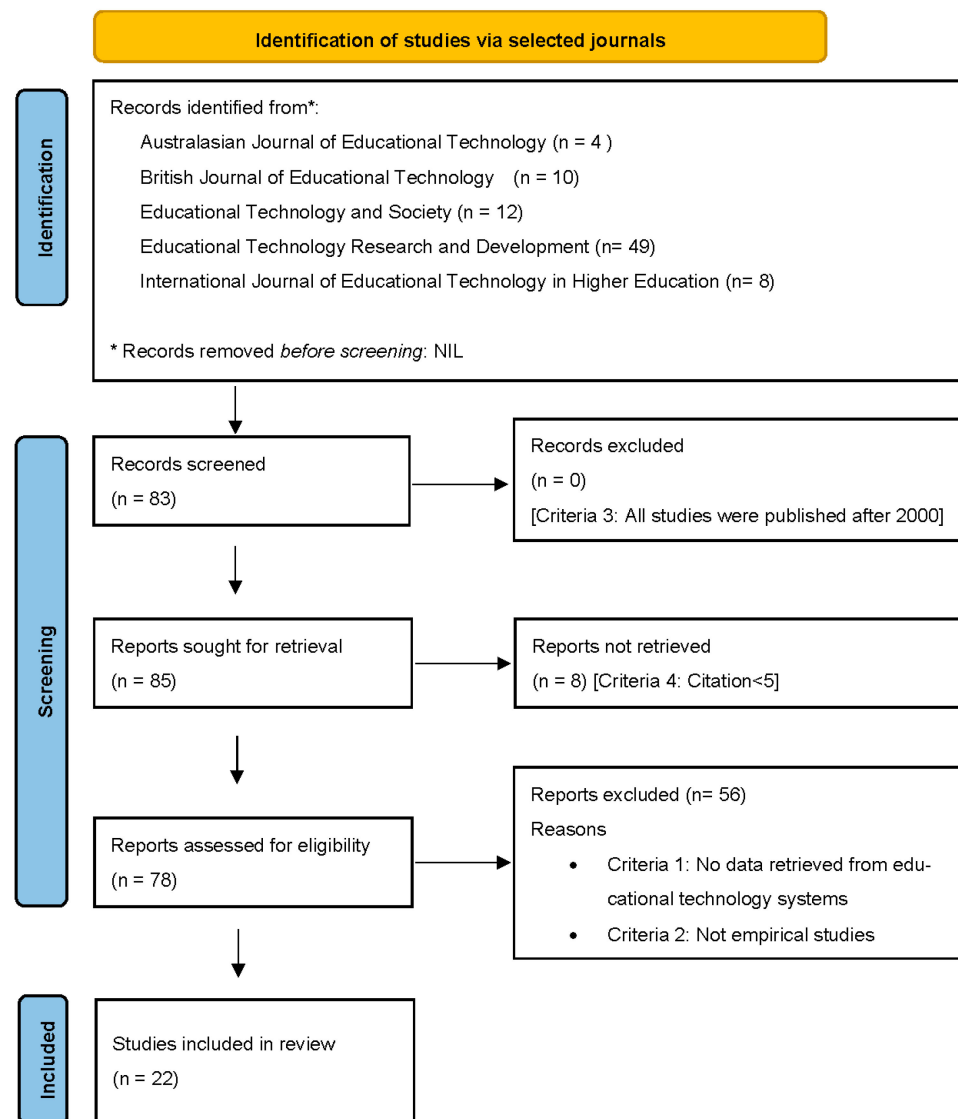

Figure 1. PRISMA 2020 flow diagram on article identification (adapted from Page et al. [22]).

2.2. Article Identification

After conducting our initial search, we identified a total of 83 studies with no duplicates. As we had targeted specific journals, all of the papers were peer-reviewed and written in English. We then applied the following inclusion criteria: (1) empirical studies; (2) data retrieved from an educational technology system (i.e., LA); (3) published after the year 2000; and (4) more than five citations.

Some of these criteria deserve brief explanations. The second criterion allowed us to exclude studies with traditional data collection strategies, such as questionnaires or interviews (which participants consent to complete). Because such participants provided their data willingly, these studies did not fit our aim. Using the fourth criterion, we ensured that we only included studies that have already received some attention in the field. While we believe that all of the studies in these journals are high quality, studies with at least five citations have gained recognition from the scholarly community, making them our priority.

2.3. Data Analysis

To understand how data colonialism is being realized in educational technology research, we examined four of its key features (see [12] for a detailed account of the concept). We developed key questions to correspond to each feature, as presented in Table 1.

Table 1. Guiding questions for data extraction.

Feature of Data Colonialism	Guiding Question
Appropriation of Resources	What data are being retrieved?
Social Relations	Other than the data being retrieved, what other information about users is involved?
Concentration of Wealth	Who has the privilege to approve the use of data? Are users aware that their data are being retrieved?
Promotion of Ideologies	What "better" outcome is being presented as the result of using the data?

3. Results

3.1. Overview of Studies

The final dataset included 22 studies published between 2013 and 2023. The number of citations in the studies (as of 1 October 2023) ranged from 6 [23] to 146 [24]. Among these studies, two were from the *Australasian Journal of Educational Technology*, four were from *Educational Technology Research and Development*, and eleven were from *Educational Technology Research and Development*. No studies from *Education Technology & Society* were included upon considering the inclusion and exclusion criteria. A general summary of the sources identified can be found in Sections A and B. As the studies came from educational technology journals, most focused on learning behaviours or the effectiveness of particular platforms. They included studies on learning argumentation [25,26], facilitating academic advising sessions [27], and coding for kids [28]. Their samples ranged from less than 50 [25,29–32] to more than 100,000 students [24,28]. Many were based on introducing a new educational technology program in either an undergraduate [25,33–38] or postgraduate course [28,38]. Other contexts included elementary/high school [26,38,39], professional development for teachers [23,40] or university academic advisors [27], and online programs [28,30,31,35]. Seven studies were from the United States [25,26,30,31,35,39], and four were from Australia [34,38,41,42]. Other studies were performed in Asia [37,43], the United Kingdom [23,35], and Ecuador [27]. One was conducted online and did not specify the location or demographics [28]. Five [29,32,33,36,38] did not explicitly disclose the location despite being empirical studies.

3.2. Features of Data Colonialism

The following section describes the features of data colonialism identified in the studies based on the guiding questions presented in the previous section. After each feature is introduced, it is discussed with reference to the literature.

3.2.1. Appropriation of Resources

Among the studies reviewed, most retrieved behavioural data that had been generated by users of an educational technology system, including game logs [40], page views [24,39], and usage of an e-book tool [33] or learning management system [31,34]. Some studies were interested in user interaction data, such as forum posts [30,31] or chatroom chat logs [43]. Others were interested in spatial data and adopted tracking devices to capture and exploit the movements of learners [38,44]. A few retrieved assignments [25,26,29]. Importantly, all of these data were generated for other purposes (e.g., using a learning tool), not specifically for the research. They were then repurposed to promote the ideologies of the researchers. While many researchers captured log-based data, they also captured other data for linking purposes (e.g., questionnaire data or student outcome data). These data are described in the following section.

3.2.2. Social Relations

In these studies, log-based data were most often linked with questionnaire data. Researchers retrieved individuals' log-based data (as described in the previous section) and connected them to their answers on a questionnaire. The data included students' and teachers' strategies [42], affective outcomes [34], and experiences [39]. Log-based data were also linked with learning achievements, such as final grades [20,32–34,39,42], language test results [43], tests of concepts [25], and teachers' assessments [40,44]. Finally, log-based data were linked with teacher and student demographic data [23,33,36].

3.2.3. Concentration of Wealth

When data are considered a form of wealth, it is necessary to consider who has the power to distribute this wealth. In all of the studies, data produced by users for other purposes were appropriated for LA. While teachers (who may double as researchers) and IT departments can always access such data, we investigated the procedures by which the researchers obtained the authority to access this "wealth". Several studies did not disclose how they obtained approval to retrieve the data [26,34,37]. Unsurprisingly, most stated that an institutional research board or ethical clearance committee was able to approve this access through a data request [23,30–33,35,39–42]. Some studies, however, indicated that approval was "not required" [40], with one claiming that approval was "not applicable" because of "the nature of a study conducted on already available/existing data" [29]. This reflects the notion that wealth is "just there" to be capitalized on by others. It is encouraging to see that a few studies gave the power back to users and obtained their informed consent to use the data they produced [27,44].

3.2.4. Promotion of Ideologies

The ideologies promoted in the reviewed studies were consistent. Most were concerned with engagement [30,31,41,43], outcomes [23,29,35,39,43], or experiences [27,39,41]. Some were more specific, considering how to adopt educational technologies effectively [33]. While these ideologies are noble, other researchers with access to the same data may not share these aims. While these ideologies may also exist in other research disciplines, their use as an excuse to exploit data matches the notion of data colonialism.

4. Discussion

4.1. The Presence of Data Colonialism and Related Concerns

The results of this study suggest that data colonialism exists in educational technology research. In general, data were produced using private tools [28,35], higher education

learning management systems [31,34], and location tracking tools [38,44]. They were then captured and repurposed by researchers, including teachers [25,26] and members of the general public [28]. While researchers may have had admirable intentions, such as improving engagement [30,31,41,43], outcomes [23,29,35,39,43], or experiences [27,39,41], users were not always given a chance to agree to the use of their data. In practice, some users were only informed that their data was being used [43], and many were not even aware of this because approval was granted by ethics committees [30,31,33,35,39–42]. This practice echoes the idea that data simply exists, and anyone can take advantage of this [12]. Furthermore, under capitalism, no one can control whether such data will be exploited by others with different, less noble intentions. Some data from these studies are publicly available [28], so future researchers or private contractors will be able to capitalize on it without being bound by any constraints.

Our results highlight three major concerns related to data colonialism. First, data colonialism can further marginalize particular communities of learners. When researchers use existing data to establish new relationships with demographic variables [23,33,36] or final grades [34,39,40,42], they also establish relationships between students' demographics (e.g., race and gender) and behaviours. We found that these patterns may change more often in education than in other fields. For example, Williams et al. [36] examined students' use of a lecture-capturing podcast and concluded that Asian students and women were the heaviest users at this particular US university. Asian women were then chosen for further discussion in the study; the results of students from other races were not further discussed. In their study, the authors specifically focused on Asian women and found that heavy usage did not correlate with exam performance. This conclusion was drawn without making a comparison to other groups. While the study makes the argument that its findings are meant to relate to other literature, this can be considered as the first step of marginalizing Asian women. If these marginalized communities are targeted, their learning experience may be affected in the future. It is possible that some teachers would neglect heavy usage as an indicator of diligence based on the results of this study, making students feel that their time was wasted.

Second, the power dynamics between teachers, educational technology researchers, and learners make educational data especially vulnerable to data colonialism. For example, in relation to marketing analytics or social media analytics, users can choose not to use certain platforms to prevent their data from being colonized (as suggested by [13]). However, in educational institutions, it is hard for users to refuse. In practice, students generate data through courses they have to take for credit [25,32–37,42,43]. This may involve an educational technology tool they are required to use to pass the course or complete a mandatory assignment. The data students generate can then be retrieved for research purposes, a practice that can be seen as a form of colonial aggression.

In this context, teachers and/or educational technology researchers can also leverage their roles to require students to generate data/wealth, which can then be retrieved and capitalized upon. Significantly, this process also contributes to the advancement of researchers who benefit from the extraction of this "data-wealth". After obtaining approval from educational institutions [32,33,35,42], the data can be repurposed and exploited, often without giving students a chance to refuse or informing them that their data have been retrieved. This scenario can occur only because educational administrators or teachers hold power over their students, creating an unbalanced relationship that closely resembles colonialism. Therefore, these users are especially vulnerable to data colonialism and the exploitation of their data to benefit others.

Third, it is also concerning to consider the data retrieval and approval process. We have identified six levels of data sovereignty, from studies with no information on how they obtained approval for data retrieval to those giving users a choice of whether to participate. At the lowest level, some studies do not even disclose how the data retrieval was approved [26,34,37]. Other studies claimed prior approval was not required or necessary [29,35] but still disclosed this practice. At level three, one study used a secondary

dataset available online [28]. Many studies followed a conventional approach and gained access to data after ethics clearance from institutions [30,31,33,35,39–41]. At this level, students may still not know that their data are being retrieved or used for research purposes. At level five, one study informed students that they were using their data [43], which we consider a better practice. At the highest level, many studies asked students for explicit consent [23,25,27,32,36,38,42,44]. This practice provides students a chance to agree or disagree with the use of their data. These six levels of data retrieval practices provide a contextual overview of how data colonialism takes place in the field of educational technology. In subsequent sections, we offer recommendations to decolonialize such data retrieval practices.

4.2. Limitations

While we position the current study as an exploratory overview of the current literature, several limitations deserve readers' attention. First, it is ironic for the current review to choose only studies from the most impactful journals to examine colonialism. This means studies that embraced the "English language and Euro-Western worldviews" [45], which is made apparent by the notions of "better" and "more effective" in the reviewed studies. Unfortunately, this is a common issue in systematic reviews. (See de Almeida and de Goulart [46] for more discussion.) We believe that this review is only a starting point for understanding the so-called "mainstream" literature; more can be done afterwards.

Second, only one search term (i.e., "predictive analytics") was used to represent the field of learning analytics. The original intention was to gather any studies on data-driven analytics (see inclusion criteria), as predictive analytics is an important stream of research within the field. We eventually included all data-driven studies, which may have excluded other important learning analytics studies (e.g., those that profiled students through clustering). In other words, the studies identified are not yet representative of all learning analytics studies.

4.3. Implications and Recommendations

After finding evidence of data colonialism in education technology research, it is difficult to decide what to do next. User data generated by educational technology are available, their use is endorsed by institutions, and researchers take advantage of them to promote their ideologies. While we can offer some suggestions to empower the "colonized" users of educational technology, we are reluctant to argue that researchers must stop retrieving or mining data as a form of "decolonization". LA, AI, and educational data mining have established positions in the world of knowledge.

However, it may be possible to perceive data colonialism through a traditional postcolonialist lens. Postcolonialism generally refers to the study of formerly colonized cultures [46]; it often refers to hybridity, as suggested by Bhabha [47,48], and acknowledges the value of both the identities and knowledge that are produced through the process of colonization and those that pre-dated it. This notion of "hybridity" has started to emerge from the technological literature (e.g., [49]). Such an approach may help us move forward from arguing that data colonialism exists to embracing the postcolonialist world. In practice, we propose the following steps to decolonize data practices:

1. Respecting data sovereignty: Institutional ethics committees need to ensure that researchers have made a reasonable attempt to decolonialize their data practices by obtaining consent from users before using their data. While this is not always possible, especially with large institutional datasets, this review shows that it is sometimes possible to obtain student consent. In our review, we acknowledge that Yan et al. [38] and Broadbent and Fuller-Tyszkiewicz [42] did ask for consent from users despite retrieving their data directly from the university computer systems. This shows a significant effort to respect users' "right to be forgotten" [50].
2. Sensible data relations building: Institutional ethics committees should decolonialize their review of data retrieval requests and consider how researchers are building

relationships between variables. Only theoretically or empirically meaningful relationships should be examined. In our review, we were pleased that behavioural data were seldom linked to demographic data, as this is one of the students' major concerns (see [10]). If there are too many linkages or data points, ethics committees should be cautious about how this could affect the personal lives of users, especially those from marginalized communities.

3. Avoiding manipulation of user behaviours: We do not dispute the ideologies promoted by the reviewed studies, such as promoting engagement [30,31,41,43] or analyzing the effectiveness of programs [30,31]. To embrace a postcolonialist perspective, however, knowledge derived from data analytics alone should be deployed with caution. First, educational technology practitioners should further their understanding of user behaviour based on self-reported measures [30,31,33,34,39,42] or qualitative approaches [27]. Second, measures that aim to promote engagement or improve outcomes should not manipulate users' behaviour.

4. Decolonializing the ethical clearance process: While ethics clearance committees do not usually include students due to their technical and academic nature, institutions should consider engaging students, staff members, and other users in approving data retrieval requests. We believe that the best practice is to ask for consent directly. If that is impossible or inappropriate due to the ecology of ethics approval at an institution, one appropriate first step towards decolonization would be to include student members in the data retrieval committee, which approves and rejects requests from researchers. Having all data users represented can provide a sense of "sensible relationship building" and "avoiding manipulation of behaviours" described above.

5. Decolonializing system design: While we do not have the technical knowledge necessary, we suggest decolonizing educational technology systems from the top down (i.e., the system design level). Modern university systems are linked together, and user attributes are shared among databases. For example, students' numbers and preferred names are entered into the registrar's system and shared with the learning management system. In recent decades, educational institutions have adopted the inclusive practice of allowing users to enter their preferred pronouns on various systems (see [51] for a detailed discussion). We argue that institutions could also permit users to choose whether their data are shared across systems. With this attribute, IT personnel could retrieve data after filtering out those who have exercised their "right to be forgotten". Instead of retrieving all user data and deidentifying it manually, omitting data from certain users may be a more decolonized practice.

6. Informing students about data use: As part of the data consent process, students should be informed at the point of registration that the data they generate by interacting with the institution's systems may be utilized for various purposes. This can include not only the improvement of courses and programmes but also research purposes. This transparency could empower students to make informed decisions about their data and contribute to the decolonization of data practices.

5. Conclusions

Colonization has never been alien to the educational community, and this study shows that it is manifesting in the use of data for research, as well. This review study examined 22 articles using a predictive analytics approach and educational technology data. We found that data colonialism is common in the field of educational technology. With vulnerable data users and administrators who are in an "ivory tower," educational technology produces a broad range of data that is "just there" to be exploited. Promising better learning outcomes, researchers retrieve, repurpose, and link data. While some users were fortunate enough to have control over their data, others' data were used based on the approval of institutional ethics committees.

We are concerned that this sort of data colonialism could lead to the further marginalization of some learners. However, we are not advocating for researchers to stop using data

completely in order to achieve the "decolonization" of educational technology. Instead, we have proposed a range of measures to decolonialize data practices so users can regain data sovereignty and limit their chances of being manipulated by algorithms. These practices may not fully decolonialize educational technology, but they can at least raise awareness of data colonization.

Appendix A

Table A1. General summary of 22 studies being reviewed.

Citation Entry (#)	Article Title	Year	Authors	Links (All Accessed on 26 September 2023)
[22]	Analysis of patterns in time for evaluating effectiveness of first principles of instruction	2022	Frick et al.	https://link.springer.com/article/10.1007/s11423-021-10077-6
[23]	A large-scale implementation of predictive learning analytics in higher education: the teachers' role and perspective	2019	Herodotou et al.	https://link.springer.com/article/10.1007/s11423-019-09685-0
[24]	The effects of successful versus failure-based cases on argumentation while solving decision-making problems	2013	Tawfik and Jonassen	https://link.springer.com/article/10.1007/s11423-013-9294-5
[25]	Identifying patterns in students' scientific argumentation: content analysis through text mining using Latent Dirichlet Allocation	2020	Xing et al.	https://link.springer.com/article/10.1007/s11423-020-09761-w
[26]	Adoption and impact of a learning analytics dashboard supporting the advisor—Student dialogue in a higher education institute in Latin America	2020	De Laet et al.	https://bera-journals.onlinelibrary.wiley.com/doi/abs/10.1111/bjet.12962
[27]	Understanding the relationship between computational thinking and computational participation: a case study from Scratch online community	2021	Jiang et al.	https://link.springer.com/article/10.1007/s11423-021-10021-8
[28]	To design or to integrate? Instructional design versus technology integration in developing learning interventions	2020	Kale et al.	https://link.springer.com/article/10.1007/s11423-020-09771-8
[29]	Priming, enabling and assessment of curiosity	2019	Sher et al.	https://scholar.google.ca/scholar?hl=en&as_sdt=0,5&q=Priming,+enabling+and%C2%A0assessment+of%C2%A0curiosity&btnG=
[30]	Exploring indicators of engagement in online learning as applied to adolescent health prevention: a pilot study of REAL media	2020	Ray et al.	https://link.springer.com/article/10.1007/s11423-020-09813-1

Table A1. *Cont.*

Citation Entry (#)	Article Title	Year	Authors	Links (All Accessed on 26 September 2023)
[31]	Gamification during COVID-19: Promoting active learning and motivation in higher education	2021	Rincon-Flores and Santos-Guevara	https://ajet.org.au/index.php/AJET/article/view/7157
[32]	The adoption of mark-up tools in an interactive e-textbook reader	2016	Van Horne et al.	https://link.springer.com/article/10.1007/s11423-016-9425-x
[33]	Academic success is about self-efficacy rather than frequency of use of the learning management system	2016	Broadbent	https://ajet.org.au/index.php/AJET/article/view/2634
[34]	Empowering online teachers through predictive learning analytics	2019	Herodotou et al.	https://bera-journals.onlinelibrary.wiley.com/doi/abs/10.1111/bjet.12853
[35]	Lecture capture podcasts: differential student use and performance in a large introductory course	2015	Williams et al.	https://link.springer.com/article/10.1007/s11423-015-9406-5
[36]	Learning Analytics at Low Cost: At-risk Student Prediction with Clicker Data and Systematic Proactive Interventions	2018	Choi et al.	https://www.jstor.org/stable/26388407
[37]	The role of indoor positioning analytics in assessment of simulation-based learning	2022	Yan et al.	https://bera-journals.onlinelibrary.wiley.com/doi/abs/10.1111/bjet.13262
[38]	Predict or describe? How learning analytics dashboard design influences motivation and statistics anxiety in an online statistics course	2021	Valle et al.	https://link.springer.com/article/10.1007/s11423-021-09998-z
[42]	Do social regulation strategies predict learning engagement and learning outcomes? A study of English language learners in wiki-supported literature circles activities	2021	Li et al.	https://link.springer.com/article/10.1007/s11423-020-09934-7
[39]	Does slow and steady win the race?: Clustering patterns of students' behaviors in an interactive online mathematics game	2022	Lee et al.	https://link.springer.com/article/10.1007/s11423-022-10138-4
[43]	Mapping from proximity traces to socio-spatial behaviours and student progression at the school	2022	Yan et al.	https://bera-journals.onlinelibrary.wiley.com/doi/abs/10.1111/bjet.13203
[41]	Profiles in self-regulated learning and their correlates for online and blended learning students	2018	Broadbent and Fuller-Tyszkiewicz	https://link.springer.com/article/10.1007/s11423-018-9595-9
[40]	Identifying engagement patterns with video annotation activities: A case study in professional development	2018	Mirriahi et al.	https://ajet.org.au/index.php/AJET/article/view/3207

Appendix B

Table A2. General summary of 22 studies being reviewed.

#	Authors	No. of Citations (as at 1 October 2023)	Context	Sample Size	Location	Data Retrieved from Educational Technology Systems	Other Data Collected/Retrieved (Excepted)
[22]	Frick et al.	6	University Teachers	59	UK	Login data of a dashboard	• Student final grades • Teacher demographic info (gender) • Student demographic info
[23]	Herodotou et al.	146	MOOC	172,417	US	Usage data on webpages (pageviews, clicks scrolling)	nil
[24]	Tawfik and Jonassen	85	Undergraduate	36	US	Arguments produced by users	Pretest and post-test of concepts
[25]	Xing et al.	26	Middle/High School	2472	US	Student produced arguments	Teacher assessment of students' learning
[26]	De Laet et al.	34	University Academic Advisors	172	Ecuador	Student study plan before and after intervention	Simulated advising sessions (qualitative data)
[27]	Jiang et al.	10	online learning tool	105,720	Online	Online learning journey (likes/loves) remixing projects	Computation scores assigned by another researcher
[28]	Kale et al.	17	Postgraduate	22	Not mentioned	Final projects completed for courses	nil
[29]	Sher et al.	11	Online program for youth club	38	US	Participant interactions	Questionnaire data on audience engagement
[30]	Ray et al.	13	Online Substance use prevention program	38	US	User interactions on the LMS	Questionnaire data on program usability
[31]	Rincon-Flores and Santos-Guevara	54	Undergraduate	40	Not mentioned	Student final grades and course achievement	Student grade
[32]	Van Horne et al.	71	Undergraduate	274	"Midwest"	Student Usage of mark-up tool (for a reading tool)	Questionnaire on reading behaviour
[33]	Broadbent	100	Undergraduate	310	Australia	Student LMS usage data	Questionnaire data on self-efficacy locus of control motivation
[34]	Herodotou et al.	79	Undergraduate	559	UK	Usage of dashboard system	Discipline of teachers/student performance
[35]	Williams et al.	46	Undergraduate	835	not mentioned	Login data from video viewing site	In-class clickers student demographic
[36]	Choi et al.	113	Undergraduate	1075	Hong Kong	In-class clickers data	Demographic information

Table A2. *Cont.*

#	Authors	No. of Citations (as at 1 October 2023)	Context	Sample Size	Location	Data Retrieved from Educational Technology Systems	Other Data Collected/Retrieved (Excepted)
[37]	Yan et al.	12	Undergraduate	3604	Australia	Position tracking in a simulated room	Teacher assessment of students' learning
[38]	Valle et al.	20	Postgraduate	179	US	Number of views	Questionnaire data on prior content knowledge, experience
[42]	Li et al.	20	English language course	95	China	QQ chatroom chat logs	Language test at the end of activities
[39]	Lee et al.	9	Middle school	227	US	Student game logs	• Type of math classes attending • Gender • Grade
[43]	Yan et al.	8	Elementary	98	Not mentioned	Position tracker/wearable device position data	Student progression
[41]	Broadbent and Fuller-Tyszkiewicz	122	Undergraduate	606	Australia	Final grade	• Questionnaire data on motivational and self-regulated earning strategies • Student demographic information
[40]	Mirriahi et al.	37	Teachers	163	Australia	Behavioural data on video annotation tool	nil

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Article

Designing for Social Justice: A Decolonial Exploration of How to Develop EdTech for Refugees

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Abstract: This paper reflects on the lived experiences of young refugees located in Pakistan and Rwanda when interacting with education technology (EdTech) during and following displacement. We offer a broad decolonial commentary on issues related to the design and development of EdTech initiatives for refugees, noting some of the historical trends prevalent in the education and emergencies sector. We are guided by questions such as: Why EdTech to start with? Who designs the products? Where are they designed? How are they designed? And, which power dynamics are at play during the design process? From this, we draw on qualitative data generated through three focus groups, where we explore young refugees' experiences of EdTech. The focus group included a creative element inviting participants to imagine what a liberatory EdTech practice would look like. We aim to illustrate the practical implications of design choices taken by EdTech developers and, from this, recommend a set of justice-centred design principles for developers of EdTech in refugee contexts. These insights relate specifically to the experiences of refugees in Rwanda and Pakistan, though we also discuss the implications of these learnings for other contexts.

Keywords: refugee education; education technology; education in emergencies; technology design; decoloniality; decolonising EdTech; digital neo-colonialism; Pakistan; Rwanda

1. Introduction

There are growing bodies of literature that explore strategies for decolonising EdTech (e.g., [1–4]) and the role of EdTech in emergencies [2]. Yet, scholars have noted the paucity of literature that considers the use of EdTech in refugee contexts [3,4], let alone from a decolonial lens. Indeed, the varied and unstable nature of displacement scenarios may give rise to questions around whether EdTech is appropriate at all in some displacement scenarios, and if it is, whether alternative access routes to it may need to be considered to ensure equitable benefit.

Previous research into refugees and EdTech has tended to focus on primary- and secondary-age students, with tertiary level education de-prioritised [5]. In addition, Crompton et al. call specifically for further research into emergency remote education for "refugees who may not be connected to local educational entities" [2] (p. 1571). With these gaps in mind, this paper focuses on the use of EdTech by young refugees in low- and middle-income countries (LMICs) who are either studying at a higher education level, or who are outside or beyond formal education. This may include those striving to supplement or pick up the threads of prior formal learning; achieve academic recovery; supplement ongoing tertiary education; or gain professional skills for direct employment purposes.

This paper considers a range of injustices in EdTech research and design for young refugees in LMICs during and following displacement. These injustices include the Cultural–epistemic, material, and political or geopolitical, as outlined in the dimensions of human injustices framework [6]. Using the latter, we start by offering a decolonial commentary on existing literature in the field of education (and EdTech) for Emergencies and EdTech for refugees. We then apply the same lens to the experiences of using EdTech of young refugees in Pakistan and Rwanda, delineating the ways in which their interactions with EdTech were positive/helpful and/or unjust/oppressive to their status. Finally, we attempt to present suggestions, based on the views of our refugee research participants, towards a more just EdTech design, inviting a delinking from digital neo-colonial logics. It should be noted that we have added a list of definitions within the Supplementary Materials (S1) of this piece. These definitions unpack some of the key terms we use—and grapple with—while writing this piece, including decoloniality, digital neocolonialism, and displaced person(s).

Thus, this study first reviews the literature on EdTech for refugees through a decolonial lens, and then applies this decolonial lens to present design principles to consider effective and inclusive EdTech development for this marginalised group. It is hoped that this process provides a useful bridge between theory and practice.

1.1. Research Questions

This study will address two core questions:

1. What can the lens of decoloniality add to the evidence of "what works" when using technology for refugee education?
2. How can our current understanding of existing decolonial education frameworks, as well as lived experiences of refugees in Rwanda and Pakistan, help us move towards decolonising EdTech products, policies and interventions for refugees?

1.2. Dilemmas and Paradoxes

We acknowledge some of the paradoxes inherent in contributing to the conversation around how decolonial research can exist within neocolonial structures.

First, we acknowledge the limitations of using a Western-centric research methodology, knowing that such methods have historically been based on extractive imperatives and colonial world views. This issue has been mitigated to the extent possible by choosing to focus on contexts where the majority of the research team has a lived, embodied experience, and that recommendations are based on the voices of refugees themselves.

Second, while we focus on two specific refugee contexts for the purposes of this study, we also acknowledge the heterogeneous nature of refugee experiences. As such, we posit that the suggestions made in this article may be extrapolated to similar refugee contexts, though further research is required in relation to other specific refugee groups that vary in age, educational and political economy goals, and nature and geography of displacement.

Third, we recognise that the literature upon which our research is based is available primarily because it conforms with Western-centric academic conventions, such as peer review processes, journal formats, and professionalised reports that are written in English. Drawing only from this literature means that other epistemic approaches and distribution formats are not represented. Furthermore, the literature itself was sometimes sourced from institutions that have historical ties to colonialism and neocolonialism. It is often these multilateral international development institutions which have readily available data. However, we endeavour to approach this (and all) literature with a critical eye. In addition, seeking publication in a journal may inadvertently lead to a perpetuation of the very exclusionary practices and power dynamics that this paper seeks to dismantle. To ensure more equitable access to our research, we shared our paper and findings with our research participants and their communities in the format and languages of their choice, such as via WhatsApp voice messages. Participants were encouraged to share their feedback on the findings and check that they were satisfied with the way in which their voices had

been represented; any suggested changes were then integrated into the final publication as necessary.

Fourth, we recognise the privilege we have as researchers employed at a research institution that is funded by, and is in partnership with, Global North institutions. In addition, we recognise the payment we take for our work probably stands in stark difference to what most of our refugee research participants can gain. To the recognition of this entanglement, we say that with this privilege comes the responsibility to form partnerships and mediate conversations that do not usually happen between EdTech designers, policymakers and refugees, a central goal of this paper.

Finally, we recognise the risk identified by Traxler [7], that our attempts to suggest ways to decolonise EdTech may be "driven by members of the majority community and inevitably seen through the lens of their (mis)understanding and privileges". It is hoped that the diverse range of lived experiences within the team may serve to dilute this risk; the research team operates in a non-hierarchical format in which members continuously hold each other to account and challenge others' assumptions.

2. Analytical Framework

In this paper, we adopt decoloniality, and by extension digital neocolonialism, as a central analytical lens through which all other relevant concepts are viewed, and primary data are analysed. Among the different decolonial conceptual frameworks, we find the one titled "Dimensions of Human Injustice", developed by Adam [6], to be most helpful.

The decolonial lens enables us to ask questions and look at the data from perspectives that are missing in the general bodies of literature around EdTech for refugees. The broader literature focuses on the products, services, policies, modes of implementation, and even inequities, in the present moment, which are in themselves important for emergency management and response. However, the decolonial perspective centres the geopolitical power dynamics and historical injustices at play when thinking about EdTech. Given the refugee context is one of oppression, related to geographic displacement and entangled historic and political processes, it seems fitting to add a geopolitical lens into the conversation. This means looking beyond the crises of the present moment, and instead analysing what led to them, to be able to imagine solutions that adaptively address root causes rather than offering surface-level technical fixes for symptoms.

The dimensions of human injustices framework emerged from Adam's [6] research on using a decolonial lens to explore South African Massive Open Online Courses (MOOCs) and their conceptualisations with participants and EdTech designers (see Figure 1 below). The framework merges discourses around the decolonial theory between dimensions of coloniality of power, being and knowledge [8], as well as social justice Global North [9] and South frameworks [10–13] between ameliorative and transformative responses. This is in addition to synthesising other philosophical underpinnings, namely embodied cognition, the capability approach [14], and critical pedagogy [15]. All the previous take an epistemological stance towards education and knowledge production as a political issue shaped by historical and geopolitical power dynamics, emphasising that critical, decolonial education can be a means to face oppression.

This paper analyses the lived experiences of refugees in two Global South contexts interacting with EdTech products (including MOOCs) to continue their education. Hence, Adam's [6] framework's emergence in a Global South context, particularly in relation to EdTech research, in addition to its synthesis of a broad literature all concerned with analysing multiple levels of injustice and oppression, makes it a suitable analytical lens for our work. Moreover, the framework adopts a stance of entanglement offering a complex understanding of knowledge, pedagogies and education design that evolve and travel across space and time, while acknowledging the power dynamics that exist among such formulations [16]. We see this as closer to reality and to our research than putting epistemologies in binaries (North–South) against each other. Our adaptation of the framework for the refugee context can be seen in Table 1 below.
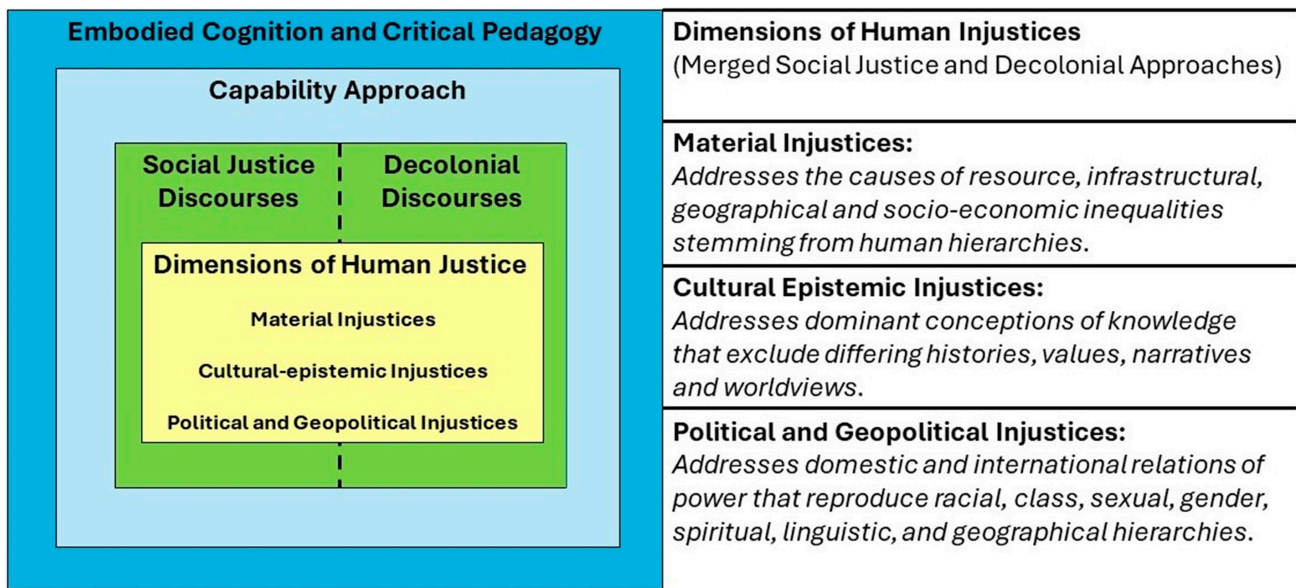
Figure 1. Adam's [6] Dimensions of human injustice framework and the roots of its synthesis, licensed under CC-BY-NC-SA 4.0.

Table 1. Dimensions of Human Injustice: adaptation for the refugee context.

Dimensions of Human Injustice Aspects	Research and Analysis Questions in the Context of Lived Refugee Experiences in Pakistan and Rwanda
Material Injustices	• Who is the product's/intervention's target group? How is this group reached? And who is the provider? What is the financial flow of resources? • What infrastructural or resource-based or socio-economic barriers to access exist? • According to principles of digital development, were users involved in the conception, design and development of the technology product or the EdTech program (beyond user testing)? Would they have liked to? • What data are collected through technologies for refugees? Is knowledge about how the algorithms work to collect data and design learning pathways made open, accessible and understandable? • Do learners/larger community of refugees own the means of producing and/or remixing technologies for their own benefit?
Cultural–epistemic injustices	• What is the underlying assumption around what technology can offer for refugees? Where did this assumption come from? • What pedagogical underpinnings are there in the technology offered for refugees? • What is the content format and type? What were the activities involved? • How were the epistemic and cultural diversities of users considered in EdTech design: (a) language and history; (b) ability; (c) access to connectivity; (d) epistemological (way of knowing)/cultural worldview?
Political and geopolitical injustices	• What are the learning goals embedded in EdTech for refugees? Where do they come from? Are learning goals contextual to the situation of refugees? • On an institutional level, why was this particular EdTech option chosen by institutions as the one to offer to refugees? • What power structures exist within the EdTech offering between the learners, teachers, designers and institutions supporting the design/intervention? • What are the ethics around data collection? Is there an option to opt-out? What are the consequences of opting out of data collection? • How do EdTech products/interventions consider and/or deal with intersecting issues of systemic oppression for refugees, if at all? Do EdTech products reinforce/reproduce, evade, ignore, or transform such systemic oppression for refugees (along lines of geographic, gender, class, racial, spiritual/religious oppression)?

3. Literature Review

While there is a plethora of evidence available about education in emergencies (EiE), there is a widely acknowledged evidence gap about the use of EdTech in emergencies, including refugee contexts [17], as cited in Ashlee et al. [5]. Much of what we know about education in emergencies is in relation to COVID-19 [5,18]. To our knowledge, there are no specifically defined design principles to contextualise EdTech interventions for refugees. More work is needed to unpack existing trends in refugee and emergency education. Acknowledging this evidence gap, below we synthesise the literature around EdTech interventions for refugees.

3.1. Historic Trends in Education for Refugees

Article 26 of the United Nations' Universal Declaration of Human Rights identifies education as a basic need. Studies have shown that schools play a "vital role in the resettlement of refugee children and their families", highlighting that education can play a critical role in addressing the socio-emotional needs of refugee learners [19] (p. 1). Guidelines for EiE are shaped around the interdependency between psychosocial well-being and education. For example, the Inter-agency Network for Education in Emergencies' (INEE's) Minimum Standards for Education [20] highlights the need to address psychosocial well-being to support learning continuity. The guidelines also acknowledge that, as an emergency continues, it is important to address the "evolving learning needs of the affected population". In the case of refugees, however, "once the attention of the international community strays and funds begin to dry up", the pursuit of education is often left unaddressed [21] (p. 211).

In addition, refugee camps are often designed to serve a temporary function. Historically, international development organisations have partnered with host governments to cater to refugees' survival needs with the end goal of repatriation [22,23]. In reality, many refugees spend years in "protracted refugee encampment", requiring pathways for learning continuity [24]. In contexts where education is available to refugee communities, there is less funding to meet the needs of learners the further along they are in their learning journey. Primary education receives the most amount of funding and tertiary education the least, if at all [25]. As a result, only 6% of refugees worldwide are enrolled in any form of a tertiary education programme, compared to 40% of non-refugee people worldwide [26].

Yanay and Battle [27] provide a detailed account of various barriers that prevent inclusion in a host country's education system. On a structural level, refugees may lack the required documentation to participate in education. This is particularly challenging for refugees who have to flee suddenly, leaving behind school certificates. But even when these documents are available, their existing qualifications might not be perceived as equivalent, or the language requirements in their host country might prevent them from enrolling in educational institutes. On an individual level, refugees might lack the resources to participate in education. This is particularly salient for those who are reliant on humanitarian aid. Further, lack of financial resources can also lead to the need for refugees to provide for their families as they grow older, disincentivising individuals from pursuing education.

Refugee situations are primarily political situations, whether they result from war, displacement, discrimination, prolonged market exploitation and extraction of natural resources for production in the Global North or any other forms of violence [28]. Furthermore, critical pedagogy, represented within the dimensions of human injustices framework we adopt in this paper, asserts that "every educational act is political and that every political act is pedagogical" [29] (p. 176), as cited in Mackinlay and Barney [30].

Zembylas [31] offers an in-depth analysis of the refugee situation, applying Agamben's theory of biopolitics, while critiquing the liberal/humanitarian response and language of refugee "inclusivity". In his analysis, Zembylas describes three essential components of the refugee experience, these being (a) "abandonment" as the logic and process by which refugees are left behind as abject figures of fear and precarity in opposition to

society, thereby legitimising their lack of access to rights and protections; (b) "bare life" which refers to reducing human beings to only basic survival needs and stripping them of any political and social significance, serving to reduce refugees' agency; and (c) "the camp" which denotes spaces of confinement and control, that exist beyond particular physical sites and extend into society, thereby normalising dealing with refugees through abandonment and exclusion. For Zembylas [31], the liberal/humanitarian response which calls for "inclusive education" of refugees, aiming to promote recognition and empathy while disregarding the previously outlined power dynamics and structures at play, may inadvertently contribute to the perpetuation of refugee problems by "failing to challenge the separation of humanitarian concerns from politics and by perpetuating exclusionary categories and invisibility".

Dovigo [28] reminds us of the risks of shying away from talking about the politics of refugee education, including the importance of addressing how much is spent on border management to prevent refugees incoming as well as resources allocated to media narratives to "other" refugees versus actual spending on refugee education. Without such conversations, and focusing only on pedagogy and design, Dovigo posits we are shying away from the decolonial process altogether.

Within the politics of refugee education, Dovigo [28] and Mustafa [32], highlight what they call a "differential humanity", that is a full hierarchy of statuses between a refugee, an asylum seeker, and a forcibly displaced person. Additionally, differential humanity is represented by refugees being displayed by the media differently according to their country of origin as either a "good deserving victim" or an "undeserving bogus survivor" coming to snatch away resources from the host country. Such conditions result in differential, unequal legitimacies of access to services and public support.

The previous are all real, material conditions that shape the experiences of refugees. They need to be holistically considered when intervening in education. We cannot pretend that using EdTech alone can solve such deep injustices, or indeed that EdTech itself could not contribute to inequality or injustice [33]. These issues are discussed in the following section.

3.2. Use of Education Technology in Emergency Responses

Over the past decade, the affordances of technology have offered potential avenues to altering the way learners can continue their pursuit of education during disruptions. Since 2015, technology has been widely advocated for as a "solution to humanitarian crises" [34] (p. 313). Cross-sectoral partnerships have emerged to drive EdTech responses in the pursuit of learning continuity. It has been celebrated that private sector actors including Avanti, CISCO, Ericsson, Google.org, HP, Microsoft, and Vodafone Foundation have invested in digital learning. This has led to the development of educational platforms, including Learning Equality's Kolibri platform, and the Learning Passport developed by UNICEF and Microsoft [35].

Pallitt and Kramm (forthcoming) outline various intellectual positions adopted by different stakeholders when using EdTech, namely the instrumentalist, interdisciplinary and the post-digital. In their differentiations, they outline the instrumentalist positionality as a view that privileges the functional use of a neutral technological tool to achieve an educational goal. The interdisciplinary position views the social interactions between technology and humans "in ways that reflect the values, interests and power dynamics of the societies in which it is created and used", including broader phenomena such as neoliberalism. Moreover, the post-digital position encourages the investigation of the role of the non-human and more-than-human as non-neutral actors. As such, we cannot just focus on technical skills when using EdTech, or view refugee education as simply a "bureaucratic activity" [28].

It is important to question the fundamental assumption prevalent in the literature that EdTech is the most effective tool for (re)connecting refugees with learning during and following displacement. Al Habsi and Rude [3] note that "the potential of EdTech for refugee education is large but marked by several pitfalls" (p. 43). Among these are the

material injustices identified by Adam [36], with many refugee communities lacking the infrastructure, device access, and digital literacy needed to take full advantage of EdTech offerings [3].

In addition, EdTech may not only be inaccessible to some refugee groups, but the introduction of EdTech may serve to exacerbate pre-existing societal inequalities and digital divides. As Ashlee et al. [5] noted, girls experience reduced access to technology in many contexts due to cultural gender bias. Investing in EdTech for refugees therefore runs the risk of leaving some members of refugee communities even further behind.

Tauson and Stannard's [4] systematic review expands upon the ethical implementation of EdTech in emergencies. They compile several questions that should inform decisions regarding EdTech implementation. Their review emphasises a need to understand the length of disruption, and whether displaced people are restricted from accessing technology. Asking these questions may help to establish whether a response involving EdTech is appropriate for a given emergency, and doing so may help to challenge the neocolonial assumption that technology is universally desirable and applicable. Importantly, EdTech is not a neutral tool and if we decide to use it, we need to think largely about how it can be leveraged to address systemic colonial problems within the field of refugee education and humanitarian aid at large [37]. Regarding the length of disruption, it is important to note that experiences with technology differ greatly between refugees and displaced persons in protracted crises when compared with more acute crises [38]. Those in protracted crises may use technology for their education more often given the relative stability of their circumstances. However, increased technology use—and expectations of this increased use—can create different emotional stresses. For example, access to power and connectivity may be limited or unreliable, or refugees and displaced persons may carry possible feelings of shame if they are not visibly thriving in their new environment and reporting this on social media or messaging apps [39].

3.3. Designing EdTech for Refugees

Different approaches for designing equitable EdTech in general (i.e., not aimed specifically at refugee communities) have been proposed over the years [40,41]. More recently, in 2017, the principles for digital development (PDD) were developed by the Digital Impact Alliance for use in the development sector. Building on frameworks from UNICEF (2009) and the UK government (2012), the PDD consists of nine principles (see Figure 2).

Figure 2. Principles for Digital Development, 2017.

The principle, 'Understand the existing ecosystem', is echoed in the literature on EdTech for refugees. Menashy and Zakharia [34] advocate for the importance of contextualised and evidence-based interventions that recognise "the knowledge, experiences, and needs of refugees" (p. 325). Ashlee et al.'s [5] rapid evidence review on refugee education similarly signifies the need for "EdTech to be adapted and contextualised to each refugee setting" (p. 6).

There is now wide consensus in the literature that, in line with the principle 'Design with the user' (Digital Impact Alliance, 2017), EdTech products should be designed in collaboration with the refugee communities that the EdTech aims to serve [42–45]. However, positions vary regarding the extent of this collaboration. For some, this may mean consulting with the community about their needs and contextual realities [6,8,34]. Such consultation may help to avoid assumptions being made, such as levels of digital literacy, which may result in adverse effects such as increased "marginalisation, loneliness, and difficulty communicating and learning the social norms of the host country" [3] (p. 46). Furthermore, community participation is viewed as a trust-building exercise that represents a crucial step in ensuring buy-in to, and eventual ownership of, EdTech products [5].

Other scholars suggest that a more active and central role for refugees in EdTech design processes may be key to ensuring usefulness and relevance, namely through participatory approaches. Kennedy and Laurillard [44] propose employing co-design methodologies, in which refugees are not only asked about their context, but actively contribute to the design of the products themselves. Alain et al. [45] describe their approach to co-designing EdTech with refugee children as follows:

"Design work starts with children envisaging solutions and producing requirements. Children are then asked to create both the pedagogical and technological aspects of the design, including contextual elements. The children's designs are then brought to adult design workshops where they are matched with the available resources such as locations, time, human resources, equipment, and funding to insure applicability and sustainability" [1–4,45] (p. 4).

In alignment with the "Design for scale" principle, Butcher [46] cites other scholars (e.g., Bozkurt et al. [47], Rapanta et al. [48]) who posit that the use of technology provides the most efficient, cost-effective, and perhaps the only method to continue learning at scale during emergency situations where face-to-face interactions are not possible. Butcher [46] also acknowledges limitations, including internet access or applicability of language and other contextual needs for students in LMICs.

In alignment with the "Be collaborative" principle, Crompton et al. [2] systematically review the literature related to EiE in light of COVID-19. They highlight the significance of partnerships to ensure effective remote learning in emergencies. They add that the importance of exploring multiple partnerships with organisations, companies, local groups and individuals not only expands the support base (particularly in terms of resources) but can also facilitate a shared responsibility and investment in the outcome.

Finally, and in alignment with the 'Use Open Standards, Open Data, Open Source, and Open Innovation' principle, El-Serafy et al. [42] call on EdTech developers to embrace openness as a key focus of their work. This could involve making systems interoperable, using open-source applications and technologies, and openly licensing their work. The Digital Impact Alliance notes that such practices "can help to increase collaboration in the digital development community and avoid duplicating work that has already been done. Programs can maximise their resources—and ultimately their impact" [49].

Despite the previously noted alignment of the PDDs with the broader literature on EdTech for emergency, including refugee, contexts, we do note the absence of historic and present power dynamics. It invites adopters to "design with the user", "be collaborative", "be data driven", or "use open standards", without giving the end user—refugees in this case—any decision-making power. Such collaborations, and flow of information, are full of hierarchical power dynamics between designers and users, and moreover, humanitarian donors in refugee contexts.

On the "Design with the user" principle, it is important to critically question universalising the "refugee community" experience. The literature reiterated the need for EdTech to "be contextualised and respond to learners' needs" [5] (p. 23), but how can EdTech designers realistically achieve that given the general imperative to design for 'universal' reach?

Adam [16] suggests that "MOOC designers create MOOCs that strongly link to who they are, what they value, and how they understand the world, highlighting the crucial need to have epistemically diverse MOOC designers from different cultures, value systems, and epistemologies" (p. 171). Following this logic, EdTech products can never truly reflect the needs and values of refugee communities unless refugees take a leading role in the design process. Whether consciously or not, designers from other contexts will assert their own identities and beliefs over the products that they create. Selwyn [50] reminds us that "it is crucial that well-intentioned education technologists in the Global North see their primary role as listening and learning from others, rather than attempting to lead and innovate 'solutions'".

Reflecting on the principle of 'Build for sustainability', we posit that genuine strides to make EdTech development sustainable will require analysis of the ecosystem—codified as people, provision, product, practice, policy and place—to determine the interdependencies, levers and barriers to sustainability across the system [51]. For example, in relation to EdTech as a product, this could mean listening to and being led by post-colonised viewpoints—"If we can no longer buy a new replacement laptop every 12 months, then what might be learnt from repair and reuse cultures in Kenya? If there is no longer the guarantee of 'always on' connectivity due to energy blackouts, what might be learnt from off-grid digital infrastructures run on solar, wind turbine or wind-up power?" [52] (p. 1797). Selwyn [50] continues, "perspectives from the Global South might enhance the understanding of 'technological development' from a degrowth perspective and provide paths forward to sustainability".

In thinking about the Design for Scale principle, it is important to question the contradictions between designing for specific contexts—as recommended by the literature on effective refugee education—versus designing for scale, which is described in the principles as "thinking beyond the pilot and making choices that will enable widespread adoption later". Yet, this limits the notion of scale to simply expanding numbers. Alternatively, Coburn [53] offers a reconceptualisation of scale as four interrelated dimensions of depth, sustainability, spread and ownership. She argues that depth, that is, the nature and quality of change, should form the central premise of scale. This alternative notion of what scaling means could resolve the clear tension here between context-specificity and scale.

Yet, even if we adopt the standard approach to scaling; while cross-sectoral partnerships as recommended by the PDD are important in helping bring interventions to scale, it is critical to consider whether solutions are catering to the needs of the communities they intend to benefit. Drawing on McLean and Gargani [54], Mazari et al. [18] argue that, in addition to being justified by implementers or even by technical evidence alone, EdTech in emergencies also should be justified by the experience and needs of impacted communities, rather than being seen as yet another market of expansion for global EdTech companies.

Menashy and Zakharia [34] examined Syrian refugee education in Jordan, Lebanon, and Turkey, critiquing "digital humanitarianism". They found that a "pervasive optimism" around using EdTech has fuelled a problematic, disproportionate focus on technology. In this context, a "surge" in private-sector engagement has led to interventions being designed "free of coordination; driven by profit motivations; and developed in a manner decontextualized from the learning context" [34] (p. 4). Their study aims to counter the "overwhelming optimism" which, they argue, fails to consider the problematic implications of exporting interventions "developed in the Global North into the 'distant other' in the Global South". In interviews conducted by Mazari et al. [18], key informants described the new EdTech for emergencies landscape as "an arms race". One stakeholder in particular feared "the commercialisation of education provision in humanitarian responses" in which

"EdTech resources are dumped" on communities without any localisation, leading to responses that are "colonial at best" (EiE Expert interview notes, in [18]).

Finally, on the "Be data driven" principle, we note two issues. First, is the importance of questioning what kind of data are collected and the extent to which refugees are accounted for in the host country's education sector planning. Second, is the ethical and political role that data collection plays in refugee contexts. Krishnan [55] explains the harm inflicted on refugees through the unethical interplay between aid conditions, government persecution of individuals and data collected by digital systems. Interlinked to this, and cross-referencing the "Use open standards" principle, is the harm publicly available refugee datasets could play in terms of racial discrimination, xenophobia, and related intolerance.

Having explored the broad literature related to education (and EdTech) in emergency, including refugee contexts, we will now present the two research contexts for which this paper is specifically focusing on, Pakistan and Rwanda.

3.4. Research Contexts

In this subsection, we summarise the nature of the situation that led to the study participants' arrival in the host countries (Rwanda and Pakistan). We will discuss the EdTech ecosystems, including educational opportunities and socio-political challenges that currently exist in both contexts. The national education systems of these countries are not discussed beyond the extent to which they relate to refugee experiences due to time and space limitations. However, it is acknowledged that some challenges affecting refugees are likely to also be experienced by host community members; the intention is not to exclude other experiences of injustice.

3.4.1. Pakistan

Afghan people have been "caught in the crossfire" of geopolitics since 1979 [56]. As a result, the number of Afghan refugees in Pakistan ebbs and flows, most recently increasing in 2021 due to the Taliban's return to Afghanistan's Government [57]. While UNHCR estimates that Pakistan hosts 1.43 million registered Afghan refugees, official figures expect there are as many as 4 million undocumented refugees in Pakistan, with several generations born in exile. Of this population, 44% are estimated to be children under the age of 18 [58]. These disruptions have had a drastic impact on education. As UNHCR [59] described, "The education of successive generations of Afghan refugee children [are being] disrupted, discontinued or forgotten, due to a range of barriers that are largely outside their control". Hervé [60] raises the importance of situating these barriers within the context of the mass returns, as well as the structural weakness of Pakistan's education system.

Pakistan has the second-highest number of out-of-school children in the world, of which approximately 56% are girls [61]. Of those who are in school, 74% of children are in learning poverty [62]. The learning crisis is predicted to have been significantly exacerbated by COVID-19 [61] and the recent floods [18,62]. There are also critical funding constraints; Pakistan spends approximately 2.3% of its GDP on education, compared to the global average of 4.21% [63,64]. While there are nationwide challenges to education, it is critical to contextualise the prospects of refugee education at the provincial level. Education is devolved to the provincial level under the 18th Amendment [63–65]. However, there are significant disparities across Pakistan's provinces that shape access to education and technology.

The Afghan refugee population in Pakistan predominantly reside in two provinces: Khyber Pakhtunkhwa (KP—52.3% of total refugee population, see S2 in the Supplementary Materials for more details) and Balochistan (24.5% of total refugee population, see S2 in the Supplementary Materials for more details). The very border implemented during the colonial era that separates Afghanistan and Pakistan, the Durand Line, divided ethnic Pashtoon and Baloch people [64]. As a result, Afghan refugees who speak Pashto and Bruhui share their language with many Pakistanis in these two provinces. In KP, 78.9% of

the population speaks Pashto. In Balochistan, 35.5% of the population speaks Balochi and 35.34% speaks Pashto [65].

Despite being a multilingual country with over 25 languages, Pakistan's official languages are Urdu (mother tongue to only 7.57% of the population) and English [66]. These linguistic challenges lead to ongoing debates on language of instruction (LoI), curriculum, and textbooks. For this reason, the shift to Urdu or English education could potentially be as much a barrier for Pakistani nationals as it is for refugees in some cases.

Across KP and Balochistan, an estimated 50,000 Afghan refugee children have enrolled in government schools, while UNHCR provides direct support to 144 primary and secondary schools across 54 refugee villages. In addition to this, to promote refugee girls' access to education, Accelerated Learning Programmes (ALPs) have been offered, some of which provide home based classes for refugee girls and women [67]. Although there are policies to provide education to documented refugee children at the school-level, there is no provision to continue onto higher education [68]. There are, however, donor-funded initiatives that provide vocational training and scholarships at the tertiary level [69].

Yet, even where educational opportunities are available, there are multiple attitudinal barriers that impact refugee education in Pakistan. Hervé's survey [60] found that only 10% of refugees surveyed were out-of-school because there was not a school nearby; the majority did not attend due to other factors. These reasons varied by gender, where 57% of girls did not attend school because their families do not allow schooling (compared to 1% of boys), and 44% of boys did not attend school because they needed to earn money (compared to 1% of girls) [60] (p. 17). Based on their findings, Hervé argued that attitudes play a greater role in impeding refugee education than national education policy does [60].

Although Pakistan has a vibrant EdTech ecosystem with multiple players offering learning content, many of these solutions cater to primary school students [61]. Furthermore, evidence from COVID-19 exposed that high-tech distance learning runs the risk of leaving marginalised learners further behind [61–63,70,71]. Adding to this challenge, there are also a number of factors that make it even more difficult for Afghan refugees in Pakistan to access digital devices, and thus high-tech learning solutions. Access to SIM cards and Internet services in Pakistan requires all individuals to have identification cards, making access particularly challenging for undocumented refugees. Refugees can buy SIM cards and access the Internet if they have valid Proof of Registration (PoR) or an Afghan Citizenship Card (ACC) [72].

3.4.2. Rwanda

Rwanda has been a host country for refugees for over two decades, with the majority of its refugees coming from the Democratic Republic of the Congo (DRC) and Burundi (59.6% and 39.9%, respectively, of a total of 126,737) [73]. Burundian refugees, the focus of this study, fled Burundi in 2014 due to the acceleration of political unrest in the country, but they have only been officially recognised as refugees in Rwanda since April 2015 [74].

Since the 1994 genocide against the Tutsi, which resulted in millions of Rwandans fleeing the country, Rwanda has made steady progress in social and economic development and this includes continued investment in education. In Rwanda, the Education Sector Strategic Plan (ESSP) provides guidance to the education sector in five-year cycles and specifically aims to "promote access to education at all levels, to improve the quality and strengthen the relevance of education" in order to meet labour market demands [75] (p. i). Rwanda's Education Sector Strategic Plan (NST1 2017–2024) proposes strategic interventions to build a strong foundation for a quality education. The key strategic priorities include improving the pre-primary enrolment rate, upgrading and increasing school infrastructure and resources, increasing the number of qualified teachers and improving their welfare [76].

Regarding EdTech specifically, the National Strategy for Transformation (NST1) includes an aim to increase the use of ICT in teaching and learning through scaling up SMART classrooms and ICT devices. A recent report by Kimenyi et al. [77] also suggests that rele-

vant policies have been put in place at the national level: three National Information and Communication Infrastructure Plans were implemented from 2000 to 2015 which included several ICT for Development (ICT4D) programmes. Additionally, the Smart Rwanda 2020 Master Plan (SRMP) introduced in 2015 included key areas such as education, women and youth empowerment in ICT [78]. The ICT Sector Plan (2018–2024) also emphasises the importance of ICT in education and academic institutions [79].

An example of EdTech available to refugees in Rwanda outside formal education is Coursera for Refugees, launched in 2016. Through the platform, refugees are able to access free education courses covering a variety of disciplines. All refugees, persons under subsidiary protection, and asylum-seekers are allowed to apply for Coursera courses. While refugees worldwide theoretically have access to the platform, they must register through their UNHCR country office. UNHCR Rwanda has partnered with Coursera to be able to offer free access to both its portfolio of online courses and its free certificates provided by universities and educational institutions around the world [80].

The Rwandan government aims to provide the same quality of education for refugees and nationals through free primary and secondary education, equal access to higher and further education, and the certification of their educational progression [81]. According to the joint strategy on economic inclusion of refugees and host communities in Rwanda [82], interventions related to refugees' inclusion and self-reliance (including refugee education) are in line with the Rwandan Government's NST1.

However, the ESSP identifies several challenges faced by the education sector, which negatively impact student learning outcomes. First, insufficient teacher competencies in subject content, pedagogy and languages of instruction (English) jeopardise the delivery of inclusive education, especially in Science, Technology, Engineering, and Mathematics (STEM) and Information and Communications Technology (ICT). Secondly, the insufficient cooperation across districts and between the public and private sectors, with the latter affecting higher education, particularly hinders education sector progress. Lastly, a lack of strong indicators to monitor progress poses a major risk to the provision of equitable access, especially for marginalised groups such as refugees.

Language is also an important aspect of refugee education and social justice. Rwanda has four official languages: Kinyarwanda, English, French, and Swahili [83] and two of them are used as LoIs. Since 2008, students have been taught in Kinyarwanda in lower primary level (grade 1–3), while from grade 4 onwards, English has become the LoI (shifting from French as the LoI associated with colonialism to English, perceived as the global language) [84]. Refugee education in Rwanda is provided only in Kinyarwanda and English, though it is worth noting that, due to the mutual intelligibility between Kinyarwanda and Kirundi (the official language of Burundi), and the use of French in Rwanda, Burundi and DRC, the shift to English education may be as much a barrier to Rwandan nationals as it is for refugees in some cases.

4. Materials and Methods

4.1. Sampling Approach

Participants were selected through convenience sampling [85] (p. 218). All participants were members of three of the research teams' personal networks. This was deemed the most efficient way of sourcing participants who would meet the inclusion criteria:

- Between 18 and 35 years old;
- Based in either Pakistan or Rwanda;
- Experience of using EdTech to access education post-displacement;
- Refugee status at the time of engaging in EdTech.

As recommended by Fowler [86], each Focus Group Discussion (FGD) needed a minimum of six and a maximum of eight participants to ensure that all participants would have a chance to contribute fully, and that groups would be manageable for the facilitator.

The original intention was to conduct one FGD per focus country. However, when asked whether they would be comfortable participating in a group with members of the

opposite sex, several participants, both male and female, said that they would not. This is reflective of cultural norms in Pakistan. To respect such sensitivities, and facilitate active participation, it was decided to conduct two separate, single-sex groups in the Pakistan context, each facilitated by a researcher of the same sex as the participants. Details of the final sample are provided in Table 2 below.

Table 2. Dimensions of human injustice: adaptation for the refugee context.

Focus Group Discussion	Location	Number of Participants	Gender
1	Pakistan	8	Female
2	Pakistan	6	Male
3	Rwanda	6	Mixed

4.2. Data Collection Method

A key aim of the study is to guide EdTech designers and developers along the road of adopting a decolonial lens while creating products that are pluralistic, designing "with" rather than "for" refugees as they navigate their educational journeys post-displacement. With this in mind, and in line with the decolonial literature (e.g., Maldonado-Torres, [8]), it was important to elevate the voices and lived experiences of the young refugees themselves. FGDs lend themselves well to decolonial approaches given their capacity to enable participants' views to emerge through interaction, so that "the participants' rather than the researcher's agenda can predominate" [85] (p. 532). It was also deemed the best choice given the collaborative, creative nature of the second phase of the FGDs (discussed below).

Prior to data collection, a two-part focus group template was prepared. The first part was designed to elicit details of refugees' educational background and learning goals following displacement, as well as their experiences with EdTech products. In the second part, participants were invited to collaboratively imagine an 'ideal' EdTech product that would suit their and their community's educational needs. The FGD template can be found in the Supplementary Materials (S4).

Due to logistical constraints, FGDs in Pakistan were conducted online, while the FGD in Rwanda took place in person. In all cases, audio recordings were made of the sessions for transcription purposes.

4.3. Analysis Approach

FGDs were transcribed verbatim from the session recordings, then translated into English and cleaned and anonymised by the research team. The transcripts were then subjected to a combined inductive-deductive coding process [85], using Google Sheets. Predetermined themes were established according to the dimensions of human injustices framework [6], and data were categorised according to those themes. A second round of inductive coding then took place to capture any additional themes that did not readily fit into the framework.

4.4. Ethical Considerations

Ethical clearance was obtained to conduct the FGDs from the EdTech Hub Ethics Committee on 17 March 2023. As detailed in the clearance application, several decisions were made to ensure that the research was conducted in an ethically sound way, especially given the specific challenges that may arise when involving refugees in research, including unequal power dynamics [87] and heightened risk of distress and re-traumatisation [88].

Firstly, participants were provided with detailed written information about the purpose of the study and were sent FGD question summaries in the days prior to the focus group. Secondly, prior to the beginning of the FGD, participants were reminded of the study's purpose, and facilitators explained in detail what their participation would involve, what would be produced as a result, and how their data would be used and stored. The

full consent script (see Supplementary Materials S3) was read to participants verbally; they also received an email copy for their records.

Thirdly, FGDs were conducted by research team members who are themselves members of the refugee communities involved. These individuals were well-placed to understand the sensitivities particular to their participants, and also to communicate in their languages of preference. Relatedly, while a mutually understood language was chosen as the main language of the FGD (Urdu in Pakistan and Kirundi in Rwanda), the facilitators' multilingual knowledge made it possible to invite participants to respond to questions in other languages that they might feel comfortable using (Dari or Pashto in Pakistan; Kinyarwanda or French in Rwanda). Participants could also request for questions to be clarified in any of these languages. This was deemed crucial to ensuring participants' comfort and making them feel fully understood, especially given the political sensitivities around the use of different languages in both contexts described in the research contexts section.

4.5. Limitations

This study had a limited timeframe in which to complete data collection, resulting in it only being possible to gather data from one source. Ideally, FGD data would have been supplemented with other sources, such as key informant interviews with UNHCR staff in each context.

Due to logistical constraints such as participants' disparate locations or ability to travel, both FGDs in Pakistan were conducted online. Connection stability is a risk with online data collection, though the internet remained stable throughout both calls in this instance. There are also suggestions in the literature that online FGDs present more limited potential for natural interaction [89]. However, Moore et al. also note that interpersonal exchanges can remain rich, especially with the help of ice-breakers to build rapport [89]. In addition, Woodyatt et al. [90] found that online and in-person FGDs yield "remarkably similar" content (p. 741).

It is possible that the dual role of some research team members, who are both researchers and members of the participating refugee communities, may have led to findings being skewed by assumptions based on pre-existing knowledge of their community, rather than discovered through the application of research methods [91]. For example, researchers may have inadvertently asked leading questions based on their experience, or been tempted to interpret data according to their personal experiences rather than being guided by what participants were actually saying. This was mitigated by thorough research methods training prior to conducting FGDs, team conversations to raise awareness of issues of positionality, and all team members sharing the task of data analysis. Indeed, the involvement of team members based in the participating refugee communities in the analysis has also facilitated contextually relevant interpretations of data and ensured that any assumptions made by other team members were addressed.

Finally, it is important to acknowledge that conducting FGDs with participants who have sought access to EdTech and may be studying at higher education level means that our findings are unlikely to reflect the experiences of the most marginalised refugees. We stress that we do not seek to achieve large-scale generalisability within our study, but rather to highlight some examples of experiences, needs and ideas that may or may not be similar in other refugee groups. Further research on EdTech for refugees of different age groups and educational backgrounds would be a welcome addition to the literature.

5. Results

The FGDs were characterised by a diversity of experiences and perspectives, reminding us of the fact that refugee communities are deeply heterogeneous. The section begins with an overview of participants' personal displacement and education narratives to provide context for the subsequent views and ideas expressed. This is then followed by a section on which EdTech features participants had found particularly helpful when seeking to continue their education, and the barriers that they experienced when trying to access

and use these products. Finally, participants' design ideas for EdTech products to meet the needs of refugees in their communities are presented.

5.1. Displacement Narratives

5.1.1. Pakistan (Females)

The eight participants became refugees at different points in their lives. Three (PK1-B, C, D) had been born and raised in Pakistan, and one (PK1-A) had moved to Pakistan when she was very young. The remaining four (PK1-E, F, G, H) had fled Afghanistan when the Taliban came to power in 2021; three had been studying at university (law, medicine and computer science) and one had just completed secondary school. Two of those who had come to Pakistan most recently spoke openly and passionately about the experiences that led to their displacement; they recounted how speaking out about women's rights had led to them and their families being threatened by the Taliban, and their desire for support and compassion in their host country. Sadly, this wish was not fulfilled for these participants; instead, they experienced discrimination:

> *"I went to the hospital with a friend on my first day here. We spoke Farsi, and the guy noticed us not being Pakistani, so he charged us more. . . When you look for a house to rent initially, the owner doesn't want to rent his house to refugees, and then he asks for double the price. We need support, but we get the opposite".* (PK1-H)

Participants also reported education-related barriers upon arriving in Pakistan. Two participants (PK1-E, G) spoke in detail about how policy-related documentation requirements, for instance to access the internet, posed a major challenge to refugees seeking to access higher education. One was fearful and uncertain about her future given that her visa was about to expire, and she did not possess any other documentation needed by her education institution. Another reported a general lack of advocacy for female education:

> *"Are we unlucky because we are born Afghan women, or is it the world ignoring us because we are Afghan? Nobody thinks about the benefits [our] education can provide to boost the economy. We hear empty words from organisations and activists, but don't see action".* (PK1-G)

Despite these obstacles, two participants (PK1-E, G) reported that they were now studying at universities in Pakistan, with one having received a scholarship (although she shared that the amount she received did not completely cover all her needs). Participants reported dreams of becoming doctors, lawyers, and policy-makers.

5.1.2. Pakistan (Males)

All participants had been born and raised in Pakistan, though one (PK2-F) had returned to Afghanistan, where he completed his final two years of secondary education before returning again to Pakistan. One participant (PK2-A) highlighted that his family had left Afghanistan before he was born for security reasons.

Participants expressed a number of educational and professional goals. Two are medical students, one noted being "on track to achieve my goal of becoming a professional doctor" (PK2-A). Three are IT developers, all of whom had aspired to continue to higher education (one to be a doctor, specifically) but had been unable to due to financial and documentation issues. One had been introduced to web development by a friend and another noted that, while he had been unable to study medicine as he initially intended, he was happy with his chosen profession as an app developer. The final participant had always aspired to become a 2-D and 3-D animator, and was currently studying to realise that goal.

5.1.3. Rwanda

All six participants were from Burundi, arriving in 2014 and 2015 due to increased political instability in Burundi at that time. At the point at which they were forced to flee to Rwanda, two (RW-B, C) were at different stages of their undergraduate degrees (studying law and medicine), while one (RW-A) had just graduated with a science degree. The remaining three (RW-D, E, F) were in different grades of secondary school.

Educational and employment goals varied across the group, and many of the group's original goals had changed in light of challenges post-displacement. Upon arriving in Rwanda, one participant wanted to study journalism, another medicine, another to finish their law degree, and another to study for a master's in mathematics.

The main barrier to continuing their education journeys was financial issues. Four reported having to change their plans because they had been unable to secure a scholarship for their chosen pathway. However, all participants had found different ways of continuing their education. One aspiring journalist had instead started working in a library after taking a MOOC in Library Management. Of those who had been undergraduates when they were displaced, one had aspired to become a lawyer, but had since started studying Business Management remotely with the help of a scholarship. The medical student had been granted a scholarship to enable them to complete their studies in Rwanda. The participant who had graduated before leaving Burundi managed to secure a scholarship to study for a master's in mathematics and is now working in telecommunications. Finally, one participant who had left Burundi during secondary school had secured a scholarship to help them complete their secondary education, and another, an aspiring doctor, had ended up studying Healthcare Management.

Five of the six participants emphasised that their primary focus post-displacement had been to continue their education. The remaining participant explained that they had been focused on being "able to satisfy my basic needs" (RW-A) and had therefore put their education aspirations to one side to look for a job instead.

5.2. Refugee Participants' Experiences of EdTech

This section provides details of the EdTech products with which participants had the most familiarity, followed by reports and analyses of the positive interactions and barriers experienced when engaging with these products. Findings are analysed using the dimensions of human injustices framework (see Figure 1). Further, we draw links, where relevant, between the findings and the general and decolonial literature relating to refugees and EdTech.

5.2.1. Focus Products and Reasons for Engaging with Them

During FGDs, participants were asked to focus on one EdTech product that they had found particularly memorable, either for positive or negative reasons. Chosen EdTech products varied according to context. Female participants in Pakistan mentioned using general websites (such as Google, YouTube and Wikipedia) most frequently, while Rwanda-based participants chose to focus primarily on their experiences of using MOOCs—specifically, MOOCs offered through Coursera for Refugees. Some also focused on an integrated study platform that they had used at university (Canvas) and one participant chose to talk about a platform specifically for accounting students. Similar to the latter example, male Pakistan-based participants chose to talk about online courses or platforms that provided instruction related to a specific discipline: these included a coding course, an animation course, a web development course, and a platform providing academic support for medical students.

Those participants who chose to specify reasons for engaging with EdTech gave rationales that fell into two key categories: to gain professional skills (often while waiting for other opportunities and support to materialise, such as scholarships RW-C, D, E, F), and to obtain certificates with which to apply for jobs (RW-B, E, C; PK1-A, D). One female participant in Pakistan also pointed out that she engaged with YouTube tutorials primarily due to being unable to afford paid courses.

5.2.2. Positive Interactions with EdTech

Participants across all FGDs reported significant benefits to using their chosen EdTech products to continue their education. A theme emerging from the male Pakistan-based group and the Rwanda-based group was the belief that online courses had had a notable impact on participants' ability to achieve their goals within formal education. Three participants in Rwanda and two in Pakistan reported that accessing support from online courses had helped them to pass university exams. Participants across the same two groups emphasised their belief that online courses were effective for developing a range of professional skills, including language skills (RW-D), writing skills (RW-C, D), web development skills (PK2-E) and animation skills (PK2-F). One female participant in Pakistan also noted that browsing the internet had enabled her to develop analytical skills, and to become more aware about global affairs (PK1-A). In Rwanda, skill and knowledge development through online courses (in this case, MOOCs through Coursera for Refugees) were directly linked with securing employment: "I learned a library management course which allowed me to get the job I am currently doing" (RW-D); "[Coursera] enabled me to quickly earn certificates that I used to get a job that I now have" (RW-A).

The supportive factors for such positive interactions with EdTech included: (a) clear purpose of skills development for better life opportunities, (b) contextualised content, (c) language support, (d) illustrative visuals, (e) facilitated interactive elements, (f) expertise of presenters, (g) clear, easy to navigate delivery style, (h) self-paced options, and finally, (i) being free of charge. Below, we offer more details on each of these elements.

Some participants in Rwanda focused their comments on positive experiences of MOOCs that took their context into account. One participant (RW-B) explained that taking MOOCs that used examples from similar contexts to those that he had used in Burundi made the courses feel accessible. Another explained the importance of the accountancy training platform that he used being based on the Rwandan accounting system:

"[E]verything was designed taking into account local accounting context. The examples given in the documents and videos were all Rwandese case studies, which allowed me to easily understand the content of the modules. . . it could allow me to integrate myself in the Rwandese accounting industry". (RW-F)

Relatedly, one participant in Rwanda noted that the variety of different MOOCs available through Coursera for Refugees enabled "people from different cultural and educational backgrounds to easily learn" (RW-D), suggesting that offering diverse courses based in a wide range of different contexts (i.e., not just those in the Global North) may make learning feel more accessible to refugees with varying backgrounds and educational priorities.

Where it was not possible to find resources in the participants' languages of choice, language support was identified as an important feature that facilitated EdTech access for refugees. Subtitling was identified by participants in both the Rwanda-based group (RW-D, C, A) and the female Pakistan-based group (PK1-A, F) as the most helpful means of ensuring their access to online and course content in other languages. One female participant in Pakistan noted that, in addition to captions, highly visual content was particularly useful in helping to overcome language barriers, as well as support from those around her:

"Ted Ed is in English, but it provides visuals which can make viewers understand a little, and seeing the captions and having the support of a family member and friend can help". (PK1-F)

Interaction was rated as an effective component within successful EdTech offerings. Participants from the male Pakistan-based group and the Rwanda-based group highlighted the importance of including an interactive, facilitated element, which enabled participants to receive more tailored learning experiences through being able to ask questions (PK2-D; RW-B, D). In addition, one of the Rwanda-based participants highlighted that the discussion forum component of some MOOCs was helpful for developing cultural awareness through comparing ideas with course peers (RW-D). In contrast, much was made in the male Pakistan-based group of the idea that courses or tutorials that they had experienced had

been effective because they had been delivered by field experts, with four group members citing this factor (PK2-D, A, B, F). These participants also cited a preference for pre-recorded lecture content, reflecting the linear, hierarchical teaching style that typifies the Pakistani education system [1,92].

Other features of EdTech products commonly valued by participants included: content being well-organised and easy to navigate (RW-F, E; PK2-A, B, E); facilitators of pre-recorded lectures having an appropriate pace and clear delivery style (PK2-A, E, F); courses being self-paced (RW-A, C, F); and content being free to access (RW-D, C; PK1-H, B; PK2-F).

5.2.3. Barriers to EdTech Use

While participants reported myriad ways in which EdTech products had enabled them to continue learning, they also indicated a number of barriers that prevented them from taking full advantage of these products.

Using the dimensions of human injustices framework outlined in this paper as the analytical framework, we find that material injustices were represented by lack of infrastructure access and commodification of products. Political and geopolitical injustices were represented; again, by the commercialization of such education services, the power dynamics played by the field of technology and the fear of doubling down on their marginalisation as refugees when not mastering such tools, as well as the lack of access to documentation, rights and consequently, several other restrictions on financial services. While Cultural–epistemic injustices were represented by a general feeling of alienation from the whole experience, and that such products are not designed for refugees in the first place, using Western-centric content, pedagogies and language. Below, we offer more details on each of these experiences.

Numerous references were made to struggling to access EdTech products due to a lack of infrastructure and resources. Several members of the Rwanda-based group and the male Pakistan-based group reported not having access to an appropriate device for learning. As one Rwanda-based participant explained,

"I also had challenges at the beginning of my refugee life, because I had no laptop, and I had to use the phone to learn. My phone could not allow scripts, and I was hardly able to understand everything". (RW-A)

Another material barrier identified by participants from all three groups (RW-F; PK1-A, C, D; PK2-C), was the issue of paywalls, with these participants noting that courses with fees attached would certainly prevent refugees lacking financial means from accessing the educational experience and opportunities promised by some EdTech products. This awareness of the commodification of education was summarised by one female participant in Pakistan: "[h]ere education is a commodity, not a right. You need to pay with your kidneys to learn" (PK1-C). It is also telling that one male participant in Pakistan said "expensive" when asked to name a word that he associated with the word 'education'".

Elsewhere, members of the female Pakistan-based group reflected on how restrictions imposed on refugees in Pakistan resulted in them continuing to be excluded from the benefits of EdTech products. This took two forms; firstly, one participant explained that, even if they have enough money, Afghan refugees' lack of access to payment methods make them unable to access paid EdTech products:

"Refugees do not have access to paid websites. . . We are not provided with cards from the bank, and we cannot use e-services. We are provided with cheque books only, not even ATM [access] often. So we can't use these learning resources even if we want to". (PK1-A)

Secondly, another participant noted that some free EdTech resources developed in Pakistan, such as digiskills.pk, require users to have a computerised national identity card (CNIC), which Afghan refugees cannot apply for. Refugees are therefore unable to access such resources unless they can convince a Pakistani national to give them access to their CNIC.

Indeed, a significant finding from both contexts, and all three groups, is a sense from participants that EdTech products that they have experienced were not designed with refugees in mind, or even to include refugees among other user categories. All members of the male Pakistan-based group and one Rwanda-based participant (RW-B) agreed that none of the products that they had used had been designed for refugees specifically (though two felt that the courses that they had followed had been designed for general ease of access—PK2-C, F). Two female Pakistan-based participants noted their belief that EdTech aimed at refugees did not exist anywhere. The exception to this was Coursera for Refugees, which one Rwanda-based participant identified as having been "designed for emergency learning for refugees to learn quick and useful skills for academic and professional purposes" (RW-C).

Not only were products not felt to target refugees, but participants noted the Western-centrism of EdTech offerings. One Rwanda-based participant describe their discomfort when studying MOOCs that were made by British and American universities, both in terms of the content and the pedagogy used:

"[T]he courses were from American or British universities, and it was hard for me to feel comfortable with the programme in its essence due to my familiarity with Burundian education system mostly based on memorisation. I remember having failed in many quizzes at the beginning because I could not [understand] what I had watched in the videos. . . The context (examples given in the videos) was not familiar to me, and this was also a challenge". (RW-C)

Similarly, another Rwanda-based participant noted that course examples were dictated by the university that created the MOOC, making them less applicable to refugee contexts: "some business courses are hard to understand, because the scenarios are more related to the location of the university (RW-B).

Rather than rejecting such offerings, however, several participants' comments suggest that many are prepared to buy into these 'universal' products and ways of learning. When asked for words that they associated with the word 'technology', several male participants in Pakistan chose words associated with power and forward motion: "advancement"; "future"; and "ease of work". Crucially, participants from all groups referred to a perceived need to adapt themselves to the products available, regardless of the additional challenges they faced to do so:

"Although the course was not tailored for refugees, we made sure to tailor ourselves and our capabilities to learn from it". (PK2-E)

"I think I have to conform to the context. . . The other students may be familiar with the whole content, and to be able to get that degree, I have to make efforts and find ways of fitting into the context". (RW-B)

"I am not very fond of tech, but now I am getting used to it because it is an essential part of learning today". (PK1-D)

A final but related barrier identified by participants in all groups (RW-D, A; PK1-E, B, C, F; PK2-C, F) was that of language. While some participants noted that subtitling functions were helpful in overcoming this barrier, this was not the case for all. Female participants in Pakistan focused on the dominance of English as the language most commonly used within EdTech content; one participant identified English as a "universal language", but also noted that trying to access resources in an unfamiliar language added to the strain of being a refugee: "The tech can be helpful but not entirely if you are displaced and unfamiliar with the languages" (PK1-B).

5.3. EdTech Product Design Ideas

Based on their own experiences of EdTech products and their perceptions of what others in their communities might find most helpful, participants made several design suggestions for future EdTech products aimed at enabling refugees to continue their education post-displacement. These ideas are presented below and cover the following considerations: what primary goals should the EdTech product have; what format should it take; by whom should products be designed; what content should be covered; and how should EdTech content be delivered.

5.3.1. What Should Be the Goal of Learning through EdTech?

The most common purpose of education for participants and their communities was employment. Participants across the three groups (RW-F, D, A; PK1-D, C; PK2-B, C) suggested a common belief that education leads to increased skills, which leads to employment, which leads to financial security: arguably the ultimate goal. Accordingly, a key priority for participants, particularly in Rwanda, was that EdTech offerings culminated in some form of tangible accreditation or certificate that could be directly used to gain employment (RW-F, B, D). This idea of placing importance on accreditation was reflected in the fact that, when asked to recall positive educational memories, several Rwanda-based participants chose to speak about formal education milestones and successes, such as passing exams or being accepted to a university.

Conversely, participants in Pakistan appeared to view education in terms of its wider potential. Participants in both male and female Pakistan-based groups used broad conceptual nouns when asked to name words that they associated with 'education'. Three major sub-themes emerged: ideas around helping others ("compassion"; "support for humanity"; and "respect"); ideas around helping oneself ("independence"; "opportunity"; and "self-improvement"); and ideas around hopefulness ("prosperous future"; "development"; and "hope for a better life").

Another purpose of education for refugees identified by participants was community integration (RW-F, C; PK1-C). This emphasis on increasing employability, alongside using education for community integration, are succinctly combined in a comment from one Rwanda-based participant:

> "Refugee youth need to gain skills that can help them to be competitive in the job market. I think every EdTech product should take into account building theoretical content that is relevant to the current demands, and enabling refugee youth to know the realities of their host community; which can facilitate their full integration". (RW-F)

5.3.2. What Format Should EdTech Products Take?

Unsurprisingly, given the types of EdTech products that participants were familiar with, participants that commented on their ideal EdTech product format all suggested some form of learning platform. Within this, content format suggestions varied from recorded video lectures similar to those that they had found effective (PK2-A, B, F, E) to interactive courses (RW-A, C, D, E; PK2-F).

In terms of overall format, all three groups' participants debated the pros and cons of apps and websites accessed through computer browsers. Proponents of the app format noted that an app would be more appropriate given that many refugees lack laptops (RW-F; PK1-G, B) and suggested that apps are also easier to navigate and quicker to access than webpages (PK1-A, H, B; PK2-E). One female participant (PK1-B) also noted that app notifications were helpful as study reminders. Conversely, those in favour of a browser-based offering felt that webpages were easier and clearer to learn from (RW-F, C; PK2-D, C; PK1-F). Given these arguments, several Rwanda-based participants (RW-B, F, E, D, A) and one male participant in Pakistan (PK2-D) concluded that it would be best for learning content to be available both through an app and a website.

5.3.3. Who Should Design EdTech for Refugees?

Prior to this research, the vast majority of participants had never been consulted about how EdTech could best be designed to meet their needs. On being asked whether she would be interested in participating in the design of an EdTech product, one female Pakistan-based participant's reply conveys something of the novelty of this idea: "You are the first to ask this question, and I wonder if they [EdTech product designers] have ever thought of designing an online learning platform for refugees until now" (PK1-E). Despite not having been asked, almost all participants in all groups expressed an interest in being involved in design, though the extent of this involvement, and that of others in their community, differed from group to group.

Participants from the female Pakistan-based group were strongly in favour of refugees themselves playing an active part in the design of EdTech products:

"These people think they are experts and don't value our voices and opinions, resulting in failed schemes. We need to play a role in decision-making processes because it will contribute to developing the refugee community". (PK1-E)

Participants from the male Pakistan-based group also indicated that refugees themselves should be involved in EdTech design, with one noting that refugees "can better address their community needs" (PK2-D). However, several group members also indicated that field expertise was equally important; they then combined these priorities to suggest that refugee professionals should play a leading role in developing EdTech content (PK2-D, E, A, B).

Interestingly, while members of this group were eager for refugees to lead on content, they were quick to defer to other actors when it came to technical design (PK2-C, D, E). Again, the issue of expertise was an important concern for these participants, as illustrated by one comment that "the product should be designed by expert professionals, whether local or foreign, and they should be making the decisions" (PK2-D). Another participant took a slightly different view that Afghan refugees should take the lead on design, but that they should do so "with support from expert foreigners" (PK2-F). One Rwanda-based participant shared similar sentiments, noting that "regardless of the origin of the new EdTech product or existing one, it can be useful for refugee education if it is well-organised" (RW-E).

In contrast to comments from the Pakistan-based groups proposing a central role for refugees in EdTech design, participants in Rwanda proposed a more tentative approach. Two participants in this group (RW-A, D) suggested that refugees should be brought in at the user testing stage, but not before, suggesting that they doubt whether refugee actors are capable of taking a more decision-making role. Furthermore, and in relation to the suggestion that online courses were the best form of EdTech to focus on for refugees, five of the six participants in Rwanda (RW-A, C, D, E, F), along with two in Pakistan (PK1-A; PK2-C) indicated that local universities and refugee organisations such as UNHCR should play a key decision-making role in EdTech design. One participant explained that such collaborations would ensure that access was made "easy for the refugee learners" and that courses were "relevant to the needs of the refugees residing in Rwanda" (RW-A).

5.3.4. What Content Should Be Covered?

Given participants' aforementioned prioritisation of employability as a core objective of their learning, several group members (RW-F; PK1-D; PK2-A, D) noted the importance of EdTech products developing practical skills that could be used for employment purposes. One female participant noted the benefits for women in particular:

"I think training programs to make them stand on their own feet instead of asking for support, especially for women: beautician courses and cooking courses, baking cakes, designing, these all are a great idea to help them [women] build their lives and contribute to the host community in general". (PK1-D)

Other skills that were suggested as high priority areas in Pakistan were digital skills (PK1-G, C, E; PK2-B, D, E) and host-country language skills (PK1-H, G, C, E; PK2-A, B, E). In addition, one male participant suggested that English language skills should also be a content focus as a bridge to further study:

"Learning and understanding English will provide access to a wealth of content online, making it easier to learn and understand other subjects". (PK2-C)

While not suggesting that language learning should be the focus of courses, several other participants (RW-C; PK1-A; PK2-ALL) emphasised the importance of making content available in multiple languages, with three in Rwanda (RW-D, C, B) specifically recommending the use of subtitles for access to a wider variety of content.

A common preference across all groups was that EdTech content should be conversant with secondary or tertiary curricula of the host country (RW-A, C, B; PK2-A, B), and that this content should be grouped by age and educational level (RW-F, B; PK1-D; PK2-A). Other participants agreed that content should be organised in terms of the subject studied at different levels, and that a wide variety should be available to suit individual interests (RW-A, C, E; PK1-A, H).

Educational content that directly addresses refugees' needs was proposed by two participants in Rwanda (RW-B, D) and one female participant in Pakistan (PK1-A). For RW-B, this meant providing content aimed at helping refugees to integrate into the host community, echoing previous comments that this was a priority for refugee education in general. For PK1-A, addressing refugees' needs meant having EdTech content that focuses on addressing the challenges experienced by Afghan refugees in Pakistan, including how to deal with experiences of discrimination and trauma:

"Initially, we need to teach the refugee community about its value, teaching them to stand up for themselves and how to cope with discrimination and feeling of isolation. We need to target areas that will provide them with support for the trauma they have been through and the sense of isolation they experience. Inclusion can only begin by teaching refugees ways to include themselves". (PK1-A)

For this participant, educational provision of this nature should be prioritised as it would tackle refugees' most immediate needs, a logic that was supported by one of the newer arrivals from Afghanistan within the group (PK1-H). Both participants felt that this initial support could also act as preparation for other educational content, such as subject-specific, curriculum-aligned content.

In Rwanda, several points were made around the contextualisation of EdTech content, not just for refugee communities, but in terms of their geographical locations. Two participants (RW-F, A) stated the importance of content being relevant to their immediate contexts, with one noting that MOOCs rarely originate in countries in the Global South:

"[T]he content of that EdTech product should be adapted to the local programmes, because it is obvious that Coursera does not include programmes from the many African universities. I am not even sure if the African universities have their programmes on Coursera". (RW-A)

Conversely, two other participants (RW-D, E) took the view that EdTech content should be deliberately made less 'local' as they perceived that being exposed to more international content would better prepare them for the demands of the job market (the group's main priority for education):

"I think it should not only focus on the local programme... We are now in a global education... We have foreign companies here which need people with global skills". (RW-D)

5.3.5. How Should EdTech Learning Be Delivered?

Participants chose to focus on online courses, whereby ensuring that refugees can study at times that are convenient to them was a key concern for three participants in Rwanda, who were in favour of a self-paced delivery format. Though one participant in the male Pakistan-based group (PK2-F) expressed a preference for a live teaching component, no other participants in either Pakistan-based group distinguished between synchronous and asynchronous delivery. Instead, they focused on who should teach or facilitate the online courses.

Both Pakistan-based groups supported the idea of refugee community members delivering online courses, with three members of the female group (two of whom were new arrivals—PK1-E, F) noting the value of these facilitators being long-term Afghan refugees:

"Our Afghan refugee community who have been here in Pakistan can provide great knowledge and skills to other refugees. They are talented and understand the refugee situation". (PK1-E)

Another female group member (PK1-C) added that refugee facilitators should be trained by UNHCR, with PK1-F also noting that this strategy could serve to boost refugee employment.

Finally, and echoing the emphasis on expertise highlighted in relation to who should design EdTech products, four Pakistan-based participants (PK1-A, D; PK2-A, B) noted the importance of recruiting "skilled professionals" to deliver courses (PK1-D). The two male participants added that these should ideally be professionals from within the refugee community.

6. Discussion

In this section, we apply a decolonial lens and the dimensions of human injustices framework [6] to the findings to identify the range of positive interactions, injustices and paradoxes of refugees' experiences with EdTech.

Refugee views on what makes good EdTech are diverse, emphasising the point that there is no 'one size fits all' when it comes to designing EdTech for and with refugees. However, there was strong consensus that technology is central to enabling the participating refugees to achieve their educational goals, and subsequently their core goals of securing employment and integrating within their host communities. Refugees reported numerous positive examples of ways in which existing EdTech products, predominantly online courses and platforms, have enabled them to achieve their educational and employment goals, whether by expanding their knowledge, building professional skills, or providing them with tangible credentials with which to enter the job market. Indeed, they appear to view technology as crucial to accessing prosperity; as one female participant in Pakistan reminded us, "Tech is central".

Despite the positive examples of EdTech use provided, participants reported several barriers that continue to hamper their progress towards achieving their goals, many of which stem from the cultural, material and (geo)political injustices to which they are subjected as refugees. We begin to see that, for refugees, injustices are in fact multi-layered. These multi-layered injustices underscore the importance of going beyond an EdTech "arms race" that prioritises the commercialisation of education provision in humanitarian responses.

On the material front, and in light of their personal and communal experiences and priorities, refugee participants agree that EdTech products should be delivered in a language and format that is appropriate and accessible in the context. The previous was not always the case according to participant testimonies, with reports of limited device access, paywalls and language barriers common among participant responses. Generally, FGDs included significant discussion of MOOCs by participants, particularly in the Rwandan context. Given this paper is framed Adam's decolonial critique of MOOCs [6], we acknowledge the number of issues related to the design and implementation of MOOCs, especially for

refugees, such as the predominance of mobile technologies among refugees, often with smaller screens not conducive to effective engagement in MOOC content.

On the cultural–epistemic front, some participants report alienation due to accessing courses that they do not feel reflect their cultures, epistemologies, or practical needs, reflecting Western assumptions that Western contexts and methods are 'universal', i.e., familiar and applicable in all contexts [6]. Such products are therefore perpetuators of cultural and material injustices articulated in the dimensions of human injustices framework. They have no doubt become so at least partially due to a pronounced lack of effort to design products that meet refugees' needs specifically, and a lack of consultation with refugees—despite their enthusiasm to be involved—around where, how and by whom these products should be developed.

Conversely, while some participants feel that the content available through EdTech products needs to be appropriate to refugees' host country contexts, many recognise a need for EdTech content to be directly conversant either with host-country education curricula, or focused on the development of professional skills, including language skills that will help them to integrate into their host communities.

Several voices also articulate a perceived need to adapt themselves—from the language they use to the pedagogies and content examples they experience—to fit into, or become comfortable with, Western educational paradigms. This need is based on the provenance of the EdTech they use and, crucially, the demands of a Western job market. Through our decolonial lens, this tendency may be understood as a way in which EdTech products reinforce the intersectional oppression experienced by refugees on two levels: a need to deprioritise their own cultures and preferences for the benefit of a host community, and also a need to adapt to the demands of Western ways of thinking, being and learning that characterise most EdTech design.

On the political and geopolitical fronts, the example of refugees being unable to access EdTech due to not possessing a national identity card is particularly striking. Thus, not only are resources being designed with no intention of including refugees, but deliberate attempts are made to prevent refugees benefiting from resources that stand to enrich and improve their education chances.

Moreover, refugees reported a feeling of dependency on technology, a need for it to get ahead, and a fear of missing out. This strikes us as problematic, especially given the vulnerability of the group in question. It is important to bear in mind that messaging around the indispensability of tech is rooted in the techno-capitalist agenda that prioritises tech company profit over the wellbeing and prosperity of consumers [16]. This becomes even more problematic in the refugee context; forcing those with compromised access to technology to feel that they are helpless without it, arguably constituting a key example of intersectional injustice and digital oppression.

While some participants feel strongly that refugees themselves ought to be at the centre of decision-making processes during EdTech design, others appear ready to entrust this power to other agencies: some familiar to them (UNHCR; national NGOs) and others further away (EdTech developers in other countries). It is possible, especially given some comments from the male group in Pakistan, that some do not believe that their own communities possess the knowledge and skills to design their own products. This could be a case of internalised oppression [92] and a sign that colonialism has succeeded in making the colonised themselves believe that they are inferior. It is also possible that some refugees have never questioned the power structures in which they are entangled (another key goal of colonial education: to reduce the extent to which the oppressed are able to question the power structures that bind them) [15]. Alternatively, refugees may be aware, but may have simply accepted, that decision-making power usually lies outside their communities. Either way, this serves as an important example of geopolitical oppression that disempowers refugees and reduces the control they have over their own futures.

As general comments, we offer two concluding thoughts:

On one hand, these findings force us as a research team to face a challenging paradox: decolonial thought posits that placing trust in the tech developers of the West simply perpetuates the role of these developers as producers and decision-makers which, by extension, and given the dominance of tech in all aspects of life today, forces our refugee participants and their communities to remain in the role of dependent consumers. Yet, following this argument carries the temptation to dismiss the perspectives of the refugees we interacted with, some of whom appeared perfectly accepting of this status quo—voices that we, by writing this paper, are seeking to amplify and lend agency.

On the other hand, by reviewing the broader literature, and especially taking into account direct representation of refugee voices and possibilities beyond an instrumentalist functional positionality around EdTech as outlined earlier, Meyer et al. [93] offer portraits of refugee narratives growing up in the Dadaab refugee camp in Kenya. Like our research team, the writers of this paper are all refugees themselves based in a Global South context. In their recommendations, Meyer et al. call for a rethink of curriculum theory for refugee education to consider accounting for "pedagogical possibilities commensurate with: the exigency of time in long-term displacement situations; the implications of crossing physical, social, and cultural borders; the losses endured by marginalised communities; and the problematics of adaptation in lieu of choice in the daily life of displaced people" [93] (p. 1).

Meyer et al. [93] call for an education that serves refugees to critically participate rather than adapt and conform, to view their lives through a "critical consideration of reality, not as marginals living outside society", but as agents who can transform it. They assert that students are more inclined to fatalistically accept and conform when there is no critical examination of such a reality, seeing it as a "closed world" rather than a result of the historic and sociological power dynamics that led to its formation. Furthermore, they call for an education that prepares refugees for a return home, rather than being in an accepted endless state of emergency and forgetfulness. In a similar vein, Dovigo [28] concludes his work on Decolonising Refugee Students Higher Education, calling for a goal of "promoting memory as a critical remembrance process for self-healing, understanding, to build a narrative around self and community that can be alternatively disseminated", to counter political, geopolitical and epistemic injustices.

If anything, this all serves to highlight the complexities and heterogeneity of the refugee experience which cannot just be "solved" or "fixed" through one universal, designed for scale, EdTech product.

7. Conclusions and Future Directions

In light of the decolonial commentary and analysis of primary data presented above, we propose the following design principles for those seeking to develop EdTech for refugees using a decolonial, justice-centred approach:

1. Prioritise designing diverse EdTech products for and with refugees. Refugees are not a homogenous group. Many refugees report that EdTech access is important for their educational success and future prosperity. However, there are very few EdTech offerings that design specifically with and for refugee communities. Rather than aiming for maximum reach and universality, funders and designers should consider focusing their efforts on designing for particular refugee groups, which will involve careful research within different refugee groups' contexts, needs, and priorities. Additionally, in order to avoid disruption to learning progression, the sustainability of products should be considered from the outset.

2. Actively seek refugee involvement and relational accountability in EdTech design. Although the vast majority of participants noted they would be eager to be involved, none report contribution to the design and/or development of EdTech products (though we acknowledge the small sample). They also report that their communities involve people with different professional skills and expertise (though the breadth of educational experiences and attainment among our participants, we argue, should

not be discounted) who can be employed for both consultation on design and facilitation/presentation of the educational content. Doing so will ensure that products are not only contextually relevant, but genuinely empowering for the refugees that use them. It also acknowledges that design is a process of mutual accountability, learning and unlearning rather than a technical fix or end product [28]. The level of this involvement should also be decided by refugees themselves; some may wish to offer their perspectives only, while others may wish to assume a more decision-making role. Fair compensations should be offered for such consultations, commensurate with the time and effort spent.

3. Design for maximum adaptability. Given the diverse needs and preferences of participating refugees, a sensible way forward for refugee EdTech design may be to focus efforts on designing products with high potential for adaptability. Rather than using such tools to distribute 'universal' content, models that provide a 'shell' within which content can be added and adapted by refugee actors for their own specific contexts may enable refugees to take greater ownership of, and a stronger decision-making role within, design processes for the EdTech products they use.

4. Design for holistic interventions. As outlined, the refugee situation is complex, it has political, cultural–epistemic and material facets to it. A holistic intervention would first ensure that multiple stakeholders from across these multiple facets are part of the design process, i.e., that design is in conversation with policy and community. Second, holistic interventions would prioritise both survival skills, host-community integration, social and legal protection from exploitation as well as cultural affirmation and empowering refugees to build a communal narrative of being active agents, critically conscious of their realities and the forces producing it, rather than conforming subjects to the status quo.

5. Raise awareness of power dynamics in parallel with design. Given the apparent lack of awareness of the sources of oppression that refugee participants experience, an important next step could be to increase efforts to engage with refugees about the reasons (and actors) behind their alienating experiences, in order to better equip them to identify and critically analyse the injustices they face [15] and reassert themselves within structures from which they continue to be excluded. How and by whom this is done should be the subject of further discussion.

6. Educate designers into the historical context of refugees and the multiple dimensions of injustice. This starts by acknowledging epistemic limitations of designers and their experiences and the need to understand the complex political, historical, linguistic and psychological realities of the particular refugee group they are designing for. This would avoid reproducing systematic disempowerment. Scaife et al. [40] encourage "shaping the design at different points; for example, at the beginning to help problematize the domain, in the middle to test out and reflect on cognitive and design assumptions and biases, and at the end to evaluate prototypes in real-world contexts" (p. 350).

7. Assess harm and accountability when it comes to data collection and ethics. Krishnan [55] developed a "Humanitarian Tech Ethics Assessment Considerations" framework (p. 8) to be applied in humanitarian settings to assess "plausible, possible and probable future harm", taking into account decolonial principles. Such a framework can be a guide to designers, organisations and governments towards more transparency and accountability during data collection and usage in refugee education contexts. Indeed, the framework could be a helpful guide for the participating refugees themselves to understand possible risks and mitigations.

8. Prioritise environmental sustainability when designing both hardware and software. Open systems that can be tinkered with and repaired have more scope to be used in the long-term. This is particularly important for refugees who may not have significant savings or disposable income to buy new technology, but they may well have the means to repair what they already have, and importantly will know how to use existing tools.

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Article

Kitambaa: A Convivial Future-Oriented Framework for Kinangop's Learning Hub

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Abstract: The aim of this paper, and more generally, our project "Impact from the ground" (a multi-stage ongoing project), is to reimagine education so that it transcends the walls and harsh constraints of a "universal one size fits all" education. To achieve this, we propose a framework that will inform the design of a participatory approach to co-create a learning hub (an informal lifelong learning opportunity) with and within the community. To weave this framework, we explore the current landscape of education, looking at the challenges that youth from rural settings face to complete their studies in urban universities, and the difficulties they experience when looking for jobs after having done so. We briefly explain our research project and contextualize it in Kinangop, a small region in the Nyandarua County in Kenya, where we explored the enablers and constraints people face to engage in social innovation. We proceed to imagine an alternative education that is local and organic, with different principles and theories weaved into a, *kitambaa* in Swahili that serves as the ground for an education intervention that is meaningful, binding, and bonding for the community members. In so doing, we aim to center matters of knowledge production as multi-epistemic conversations, situating those at the margins of epistemic divisions at the center of productive and creative debates.

Keywords: critical pedagogy; education; decoloniality; conviviality; futures literacy; capability approach; capability approach; EdTech

(. . .) a profusion of imaginative ideas can only be a first step in the necessary liberation from the confines of the contemporary limited thinking about the university (Barnett 2014, p. 24).

1. Introduction

Africa is far more than the sum of its diminishing stereotypes, which sadly tend to be inspired by flawed images of poverty, disaster, tribal genocides and civil wars, illness, and large lands of arid red soil, where nothing but misery and famine grows. As if these malaises only happen to occur in Africa. Africa is a vast continent of fifty-four countries, more than two thousand languages, and approximately 1.4 billion people, the globe's youngest population. "In reality Africa is a rich mosaic of experiences, of diverse communities and histories, and not a singular monolith of predetermined destinies. We sound different, laugh differently, craft the mundane in unique mundane ways, and our moral compasses do not always point in the same direction" [1] (p. 18).

There are different areas where such negative stereotypes seriously harm countries and their people, while benefiting foreign big corporations that, using the catastrophic scenario, make strategic and very profitable private–public partnerships [2]. A representative example of these initiatives is the so-called fintech revolution unfolding in Kenya, which has brought a troublesome new experience of debt to Kenyans. The fintech industry envisions Kenyans as, first and foremost, borrowers and of course, a source of profit. Thus, they design their fintech ecosystem accordingly [2]. The emergence of over-indebtedness

in Kenya signals the intersection of a reliance on finance to ameliorate the lives of the poor and a recognition by techno-capitalists that these same lives are the source of shear profits.

Along the same lines, but in a different realm, the continent, despite its rich array of foods and food crops, is depicted as a vast, arid red soil desert, where only poverty and despair grow. As Baxter recognizes in her extraordinary culinary journey in Africa, "the rest of the world has pretty much ignored the culinary cultures of Africa, or else swallowed simplistic stereotypes about a constant continental food crisis and negative portrayals of African diets and eating habits" [3] (p. 9). This misrecognition is not neutral but political. We have witnessed how Africa's cuisines and foods have been threatened by the ever-growing push for industrial and corporate agriculture, benefiting neither small farmers nor local cuisine experts. Instead, big corporations, such as the G8's New Alliance for Food Security and Nutrition and Alliance for a Green Revolution in Africa (AGRA), to name but a few, are among the primary beneficiaries, as they have taken over Africa's food and farms through multi-billion-dollar initiatives [3].

These corporations profit from such stereotypes by using them to bring forward strategies such as free trade and the creation of infrastructures to facilitate multinational penetration into Africa, hiding in misleading initiative titles, such as the Green Revolution. Despite increasing crop production, these foreign initiatives are unsustainable as they damage the environment, produce dramatic biodiversity loss, and eschew traditional knowledge [4]. In addition, it generates uneven benefits, favoring farmers with financial resources of their own, with access to more land, and with some formal education, leaving those who are resource constrained excluded from public support for agriculture and, even worse, unable to afford fertilizer costs, patent-protected plant varieties, and genetically modified seeds [5].

What is paradoxically ignored in all this is the fact that peasants (the small-scale producers) are the main providers of more than 70% of the world's people, using as little as 25% of the agricultural resources. In contrast, the industrial food chain uses 70% of those resources and is a major source of greenhouse emissions, despite only producing food for less than 30% of the world's population [6]. Another curious paradox, this time regarding the realm of knowledge production, is the fact that the whole of Africa contains only about 2.6% of the world's geotagged Wikipedia articles, despite having 14% of the world's population and 20% of its land. In the global context of today's digital knowledge economies, such digital absences are likely to have negative material consequences. The Internet allows those with economic and cultural advantages to control a large part of the discourse, thus favoring the Global North and elite classes, as has already been noted by other scholars.

From the time of colonialism that damaged the continent so deeply to more recent initiatives that range from the fintech industry to the Green Revolution, Africa continues to be the target of relentless exploitation and neo-colonialism. We argue that we should be able to draw from another view of Africa that is more realistic and positive, one where African nature brings hope and inspiration for a more convivial form of multi-species existence: More than half of the world's unconverted arable land lies in Africa, indicating broad prospects for both food production and conservation [7]. In the early twenty-first century, as argued by Bollig [8], about 4.28 million square kilometers (14.2%) of the continent's terrestrial surface were demarcated as biodiversity preserves (cf. Europe 3.18 million square kilometers, or 11.4%). Across the continent, more than 8448 protected areas, including about 1100 national parks (of which 36 have been enshrined as World Heritage sites), have increased the chances of survival for many species, while significantly altering human–environment relations [8] (p. 113).

In this land of hope and inspiration is where our project, "building impact from the ground: The case of Kinangop's Learning Hub" unfolds. Kinangop is a small region in Nyandarua County, in Kenya and the Mkungi Urumwe community self-help group that started in 2008 is located north of Kinangop Division. The group has thirty members, with seven affiliate schools serving at least a population of about two thousand people. Two

of the authors of this framework are community leaders who are working in partnership with the other author, who works at an educational institution in England and has a long-lasting relationship with them. The area has agricultural high potential. The main land use activities in the area are livestock and crop farming, agroforestry, and urban settlements. The dairy sector plays a vital role in achieving the development goals of Kenya's Vision 2030. Kenya's milk-based enterprises are crucial for rural communities, supporting over 2 million households. However, the marketing system is challenged by non-compliance with safety and quality standards, a fragmented market structure, limited product diversity resulting in low-value offerings, and the insufficient participation of small producers in policy formulation. The end goal of the project is to co-design an animal boarding farm to improve the production and quality of dairy products and their commercialization. Attached to the boarding farm is the "learning hub", where participants will learn new skillsets and knowledge so that they can engage in the boarding farm (this is being outlined in an upcoming publication we are working on at the moment, which is informed by a series of interviews we conducted with key stakeholders in the dairy value chain in Kenya). The learning hub is envisioned as an informal (at least at the start), adult and youth professional lifelong learning opportunity. We aim to involve community members, including smallholder farmers, women, and under/unemployed youth.

Holding up to this more realistic and human view, we think about problems that are not exclusive to Africa or Kenya in particular, but can be seen worldwide, e.g., the high rate of unemployment amongst youth. The total global number of unemployed youths is estimated to reach 73 million in 2022, a slight improvement from 2021 (75 million), but still six million above the pre-pandemic level of 2019 [9]. Kenya has been grappling with high unemployment rates, particularly among its youth. The overall unemployment rate was around 10% in 2020, with youth unemployment estimated at more than 20%. Most Kenyan workers are engaged in the informal sector, which includes self-employment, casual labor, and small-scale businesses. Agriculture remains a significant sector in Kenya, employing a substantial portion of the population. However, the sector faces challenges, such as limited access to credit, outdated farming techniques, and vulnerability to climate change. In addition, there is a mismatch between the skills demanded by employers and those that people possess. Graduates struggle to find employment due to a lack of relevant skills or limited job opportunities in their fields [9].

More generally, the 2021/22 United Nations Development (UNDP) report revealed that, for the first time ever, the Human Development Index (HDI) declined for two years in a row due to an "uncertainty complex", of which the COVID-19 pandemic is emblematic. The "uncertainty complex" is framed by three layers: Widespread intensifying societal polarization, thus delaying collective action; rapid technological change impacting prospects of human development; and the intertwined planetary pressures and inequalities of the Anthropocene shaping opportunities for human development well into the future. One thing that became clear during the pandemic was the failure of collective action [7]. The combination of Kenya's reality described above, and the general picture depicted in the UNDP report begs the question of what can be done to alleviate such a situation, in particular for the people?

In a recent report [10], UNESCO argues for a new contract for education, where its purpose is defined as a common good involving everyone coming together to repair a damaged planet. Moreover, it is widely known that having access to education can significantly benefit both individuals and societies, given that those well-educated have a higher income, but more than that, they have better health and report higher levels of well-being [11]. However, not everyone has the same opportunities to succeed or to meaningfully participate and learn. Multiple elements influence and shape the provision of equitable access to education. Studies that address the spatial dimension of knowledge, education, and science (cf. [12]) have shown that spatial disparities in knowledge and creativity are not short-term transitional events, but rather, a fundamental structural element of society and the economy. Educational institutions (such as schools and universities) have been

historically designed to fulfil the needs of a small elite (e.g., male, white, and people of economic means), with structures, values, and practices set up to support some students, while excluding and marginalizing others. There are a multiplicity of factors affecting the transition from students in rural areas to urban higher education (HE), including geography, financial resources, schooling, and language, adding another layer of exclusion for those living in rural communities [13,14]. Equitable societies call for more inclusive education systems, for learning environments that are designed to meet the needs of a more diverse student population, and for addressing barriers that may exclude some young people from education [15].

These factors partially explain why student representation in universities is highly unequal in terms of demographics and geography, with remote rural areas being particularly under-represented [16]. As stated before, acknowledging these challenges does not mean that there is nothing of value in those people living in these areas. On the contrary, a dynamic and generative understanding of rurality values the contribution of local actors in transforming their context [13]. Cultural practices and a grounded sense of responsibility are likely to nurture stronger community interrelatedness and identity [17,18]. This is what our learning hub is aiming at, including this myriad of local cultural practices and the inclusion of different actors from rural communities in the design of the learning experience. By this, we mean that our aim is to craft an education intervention that unfolds at the local level, in the community instead of outside, inviting people from the local community to participate in a local education experience instead of having to go to an urban setting to study, and inviting those who can contribute with more technical knowledge where needed. This initiative being envisioned from the bottom up, that is, it involves the community in its design together with other agents that can provide the community with more technical knowledge, is nevertheless aligned to UNESCO's principles of education for sustainability [19], as our framework aims to respond to the current pressing needs such as climate change and food insecurity. It is our vision to include some of the cross-key competencies for achieving some of the SDGs. We will expand on how we envision including some of these competencies when we describe the framework in the next section. With this bottom-up approach that takes some inspiration from international institutions such as UNESCO, we want to bring to the fore a set of social science methodologies placed in an out-of-the-lab context, as well as social issues or concerns raised by community members and the ways in which these produce new knowledge. Situating these social concerns at the center of research, and its public, has important implications in terms of the legitimacy of the research and of giving voice to under-represented or vulnerable groups.

How, then, can an equitable, inclusive, and meaningful education system/initiative be designed with and for deep rural communities, in this case, the community of Kinangop, that so often are excluded from broader education initiatives? This is the main question that this paper aims to address. To answer this question, we have come up with a framework that we call *kitambaa*: A convivial, future-oriented framework. *Kitambaa* means fabric or tapestry in Swahili, which serves as a metaphor to think about the framework, a fabric woven using a loom and different threads. Each thread will allow the framework to achieve something that is not working well for the community, and hopefully, it can serve as an inspirational idea for other communities with similar social realities. The loom we are using to weave the *kitambaa* represents our philosophical umbrella, with which we guide our endeavor. In the next section, we explain and describe in detail the mechanisms of the loom and the threads chosen to weave the *kitambaa*.

2. *Kitambaa*: A Convivial Future Oriented Framework

Higher education in Africa has been biased towards Eurocentrism, which often overlooks legitimate knowledge claims in and about transformative change in the sector [20,21]. Literature on higher education is plagued with claims about how a primary focus on mainly Eurocentric knowledge (re)constructions seems to undermine forms of authentic knowledges [20]. Like many universities on the African continent, loyalty to the hegemonic

knowledge interests of a Global North seems to impair attempts on the part of higher education institutions to cultivate more democratically inclusive knowledge spaces. In this paper, we want to propose an alternative view on tertiary education that is locally developed, combining both local knowledges and ancestral wisdom with more technical and scientific knowledge generated in urban higher education institutions (HEIs). We wonder if the "learning hub" could be such a democratic, convivial, and inclusive knowledge space.

Hence, the framework we have envisioned is intended to (re)imagine an education that is aligned with local knowledges (plural) and values that are attuned to the culture of the place. It is weaved intentionally with an ethics of care and empathy [22], so that we create a strong, but flexible, tapestry that includes the local and the global, the indigenous and endogenous, the ancestral and contemporaneous, not in a binary relationship, but rather, in a dialectical and thus, generative one. An education in place rather than outside of it. As such, it cannot be a Western idea of education, even less a "Universal" understanding of education. Instead, we envision an education that is community based, relational, and participatory, thus being convivial [23]. We build on this in the next section.

We are inspired by Barnett's [24] idea of the "Ecological University" as it goes beyond the instrumental goals of generating increased revenue and secure markets, positionings in the world rankings, and student satisfaction ratings. A university, as he argues, that is interconnected with a number of ecosystems: Knowledge—plural, we argue—social institutions, persons, the economy, learning, culture, and the natural environment. An institution that opens new possibilities for better futures for all entities on Earth, human (individuals and collectives) and non-human, organic, and non-organic. This is particularly important for the African continent, which must grapple with unforeseeable weather conditions given the uneven distribution of the consequences of climate crisis. We believe that education's mission should be to contribute to human development and wellbeing. Hence, any education initiative ought to actively engage with the myriad challenges society is facing nowadays regarding humanity's well-being and development, e.g., social injustice, food security, the environmental crisis, abuses, and a lack of respect for human rights. However, these human rights need to be redefined by the local people who are enduring those abuses [25].

We are not the only ones who are reimagining a more humane education UNESCO [10], as we do, recognizes the transformational potential of education as a route for sustainable collective futures. It argues that to achieve this, a new social contract "grounded in human rights and based on principles of non-discrimination, social justice, respect for life, human dignity, and cultural diversity is needed. It must encompass an ethic of care, reciprocity, and solidarity. It must strengthen education as a public endeavor and a common good" [10] (p. iii). This reimagined vision of education is human centric and, thus, in tune with the human development capability approach (CA), which is one of the threads we have used to weave the *kitambaa*.

This framework sets out to enable people and communities to start thinking about a convivial, more honest, local, meaningful, and holistic approach to re-envision education with the community and, thus, their own development. The *kitambaa* offers an alternative model for thinking about how an educational intervention can be co-designed by different stakeholders, some of whom will be local practitioners from Kinangop, others will be scholars from urban HEIs, while others will be actors of the dairy value chain, including farmers and lay community members who would like to make a meaningful epistemic contribution to the common pull of knowledge. In the next section, we describe the mechanisms of the loom, with which we have weaved the *kitambaa* and the different threads we have chosen.

2.1. The Loom

The loom, the structure with which we have weaved the *kitambaa*, represents the underlying philosophy that guides our work. For this, we have chosen critical realism (CR), a philosophy of social science that proposes a stratified ontology of the social world, that is,

the world is much more than what we can observe at the surface. Hence, we need to delve deeper to uncover the invisible and pervasive social structures that are responsible for much of what we have described so far. The social world is understood as multi-determined and, thus, conceptualized as a causal network of interacting forces, which we cannot predict but only attempt to unpack and understand so that change can be fostered [26], and with that, an improved livelihood.

CR is a philosophical approach that acknowledges the interplay of structure, culture, and agency [27], arguing that structures are transformed or reproduced by agents, which in turn, transform themselves (individuals or collectives) in that process. It, therefore, considers the reciprocal impact that society and technologies have on each other and the people who use them. A preoccupation is, thus, to think about which tools correspond to and promote a certain kind of society and what the role of the people is in that shaping. For CR, the most fundamental task in social science is to uncover the properties of social and cultural structures that produce the events upon which our experiences are based. It offers conceptual tools to grasp and explain the effects of the often invisible social and cultural structures that cause so much of the illness experienced in our societies, e.g., the increasing social injustice faced by those who live at the margins and the unequal distribution of the consequences of the climate crisis, to name but a few.

Epistemologically speaking, CR proponents believe that knowledge is subjective and relative to the knower, who is qualified to specify the relevant parts, relationships, and mechanisms pertinent to problems in their area of expertise. Therefore, any knowledge claim is not universal, but rather, local, historical, and contingent. Any knowledge claim is open to revision and refutation in the light of new and different evidence and theories. This opens the space to think about knowledge as something local, organic, and always open to change. And last, for a theory or a knowledge claim to be adequate, the person(s) who is(are) constructing the knowledge needs to consider the particularities of the reality described by scrutinizing whether the social reality is accurately described and therefore has a greater explanatory potential with useful application to practice, which in turn, will provide emancipatory power. This makes realists tolerant of theoretical differences, and thus, it opens the space for different knowledges to come to the fore. This is, of course, a simplification of a philosophical approach to social science, but the scope of this paper does not allow for a more extensive description. For the interested reader, I refer you to [26], which is a good start.

CR also suggests that any social change should be studied and explored in terms of layers or strata. Accordingly, [26] proposed a model of a four-planar social being. That is, in the model, four different levels of interactions are considered: Interactions with the material world, the social world of relations, or the intersubjective level; interactions at the level of structures; and the intrasubjective level, which is that of the person and their values, beliefs, culture, and other predispositions that shape them. This means that change is not something that happens at the surface but rather at different levels, aiding in the exploration of some of the root causes of community social problems.

2.2. The Threads

These threads represent different theories and ways of thinking that will be used to weave the *kitambaa* so that the education delivered is different from the so-damaging "Universal and Western" imaginaries of education. The five threads we initially chose are the capability approach, decolonial thinking, conviviality, critical pedagogy, and futures literacy. Each of them is explained in detail in the next section.

2.2.1. The Human Development Capability Approach

The capability approach (CA) was introduced by Amartya Sen. He defined it as "an intellectual discipline that gives a central role to the evaluation of a person's achievements and freedoms in terms of his or her actual ability to do the different things he or she has reasons to value doing or being" [28] (p. 19). The approach critically interrogates the

meaning of human progress, development, and wellbeing. Its core values are agency and justice, thus, dignity. It attaches central importance to human capabilities, which are conceived as the effective opportunities people have to lead the kind of life they have reasons to value, while considering the critical role of social and cultural structures as enablers and/or constraints that people encounter when pursuing what they value. In short, capabilities are the opportunities to pursue a life people value, together with the resources and support embedded in the context. Once the capabilities have been achieved, they transform into functionings; that is, what people are now able to be and do.

The CA acknowledges the importance of people participating in meaningful ways as agents in their own development practices [29,30]. Therefore, enabling individuals to be participants in their own development is one aim of education, and thus, we suggest, one of the goals of our education initiative. Meaningful participation in communities is, among other things, about making meaningful epistemic contributions to the shared pool of knowledge, which Fricker [31,32] argues is fundamental to human wellbeing, a dignified life, and expansive freedoms. Such contributions, the corresponding capabilities, and concomitant functionings can and should be fostered in and through education. Nussbaum, for example, advocates a higher education that develops the capacity of individuals to be "fully human" [33] (p. 209), but importantly for us, what fully human means will be defined by the community. Walker argues that "the university can be re-imagined in terms of its commitment to individual freedoms, social citizenship formation and social change. The university should have an active role, engaged in local and global spaces, to foster and support a just and sustainable society" [34] (Para. 1). These are, undoubtedly, the socio-cultural objectives of HE that are overlooked in the neoliberal agenda of higher education, in which the university has been forced to monetize higher education, functioning like a private corporation with an orientation to profit making by maximizing outputs at the expense of human capital. Hence, we aim to take these socio-cultural objectives into account.

The CA commits itself to respecting people's power of self-definition and self-realization. Capabilities, thus, have value as spheres of freedom and choice, or as Sen suggests, they are valuable zones of freedom [29]. Therefore, we suggest that the functionings of those at the center of the education endeavor cannot just be defined by others, as this would contradict the human development capability approach ethos, where the choices are made by the individual who is aware of the social reality they are embedded in. However, making choices is not a matter of free will, but rather, a tough confrontation with social reality and its enablers and constraints. Hence, part of what is needed is to become aware of these contextual forces that are shaping how education is understood and realized so that together we can come up with local and meaningful strategies to overcome them. It seems clear to us that the interrelated set of choices and actions, the potential (capabilities) and actual (functionings: being able to materialize the set of valued choices), are important [35,36] in the light of epistemic justice [31]. Using the CA will allow the community and other actors to have center stage in defining what is missed and achieved in terms of particular perspectives of the world. This will, thus, be a key goal when designing our education intervention.

We are aware that individual agency, social arrangements, and social conditions are intertwined in the achievement of the chosen capabilities. Thus, setting the capabilities wanted to be achieved does not tell us enough about the fairness of the process involved in the transformation of choices into functionings. This process of transforming capabilities into functionings is affected by different conversion factors (the external factors that shape the process of achieving the functionings). Therefore, if we aim for a more just and fair approach to education, we need to pay attention to the social conditions needed for the uptake of these capabilities. This will be guided by our philosophy of CR and by the second thread, i.e., critical pedagogy.

2.2.2. Critical Pedagogy

This strand of the *kitambaa* will allow us to design an education that is rooted in the community and aims at developing critical consciousness [37,38], such that people that participate are able to critically think about what capabilities they wish to develop, what the social constraints are that they need to overcome, and the enablers they can harness to achieve these capabilities. This critical reflection, in turn, will be geared towards social action. We are convinced that a critical aspect of any approach to education is ensuring that people are not passive objects of history, but rather, active subjects capable, where possible, of changing history. This dialectic between critical analysis and action will be addressed through praxis. In short, we conceive education as a historical–cultural and political project to transform people and the collective into a historical subject/collective through emancipatory educational–pedagogical praxis. In short, education is rooted in community work, which is located in the essence of people's lives.

One of the main goals of this initiative is finding ways in which local knowledges and technical ones can be merged so that people in the community are capable of making meaningful epistemic contributions to the pull of knowledge, which Fricker [31,32] has shown is of vital importance for the well-being of people and the community more generally. To pave the way so this can be possible, people should start by recognizing global power imbalances in relation to the production of knowledge, recognizing whose and what knowledges count [39]. As Adams argues, "Decolonial theories emerged in contestation with the universalisation of Euro-centric frameworks of human values" [40] (p. 68). We will chart imaginative paths towards alternative and local realities by critically diagnosing the conditions of the present. This is why our *kitambaa* also uses decolonial theory as one of its threads, which we describe in what follows.

2.2.3. Decoloniality and the Geopolitics of Knowledge

Decolonial studies or decoloniality [41–43] will be critical to dismantling geo-political hierarchies that, as Adams has argued, have found new and more powerful forms of expression in the modern/colonial world [40]. We are particularly concerned with the politics of knowledge production in rural communities and the epistemic hegemony of higher education institutions, Western ones in particular, as the main valid source of knowledge production and dissemination [20,21]. Decoloniality will guide us in building a bridge between rural/local and urban/global education, as we believe that education based on neoliberal values is not what is "universally" needed [20]. Instead, and as highlighted throughout the paper, we believe that an in-place and more local approach to education, where technical expertise and scientific knowledge are complemented with local knowledges on site, is what is needed to advance social change and improve local livelihood. In doing so, we are fostering one of the cross-cutting key competencies suggested by UNESCO [19] (p. 10), i.e., self-awareness competency, which is the ability to reflect on one's own role in the local community and broader society; to continually evaluate one's actions.

Decoloniality is defined as "the dismantling of relations of power and conceptions of knowledge that foment the reproduction of racial, gender, and geopolitical hierarchies that came into being or found new and more powerful forms of expression in the modern/colonial world" [41] (p. 440). Thus, decoloniality is concerned with the process of dismantling colonial legacies. In this project, one of the aims is to remove the colonial legacies embedded in traditional understandings of education and elaborate new local structures that emerge from the community and are, thus, meaningful and transformative for the community.

The three main concepts of decoloniality are coloniality: Of power, of knowledge, and of being. Coloniality of knowledge refers to knowledge production and hegemonies that exist around the politics of knowledge production. This dimension will be important for us because the future of African farmers is shaped by international research in agriculture and development actors [44,45]. Furthermore, during the 2021 UN Food System Summit, it was recognized that food systems need urgent transformation as a catalyst to achieving

the goals set out in the 2030 Agenda for Sustainable Development. Mutyasira shows how the post summit conversations have been at a high level [45], focusing on the country's macro-level strategies and thus, leaving outside of the discussion smallholder views and understandings of what it takes and what is implied in the transformative agenda for more sustainable methods of production.

The question that is critical to ask in light of this reality is "who generates which knowledge and for what?" [46] (p. 490). For the "learning hub" we envision a dimension of knowledge generation that answers questions about what do community members, including smallholder farmers, women, and under/unemployed youth, already know and still need to know, to engage in the boarding farm through the learning hub? What do women and their husbands need to know and understand so that they are ready to embrace different and maybe new roles of women in the community and their households, e.g., women managing money, making business decisions, where to re-invest the money, and the like? That knowledge will be crowdsourced from the community, including men and youth that have recently graduated, but are currently under/unemployed. We are hoping to invite them to co-design, organize, and run some of the workshops. We also will involve conservationist experts from the community to generate the knowledge needed for farmers to learn what is required to increase, in a sustainable fashion, the use of their land, thus being active participants in co-designing their food system transformation agenda.

We believe that this is one way to contribute to producing diverse and rich knowledge to make sense of the world people are embedded in. In so doing, we will bring indigenous/rural and local knowledge to the center. The coloniality of power will also be addressed, in particular, the global hierarchy of epistemic domination of HEIs. That is, they are the recognized and most prominent institutions of knowledge production. We aim to break this hierarchy through inviting universities and other knowledge experts to join us in the process of local knowledge production and dissemination. We are particularly curious as to how this will unfold and aim to explore it in the next phase of this project.

To dismantle colonial legacies and stop reproducing those old patterns, we also need to decolonize the future, reimagining alternative ones so that we can envision the road ahead, making room for ignored worldviews and historically marginalized cultural identities. For this, we will use futures literacy, in particular, the UNESCO framework [47], complemented by a broader imaginary inspired by African scholars (Kwamou Eva Feukeu and Geci Karuri-Sebina. You can explore more of their work in this interview with Nicklas Larsen. https://medium.com/copenhagen-institute-for-futures-studies/african-futures-with-geci-eva-28d6064e3629; accessed on 6 June 2023), who are active in decolonizing future initiatives (https://en.unesco.org/imagine-africa-futures; accessed on 6 June 2023) [48] (cf. C2D—Capacity to decolonize (http://foresightfordevelopment.org/c2d/; accessed on 19 June 2023), and the work done by Barnett [24,49], who has done extensive research reimagining HE as an ecology university.

2.2.4. Futures Literacy

In an increasingly complex, fractured, and uncertain world, it is becoming critical for communities to build their capacities to imagine and ultimately own their futures—even more so in a post-colonial context. Fiction and imagination are fantastic, shared tools that afford people to create new identities and ideas about what they value most. As Hoffman [50] claims, all nations, cities, and communities are the product of shared fictions, as they fundamentally shape the directions people choose to take. It is said that when more people feel empowered to envision their own hoped/imagined futures, they are better equipped to advocate for their wants and needs. She [50] argues that speculative futures cultivate self-determination, thus making communities more likely to work for all.

Futures literacy [47], a core capability for expanding imagination, choice, and agency to decolonize the future, serves as a tool to significantly enhance the capacity to conceive and to use the future to improve the present. It consists of harnessing the natural capacity of humans to anticipate, developing people's anticipatory competency as suggested by

UNESCO [19]. Anticipation occurs when the future is used in action, for example, we know that there is going to be a storm and we decide not to go out on a boat. The anticipatory processes allow the future to become part of actions in the present. While becoming "futures literate", people start understanding how they refer to different kinds of futures in the present world as different forms of anticipation. They also acquire the capability to "use these futures" to deploy tools and methodologies to work on particular challenges. "Collective Intelligence Knowledge Creation" is a very powerful instrument for futures literacy, especially through the so-called Futures Literacy Laboratories (https://unesdoc.unesco.org/ark:/48223/pf0000385485/PDF/385485eng.pdf.multi; accessed on 3 June 2023). These are methodically designed learning-by-doing workshops, during which participants can collectively test a wide range of hypotheses and invent new solutions to improve their world.

By thinking about the future, people can have new conversations and challenge existing norms and structures that no longer serve their original purpose. This is particularly true for communities that have been marginalized by new social imaginaries that tend to belong in urban, neoliberal-infused contexts. Futures studies [47,50,51] examine why and how we use our imagination, which deals with the ability of the mind to form and hold images, concepts, descriptions, and representations that do not exist or have not been physically experienced yet [52,53]. Talking about the future affords people thinking about and (re)inventing their futures as spaces of possibility [29] or sensing and making sense of novelty [47].

The capability is about being able to find answers to questions, such as, how to identify changes and imagine alternatives to foster change? How to integrate the future into what we see and do? What images of the future do we have, and where do they come from? What frameworks, tools, and processes enable us to better understand the origins and implications of our images of the imagined future? The idea with this activity is to gather different stakeholders in the community and use the collective intelligence knowledge creation tool (a tool envisioned by the futures literacy UNESCO framework) to assess the probable and desirable futures of life and work in Kinangop. To hold this workshop, we will seek support from one of the futures literacy centers that were setup by UNESCO as part of the Imagining Africa's Future project (https://en.unesco.org/imagine-africa-futures; accessed on 4 May 2023) as this requires specialist knowledge that we do not have at this moment. We trust this will be a generative exercise for the community to imagine and make sense of what it is they need and want to change and how they can get there. We rely on Poli's argument that "as soon as the future is understood an active force that is able to influence the present, it becomes one of the most relevant values generating, sense-making force" [51] (p. xx).

Part of what we envision in a decolonial, more local, and meaningful understanding of education and development is the role of technology and how it should be used in the "learning hub". This is critical because we know the crucial role that science and technology play in shaping norms, knowledge, and visions that cement relations of power [52]. For this, we want to engage with tools for conviviality as they align with the philosophy of the people in the community and the project's ethos. In the next section, we explain the concept of conviviality and the role that tools for it play in such an approach. For this, we draw upon the work of Ivan Illich [23] and the Convivialist Manifesto: A Declaration of Interdependence (Convivialist Manifesto. A declaration of interdependence (Global Dialogues 3). Duisburg 2014: Käte Hamburger Kolleg/Centre for Global Cooperation Research (KHK/GCR21). Doi:10.14282/2198-0411-GD-3. Licence: Creative Commons Attribution CC BY-ND 4.0. Available from http://www.gcr21.org/ accessed on 4 April 2023).

2.2.5. Convivial Thinking

What are the tools that will suit the nature of our initiative, that is, which tools will foster freedom, creativity, relationality, play, and cooperation? Our answer is guided by the idea of conviviality and, in particular, tools for conviviality [23] that can disrupt instru-

mentalization. Conviviality is well aligned with our project, which aims to foster a more relational approach to education and work that moves away from questions of technical implementation of technology to questions of value driven use of technology. Convivial ideas have also been applied to development [54] and are already being practised in Africa. In this regard, Scoones states that "convivial development—one that is responsible, social, shared and led by a political community, not experts or managers—is an approach that truly embraces uncertainty—outside the mainstream, in the margins and already being practised across Africa" [54] (p. 101). He argues that the colonization project of aid-led development has been deficient because simplistic technocratic impositions and the Western or Chinese model of development have failed. Therefore, including conviviality as a way of thinking about the use of technology is contextually sound for us.

We take the concept from Illich [23], who focuses his work on tools, which refers to a fairly broad concept that includes both concrete artefacts (e.g., tools) and institutional arrangements (e.g., educational institutions), along with the rest of the rules they define. Illich [23] recognizes the reciprocal impact that society and technology have on each other and addresses one specific aspect of technologies' non-instrumentality related to power imbalances. For us, these power imbalances are directly connected with the primacy of the Western and Universal imaginaries of education we have described so far and that we aim to address through the decolonial thinking described above.

A convivial society is one "in which modern technologies serve politically interrelated individuals rather than managers" [23] (p. 12). The community ethos so present in Africa (generally speaking) relates well to the idea of politically interrelated individuals, and it is something that our initiative wants to strengthen even more. Illich argues that people need first and foremost "the freedom to make things among which they can live or give shape to them according to their own tastes, and to put them to use in caring for and about others" [23] (p. 24). In short, conviviality is "individual freedom realised in personal interdependence and as such it is considered [by Illich] an intrinsically ethical value" [23] (p. 24). A society is convivial if people have the chance to shape the things they—jointly—have to deal with, in mutual interdependency and relatedness, both to each other, and to nature. This definition has implications for the politics of technology, precisely because technologies, beyond their instrumental capacities, have a significant impact on human practices and social relations; their design is of political relevance and needs to be democratized. Otherwise, if a technological elite monopolizes the design of socio-technical systems (with its concomitant tools), it obtains the capacity to impose certain practices and power relations on society. An illustrative example of this practice is the one that occurred in India through the digital identity initiative called Aadhaar, which consequently led to the introduction of demonetization that prioritized automated payment systems in ways that were discriminatory to the poor, as they had the least access to mobile phones, formal savings, and bank systems [55–57]. The technology served managerial elites in very instrumental ways to portray India to their international "clients" as a modern and progressive society, which is of high value in a neoliberal market economy.

Since tools are intrinsic to social relationships, "con-vivere, living together, implies the capacity to shape interpersonal relationships by shaping the artefacts and institutions that matter in those relationships" [58] (p. 135). Thus, tools for conviviality are shaped individually and collectively.

To evaluate which tools can be used in a convivial fashion, we will use Illich's criteria:

- Can everyone use it? (For example, knowledge databases are almost only accessible to members of higher education institutions.
- Can the tool be used as often or as seldom as desired? This relates to the issue of whether there is an imposition to use tools or not. (For example, do people have autonomy of choices regarding engagement with technologies?) (For the interested reader, this point can be expanded by reading [55] listed in the reference list).
- Can the user determine the purpose of the accomplishment for which it is used? (Does it enable the user to realize their ideas?).

Illich [23] is of the view that convivial tools foster self-realization, in that people can pursue their own goals in their own unique way, which is aligned with self-determination, which is so important in the CA. It is, thus, salient to revise the concept of ownership of tools in light of Illich's ideas. He argues that to own a tool is to be able to control it, instead of the tool/technology controlling you. A patent and very present problem society is dealing with through technologies, such as artificial intelligence and all its applications in our daily lives, with education being no exception. There is more to say, but for the scope of this paper, this will suffice.

3. Next Steps

We should avoid falling into the trap of believing in the doom scenarios we have described in the introduction. Instead, and as we have also described in this paper, we should embrace Africa as a generative, rich, and hopeful place with successes and failures. It is precisely here in this beautiful landscape where our project unfolds, and part of it is a local, in-place education initiative that aims at reimagining an education that is relational, pluralistic, and meaningful to the community that speaks to their social reality. The initiative will be designed using *kitambaa*, a convivial, future-oriented framework. The tapestry is weaved using a loom that is built on critical realist's pillars, and the threads we used provide the *kitambaa* with a flexible, but robust nature so that it can adapt to the fluid social reality of the place, providing strong pillars to base the intervention upon. We have used the CA, because it enables individuals to be participants in their development, supporting them to make meaningful epistemic contributions to their shared pull of knowledge. This we consider as being fundamental to a dignified life, where freedoms are to be expanded in people's own terms. To generate meaningful contributions, we are using Freire's idea of critical consciousness to guide our educational praxis. To honor and strengthen the value of the local, we infuse our praxis with decolonial thinking so that the hegemony of Universal and Western knowledge is challenged, and we can craft an education that is based on local culture and values. To approach technology in a way that is consistent with the above, we will embrace convivial tools, as Illich [23] thought about them. This will involve paying attention to the interplay between people and technology and the concomitant practices. But we are convinced that in Kinangop we need to imagine a future that is different from that shaped by doomed scenarios of poor land and starving people. Therefore, we are developing an intervention—Futures Literacy Lab—as explained above, which will consist of a two-day workshop organized by experts in futures literacy where people will learn about futures literacy, expanding their capability to reimagine a community vision of their desired future of the dairy industry, the agricultural practices, and sustainable business models that will support them in developing different approaches to commercialization. We believe that notions of futures literacies nurture an approach towards a convivial in-place education. The more pragmatic next step will be to brainstorm with the project leaders and the different stakeholders to find out the best way to implement this framework and start co-designing the education intervention.

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Shaping the Discourse around Quality EdTech in India: Including Contextualized and Evidence-Based Solutions in the Ecosystem

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Abstract: This paper examines the extent to which an initiative in India, namely EdTech Tulna, has been able to move towards decolonization of EdTech by shaping the discourse around the adoption and use of good quality and contextual educational technology solutions for Indian learners. Set up as a collaboration among researchers, practitioners, teachers and governments, EdTech Tulna aims to encourage the selection of EdTech solutions that are appropriate for the community they are designed for, rather than adopting solutions that market themselves or those that have been successful in Western countries. The paper adopts the lens of justice-oriented design and first critically examines the design of the EdTech Tulna index. Then, it examines the success and hurdles of the collaborative efforts towards the implementation of contextualized and evidence-based solutions in the ecosystem. By analyzing stakeholder interviews and meeting notes, this paper addresses two questions. First, how does Tulna assist in identifying quality contextual solutions that are likely to enhance the learning of children in India? Second, how do state government officials and practitioners collaborate with researchers to use research-based standards for selecting such solutions? The discussions outline the progress and draw a broad contour of the road ahead.

Keywords: educational technology; justice-oriented-design; digital; education; India; quality; government adoption

1. Introduction

Globally, the availability and usage of educational technology (EdTech) solutions in the school education space have surged in the last two decades [1]. This trend is seen in developing countries like India too, with the influx of EdTech solutions spanning a range in terms of age group, pedagogical design, technologies, cost and instructional setting [2]. In India, the dependence on EdTech increased after the school closures following the outbreak of COVID-19, with more parents from different socio-economic backgrounds investing in smartphones and digital devices than ever before [3]. In an era where consecutive yearly reports and research [4] have been documenting the fall in learning levels among Indian children [5], a new reliance has been developing on technology to bridge the learning gap [6]. While studies have documented a link between positive learning outcomes and the use of various technology-supported learning models in India (for example, [7–9]), there has been considerable evidence of no significant outcomes and negative outcomes as well [1]. At the same time, techno-optimism and techno-solutionism, which have increased in the post-pandemic era, are not without critique [10]. A significant challenge that has emerged, and is commonly faced by teachers, parents and state officials, is choosing the appropriate technology [11].

A large proportion of the EdTech solutions are paid and hence the access gap remains, potentially leading to the formation of a new form of education inequity. To address this gap, state governments in India provide not only hardware but also appropriate learning software [12]. However, the common approach for the selection and implementation of EdTech solutions in government schools can be critiqued as a manifestation of digital neocolonialism [13]. State governments procure 'globally tested' EdTech learning software, which is then mandated to be used in the local schools. Learners may become mere recipients of learning materials created for a different context, typically for learners in English-speaking Western countries, thereby erasing their identity [14]. Left unchecked, content can colonize education, and pedagogy that is not well-designed for the intended learners can significantly hinder learning [15,16].

As an approach to addressing the above challenges, we discuss a collaborative effort in India called EdTech Tulna [17], and examine the extent to which it has been able to move towards decolonizing EdTech in India. As part of the EdTech Tulna initiative (hereafter referred to as Tulna, which means to measure or judge in Hindi), researchers, non-governmental organizations, teachers and state governments in India are working together to come to a common understanding of what good quality EdTech means in their context, keeping the learning of children as the key consideration [18]. The Tulna initiative comprises subject-specific indexes aligned to the respective curricula. These indexes define quality standards relevant to the local context in India and evaluate EdTech products against these standards before use. In addition, Tulna indexes include explicit criteria to ensure that teachers are supported when they use the EdTech solutions. Tulna examines if the solutions under consideration are appropriate for the community for which they have been designed, thereby questioning the 'core-to-periphery' implementation in the EdTech domain [19]. Another goal of Tulna is to foster a collaborative decision-making process for the adoption of context-appropriate EdTech solutions. Tulna aims to empower end users such as teachers and governments with the knowledge and resources for making evidence-driven decisions.

In this paper, we adopt the justice-oriented design framework [20] to critically examine two research questions. The first research question is RQ1: How does Tulna assist in identifying quality contextual solutions that are likely to enhance the learning of children? This is addressed in Section 4, where we detail the Tulna design process and analyze selected criteria from the index from the justice-oriented design lens. The second research question is RQ2: How can Tulna be used to involve multiple relevant stakeholders in making decisions regarding the selection and use of contextual EdTech solutions? This is discussed in Section 5, where we report the findings of a qualitative study using thematic analysis to examine Tulna's role in the EdTech procurement process of a state government.

At this stage, we briefly discuss our positionality as researchers and authors of this paper. We place ourselves on a range in the 'insider-outsider' continuum [21], as we have some similarities with other stakeholders in the ecosystem. In the process of designing the index, as insiders, we evaluated products, published reports and worked on building capacity among new evaluators and trainees. However, while supporting the state officials during EdTech procurement, we found ourselves as outsiders to the process of implementation. Our involvement was primarily focused on training the evaluators chosen by the state to interpret the index, whereas the state officials held power over the final decision-making. Our positionality and multiple identities have implications in the description of the findings and their interpretation.

2. School Education in India and the Role of EdTech

2.1. Background

The school education system in India is a concurrent subject; that is, both the central government and the state governments are responsible for enacting and implementing education policies. The Right of Children to Free and Compulsory Education Act, commonly known as the RTE Act of 2009, made elementary education, that is, Grades 1–8, compulsory

for all children in India [22]. Due to concerted efforts by the central and state governments, India has achieved near-universal enrolment in school education, and students across socio-religious groups have seen an increase in school enrolment and attendance [5]. Public schools have become increasingly accessible across the states and there has been an increase in the presence of technology in schools [18]. Between 2007–2008 and 2017–2018, the percentage of children aged 6–14 years attending English medium schools increased from 12 to 23 at an all-India level [23]. The demand for EdTech for learning the English language has also risen in recent years [24]. While some scholars have argued that the spread of English is a linguistic imperialism that can erode countries' culture and linguistic ecology [25], others have argued that the English language is an agent of decolonization that has allowed the urban poor to access opportunities present in the global economy [26]. Nonetheless, English EdTech has gained considerable popularity in the Indian context. A survey conducted in six states in India found that 'English (84%) and Mathematics (76%) were the most studied subjects using EdTech tools' [24].

2.2. Growth of EdTech in India

There has been a gradual emphasis in India on integrating educational technology in classrooms and at home. The National Educational Policy [27] focuses on catalyzing the use of technology for improving pedagogy and content at all levels of education, and the National Educational Technology Forum facilitates decision-making about the use of EdTech in educational institutions across the country. In parallel, non-governmental organizations focusing on educational policy and strategy have channelled their efforts to catalyze the demand and supply of quality EdTech solutions for various users [28]. Yet another dimension to this push for EdTech in India is from the private companies and startups that have mushroomed over the past few years in response to the rising demand. Relatively recently, researchers from a leading research institute in India have been actively working on shaping the decision-making process to ensure systematic and research-based design, evaluation and selection of EdTech solutions [9].

Earlier, the EdTech programs in government schools in India primarily focused on input parameters such as deploying hardware, installing software and conducting teacher training, and there was minimal focus on the quality of the software and its impact on learning [29]. There are only a few mechanisms in place (e.g., [30]) to check the suitability, usability and content accuracy of the quality of software. In many cases, this mode of the selection process for hardware in ICT procurement tends to prioritize the lowest-cost option that meets technical and financial requirements [29] without the active participation of important stakeholders, such as principals and teachers. Recently, there has been a shift towards adopting a more participatory approach in the implementation of EdTech which involves multiple stakeholders such as district officials, principals, teachers, EdTech providers, civil society organizations and academics [12,18].

2.3. The EdTech Tulna Initiative

The EdTech Tulna initiative [17] was seeded in March 2020 as a partnership between the Educational Technology interdisciplinary program at the Indian Institute of Technology (IIT) Bombay, a premier research institute in India, and the Central Square Foundation, a non-governmental organization (NGO) focusing on educational technology, policy and strategy. Over time, other stakeholders, such as state governments along with their governance consulting groups and teachers, came under the umbrella of this initiative [31]. The key goal of this initiative is to make quality a focus on both the supply and demand side of the EdTech ecosystem in India. It aims to reduce information asymmetry by building a shared understanding of what 'good' EdTech looks like. The members of Tulna engage in a range of activities such as establishing quality standards, designing reliable and valid evaluation instruments for evaluating EdTech products and generating evaluation reports for public view. Another major effort of Tulna is to support decision-makers in a variety of settings, such as in the procurement of quality EdTech products by state governments for

large-scale deployment in schools or the selection of specific EdTech products by teachers for their local needs. Tulna members also extend training and capacity building related to identifying good quality EdTech products and engaging with international agencies for knowledge sharing.

3. Conceptual Framework

We adopt the justice-oriented learning design framework [20] to critically evaluate how the design of the Tulna index and implementation process can deconstruct established power structures and reshape notions of expertise. The justice-oriented framework underscores the idea that addressing injustice does not have a universal solution. It introduces three major approaches: Justice-as-content, Justice-as-pedagogy, and Justice-as-process [20]. In the Justice-as-content approach, the emphasis is on decolonizing the content of education, or what is taught, and ensuring it is relevant and contextual based on the target audience and intended purpose. It aims to shift from traditional, potentially biased perspectives and embrace a more inclusive and diverse educational narrative. Justice-as-pedagogy involves encouraging learners to critically engage with, reflect on and challenge the content they are being taught. Justice-as-process revolves around decolonizing the actual educational processes and ensuring diversity or plurality of stakeholders and ideas in the decision-making process both in the design and implementation of EdTech. By doing so, the aim is to break down existing power structures, fostering a collaborative and inclusive approach to shaping educational technology.

In our analysis, we use the Justice-as-content and Justice-as-process aspects. Utilizing the Justice-as-content approach of the framework, we closely examine some of the criteria under content quality and pedagogical alignment within the Tulna index to analyze how the criteria actively contribute to the essential task of decolonizing EdTech (Section 4). Focusing on the implementation or adoption within a state government (Section 5), we bring in the Justice-as-process approach to the analysis. This enables us to examine how a variety of stakeholders and a range of ideas have collectively contributed to the decision-making process. This in-depth examination sheds light on the collaborative and inclusive strategy employed throughout implementation, emphasizing the significance of integrating diverse perspectives in decolonizing the EdTech implementation and adoption process.

4. Justice-as-Content: The Contextual Relevance of the EdTech Tulna Index

In this section, we address RQ1, examining how Tulna facilitates the identification of quality contextual solutions that are likely to enhance the learning of children. This section begins with an overview of Tulna's design process, leading to an analysis of select criteria from the index. This analysis is framed within the framework of 'Justice-as-content', providing an examination of the contextual relevance for learners.

4.1. Tulna Index Design Process

The Tulna index design is rooted in research from the learning sciences and has been adapted for Indian learners through input from teachers and user studies in classrooms. Figure 1 schematically illustrates the basis of the Tulna index. Overall, 150+ research articles have been reviewed to iteratively formulate the criteria in the Tulna index.

Theoretical frameworks related to the use of technology in education, such as meaningful learning with ICT [32] and Technological Pedagogical Content Knowledge (TPACK) [33], as well as broader educational design principles such as constructive alignment [34], have informed the Tulna index design. Well-established pedagogical strategies such as formative assessment and constructive feedback [35], scaffolding [36] and the importance of situatedness in learning [37] have strongly influenced criteria in the pedagogical alignment dimension. The Technology and Design dimension includes criteria such as principles for user interface design [38] and universal design for learning [39]. In addition, domain-specific literature has been reviewed in detail to reflect the nuanced differences in learning

different subjects (see, for example, [40], in which we describe the criteria in the index for English language learning Edtech products for Indian learners).
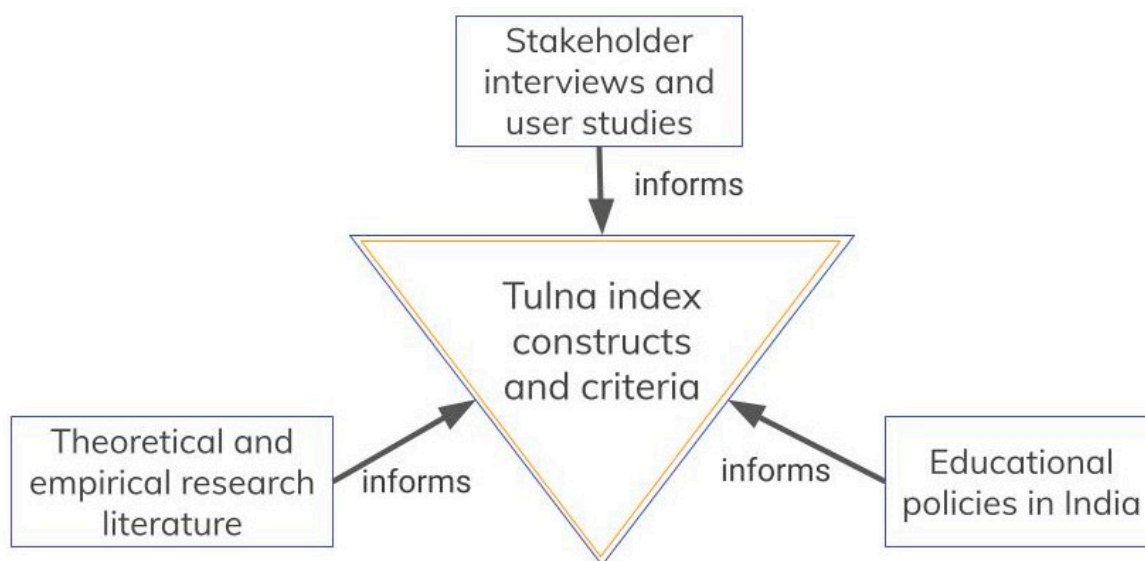

Figure 1. Basis of Tulna index.

Two key policy frameworks by the Indian government have contributed significantly to the Tulna index: the National Curriculum Framework 2005 [41] and the more recent National Education Policy [27]. Both of these policy documents provide detailed guidelines and analysis on what should be taught to children in India and how it should be taught. Sufficient prominence is given to educational technologies while keeping the teacher in a central role. Diversity and plurality of various types are recognized and valued while emphasizing the role of the mother tongue and children's socio-cultural backgrounds.

During the initial design phase of the Tulna index, we conducted a needs analysis study with the objective of gathering requirements from diverse stakeholder groups. This study utilized a semi-structured interview approach, conducted for approximately one hour each, via telephone or video conferencing. The study consisted of nine participants representing various stakeholder categories, including consultants who advised the government on EdTech adoption, school principals and parents of children in classes 6–10. Thematic persona analysis of the interview data revealed three distinct personas: Enterprise User, Local Community User, and Private User, each with unique needs and priorities regarding EdTech adoption. The findings highlighted stakeholders' demand for a reliable evaluation index and product reviews. They also emphasized the importance of contextualization in EdTech design, urging the inclusion of criteria that assess how well products integrate with the local context. Moreover, insights gained from stakeholder interviews played a crucial role in informing the design of the public portal, focusing on features such as product categorization, sorting, filtering and access to detailed evaluation reports. Additionally, as part of the Tulna index refining process, user studies were also conducted with students and teachers in government schools across two states to further elucidate the contextual parameters influencing the quality of personalized EdTech learning solutions [42].

4.2. Evaluation Parameters in Tulna Index

The Tulna index is classified into three dimensions—Content Quality, Pedagogical alignment and Technology and Design. The Content Quality dimension focuses on maintaining accurate, relevant and inclusive content. Evaluation criteria within this dimension include content accuracy, correctness and clarity in assessment, language comprehensibility, alignment to national standards, curriculum alignment, inclusivity in learner representation and bilingual use. The Pedagogical Alignment dimension emphasizes the use of

effective teaching strategies informed by educational research and policies and aligned to learning objectives. Evaluation criteria within this dimension include the constructivist approach, addressing alternate conceptions, content in context, learner scaffolding, cognitive engagement, motivational features, logical chunking and connectedness, learning objective alignment, pedagogy-assessment method alignment, cognitive levels, feedback quality, opportunities for collaboration, adaptivity and teacher support. In the Technology and Design dimension, the benchmarks revolve around seamlessly integrating technological features and user-friendly interface design to enhance the overall learning experience. Evaluation criteria within this dimension include interface design, learner navigation and pace, universal design, analytics for learners' progress, tools to support problem-solving and meaningful interactivity. A description of the evaluation parameters is available on the Tulna webpage [17].

Each criterion serves as a guide to evaluate EdTech solutions on a three-point scale: "potential to improve", "valuable" and "exemplary", along with detailed descriptors. The available EdTech solutions in the ecosystem are evaluated using this set of criteria to determine their quality.

4.3. Analyzing Tulna Criteria Based on Justice-as-Content Framework

The following section presents an analysis of some criteria from the index that aim to ensure the content's contextual relevance for learners, aligning with the concept of 'Justice-as-content' as discussed in Adam's [20] research.

4.3.1. Content Quality Dimension

The dimension of Content Quality checks several features of EdTech solutions related to the content; for instance, the accuracy of the content, the vocabulary and accent, coverage of age-appropriate skills and representation of sections of society. We draw on three criteria under this dimension and outline the details of the criteria that specifically focus on how the EdTech solutions are suitable for learners in India.

- *Language comprehensibility:* Use an easily understandable vocabulary and accent, keeping the intended learners in mind. This criterion checks whether the accent and the vocabulary used in the EdTech product are likely to be comprehended by the target learners. In our context, it checks for an Indian accent, even if the content is presented in English. A foreign-accented voice adds to the cognitive load of the learners [43]. A product is considered to be exemplary when the learners are likely to follow the accent without additional effort and the vocabulary is age-appropriate for the learners.
- *Bilingual use*: Use English technical terms as well as vernacular terms to present mathematical terms so that the learners become well-acquainted with the language of Mathematics. A dominant language of EdTech solutions in India is English. However, having all solutions in English is not an ideal case for the learners, many of whom do not speak English as a first or even a second language. The Tulna index encourages EdTech product designers to make their products available in multiple native languages, or at least to support the learners by providing scaffolds in the relevant native language. The presence of multiple languages in EdTech solutions would not only help learners stay engaged and obtain the support that they need but would also avoid their loss of identity from being exposed to content in a non-native language.
- *Inclusivity in the representation of the learners*: Address the diversity of target learners in terms of gender, race, socio-economic background, religion and appearance while creating content. EdTech solutions often are designed to include characters of fair skin and certain body types, which misrepresents the heterogeneity in Indian society. This criterion encourages the inclusion of individuals from different sub-sections of society in terms of body types, age, gender and ability, as well as clothes and accessories reflecting religion that an Indian learner is likely to observe around them. Products that are built for different country contexts and overrepresent fair-skinned people or support stereotypes are penalized under this criterion.

4.3.2. Pedagogical Alignment Dimension

The criteria under the Pedagogical Alignment dimension focus on how the content is presented to the learners and the pedagogical practices followed by the EdTech products. The following criteria show how the content is evaluated for contextual solutions that are rooted in practices that are common to the cultural context of India.

- *Content in context*: Pay close attention to the learner's context (who is learning) and location (where is the learning taking place) while designing pedagogy. The Tulna index checks whether the product design is rooted in the local and cultural context of the learners. This can be represented in terms of the choice of clothes, food, festivals or setting, to name a few. Products that are directly adopted from Western contexts or that are not designed for Indian learners are unlikely to accurately represent the needs of the intended learners and are penalized.

- *Teacher support*: Design supports for the teacher so that they know how to use the product meaningfully and can customize it to an extent in response to learners' needs on the ground. Proficiency in the use of digital devices cannot be expected from all teachers, many of whom have been exposed to technology only in their adulthood. Thus, presenting an EdTech product without any support and guidance is unlikely to be successful in the classroom. This criterion checks whether the product design considers teachers as central agents of teaching. It focuses on the support provided to teachers on using the product effectively by integrating it with classroom teaching, and whether the teachers' agency is valued.

- *Opportunities for collaboration*: Facilitate collaboration and scaffold learning via peer-to-peer interaction and feedback. Western-centric epistemological and pedagogical foundations in EdTech tend to prioritize individual learning paths and goals over emphasizing collective learning paths [44]. However, learning in small groups is more beneficial than individual learning [45] and Indian culture is deeply embedded in collectivism rather than individualism. Under this criterion, the products are penalized if they do not encourage group-based learning, especially the ones that are designed for classroom interventions.

5. Justice-as-Process: The Adoption Process of EdTech Tulna Index by an Indian State Government

This section delves into RQ2, investigating how Tulna facilitates the engagement of multiple stakeholders in decision-making concerning the selection and implementation of contextual EdTech solutions. We analyze a qualitative study examining Tulna's role in the procurement of EdTech, specifically its integration within a state government. By employing a thematic analysis through the lens of 'Justice-as-process', we explore how the involvement of different stakeholders and their varied perspectives collectively influence the decision-making process.

5.1. Methods

5.1.1. Participants

The participants involved in this study encompass a diverse group with distinct roles and expertise. The researchers, who are the authors of this paper, primarily focused on developing standards and evaluation instruments, designing evaluation processes and conducting research on evaluating the quality of EdTech products. While they possess prior experience in technology in education, their knowledge of classroom teaching is limited. The government evaluators (also referred to as practitioner evaluators) are government school teachers (N = 37) who bring extensive classroom teaching experience and some familiarity with technology. However, their exposure to evaluating EdTech products is limited. Purposive sampling was used to conduct interviews of the members of the NGO (N = 2) and members from the governance consulting group (N = 4). The members of the NGO have expertise in implementing EdTech solutions to enhance learning outcomes on a larger scale. The governance consulting group members are responsible for assisting

the state government in making informed decisions during the adoption process. Lastly, government officials, holding senior bureaucratic positions, serve as key decision-makers in the state.

5.1.2. Procedure

This study delves into the adoption process of an evaluation instrument by state governments in India, focusing on designing spaces for deliberation in implementing Tulna. Figure 2 outlines the various stages of this adoption process and the stakeholders involved at each stage. Stages 1–3 entail weekly meetings between researchers, monthly meetings with the NGO partner, and regular engagement with government officials and the governance group. Stage 4, a closed-door event, involves confidential government decision-making. Note that the stages are merely logical groupings for ease of understanding of an otherwise fluid and continuous interaction that happened between the specified stakeholders between January 2021 to September 2022. Utilizing multiple vignettes, the community's functioning during this process is analyzed.

Figure 2. Stages of the adoption process through the researcher's lens [18].

5.1.3. Data Collection and Analysis

Data for this study comprise multiple sources, including internal meeting notes, participant observations, artefacts generated by the community, survey questionnaire responses from government teachers after they completed the evaluation process, semi-structured interviews with various stakeholders and post-evaluation reflections. Of these, interview data are the primary focus, supplemented by additional sources for corroboration or counter-analysis.

The goal of the survey questionnaire was to understand teachers' experiences in using EdTech products and evaluate them with the Tulna index. It contained questions on a Likert scale as well as open-ended questions. In addition to participants' prior experience with EdTech products, the survey sought teachers' feedback about the effectiveness of the training structure, ease of understanding the index and challenges faced during evaluation. The survey also sought to understand changes in participants' perceptions of EdTech quality and their willingness to use the Tulna index in the future.

Stakeholder interviews were conducted virtually in English or Hindi, recorded and transcribed. Sample interview questions for the evaluators included: '*Describe your experience using the Tulna index*', '*What questions arose during the evaluation process? How did you find solutions for those?*' Questions for the governance consulting group members include: '*Did the initial discussions consider software quality or hardware?*', '*When and how did the conversation about quality start*?' and '*What role did Tulna play in the adoption process?*' The responses were

coded to include instances where stakeholders mentioned their experience of using the Tulna index, collaborating with other stakeholders in the process and the significance of language in this process. The coding process involved the first author primarily, with verification from other authors, resolving disagreements through discussion and triangulation with multiple data sources.

5.2. Findings

5.2.1. Vignette 1: Multi-Voiced Approach to a Fair and Just Evaluation

This vignette analyzes to what extent the multi-voicedness and cross-sectoral collaborative approach has been able to facilitate justice in the process by aiding decentralized decision-making to procure EdTech products at the state level. Overall, Tulna acted as an anchor that aided decentralized decision-making by providing the metrics and toolkits for evaluating the quality of EdTech solutions and developing a common language related to the quality of EdTech solutions. The evaluation panel consisted of government school teachers and district-level officials who were subject-matter experts. The final scores were consolidated and the decisions were made by the state-level officials.

As a collective, all the members of the community focused on helping decision-makers select the best EdTech product among the available ones in the ecosystem. Although the state officials made the final decision regarding the approval of the final index and the choice of the EdTech product by aggregating scores across the selection procedure, the selection procedure had multiple steps. In each of the steps, multiple stakeholders—the researchers, governance consulting group members and teachers—came together to support the process with their wide range of expertise.

> There was considerable emphasis on involving teachers and bureaucrats in the state in the technical evaluation process.

Members from the governance consulting group (GCG) were situated in the context of understanding current trends in technology use for classroom education. They had extensive knowledge of solutions available in the market but had limited access to education research. The role of Tulna team members was to establish a common language among the stakeholders to help them understand how to measure the quality of EdTech solutions. This was done through successive meetings and by explaining the detailed index to the stakeholders. The language in the index bridged the gap between the researchers, practitioners, teachers and state officials.

> *Mr. A (GCG): "Quality of PAL [Personalized Adaptive Learning] was a critical thing in our mind. Of course, our understanding of how this is measured was very, very limited because we only knew certain private players who were making noise in the market at the time. . . we understood that there were some good players in the market who delivered PAL but we actually had no idea of how exactly this was measured and how quality of a PAL product was measured."*

For the government teachers who had extensive knowledge of pedagogical practices related to the classroom, the Tulna index gave them a way to channel their experience towards the selection and use of EdTech products.

> *Teacher S: "Personally it gave me a systematic way of judging something. Creating parameters, taking into all the aspects or factors of judging a thing, and doing it in a good way, you get an overall picture of the thing."*

5.2.2. Vignette 2: Empowering the Teachers with Decolonized Content and Training

This vignette presents further evidence of the decolonized evaluation process but also highlights how the teachers were empowered to inform the process with the help of decolonized content. Public school teachers were invited by the state government bureaucrats to serve as state evaluators based on their experience and familiarity with the use of EdTech in their classrooms. For these teachers, the onboarding process comprised

a series of training workshops. The online training, conducted over three days by researchers, aimed to improve participants' proficiency in using and interpreting the Tulna index. Specifically focusing on three critical dimensions of the index—Content Quality, Pedagogical Alignment and Technology and Design—the sessions provided comprehensive explanations of the criteria within each dimension, complemented by examples. The training sessions were mostly kept bilingual, acknowledging the linguistic backgrounds of the participants. They were structured to be concise yet interactive, fostering active engagement among participants. This format encouraged attendees to actively participate and prompted them to seek clarification on evaluation criteria whenever necessary. Following the online training, teachers engaged in independent evaluations, using the Tulna index to assess EdTech solutions.

> Ms. B (GCG): "The role that Tulna played was to build the capacity of multiple stakeholders, all who are part of this decision-making process, at various stages. It builds the capacity and understanding of what good can look like around software and their confidence to make high stakes decisions...build capacity of multiple stakeholders."

During these workshops, the expert evaluators leveraged the expertise of the governance consulting group to customize the workshops to address the needs of the state and the teachers. The governance consulting group members were trusted by government officials, and they supported this training process through various means, such as translating or explaining the scientific terms in the regional language, making sense of the evaluation training and interpreting the criteria in the evaluation instrument. Engaging in this process helped in the enculturation of the governance consulting group members and teachers to the accurate use of the evaluation instrument. These workshops also helped the research team become encultured in classroom practices and challenges faced by the practitioners, thus enabling iterative refinement of the training process.

Hindi was the native language of the state where the adoption process was being held. Hence, the training was bilingual (English and Hindi) to help teachers understand the evaluation process and criteria easily. While the teachers understood English, they were more comfortable in their regional language. However, the evaluation index itself was in English. This was mainly driven by the researchers' positionality, all of whom hailed from different parts of India and spoke English as a common language, and the major language of operation in the research institute was English.

> Ms. AK (NGO): "...one point of difficulty was... understanding the language of the framework itself..."

After the training, the teachers evaluated the competing products for state adoption using the index provided by the researchers. At this stage, they operated independently and were supported by the research team only in terms of interpretation of the index. The researchers themselves did not see the EdTech products to avoid biasing the scores of the evaluators. The evaluators were provided with the detailed evaluation instrument on the first day of the evaluation. They then engaged in understanding and assimilating the evaluation criteria before using them to evaluate the EdTech products given to them. They followed the rules and evaluation norms set by the government bureaucrats. Debates and discussions were encouraged before the formal evaluations started and were discouraged during the evaluation process to avoid biasing each other's evaluation scores. The emphasis was on independent evaluations. There was also a strong emphasis on making all voices heard during the evaluation process and engaging in a process that was fair, transparent, confidential and rigorous to the extent possible given the practical constraints.

> Ms. R (NGO): "The idea was the evaluation team would do the heavy lifting of all of these evaluations, analysis and all of that. And the high-powered committee would take the final call. Which is basically a very rigorous process. It allows stakeholders from teachers to senior bureaucrats in the states to get involved and it does it in a way that the louder voice, the more powerful voice is not of state or not amplified because of their

position. Rather, everyone gets an equal voice in the process at some stage, right, and gets aggregated as you move forward."

Thus, there was an emphasis on including different stakeholders, undoing power structures in the process of decentralized decision-making and enabling teachers to have agency and training to exercise that agency during the evaluation process. We believe this is critical because then the teachers are directly participating and influencing the selection of EdTech products for their classroom at the government level.

We acknowledge that some shortcomings still exist in this process. As mentioned before, the researchers' primary language of communication and work is English and the index, too, was designed in English (later translated into Hindi). This may have reinforced power structures, positioning stakeholders as having different proficiency in English at different levels of the power hierarchy. The bilingual training was designed to mitigate this effect and aid better comprehension and discussion, but its usefulness may have been limited. Further, the researchers provided training, governance consulting group members supported the implementation process and the evaluators independently evaluated the competing products. However, the final decision to select one EdTech product for the entire state was taken by the state officials. While we hope that the elaborate evaluations informed this decision-making process, the lack of publicly available documentation of the final decision-making process makes it hard to comment upon.

Nonetheless, since it would be the teachers who would be the end users of the EdTech in the classroom, their greater involvement helps amplify their voices. The entire process, followed by in-depth feedback from the participants and the stakeholders, helped the researchers to reflect on the justice embedded in the process and articulate steps for future collaborations. Further, as a spillover effect, and indicating the potential for long-term capacity building, the teachers reported that the training process and evaluation process increased their exposure to critically evaluating and using EdTech in their future pedagogical practices.

Teacher S: "Yes Now I am evaluating my own teaching and try to find out the points where I need improvement."

Teacher P: "Earlier I used to focus only on content delivery but after training, I came to know about various pedagogical aspects which imparts an important role on learners' ability."

6. Discussion

To address RQ1, we analyzed select criteria from the Tulna index, focusing on the Content Quality and Pedagogical Alignment dimensions. The Tulna index has incorporated criteria, based on learning theories, national policies and a stakeholder analysis study, that enable the identification of culturally relevant, linguistically accessible and pedagogically aligned EdTech solutions for diverse learners in India. These criteria include language comprehensibility, bilingual use, inclusivity in learner representation, content in context, teacher support and opportunities for collaboration. This resonates with prior research stressing the importance of contextualized and culturally relevant educational content [43,46,47]. To address RQ2, we showed that the Tulna index promotes a shared understanding of quality in assessing EdTech solutions. Empowering teachers through training facilitates their active participation in decision-making. Prior research [48] highlights the importance of stakeholder involvement in enhancing the effectiveness and adoption of educational interventions.

One of the central limitations of this paper is that the authors represent only the researcher group in the community. The voices of other members were brought to the forefront with the help of the vignettes, but they were not active contributors to the interpretation of data and writing of this paper. The paper, at present, is written by the researchers themselves. The paper-writing process could also become part of the participation and reification process around which the community grows.

Second, the index is designed using international literature from peer-reviewed journals in English, and evidence from the local context, wherever available. In future, more research based on the local context and local languages is required, which can further inform the design of the index.

Third, considering the plurality in Indian languages as discussed earlier, the initial index was designed in English to be able to communicate with a wider group of stakeholders and state governments. The timeline of this study and the interviews of the stakeholders are based on the indexes that were designed in English, leading the government school teachers to face certain hurdles. More recently, there has been an effort to translate the index into local languages. In response to the requests from the teachers in the study, the evaluation index was recently translated into one of the dominant Indian languages (Hindi). However, this attempt has been very recent and is not captured in the dataset or analysis in this paper. Such initiatives, although desirable to reduce the cognitive burden of the teachers and enable equitable access to the research-based index for everyone, are challenging to execute in India, which has 23 official languages and 780 spoken languages. In the future, this is likely to reduce the barriers to decolonizing the process even further, but as for this paper, the language of the index remains a limitation.

7. Conclusions

In this paper, we outline the progress made toward encouraging the design, use and adoption of good-quality and contextual educational technology solutions in India through active collaboration among stakeholders. The discussion shows the usage and adoption of contextual solutions that are likely to enhance children's learning. The discussion also highlights the challenges that the researchers had to navigate to ensure a collaborative approach while working with state officials. The overall discussion suggests that while there has been some progress made in the direction of decolonizing EdTech for Indian learners, there is more collaborative effort required in the future. Researchers, through their research, can define standards for contextual solutions. EdTech product designers need to consider that while designing their products, the states have to incentivize the designers by procuring only good quality and contextual solutions. Moving forward, besides using the global literature to gather evidence on good quality solutions, it would be of paramount importance to generate local evidence of what works, and under which conditions it works, in India.

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Methodological Insights for Decolonising Research and EdTech

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1. Introduction

This paper is an innovative attempt to quickly scan methodological approaches within the field of EdTech, drawing specifically on the articles contained within the Special Issue of *Education Sciences* on decolonising educational technology for which we served as editors (https://www.mdpi.com/journal/education/special_issues/2XT510Z1D6, accessed on 12 May 2024). A secondary goal is to carry out an exercise in horizon scanning for what the next steps might be, methodologically and in the fields of EdTech as well as research more generally with communities who could be described as outside the mainstream, especially as these steps pertain to decolonisation. We finish with an axiology of decolonising research based on the collated findings from all the papers we received.

Throughout this paper we will look to methodological insights that we hope will help develop research designs, principles, tools, and techniques that will better correspond to and align with people, communities, cultures, and societies who differ and diverge from the Global Northern mainstream context, and particularly those who live, operate, and learn in situations and contexts that can be defined as disadvantaged or developmental. Similarly to an earlier paper [1], we begin by briefly outlining what we mean by disadvantage and, first, decolonisation. (Even here, we, some of the current authors, fight the style guides that prefer American English spellings and auto-correct our mother tongue).

2. Decolonisation

All of the editors acknowledge that we live and work in Global Northern contexts, and are in many ways products of the Eurocentric mindset, but, as we state in the introduction to the Special Issue [2], we advocate for a more socially just and more educationally powerful use of EdTech, which is currently principally based on the uncritical and unthinking adoption of hegemonic and ubiquitous Western technologies that are themselves inherently based on Global Northern mindsets, approaches, beliefs, languages, and understandings (cf. [3]). We state in our introduction [2] that the integration into education of these technologies may have the unintended consequences of perpetuating colonial biases and reinforcing existing societal power imbalances (e.g., [4,5]), and that we—by which we mean the entire educational establishment—need to engage with this and aim to create change. We need to look to disentangle educational praxis and its neocolonial heritage: to decolonise it. This is by no means an easy task, but the conversation has started in research [6]; in methodology [7,8]; in Higher Education [9]; and in education generally [10]. We welcome this, and this paper looks to push this conversation further as it pertains to educational technology.

3. Problematising Discourse of Disadvantage

Not everyone who is outside a Global Northern context is disadvantaged, and the term is problematic both within and without this context [11]. We tend to avoid the

term "marginalised" for the similar reason that it can easily be misconstrued and read as pejorative, implying impotence or incapacity; however, for the purposes of this paper, we are specifically discussing decolonising EdTech with the intention of empowering groups who face detriment, prejudice, or lack of opportunity for one or more of the following reasons:

- Security (e.g., those in contexts of crisis, natural disaster, emergency, conflict, and displacement, as well as the subsequent trauma);
- Capacity (e.g., disability, lack of access, poverty, lack of voice, and low status);
- Education (e.g., nonattendance, poor provision, dropout, narrow curricula, and poor teaching);
- Language (e.g., few speakers of mother tongue, nonliterate/preliterate societies, EdTech primarily available in English, non-national languages [local dialects, etc.], and suppression of mother tongues and indigenous cultures);
- Infrastructure (e.g., insecure buildings, camps, limited mains supply, poor roads, lack of bandwidth, and lack of digital devices);
- Access (e.g., isolation, distance, sparsity of habitation, poor roads, no school, lack of bandwidth, wealth, and lack of digital devices);
- Power (traditionally stigmatised groups, e.g., because of position within society, caste, class, homeless, rural, marginal, nomadic, gender-based, generational, wealth, sexual orientation, and religion).

Unfortunately, these communities are often faced with many of these barriers, rather than just one. We are not proposing "EdTech" as a panacea that can overcome these barriers. (Indeed, the idea of "EdTech" is itself problematic since it is usually refers, unchallenged, to those dedicated digital technologies sold into education systems and serving the institutional mission as well as values of those systems and overlooks the extent to which the wider population is using digital technologies, such as social media and other web 2.0 applications, for informal individual and community learning. Coloniality, specifically digital neocolonialism, is manifest in all these technologies and in the hardware, infrastructure, and systems upon which they run [12], in both the "North" as much as the "South". Note: "EdTech" is presumed to be digital technology; traditionally, it could also refer to chalkboards, books, etc.). However, we believe that effective education can support and empower individuals and communities to make changes as well as offer better life chances.

4. Decolonising Research

However, each indigenous, disadvantaged, or otherwise marginalised community is found within their own unique social and cultural circumstances, which we have elsewhere described as being characterised by, for example, "environmental differences, historic differences, community/cultural/traditional differences, cultural practices, linguistics, and world views" [13]. We note that this clearly militates against the idea of adopting, transplanting, or operationalising pre-existing strategies from other contexts (such as the Global North), be these political, educational, technological, or research-oriented [1]. The circumstances and contexts of communities across the globe who are facing one or more of these highlighted barriers are highly diverse, and any interventions and research on and with these peoples, as well as the solutions provided, should be equally diverse [14], as should the technologies used to support these. They should also, as we will argue throughout, be developed in discussion with, and with the involvement and collaboration of, these communities.

To push this point about research further, as we noted in the introduction to this Special Issue, the research methods in use in low-income countries and disadvantaged regions are generally predigital and Global Northern (and, no doubt, gendered and ableist) and, as with the EdTech we discussed above, they often still reflect Western colonial thought and prejudice, and are now being enacted and supported through neocolonial, anglophone hegemonic digital technologies. These may be appropriate in some areas

of disadvantage—for example, with the deaf and hard of hearing in Canada, or rural communities in Wales (two communities with whom some of the editors have worked); however, they are less appropriate, for example, for preliterate communities on the margins of societies in hard-to-access parts of the globe. Hence, we ask what might work for the hard-to-reach.

5. Decolonising Research Methodologies

We draw here on some of the most cited and influential texts in the field, rather than conducting our own systematic review or metanalysis. The word "decolonisation" itself has become increasingly used in educational research over the last few years. Barnes [15] notes that the field of decoloniality is somewhat of a mess of competing ideologies, understandings, and assumptions, and that focusing too closely and narrowly on decolonising research methodologies will be to the detriment of the wider decolonial agenda. Prior noted that "even the word research arouses feelings of suspicion and defensive attitudes. Indigenous people are generally cynical about the benefits of research and cautious toward what many perceive to be the colonial mentality or 'positional superiority' ingrained in the psyche of western researchers" [16] (p. 162). Keikelame and Swartz [17] argue that reflexivity and self-reflexivity on the part of "non-aboriginal" researchers (p. 6), for which we substitute any researcher outside the community being researched, "cannot be overemphasised" and that being aware of their participants' actual responses, and not their own interpretation of these, will allow any researcher to "conduct appropriate research among marginalised and vulnerable populations" (p. 6).

Thambinathan and Kinsella [8] give a convincing overview of the field, and suggest four key approaches that researchers should adopt: "(1) exercising critical reflexivity, (2) enabling reciprocity and respect for self-determination, (3) embracing "Other(ed)" ways of knowing, and (4) embodying a transformative praxis" (online).

In terms of EdTech, Adam and Sarwar [5] raise the important point that we must not conflate this with Open Educational Resources (OERs), but also that this too has inherent and unspoken colonial thinking built-in from the start, and they too have begun to question its universality and relevance through similar lenses to those with which we investigated disadvantage: access, equity, language, skills, and global imbalances resulting from geopolitics. They also raise concerns that OERs and EdTech may have negative effects, including "using openness to effectively further exclusion (through using one central, universal system of knowledge—including language—that marginalises all others)" among others.

Traxler and Smith (2020), in their paper [1] on innovative research methodologies (expanded on subsequently in a series of workshops for e/mergeAfrica (e.g., https://bit.ly/4bsGoNA, accessed on 19 May 2024), discussed a number of methodological approaches that they claim are more appropriate for research in marginalised, disadvantaged, informal, or developmental contexts. We do not intend to rehash these discussions, but we note the potential usefulness of moving away from an over-reliance on what we then called "the usual suspects" of interviews, questionnaires, surveys, focus groups, and observations. Rather, for researchers keen to explore new and different "ways of knowing" away from traditional Global Northern epistemic praxis and to elicit participants' own worldviews and understandings, rather than have them mediated through a Western perspective, we recommend instead investigating methods such as Personal Construct Theory using card sorts [18] or laddering [19], soft system methodologies [20], rich pictures [21,22], sandboxing [23], Write, Show, Draw, Tell [24], and photo elicitation or photovoice [25]. There is, however, the equally serious issue of appropriate research ethics and the dilemma that methods and ethics pose: culturally appropriate research methods could develop culturally appropriate research ethics, but culturally appropriate research methods need culturally appropriate research ethics in order to proceed.

6. Decolonising EdTech: Methodological Approaches from the Special Issue

Yang [26] writes very powerfully about supporting his participants (students) to use autoethnographic poetry to capture "what typical academic prose tends to leave out: rhythm, sound, imagery, as well as the intense emotions and voices of the participants, especially those from marginal backgrounds" (p. 2). Drawing on a range of literature, Yang goes on to say that "autoethnographies often foreground the experiences, emotions, and perspectives of marginalised groups such as female sociologists in a male-dominated academia, indigenous scholars in a West-dominated discipline, and multilingual professionals in Teaching English to Speakers of Other Languages (TESOL)" (p. 2). There are clear parallels here with, e.g., sandboxing or rich pictures, where the participants tell their story in ways that are authentically theirs, unmediated by the questions of researchers which are, even with the best of intentions, imbued with their own perspectives of what they should be asking, based on their own beliefs, ethos, and worldviews. This "allows the marginalised to speak against the culturally dominant other with their own voices" [26] (p. 2). As well as opening epistemically diverse systems of knowledge production, a second level to this decolonial approach is that it can also negate the power dynamic between teacher and student, and allow for horizontal rather than vertical learning as well as teaching (cf. [27] Yang finds that technology can be a two-faced coin: neither inherently good nor evil, it can be used for either and gives examples of how the latter may work: specifically in not "marginalising individuals and groups only as data providers and consumers of knowledge" (but) the decolonizing ways, in contrast, are honouring, sharing, and collaborating (p. 13). He imagines two people, one on either side of epistemological injustice but "bonded by... technologies/As equals" (p. 12), and notes that decolonising EdTech can be as simplistic as using current technology to support the voices of the marginalised: "through this emergent translanguaging literature, we are no longer voiceless; we have raised our collective voice under a translanguaging banner to reconsider multilinguals as knowledge makers" (p. 14)).

Costa et al. [28] state presciently, if somewhat provocatively, that the decolonisation movement has focused on types and understandings of knowledge and of learning at the expense of the inter-relationships that drive teaching and learning. They note the obvious potential of using digital approaches as "digital cultures are a global phenomenon" (p. 10), but caution against an "emphasis on knowledge as a product than on knowing practices as processes" (p. 10).

Morgan [29] provides something of a stinging critique of MOOCs in the Global South. He shows that there are issues with low course completion and certification, the low value employers place on MOOC qualifications, poverty and poor infrastructure hindering course attendance and completion, and a lack of course content available in native languages, with over 80% of MOOCs only being available in English (pp. 6, 7). He also notes that "although MOOCs may create learning opportunities for people in the Global South, critics view them as a source that may ignore the importance of culture and local academic content" (p. 10). It is also the case that MOOCs tend to perpetuate a top-down and transmissive form of education. To overcome some of these difficulties, Morgan cites [30], who has declared that MOOCs need to be more supportive rather than often only allowing for autonomous learning and to be available in local languages. One suggestion we endorse, where possible, is the setting up of community partnerships to offer further support. This certainly seems more achievable than the somewhat wishcasting of some other authors for those offering MOOCs to ensure better infrastructure or to provide enrolees with digital hardware. Morgan ends with the hope that "providing MOOCs that encourage student participation and minimise the passive exchange of knowledge will likely lead to more democratic outcomes" (pp. 10–11).

Smith and Scott [31] describe a method that itself can be critiqued through a decolonial lens, in that although they were expressly seeking answers from their participants, who had all been partners on a joint project in Palestine, the questions were posed by the authors rather than eliciting data from the participants in a purer form; however, in rebuttal to this charge, it must be noted that there are two uncredited authors: local Palestinian

academics whose names have been removed for their own safety. The questions were, therefore, created and supported by local actors, which [32] notes enables participants to produce accounts that are representative of and meaningful to the actors within the research and the setting, and to "use naturalistic data, critical discourse analysis and phenomenography, because (they are) 'culturally literate'" (op. cit. p. 2) in the setting and community being researched. This "feel for the game and the hidden rules" [33] (p. 27) means the authors feel "empowered to offer a thick description [34] of lived realities, of the hermeneutics of everyday life" [32] (p. 2). We take from this the recommendation, similar to that of Keikelame and Swartz [17], that non-native researchers work where possible with academics from the local contexts.

Farrow et al. [35] take a similar stance. They note that Open Educational Resources "provide opportunities to diversify the curriculum and challenge the dominance of Eurocentric and Western knowledge" and "promote the democratisation of knowledge by removing barriers to access and participation in education" (p. 2) by allowing educators to adapt content for their own contexts, allowing for communities and individuals who have been "historically excluded or underrepresented in formal education systems to engage with educational resources (and) contribute their knowledge". However, as with Morgan [29] in addition to Smith and Scott [31], they note the vital importance of mentoring and guidance, peer collaboration, and effective learning resources and tools, as well as insightful and supportive assessment and feedback. OERs have elsewhere been critiqued as instruments of digital neocolonialism [36], but Farrow et al. aim here to demonstrate how Supported Open Learning (SOL) can support researchers and communities to try to break the interlinked and "mutually reinforced" (p. 5) trifecta of the coloniality of power, of knowledge, and of being. In harmony with other papers in this Special Issue, most noticeably Smith and Scott, they note that where Western institutions are acting as the lead partners in international projects, there is a clear challenge in avoiding bringing Global Northern attitudes and beliefs, and that "there is a delicate balancing act to be struck between providing leadership in a particular domain and respecting the autonomy and self-determination of the collaboration partners" (p. 15).

Kohnke and Foung [37] do not add to the methodological discussion of working with disadvantaged and under-represented communities per se, but they give an excellent sketch of how to methodically interrogate data using the PRISMA [38] method. Their own research into the colonisation of data has led them to six key conclusions about ethical and decolonised practice in using data, including respecting its sovereignty, avoiding the manipulation of users, having a decolonialised approach to ethical clearance upstream, better as well as more equitable systems, and clear information for participants in how their data will be used.

Barnes et al. [39] note that EdTech can be seen as an arms race in which neo- and postcolonial Western companies compete to create resources that they can export into Global South contexts with little or no local, cultural, linguistic, societal, or community contextualisation, which Mazari et al. [40] show leads to responses that are "colonial at best", and instead call for the development of socially just and decolonised EdTech using the principles for digital development (https://digitalprinciples.org/ accessed on 12 May 2024) developed by the Digital Impact Alliance (2017; 2024). Drawing on two key projects with refugees in Rwanda and Pakistan, Barnes et al. also show the importance of "designing 'with' rather than 'for' refugees as they navigate their educational journeys post-displacement" (p. 13) (this approach resonates strongly with Richard Heeks' formulation of ICT4D2.0 [41]). They discuss focus group discussions (FDGs) as being well placed to support decolonial approaches as they allow participants' views to emerge through interaction, so that "the participants' rather than the researcher's agenda can predominate" [42]. Following their discussion of their research findings, they offer these key factors for creating positive interactions through EdTech: (a) clear purpose of skills development for better life opportunities, (b) contextualised content, (c) language support, (d) illustrative visuals, (e) facilitated interactive elements, (f) expertise of presenters, (g) clear, easy to

navigate delivery style, (h) self-paced options, and, finally, (i) being free of charge (p. 17), before offering a series of conclusions we urge all EdTech entrepreneurs to engage with.

Tompkins, Herman, and Ramage [43] report on an iterative survey and focus group research design investigating attitudes and perspectives of students on computing courses at a large open university in the UK. Their participants identified ten barriers to effective decolonisation of the curriculum, six faced by students and four by the institution. These are broadly in line with previous research identified in the article, but whilst there were worryingly ambivalent and even aggressively hostile attitudes to decolonisation within computing education in HE, there were some positive signs, such as students being "well aware of the complexities and challenges of such changes, and many are open to widening their understanding" (p. 15).

Kuhn, Warui, and Kimani [44] describe social research via the extended metaphor of a *kitambaa*, or woven tapestry of multiple threads, or knowledges (plural). They have approached their research through the lens of critical realism, utilising the human development capability approach and applying critical pedagogy to approach "futures literacy". The theme that continually speaks through this paper is convivial, shared, reciprocal, and communal emancipatory action.

Similarly, Bhattacharya, Nandakumar, Dasgupta, and Murthy [45] describe a collaborative approach to EdTech involving multiple stakeholders, each applying the lens of "justice-as-process" through their varied perspectives to collectively influence the decision-making process in the usefulness or otherwise of EdTech solutions in India. It is reciprocity and social cohesion that are continually highlighted as strengths through all of the papers in the Special Issue.

7. Decolonising Research Methodologies: The Transformative Paradigm

We have distilled the above into a version of Merten's [46] Transformative Paradigm (Figure 1, below). This still draws heavily on her original, but we have updated it in light of the research in this Special Issue.

Basic Beliefs of the Transformative Paradigm as it Pertains to Decolonising Methodology	
Axiology Assumptions about ethics.	Ethical considerations promote reciprocal exchange, support self-determination, celebrate diversity, and embody transformative practices, whilst simultaneously rejecting notions of cultural or positional superiority.
Ontology Assumptions about the nature of what exists; what reality is.	Recognises how cultural and colonial privilege may shape perceptions of reality and explores the consequences of prioritising one reality over another. Multiple realities are influenced by factors such as social, commercial, (geo-) political, cultural, economic, ethnic, gender, disability, and other values as well as contexts.
Epistemology Assumptions about the nature of knowledge and the relationship between the researcher and the stakeholders needed to achieve accurate knowledge.	Recognises the crucial need for interactive and reciprocal links between researchers and participants; reflexivity and self-reflexivity are key skills for researchers; knowledge is seen as culturally and contextually situated; issues of power and privilege (coloniality) are explicitly addressed; development of a trusting relationship is seen as critical; and emphasis is placed on knowing practices as processes rather than on knowledge as a product.
Methodology Assumptions about appropriate methods of systematic inquiry.	Qualitative methods are considered most effective, while quantitative and mixed methods can play supportive roles; researchers prioritise their participants' agendas, perspectives, and beliefs, allowing them to shape the research rather than imposing their own; methods are adapted to accommodate cultural complexity; and contextual as well as historical factors, particularly those related to colonial discrimination and oppression, are acknowledged.

Figure 1. Basic beliefs of the Transformative Paradigm as it pertains to decolonising methodology, drawing on Mertens (1998; 2005).

In summary, Figure 1 shows a clear need for researchers—especially those from the Global North—to consciously examine themselves and their assumptions for aspects of colonial thought and reject notions or positions of superiority, even when assuming leadership roles within the research, and to work in reciprocal partnership with all participants in their projects, drawing on local and contextual expertise to support all aspects of research (design, implementation, data collection, analysis, and dissemination). Dialogic research methods are seen as more effective, especially when power dynamics are identified and mitigated, allowing for the authentic voices of participants to shine through.

We have created a similar synopsis of the four aspects of Merten's Transformative Paradigm for EdTech specifically (Figure 2), based on the extant literature in the field and drawing specifically on the papers produced for this Special Issue.

Basic Beliefs of the Transformative Paradigm as it Pertains to Decolonising EdTech	
Axiology Assumptions about ethics.	Recognises that, whilst EdTech has the potential to embed colonial hegemonies of language, power, etc., this can be mitigated to support local and contextual transformative actions as well as collaborative and reciprocal research.
Ontology Assumptions about the nature of what exists; what reality is.	Supports the collection, analysis, and collaboration of multiple voices, knowledges, and perspectives; needs to be used to allow and celebrate differences rather than to average them out; and used effectively, EdTech can remove barriers to access and allow marginalised as well as unheard voices to contribute and be heard.
Epistemology Assumptions about the nature of knowledge and the relationship between the researcher and the stakeholders needed to achieve accurate knowledge.	Knowledge is seen as culturally and contextually situated, and EdTech can allow for greater contribution and understanding; development of trusting relationships is seen as critical to develop interactive and reciprocal links between researchers and participants that respect the autonomy and self-determination of the latter.
Methodology Assumptions about appropriate methods of systematic inquiry.	EdTech needs to embody the values of being qualitative, linguistically or pictorially appropriate, contextually relevant, illustrative, clear, supportive, useful, and *free of charge* in order to be of use for effective research with marginalised or hard-to-reach communities.

Figure 2. Basic beliefs of the Transformative Paradigm as it pertains to decolonising EdTech, drawing on Mertens (1998; 2005).

8. Conclusions and Recommendations

These two figures together embody the essence of our Special Issue. They tie together the strands of multiple papers on EdTech and its uses for research, much as Kuhn, Warui, and Kimani [44] wove together a *kitambaa* from all the disparate sources in their research. There are clear cautions in these papers about the unthinking replication of colonial thought and practice by automatically selecting those methods and tools known to researchers without very careful thought about the target participants and their needs, contexts, and situations. It is all too easy to unconsciously promulgate colonial hegemonies of language and technological oppression through the automatic use of Western methods, questions, and even technologies.

There is also a wellspring of hope in this collection of papers, noting that where researchers collaborate reciprocally with participants and local actors in a culturally appro-

priate manner, accepting the expertise and input from stakeholders within the contextual situations, the research projects are more effective, enjoy greater support from participants, and have a greater chance of transformational success.

We finish by returning to Yang's (2023) [26] vision of people situated on either side of epistemological injustice but "bonded by... technologies/As equals" (p. 12). EdTech, quote/unquote, has clear potential for misuse and abuse where it is exported with little or no local, cultural, linguistic, societal, or community contextualisation into contexts that have been described as the "epistemic underside" ([47,48])—i.e., those whose knowledge and perspectives have not impacted on a global stage; however, where culturally relevant technological support is used judiciously by multiple stakeholders, it can drive greater understanding and transformative practices, allowing researchers and participants to be reciprocally bonded through their use of technology, as equals, for more equitable and socially just outcomes.

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