Digitisation of higher education and research: Raising inclusivity and equity issues for indigenous students

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ABSTRACT

This conceptual article critiques digitisation of higher education and research as it relates to inclusivity and equity for indigenous students. I argue that indigenous students' access to education is not limited to indigenisation of their learning, knowledge and research; it is more about what they learn and how they learn it through technology – information and communication technology (ICT) and online platforms. These students are excluded and do not enjoy equal educational opportunities when digitising their learning and knowledge does not relate to their cultural contexts. In addition, innovative projects and programmes which are insensitive to the dynamics of indigenous knowledge further make indigenous knowledge vulnerable to colonial practices. This article contributes insights into the vulnerability of indigenous students and institutions of higher learning being uncritical of the digitisation of their learning, knowledge, and research. The article will conscientise institutions of higher learning to digitise learning and research from a truly transformational perspective.

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1   INTRODUCTION AND PROBLEM STATEMENT

Digitisation of higher education, especially teaching, learning and research is on the increase. Therefore, digitisation is revolutionising higher education. The Fourth Industrial Revolution (4IR) and the outbreak of the Covid-19 pandemic have added to the fast-tracking of digitising of education and research (Alnagrat et al., 2022). For instance, the Covid-19 lockdown regulations forced people to convert to virtual operations. Both academic staff and students in higher education institutions had to operate from home. Higher education institutions are faced with the demands to transform into technological hubs and be 4IR savvy (Telukdarie & Munsamy,

2019). For this to happen, higher education institutions should be equipped with information and communication technology (ICT) for effective teaching, learning and research (Borrero, 2013; Sharma et al., 2011).

The literature raises issues about digitisation of higher education provisioning (Strathman, 2019), such as changing the identities of academics (Dlamini, 2017) and institutional operations and architecture (Telukdarie & Munsamy, 2019). Talks at conferences and seminars herald the positive side of the digitisation of student learning. However, the impact of digitisation on indigenous students has been neglected, raising issues of their inclusion and equality. Digitisation has eased teaching, learning and research through by creating online platforms. However, technology is not yet responsive to all students' needs. Thus, the aim of this literature study is to critique digitisation of learning and research in the higher education institutional context in reference to inclusivity and equity for indigenous students. Indigenous students do not truly feel included and treated equally in the digitisation of education and research. This means that an effort should be made to include not only them but indigenous knowledge and pedagogies. Indigenous students are described as belonging to communities that are original inhabitants of a certain geographical region or country before the colonisers arrived. Indigenous communities have distinct characteristics such as culture, beliefs, language, history and technology compared to the colonising culture.

In the light of the positive side of digitisation of education mentioned above, there is a promise to increase access, shorten the distance between the lecturer and student, promote meaningful learning, etc, especially for indigenous students who have been historically marginalised (Glover et al., 2018; Makhanya, 2021; Pratt et al., 2018). In the postcolonial era in South Africa, there is a promise to include indigenous students by increasing their access to education through ICTs (Heleta, 2016). ICTs provide resources through which digitised education can be provided. Hence, digitisation and ICTs are used interchangeably in this article. However, the inclusion of indigenous students can be effectively achieved by enacting the human rights that are encapsulated in the National Constitution, and policies that promote indigenous knowledge, such as the Indigenous Knowledge Systems Policy (Department of Basic Education, 2011); the Curriculum and Assessment Policy Statement Grades R–12, which is framed within the seven principles, i.e. social transformation; active and critical learning; high knowledge and high skills; progression; human rights, inclusivity, environmental and social justice; valuing indigenous knowledge systems; credibility, quality, and efficiency (de la Porte & Higgs, 2019). Hence, higher education institutions should be sensitive toward students whom they receive from schools, who are informed about human rights. Also, the Africanisation of the curriculum project in higher education institutions suggests that digitisation of learning and research should not compromise indigenous knowledge.

Indigenous knowledge is still vital in modern times; it is however not sufficiently recorded with relevant ICTs for future use (Department of Science and Technology, 2004). In Australia, for example, cultural materials designed for Anglo Australians were found pedagogically inappropriate for indigenous Australians (South Africa, 2004). ICT programmes have been criticised for their skewed function to impose Western processes on indigenous people,

creating computer-mediated colonialism (Borrero, 2013). It is, therefore, important that while higher education institutions digitise their academic project, they should not compromise the inclusion of indigenous students, knowledge, and pedagogy. This is because indigenous people as both stakeholders and rights holders are increasingly the focus of the ongoing discussion about the positive and negative aspects of ICT, and the possibilities of information and communications-based transformation (Borrero, 2013, p. 1).

The impact of ICTs on educational access is one of the three challenges in the Draft White Paper on e-Education (South Africa, 2004). The challenges are attributed to globalisation and polarisation (rich and poor) (South Africa, 2004). For instance, the Draft White Paper records only 6.4% of South Africans who use the Internet compared to 72.7% of Americans (South Africa, 2004). The Draft White Paper also acknowledges that the digital divide is not only about connectivity and infrastructure disparities but local content development and collective knowledge generation as well, thus confirming the fact that the inclusion of indigenous students should be extended to indigenous knowledge, pedagogy, and research. The New Partnership for Africa's Development (NEPAD) identifies ICTs as the promising solution to reduce poverty on the African continent in which ICT-proficient youth and students can be produced as engineers, programmers, and software developers (South Africa, 2004). There is therefore an intention to implement ICTs that are specifically suited to Africa, through appropriate technologies (South Africa, 2004). Inspired by human rights, the use of ICTs should encourage student-centred learning; active, exploratory, inquiry-based learning; collaborative work among students and lecturers; creativity, analytical skills, critical thinking, and informed decision-making (South Africa, 2004). NEPAD's huge investment in this project might fail to provide sustainable solutions if the project cannot consider the youth's local knowledge and practices. The next section describes the working concepts in this article.

2   CONCEPTUALISATION

2.1   ICTs and digitisation

As stated above, ICTs provide resources for the digitisation of education. Viewed as digital technology, Pettersson (2017) defines ICTs as the information technologies which promote access to education. They include the new wave of ICTs which covers Internet-based communication and transaction systems, mobile devices, computer-integrated telephones, groupware, workflow, and multimedia (Sarker et al., 2019). "ICTs are the combination of networks, hardware, and software as well as the means of communication, collaboration and engagement that enable the processing, management, and exchange of data, information, and knowledge" (South Africa, 2004, p. 15). Web 2.0 applications such as wikis, weblogs, social networking, podcasts, and RSS feeds (Watson, 2013) are some of the digital platforms which are created through ICTs to enable such communication, collaboration, and engagement. ICT is also viewed as the scientific-technological and engineering discipline and management technique, and it is used in the handling of information in application and association with social, economic, and

cultural aspects (Sharma et al., 2011).

Pettersson's (2017) definition is most suitable for discussions in this article as it spotlights the reflections on the digital divide. It is in this light that besides student access, digital divide has created Internet access issues. I argue that even proper Internet access is not an end in itself but a means to an end; it should be more about the content which is conveyed to the students and how. ICTs may do well to provide full access to information and knowledge sources (Sraku-Lartey et al., 2017), but they not only do that; rather, they should help promote indigenous perspectives instead of advancing non-indigenous perspectives only. If epistemological and pedagogical issues related to indigenous knowledge are not raised, ICTs could perpetuate colonisation, thus compromising the Africanisation of education projects. The use of ICTs in education should help with the decolonisation project. This raises the need to describe decolonisation.

2.2   Decolonisation

Decolonisation refers to an action of combating the colonial status in favour of independence. Educationally, this means changing the mind, personality, social actions, education settings, curriculum, and research practices (Hart, 2010) among other things. Decolonisation means the historically colonised people freeing themselves from their colonial status to independent status. In academia, the researcher and research should be decolonised (Datta, 2017). This claim is informed by the fact that higher education institutions thrive on research, which frames their academic programmes. However, decolonisation needs rethinking and taking action, especially, in the context of this article, curriculum and research. The South African students' #FeesMustFall campaigns around 2015–2016 were about affordability and access to education, but most importantly, the students also called for indigenisation of the curriculum and pedagogy in higher education. A decolonisation and digitisation process model would ensure fair treatment of all in the country and the continent. The current study focuses on education.

2.3   Indigenous knowledge

Indigenous knowledge is commonly community-held (local) knowledge that involves detailed and shared knowledge, beliefs, and rules related to the physical resources, social norms, health, ecosystem, culture, the livelihoods of the people who interact with the environment both in rural and urban settings (Gumbo & Karel, 2020; Sraku-Lartey et al., 2017; Sukula, 2006). This knowledge is inherently tacit and uneasy to codify, and it resides in community practices, institutions, relationships, and rituals, which might be the reason why it suffers marginalisation by modern scientific knowledge (Sukula, 2006). It may be understood in terms of different fields, but it is integrated due to indigenous people's holistic approach to knowledge construction and practices. It sustains the lives of indigenous people in a particular environment. Indigenous students must primarily be taught about this knowledge. Non-indigenous students can

also benefit by being exposed to indigenous knowledge as an alternative knowledge to Western knowledge – points of contact between these two knowledge types can also be explored through learning and research.

The characteristics of indigenous education include observational learning which augments verbal learning; experiential learning which augments listening; and learning settings which are contextually meaningful (Watson, 2013). Hence, it is important to relate learning to students' contexts, authoritative knowledge by elders, the educational role of elders and other indigenous practitioners, indigenous people's ways of doing things, group solidarity, acquisition of knowledge directly from the expert in an apprentice-novice system, fusion of emotional and intellectual domains (Watson, 2013). In addition, there are seven principles of indigenous worldviews that academics should consider:

1. the nature of knowledge as holistic and cyclic, which depends on relationships and connections to living and non-living beings and entities,

2. multiple truths which depend on individual experiences which culminate into a community knowledge,

3. everything is alive,

4. all things are equal and should thus be respected,

5. the land is sacred and this deepens contextual attachment to it,

6. the relationship between people and the spiritual world is important,

7. human beings are least important in the world (Gumbo & Karel, 2020, p. 3).

Consideration of these characteristics and principles would help transform education, and indigenous students would see the value of partaking in learning and research as they would relate to the students' contexts and cultures. Thus, digital environments should be designed with cultural adaptability in mind in order to include all students (Watson, 2013, p. 14); this can help not to limit digital environments to digitisation only. The discussion in the next section turns to the digitisation of students' learning while keeping to the line of thinking on indigenous students.

3   DIGITISATION OF LEARNING FOR STUDENTS

Digital pedagogy promises to deliver effective learning to students (Salavati, 2016). It is for this reason that digital pedagogy is heralded for increasing student performance, eliciting student engagement, and defacing boundaries between learning and socialising (Watson, 2013). Digitisation of learning, therefore, promises to promote indigenous students' access to education, research, and indigenous knowledge. I also argue that digital learning has the potential to decolonise education and accommodate the indigenisation of the academic project.

When indigenous knowledge is accorded the respect that it deserves through digitisation of learning and research, it can encourage students to want to know more about it. To illustrate this point, I draw on North-West University's attempt to digitise education and research. Research students engaged in the Tswana indigenous pathways to health in collaboration with the Department of Health in the province. These students used multimedia technology to document community health practices. Thus, the task enabled interaction between the students and knowledge holders. Also, the use of technology encouraged the community project method which balanced theory and practice and encouraged the use of the local language. Elders and practitioners were regarded as important participants in knowledge sharing. They were also invited during lectures to share knowledge with the students. This approach to student learning can help address the elders' concerns about the youth who are growing up losing their true indigenous identity and lacking the understanding of community knowledge traditions (Gumbo, 2020; Strathman, 2019).

Digitisation of higher education is almost mandatory for students and academics in the current era. This must, however, be accompanied by a decolonisation agenda. Implied in this statement is the need for proper treatment of indigenous knowledge so that it is valued like other types of knowledge, and that indigenous students should feel that they do fit in the learning situation. Young people are technology activists and natives; this provides an excellent opportunity to make both indigenous and non-indigenous students learn about indigenous knowledge. It is argued that professors limit the description of the world to Eurocentric contexts and ignore indigenous perspectives and understandings (Gumbo & Karel, 2020). This exposes both indigenous and non-indigenous students to a narrow (Western) knowledge and denies them opportunities to learn about indigenous knowledge. It is claimed that marginalisation of indigenous people has been and continues to be a colonisation tool (Gumbo & Karel, 2020).

The digital misrepresentation or underrepresentation of indigenous knowledge has been observed in the massive open online courses (MOOCs). This raises critical epistemological questions related to MOOCs:

- Where do the content and technology that support MOOCs come from?

- Who controls knowledge?

- What knowledge do students learn?

- Whose knowledge do these students learn and how?

Furthermore, research, teaching, and learning material heavily depend on Western academic systems and are accompanied by the dominance of literature and articles published in influential journals (Altbach, 2014). If the academic (teacher) does not ask epistemological questions such as these, he/she would add to the marginalisation of indigenous knowledge by high-profile universities. Such an academic's uncritical attitude will only satisfy certain establishments, such as major academic journals, editors and editorial boards, and big academic

publishers which reside in the global centres of knowledge such as Boston, New York, and London (Altbach, 2014). It should be noted that modes of inquiry that are related to Western traditions are not the only available options (Altbach, 2014). Indigenous knowledge offers an alternative to such traditions.

Language also plays a big role in the digitisation of knowledge and research. In this sense, English remains to be the language of learning, research, and knowledge dissemination. There is insensitivity to other languages and major academic websites are packaged in English only, disadvantaging indigenous languages and students ultimately. Language cannot be divorced from culture as it is a tool for cultural expression. We can learn from the ICT department of Ethiopia, which has found a way to programme the local language alongside English in gadgets such as cell phones. The logic of this claim is that learning which happens through English perpetuates Western culture. A lot of digitised information is only available in English. There is a need to give equal status to all languages in accordance with South Africa's language policy. Digital transformation of education should promote indigenous languages so that indigenous students are not further disadvantaged in their learning activities. As a matter of fact, the meaning of some indigenous expressions cannot be completed through English, the obvious ones being adages that can provide educational resources for indigenous people. The next two sections are critical as they highlight the positives and limitations of digitisation of indigenous knowledge. Attempts to digitise indigenous knowledge elsewhere help in the discussion.

4   DIGITISATION OF RESEARCH ABOUT INDIGENOUS KNOWLEDGE

The ICTs can be used in a way that ensures the preservation of indigenous knowledge and the prevention of its possible extinction. Preservation, access, and wider dissemination of indigenous knowledge (Sraku-Lartey et al., 2017) can therefore be realised through digitisation. Strathman (2019) examined indigenous heritage projects produced by university researchers between 2002 and 2007 in collaboration with indigenous communities, by investigating issues that arose ten years after their production. Strathman's (2019) choice of projects was informed by the academic activism which produced them through participatory action research (PAR). PAR is regarded as engaged scholarship and a decolonising method of giving back to the indigenous communities (Strathman, 2019, p. 3722). Data was mainly collected from the respective scholars and source communities. Academic activists hereby referred to as 'technological missionaries' (Strathman, 2019), shared their technological talents by collaborating with indigenous communities in planning, using, and developing the ICTs.

In the above projects, the academics wanted indigenous communities to install and maintain the equipment themselves because they (academics) focused on sustainability (Sandvig, 2013). Indigenous people who have access to the ICTs used digital media to share their tangible and intangible culture and store their vast bodies of knowledge (Steeves, 2015; Strathman, 2019). The academics shared their technological talents by collaborating with indigenous communities in planning, using, and developing ICTs (Strathman, 2019). From the projects, most (postgraduate student) researchers made the creation of a digital heritage pro-

gramme part of their theses. The author cites Delgado, who records that every summer season, many North American and European students who possess computer skills head south to work with indigenous organisations.

Strathman (2019) further reports on a project of Braun, who founded the High-Performance Wireless Research and Education Network in San Diego. Intending to make indigenous communities the owners of the project, Braun included tribal communities as beneficiaries of Internet access when he drafted his grant proposal and allowed them to learn how to install and maintain the equipment. The native technicians designed and built the 23 solar-operated relay towers which extended wireless broadband coverage across 600 miles of tribal lands to form a Tribal Digital Village. Involving indigenous people in the digitisation of indigenous knowledge could strengthen its protection against unauthorised people wanting to claim its ownership. It can also be protected from bio-piracy and expropriation, especially by multi-national companies (Sraku-Lartey et al., 2017). However, it should be ascertained whether the communities have the ability to continuously guarantee ownership and integrity of their knowledge and that its sacred features would not be disturbed (Sraku-Lartey et al., 2017), especially considering the fact that indigenous knowledge is not easy to codify (Sukula, 2006).

A study on the digitisation of indigenous knowledge of forest foods and medicine was conducted in Ghana using open-source software (Sraku-Lartey et al., 2017). The aim was to promote Ghana's forest resources and to unearth the hidden treasures of the forest from which these resources were obtained (Sraku-Lartey et al., 2017). A key recommendation that these authors made is to promulgate laws that will protect these resources from bio-piracy. Locally, digitisation of the cultural heritage was investigated, and the results revealed that open access to digitised cultural heritage material was encouraged, but access to its use was limited (Verran, 2009).

These reported projects offer the positive sides of the digitisation of indigenous knowledge, which can be packaged for learning and research. The active involvement of indigenous communities – to decide and determine what can and what cannot work makes the digitisation of knowledge relevant for them, especially students who must learn from it and feel included. As can be noticed, research projects help to create a platform for packaging and learning about indigenous knowledge. This is not possible if the researcher and research are un-decolonised (Chilisa, 2012; Datta, 2017). Thus, a paradigm shift is invoked to ensure the indigenisation of research (Gumbo & Karel, 2020):

Ontology   should recognise the spiritual realm which is interconnected with the physical realm since indigenous science integrates a spiritual orientation that honours human relationships with other life. Hence, researchers who research indigenous knowledge are bound to accept the triple relationship between humans, nature, and spirituality. All life must be respected since humans are in reciprocal relations with everything that exists.

Epistemology   is a fluid way of knowing that derives from teachings transmitted from generation to generation by storytelling; it arises from the interconnections between the human

world, the spirit, and inanimate entities; it is undergirded by perceptual experiences about self in connection with the happenings which are facilitated through rituals/ceremonies (e.g. dreaming, visioning, meditation, and prayer) of which the ultimate is the knowledge with the elders and practitioners playing the educational key role.

Methodology   should engage participants actively throughout the research process. Hence, methodologies such as PAR are preferred (Chilisa, 2012). It is argued that for the genuine representation of participants' voices, they should participate even in data analysis (Datta, 2017). The researcher should ensure his/her relational accountability about the dynamics of the research site and participants, noting that knowledge is relational, i.e. it is shared with all creation (e.g. cosmos, animals, plants, earth), is practical, i.e. indigenous people create knowledge because they want to use it.

Axiology   in which the researchers should recognise that indigenous knowledge is undergirded by values, principles, and ethics. This includes but is not limited to the custodians who develop, approve, and implement research; respect for individuals and communities; reciprocity and responsibility; respect and safety (e.g. being open to participants' preferences about concealing or revealing their personal information such as names); non-intrusive observation; deep listening and hearing; reflective non-judgment; honouring what is shared; awareness and connection between the logic of the mind and feelings of the heart; self-awareness; subjectivity.

In light of this paradigm shift, three concepts are considered which could reorientate innovative projects which target indigenous communities (Borrero, 2013):

1. pro-indigenous (i.e. for indigenous peoples) in which external innovations to the target communities are undertaken on behalf of indigenous peoples,

2. para-indigenous (i.e. with indigenous peoples) in which innovations are undertaken alongside indigenous peoples,

3. per-indigenous (i.e. by indigenous peoples) in which innovations by indigenous peoples are based on their own self-defined needs and wants.

The projects described above would fall under para-indigenous because they were designed with indigenous people. PAR can actually make indigenous people take a lead in the projects introduced to them. Following PAR, proper fact-finding should be conducted first to identify the needs/wants/issues. Then, with proper facilitation by the researcher(s) concerned, indigenous people should be asked to suggest solutions that they can create themselves. They can be trained in computer skills, but they should take the lead in what they package and how. The parallel scenario which pertains to learning is that students should be allowed to relate learning to their contexts.

5   LIMITATIONS OF DIGITISATION OF INDIGENOUS KNOWLEDGE

No doubt, digitisation has contributed to the development of underdeveloped contexts, especially with regard to access to education, but it has also furthered marginalisation of indigenous people. The very ICTs which are praised for student access to education and digitisation of indigenous knowledge are notorious for heightening the vulnerability thereof, as well as learning, and research. Though the need for teachers to be abreast with the latest technological developments is emphasised so that they have expert technological pedagogical and content knowledge (TPACK) (Mishra & Koehler, 2006), they still present themselves with inadequate ICT skills (Watson, 2013). TPACK, which is ICT-dependent would have to be indigenised. How this can be done is illustrated through the proposed framework described in Section 6.

Technology also attracts issues about the use of digital resources to preserve knowledge, which includes affordability, simplicity of its use, security, and privacy, and reliability of access to electricity (Steeves, 2015; Watson, 2013). In South Africa, for years there have been power cuts and load shedding. Rural people the majority of whom are indigenous communities are the most affected by this issue. Digitisation and ICT do not show equal distribution considering the rural and township nature of the country. As a result, the cost, sustainability and efficient utilisation of ICTs has generally remained a problem (South Africa, 2004).

Furthermore, the "deployment of ICTs does not guarantee their efficient utilisation. Capacity building and effective support mechanisms must accompany deployment" (South Africa, 2004, p. 10). ICT-related inequality that is exacerbated by digitisation is prevalent in South Africa. This is evident in the two main challenges that students who come from poor contexts face, which are lack of access and exclusion of their knowledge. Indigenous knowledge is left out in the attempts to reverse this situation. Thus, indigenous knowledge access and promotion problems still remain despite attempts to deface them through the involvement of ICTs in education. ICTs receive emphasis with fewer debates about what knowledge should be digitised and how it should be treated.

ICTs are like a truck that delivers goods; the focus should be more on the goods themselves. What this means is that ICTs harbour the content, modes of delivery, and educational processes, which need to be checked against cultural representations. Online learning should be balanced with these important aspects. The digitisation project should be decolonised to realise fair treatment of indigenous students. The rural-urban digital divide that is propelled by ICTs should be scrutinised. This is because the problem is not only about the digital divide but knowledge delivered by the ICTs 'truck' – whose knowledge is in the 'digital truck'? What are the effects of this knowledge on indigenous students?

There are security issues presented by ICTs as well. In one project, Strathman (2019) collaborated with the Warumungu – an Australian indigenous community. The Warumungu suspected the abuse of its local knowledge by digitisation, and therefore did not want its digital archive to be online to secure the information (Strathman, 2019). In other cases, the content was shared online as virtual exhibitions as a measure to prevent its possible loss and ill-treatment. Equally, the ownership of the created content on the media which is disseminated

via the World Wide Web for educational purposes is a concern for indigenous students (Watson, 2013). Knowledge holders' lack of ICT skills (Department of Science and Technology, 2004) may raise ethical issues as researchers or digital archivers may take advantage of the ignorance of the knowledge holders.

Added limitations relate to resources (especially funding) needed to upgrade the computers which were used to archive indigenous knowledge as they became outdated. While grants may be available for the establishment of a new site or system, there might be no help to refurbish or update it; indigenous communities have mostly depended on relationships with researchers, universities, and non-governmental organisations to develop ICTs. Strathman (2019) cites another case, i.e. a computer program called TAMI (Text, Audio, Music, and Images) which has been faithful to the principles and practices of indigenous production. It is described as a completely fluid file management and database system free of Western assumptions about knowledge or ecology, and which enables the user to creatively relate and annotate assemblages of resources for his/her own purposes (Verran, 2009, p. 178). However, for enamoured scholars with indigenous knowledge, collaboration may become a disguised colonial whitewash that promotes co-optation and dependence (Hutchings in Strathman (2019, p. 3732)), a thing that must be avoided.

6   TRANSFORMING DIGITISATION OF EDUCATION AND RESEARCH

Digitisation of education and research in higher education can be transformed if there is no compromise of indigenous knowledge. Programmes that are parachuted (pro-indigenous) into the university curricula should observe the dynamics of indigenous knowledge before any attempt to digitise and teach it. There should be a commitment not to emphasise digitisation at the expense of indigenous knowledge. This can be realised only if the peri-indigenous approach in which indigenous knowledge holders take the lead can be adopted. In the teaching situation, the lecturer should learn along with students by allowing them to share and co-construct knowledge and research the phenomena that are engaged in their learning. Students, as members of their communities, bring into the lecture rich local knowledge which can make their learning meaningful and relevant to their cultural contexts. An indigenous-nonindigenous technological pedagogical and content knowledge (INDNONIND-TPACK) (Glover et al., 2018) is suggested as a framework that can balance the content and pedagogies from indigenous and Western contexts that are delivered by the "digital truck". Proper treatment of indigenous knowledge can help demonopolise Western knowledge, pedagogy, and research. It can also benefit both indigenous and non-indigenous students by creating equal opportunities for learning and doing research. The non-indigenous students have been presented with a narrow view of knowledge and deprived of the opportunity to learn about their own knowledge systems. Points of convergence and divergence between indigenous knowledge and Western knowledge could be explored through learning and research as part of decolonising digitisation and knowledge in higher education. Figure 1 shows how this could be done. Students can be teachers to one another, especially with particular reference
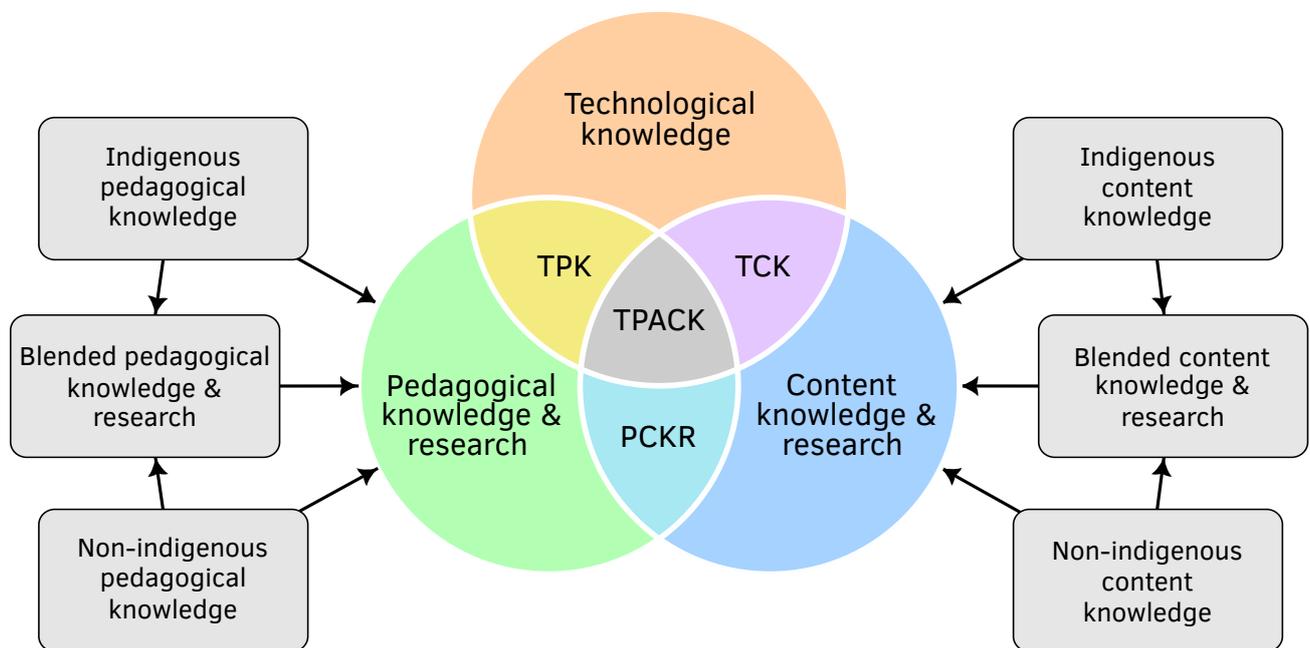
TPK - Technological Pedagogical Knowledge
TCK - Technological Content Knowledge
TPACK - Technological Pedagogical and Content Knowledge
PCKR - Pedagogical Content Knowledge and Research

Figure 1: INDNONIND-TPACK[a]

[a]adapted from Department of Science and Technology (2004)

to indigenous knowledge which non-indigenous students do not know much about.

The technological pedagogical and content knowledge framework carries the idea that technology can be used to load and present the content (packaged from knowledge) to students. INDNONIND-TPACK presents the transformational version of TPACK. It shows the two knowledge, pedagogy, and research worlds (Western and indigenous) from which to draw similarities and differences so that both indigenous and non-indigenous students can have equal opportunities to learn about knowledge that relates to their cultural contexts.

7   CONCLUSION

A clear concept of ICTs/digitisation should be established in higher education to ensure the non-discrimination of indigenous students. A central argument in this article is digitisation of student learning and research in higher education as they relate to inclusivity and equity. Critical views are provided on the topic. The article contributes insights into the further vulnerability of indigenous students and knowledge which can be created by the uncritical digitisation

of learning, knowledge, and research in higher education. I, therefore, propose that:

1. curricula should be truly transformed to make them relevant not only to non-indigenous students but to indigenous students as well;

2. there is, therefore, a need to balance indigenisation of curricula with digitalisation – it is not only about training students to be digital-savvy but more about what they learn and how technology is used in their learning and research activities;

3. inclusion and equal opportunities for indigenous students are matters of decolonisation which should penetrate digitisation of education and research.

This will establish an effective foundation for decolonised education and research (Salavati, 2016). It is insufficient to train today's students as digital activists and natives only. Instead, institutions of higher learning should integrate ICTs without compromising decolonisation.

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