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Indigenous Authorship on Open and Digital Platforms: Social Justice Processes and Potential

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Online digital platforms can increase access to educational opportunities for marginalised students, authors and communities, but digital platform design can further marginalise Indigenous knowledge because such platforms are structured according to western epistemological assumptions. They do not accommodate for Indigenous or alternative knowledge frameworks.

In addition, the premium placed on openness by certain platforms and licenses contradicts the approaches preferred by Indigenous knowledge authorities who tie the sharing of some types of knowledge to the identity and authority level of the intended audience. Knowledge in this context is not understood as discrete units of information that can be abstracted from their communities, easily shared on public platforms, but rather as sensitive materials that can only be shared by recognized knowledge authorities for specific purposes.

The processes by which Indigenous knowledge authorities engage with knowledge sharing on digital platforms comprise a complex landscape in which social justice concerns come into play. This paper discusses how, within institutional design contexts, open educational practice (OEP) by Northern Australian Indigenous authors can enable different forms of social justice and work incrementally towards achieving greater recognition of Indigenous intellectual sovereign acts with due respect to the wider significance of Indigenous Sovereignty (Rigney 2001). It examines three sets of Indigenous open resources to gauge the extent to which open digital platforms allow for the expression of Indigenous knowledge authority, one necessary feature for achieving social justice in the Australian context. It examines the resources using Fraser's social justice framework (2005) as modelled by Hodgkinson-Williams and Trotters' (2018) and Lambert's (2018) approach to educational resources, and how design decisions can result in greater justice in knowledge affirmation and transformation but originate in offline decision making.

Keywords: Indigenous knowledge and language; Open Education Practice; digital inclusion and diversity; social justice; authority; authorship

Introduction

The design of digital platforms is typically informed by western epistemological assumptions, rendering many platforms exclusionary for some knowledge contributions of Indigenous authorities. This means that while these platforms are 'technically' open to any contributor or user, they are epistemologically constrained because they are structured according to western norms of knowledge management.

For instance, Indigenous knowledges may be 'included' on digital platforms, but casual accommodation of such knowledge onto mainstream platforms can reinforce oppressive power relationships via delusory tactics (Fredericks 2010). The platforms can include Indigenous content yet still perpetuate white possessive framing of

Indigenous knowledge as property (Moreton-Robertson 2015). Indeed, many learning management systems do more than just host knowledge, they extract, and aggregate knowledge based on data collection models that are not informed by culturally responsible practices, co-negotiated with knowledge holders (Harding et al. 2011).

Furthermore, the way digital design manages information as 'content' can conflict with how information is used in Indigenous contexts, embedded in ancestral and cosmological relations, defying abstraction into discrete 'digital content containers'. Through their design, open platforms continue to digitally colonise information (Kwet 2019; Open University 2019) and shift authority over knowledge away from Indigenist intellectual sovereign processes (Rigney 2001; Warrior 1995) and rights to self-determination (UN 2007). Digital design may be agile, yet it remains dominated by white, western and male techno-scientific frameworks (Cooper 2006; Gilliard 2017; Nakata 2007).

This suggests that emancipatory digital technologies such as open platforms may reproduce western knowledge domination, a feature that has marked the entire history of cultural and linguistic relations between white Australia and Aboriginal and Torres Strait Islander communities. Such domination is not the explicit aim of these 'open' technologies which ostensibly seek to democratise access and participation, but because they are structured with western knowledge and reliant on English proficiency, they create conditions of exclusion just as they do inclusion.

These exclusions have also shaped Australia's history. The Northern Territory (NT) embarked on a programme of bilingual education from the 1970s until the 1990s when it was cut due to unfounded but alleged 'poor standards in English literacy' (Nicholls 2001, 2005). Following that, from 1998–2008, standardised testing mandated quotas of English language instruction, leading to a decrease in attendance and attainment by Aboriginal students, resulting in many of them being perceived as 'illiterate and disengaged' (Wilson 2014). Communicating the frustration of his entire community at this history, Yolŋu leader Yinya Guyula addressed the NT parliament in Yolŋu Matha (a dominant dialect of East Arnhem land), stating 'education failure for Yolŋu is your fault, not ours' (Breen 2019).

That being said, language revitalisation projects are popular in Australia due to it being an endangered language 'hotspot' (Anderson & Harrison 2007) and home to over 200 Aboriginal and Torres Strait Islander languages (AIATSIS n.d.; Marmion, Obata & Troy 2014). Digital devices and platforms are promoted to help 'save' endangered languages, ensuring a long-term digital memory of them. However, while the digitisation of languages has obvious virtues, it also reinforces a western notion of possession (of content on machines), rather than as embodied knowledge based on ancestral connections. Indigenous ontologies and languages are intimately entangled with creation, Country¹ and kinship, enriching how they could be instructive (CDU Yolŋu Studies n.d.).

Thus, in the Australian context, where even education or digital technologies can inadvertently reinforce historical power, knowledge and linguistic marginalisation of Indigenous communities, what is to be done? How can educational programmes and platforms extend the promise of increased social justice for the nation's most vulnerable communities?

Fraser (2005) defines social justice as 'parity of participation' (73) by 'all the relevant social actors [who] participate as peers in social life' (85). It is both a process and an outcome, meant to overcome three dimensions of injustice: 1) economic maldistribution; 2) cultural misrecognition; and 3) political misrepresentation. In determining how to overcome these injustices, strategies focus on producing 'affirmative' (ameliorative) change or 'transformative' (structural) change. The former focuses on alleviating the symptoms of the injustice, but without altering its underlying structure (e.g. adding Indigenous knowledge and languages on to an existing digital platform), while the latter seeks to dismantle the foundation on which the injustice is built (e.g. constructing an educational platform shaped from the outset by Indigenous epistemologies).

Digital amplification via publication and use of languages can perform all three dimensions of social justice (Hodgkinson-Williams & Trotter 2018; Lambert 2018) and help recover ownership of knowledges stolen through colonialism. 'Digital occupations' like this can displace western technology design and direct how Indigenous information is digitally valued (Funk, Guthadjaka & Kong 2015).

This paper explores the capacity of open digital platforms to promote social justice according to how they host, incorporate, structure and disseminate Indigenous knowledges and languages. It assesses them according to the three dimensions of injustice (Fraser 2005) noted above while also examining the extent to which the platforms respect Indigenous intellectual sovereignty through their design (Rigney 2001; Warrior 1995). It also draws on concepts of knowledge authority, cultural respect and collaborative, situated learning to assess the platforms' potential and the Indigenous knowledge resources that are hosted on them. This is significant because the implications for the representation, recognition and redistribution of value in the public narrative around Indigenous ontology can help the western world evolve and see our complexities in different ways. In this paper, we will focus on three such resources:

- Djurwirr, a webpage populated with Guthadjaka's Waramirri and Yolŋu ecological knowledge and language. It is hosted on BowerBird, a social media platform that aggregates biodiversity entries into the Atlas of Living Australia.
- PreVET (Pre-Vocational Education and Training), an online suite of resources showcasing Indigenous role models discussing employability, literacy and numeracy skills applied to their jobs. It is hosted on a website created by the NT government.
- IFTF (Indigenous Fisheries Training Framework), featuring a series of videos produced by Indigenous partners to support Indigenous fisheries and aquaculture enterprise development. It is hosted on Vimeo, a video sharing platform, and supported by materials on a WordPress website.

By assessing both the resources and the platforms that host them, it is hoped that we can better understand the relationship between contemporary digital platforms and their potential for promoting socially just interaction with Indigenous knowledges and languages.

In Yolŋu society, children grow up with a strong meta-linguistic awareness; their family members speaking multiple languages due to kinship structures. Children learn from birth which dialect to speak and how to address different family members based on these structures (Christie 2007; Lowell et al. 2019). Indigenous ontologies and languages are intimately entangled with creation, Country and kinship. The ways in which language organises knowledges based on these deeper entanglements enrich how it could be read by the western eye, as taught by the Yolŋu Studies program, and demonstrated by archival projects such as Mukurtu.

Literature Review

Fraser’s three dimensions of injustice are all relevant to the history and present of the Indigenous communities of Australia and touch on, in different ways, knowledge authority issues.

Regarding economic injustice (maldistribution), Fraser asserts that ‘people can be impeded from full participation by economic structures that deny them the resources they need in order to interact with others as peers’ (2005: 73). Regarding digital platforms, this means that most marginalised individuals and communities do not have platforms of their own (which are expensive to set up and maintain) but are expected to rely on the provision of external platforms, a factor that perpetuates the digital colonisation of knowledge and conflicts with the way Indigenous knowledge authorities negotiate the sharing of knowledge. This economic factor immediately leads to obstacles in the cultural dimension of increasing socially just interactions.

Regarding cultural injustice (misrecognition), Fraser says that people can ‘be prevented from interacting on terms of [participatory] parity by institutionalized hierarchies of cultural value that deny them the requisite standing’ (2005: 73). While many digital platforms do not formalise any such hierarchies with their users, they are generally designed according to western epistemological perspectives that are privileged over other forms of cultural expression. This fact is made painfully clear every time Indigenous authorities engage with platforms (or programs, or non-Indigenous people) to either collaborate or share knowledge.

Regarding political injustice (misrepresentation), Fraser argues that this ‘tells us who is included in, and who is excluded from, the circle of those entitled to a just distribution and reciprocal recognition’ (2005: 75). In most cases with digital domains, Indigenous authorities are imagined simply as ‘users’, not co-creators. It is only when they have authority over how platforms are used that the power asymmetry goes away as the Indigenous become, at once, designers, creators and users.

Table 1 shows Fraser’s framework, noting the three dimensions of injustice in relation to the relevant affirmative or transformative response to them. It shows the affirmative response to economic maldistribution is

redistribution, to cultural misrecognition is recognition, and to political misrepresentation is representation. All of these signify important changes for the people most affected by the injustice, however they do not alter the underlying inequality that remains. To do that requires a transformative response, which the table shows as economic restructuring, cultural re-acculturation and political re-framing.

Knowledge Authority

In this paper, ‘knowledge authority’ refers to the position of senior Aboriginal knowledge custodians to maintain and transmit knowledge to younger generations (Christie & Verran 2013; Douglas 2015) and the exclusive rights a person may have to talk about certain knowledge.

In Yolŋu society there are specific knowledge practices based on ancestral kinship and authority structures involving ceremonial milestones, roles in community, relationships to others and whether one is Yirritja or Dhuwa, two moiety systems linked strongly to Country and clan, kinship and the languages that emerge from this (Marika 2002; Marika et al. 2009). This means that unlimited ‘openness’ – which most westerners associate with social justice – would conflict with traditional knowledge practices on which Aboriginal civilisations have been built for millennia.

In addition, ongoing colonial activities over the last 250 years have misappropriated traditional knowledges and continue to clash with Indigenous resolve to retain and exercise authority and sovereignty over Country, language and knowledge representation (Otto 1995; Nicoll 2002; Moreton-Robinson 2006). Indigenous peoples’ wariness of openly sharing their knowledge, combined with their preference for having such knowledge handled by a recognised authority ties in to the notion of authentic education as espoused by Freire (1970):

education is ... the organised, systematized and developed *re-presentation* to individuals of the things about which they want to know more.... One cannot expect positive results from an education or political action program which fails to respect the particular view of the world held by people. Such a program constitutes *cultural invasion*, good intentions notwithstanding. (74–76)

Table 1: Conceptualisation of Fraser’s social justice framework (adapted from Hodgkinson-Williams & Trotter 2018, with permission).

Dimension	Injustices	Affirmative response <i>Addresses injustice with ameliorative reforms</i>	Transformative response <i>Addresses the root causes of inequality</i>
Economic	Maldistribution <i>of resources: economic inequality</i>	Redistribution <i>of resources</i>	Restructuring <i>of economic model</i>
Cultural	Misrecognition <i>attributes of people & practices accorded less respect, status inequality</i>	Recognition <i>valued, respected, esteemed</i>	Re-acculturation <i>plurality of perspectives, but always fallible</i>
Political	Misrepresentation <i>Lacking right to frame discourse, norms & policies</i>	Representation <i>social belonging</i>	Re-framing <i>parity of rights</i>

Hence, the concept of 'knowledge authority' limits the types of 'cultural invasion' that Indigenous peoples have long suffered. Such authority is characterised by responsible dissemination at the right time, to the right audience, and for the right reasons, as determined by Indigenous peoples themselves.

In the digital era, this means that certain types of resources should be authored by Indigenous people (rather than *for* them) according to processes and protocols established by their communities (Harding et al. 2011; Wallace & Funk 2016). It allows for critically engaged forms of collaboration and co-production (with non-Indigenous authors as well), but it vests 'authority' over the production of those resources in Indigenous hands, embedded in social contexts (Wallace 2011).

Occupying the Cultural Interface

Indigenous knowledge is often perceived by 'scientific paradigms as everything that is "not science"' (Nakata 2007). When trying to integrate Indigenous knowledge into existing scientific frameworks, various 'disintegrations and transformations occur when it is redistributed across western categories of classification [and] managed in databases via technologies' (Nakata 2007: 9). This reinforces the need for 'curriculum design to ... create opportunities for learners to achieve a balance of knowledge, skills and processes for exploring disciplinary boundaries' (Nakata 2007: 13). The border crossings (Aikenhead 1996) between workforce development, science and enterprise development, language, government and technology present ontological language barriers. This means that those who engage with Indigenous knowledge at these 'cultural interfaces' have to make extra efforts to affirm and transform knowledge for the sake of mutual recognition.

Principles of transactional distance; the relationship between distanced teachers and learners (Moore 1993) can help frame the space between author and user to address some of the complexities in these cultural interfaces (Funk, Guthadjaka and Kong 2015). Indigenous occupation of this distance can germinate social justice, traversing the distance from one that is merely transactional to one approaching transformative dynamics in digital knowledge management between learner, teacher, knowledges and platform.

Situated Knowledge and Relations of Power

Critical pedagogies of place (Freire 1970; Gruenewald 2003) engage with and act on the Country relevant to the work (Wallace and Funk 2016). The digital resource can be a reclaimed *territory*, avoiding further digital colonisation (Kwet 2019; Open University 2019). Situated learning in communities of practice (Lave & Wenger 1991; Wenger, McDermott, & Snyder 2002) and learning on Country (Indigenous place-based education) (Country et al. 2015; Fogarty 2010; Simpson 2014) perform contextualised learning and align with context-embedded, collaborative learning and power relations (Cummins 1996; 2000). Participation in where learning is happening creates community, legitimating authors as they create situated knowledge that represents an affirmative and emergently

transformative process. Posting this knowledge in its most authentic form on an open digital platform could therefore be thought of as a product of this knowledge management *process*, not the goal.

This disruption to conventional power relations centres learners and produces resources as 'public good artefacts' of knowledge-producing episodes (Christie & Verran 2013). This makes the power as generative in participatory pedagogy that undoes systemic power relations (Burke 2013: 184), the economic and educational actions in the resources increasing self-determination (UN 2007).

Guthadjaka refers to the multiple sources of knowledge in Yolŋu teaching and how learning grows out of connection to place. (Guthadjaka & Christie 2010: 30). 'Knowing' here relates to the power of contextualised authority which increases collaborative relations of power.

Respecting and representation of embedded ontologies is affirmative at politically, economically and culturally shifting levels, creates more two-way dialogue across cultural spaces (Bartlett, Marshall & Marshall 2012; Yunupingu 1989), one that happens *with*, not *to* learners (Freire 1970) and increases how we learn about different forms of knowing in western contexts. This can increase transformation as respect is cultivated in responsible digital authorship and advocacy (Hodgkinson-Williams & Trotter 2018; Keddie 2012; Lambert 2018; Marmion, Obata & Troy 2014).

Ultimately these OEP pedagogies manifest in increased social justice and digital authority in digital territories and interfaces by the knowledge holders.

Methods

The resources were selected based on their Indigenous authorship and knowledge contexts. They were also chosen because each are hosted on different types of digital platforms, combining open and closed characteristics and a range of features for both creators and users.

To analyse the social justice potential of the three resources and the platforms that host them, this paper draws on Fraser's (2005) social justice framework, as utilised and adapted in the work of Hodgkinson-Williams and Trotter (2018) and Lambert (2018) who themselves applied the framework to the open education context.

The resources were also examined for their capacity to present knowledge authority in the cultural interface and situated, collaborative language and ontology use. This was used as a barometer for whether these practices could increase social justice processes of digitally publishing Indigenous knowledges. The resources' language use and ontology were also explored for their direct link to Indigenous knowledge and learning contexts.

Results and Analysis

With Fraser's social justice framework, we will now look at each of the three resources to understand how (or whether) they achieve their educational aims on a variety of digital platforms. Each section provides a description of the resource; an analysis of it according to the concepts of knowledge authority, cultural interface, situated knowledge, and relations of power; and a determination of how

the digital platform shapes the resources' social justice potential.

Djurwirr: Indigenous knowledge and western epistemological assumptions

As noted above, Djurwirr is a webpage where people can share information (through 'sightings') about the 'Biodiversity of Gawa on Elcho Island.' It is populated with Guthadjaka's Waramirri and Yolŋu ecological knowledge and language. The webpage is hosted on the BowerBird social media platform, 'a place to share and discuss Australia's biodiversity.' (BowerBird, n.d.)

Started in 2013 by Dr. Kathy Guthadjaka, an elder of the Gawa community, the Djurwirr project engages and respects senior people's knowledge and is offered with respect to and/or in participants' first languages (Wallace & Funk 2016). The page features flora, fauna, and landscape features of the area, with photographs, taxonomical detail and, most importantly, their Indigenous meanings and practices. Through Guthadjaka's elaborations, viewers learn about the biodiversity of Elcho Island and related knowledge and language.

Djurwirr occupies digital territory with language that confronts non-Indigenous users in that it prioritises Indigenous modes of knowing over western modes. It promotes an affirmative cultural form of social justice with emergent transformative impacts on ontologies in bio-science publishing on open platforms. This resource is also politically affirmative in that it aligns with and respects Indigenous knowledge authority, promoting authentic representation.

As demonstrated by Funk, Guthadjaka and Kong (2015), Djurwirr represents situated language and knowledge by appropriating space on the BowerBird website. The Yolŋu language and font are not only visually disruptive to the western eye, but the seven Yolŋu seasons (Guthadjaka, n.d.) noted in sightings and in Djurwirr's banner image provide some nuanced cultural background to the knowledge. The various text 'boxes' on the site are subtly shown to be insufficient to house particular sets of knowledge: Guthadjaka utilises the boxes to elaborate certain forms of knowledge but ignores or repurposes those that fail to elucidate Gawa knowledge through a locally meaningful framework.

Guthadjaka uses the taxonomy fields intended for Latin names for the species' moiety and clan (**Figure 1**), showing how that species belongs to Yolŋu knowledge structures and displacing western science. Guthadjaka strongly and respectfully asserts the power relations she has over how her knowledge is represented in the cultural interface (Nakata 2007). This is a transformative political act reframing knowledge according to Indigenous understandings.

There is also an affirmative cultural aspect to the representation of Yolŋu language on the site, in that the font and terminology is in 'first place' for Yolŋu knowing on an otherwise western-centric platform. The Djurwirr page recognises knowledge authority by sidestepping the site's deterministic design, reversing coercive power relations and contextualising the knowledge in its own language. This demands intellectual labour by the more

privileged user audiences to embrace how knowledge and language are related in other knowledge systems, respecting the cultural interface. This positioning claims territory for how language organises knowledge and establishes a new relation of power between the authors, knowledge authorities, users and platform. Centring Yolŋu ontology digitally situates the knowledge, privileging its worth in the cultural interface. Acknowledging the language in this way claims digital territory for Indigenous scientific cultures, with the hopeful outcome this will translate into wider social practice.

Indigenous science has often been disregarded, but as revealed in Australia's recent 'bushfire crisis' – suddenly appropriated when western knowledge appears to fail. Since the crisis, an enthusiasm for Indigenous land management science has emerged (Faa 2019), though this uptake also potentiates 'cherry picking' of practices and incorporation *into* western management. Such acts undermine the complex integrity of millennia-old practice.

Indigenous science and cosmologies have an ontological culture of their own, different from western science which prides itself on different measures and relationships, categories and divisions (Smith 1999; Yunkaporta 2019). In Indigenous culture, ownership of stories relating to species, for instance, is ruled by cultural protocols; individual people have custodianship over knowledge and therefore cannot tell the 'knowledge story' that 'belongs' to other people. Hence, on Djurwirr, the text fields offered for 'traditional stories about this species' were not heavily populated but the usage fields were (**Figure 2**).

In many ways, Guthadjaka redistributes the power of the site's prescriptive design by systematically appropriating the platform for her people's own purposes (**Figure 3**). Repeatedly redistributing value in the digital ontological territory with moiety in this way, Djurwirr provokes an enquiry into how we demonstrate value in digital contexts of the wider 'knowledge economies' we learn and work in. By refusing to comply with coercive structures and instead claiming space for its own knowledge governance, Djurwirr reconfigures knowledge authority in the contested epistemological spaces of digitised science.

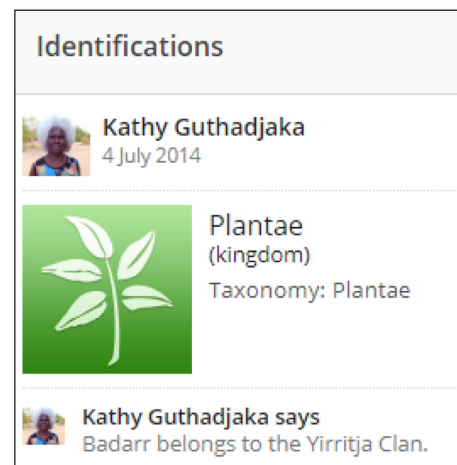


Figure 1: Guthadjaka claims space for kinship and clan knowledge.

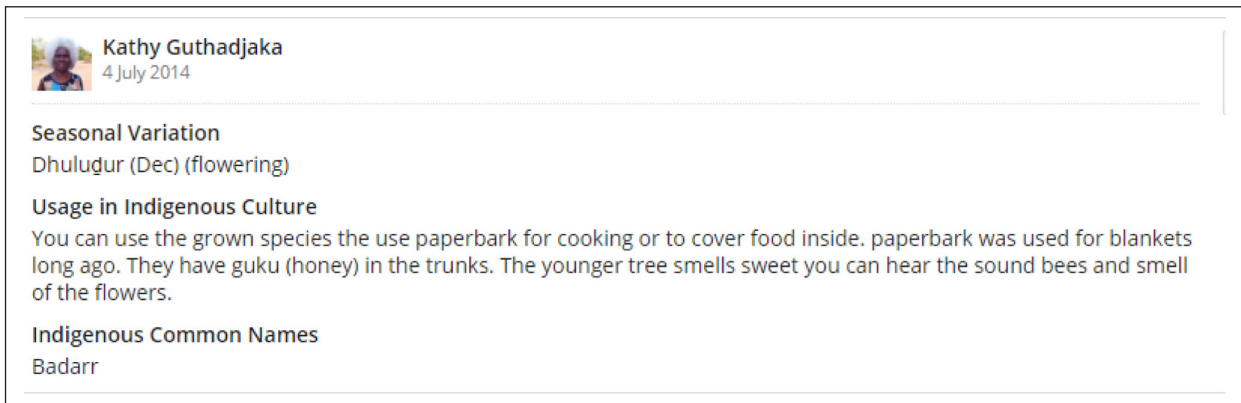


Figure 2: Guthadjaka privileges Yolŋu language seasons and ontology.

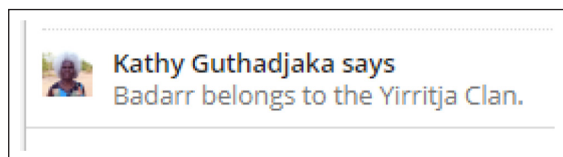


Figure 3: Guthadjaka shares information that is unanticipated by the platform designers.

Guthadjaka respects the cultural protocols and knowledge custodianship as a senior knowledge authority herself when sharing information on the BowerBird platform. Determining what is 'public' work and what is private, Guthadjaka shares information but also checks 'with the old people' herself. This is important because of the knock-on effects of contributing to the BowerBird site, which aggregates data from its platform (including the Djurwirr page) to the *Atlas of Living Australia*, calling into question the reciprocity guidelines (AIATSIS 2012) in open sharing of traditional knowledge.

Embedding the knowledge and language within Yolŋu ontologies improves the power relations between users and the authority, demonstrating ecological connections in the digital interface. An affirmative form of political justice, representation, is served by this disruption to the white possessive (Moreton-Robinson 2015) some might assume in digital publication. The Djurwirr case also reveals tensions that Indigenous knowledge authorities must deal with when sharing knowledge on public platforms. They must negotiate western epistemological assumptions in the technology. Guthadjaka has dealt with this by repurposing some of the site's features to communicate knowledge in a way that better accords with Yolŋu frameworks. While a platform like this has its obvious challenges for those who want to share knowledge, the ways in which they use the site demonstrate that they can secure affirmative forms of social justice at the cultural (recognitive) and political (representational) levels.

PreVET: Leveraging collaboration on a custom-built platform

As noted above, PreVET is an online suite of resources showcasing Indigenous role models discussing employability, literacy and numeracy skills from school in their job pathways. The custom-made website presents materials within a series of online magazines, which feature short

videos by Indigenous workers talking about the work they do and offering practical advice. The videos are supplemented with learning activities for building viewers' literacy and numeracy through games and quizzes.

According to the site, 'PreVET introduces positive ideas around work culture, resilience with work and how literacy and numeracy relates to different industries by providing relevance to learning'. It promotes an affirmative economic and political form of social justice that has emergent transformative cultural features as well as political ones, reframing people's perception of work rights and structures. However, as a product of the Federal and Northern Territory governments, it is still western in its approach to Indigenous workforce development.

PreVET recognises the need for a different narrative around Aboriginal and Torres Strait Islander participation in western economic activity. Role models' videos systematically re-present information about the skills they use on the job. The resource design acknowledges culturally informed ontologies, organising the resources under familiar categories of Country and community (**Figure 4**). Authenticating the role models' contributions also normalises the dialogue with users by acknowledging the cultural backgrounds and Country they are from. While this occurs firmly within western notions of workforce, economic and academic success *for*, not necessarily *with* Aboriginal role models, the step this resource takes towards framing economic participation as normalised narrows the negative distances in the cultural interface between students and the workforces they can enter.

Outcomes from this resource include a re-framing of participatory parity based on the authorship of experience. The knowledge authority the role models exercise over their experience doesn't solve every problem in Indigenous employment policy and practice, but it creates an emergent space for some positive possibilities. This *version* of a story shifts the relations of power to one that is positive via increased authority over the story Indigenous people tell about employment. However, the extent to which this amplifies, represents or redistributes some power over the decolonising of what 'success' looks like for students' families and communities is somewhat limited.

PreVET represents economic access and opens ideas of a kind of success. The positive story of work shows



Figure 4: Two 'magazine covers' feature Indigenous lens on jobs (<http://prevet.net.au/>) representing language based ontologies with thematic titles.

students that if they so wish, they can be in a job on their Country near family, validated by role models (and at times, relatives!) in the resources (**Figure 5**). This belonging can enable them to see potential employment futures.

Unlike Djurwirr, however, in which Guthadjaka shares knowledge on a pre-existing public site, PreVET is the result of the actions of dozens of educators, employers, workers and administrators working with government and donor funding for a very specific aim. There is a quality and focus to these resources that can only be achieved through substantial collaboration and significant funding; that, and the centring of Indigenous perspective (this aspect is free but hard won). The commitment by the contributors is further revealed by the fact that PreVET is a custom-made website, based on a clear pedagogical strategy. This does not mean that PreVET derives from a specific recognized Indigenous knowledge authority necessarily, but as a government sponsored platform, it attempts a collaboration between the state and Indigenous authorities by centring the Indigenous voice within its framework.

The transformative potential of such custom digital platforms is great for the preservation and sharing of Indigenous knowledges, but the costs involved are also substantial. Hence Indigenous leaders could partner with the government and other institutions, despite the challenges that this raises (e.g. deciding which epistemological assumptions should predominate on the site, etc.). In addition, the primary pedagogical vehicle on the site – videos – requires that users have access to appropriate devices and levels of bandwidth and/or mobile data, a real challenge in the remote areas of NT, where data packages are more likely to be pre-paid (IRCA 2015) and likely used for predominantly community purposes.

Nevertheless, because it is hosted on a custom-built platform that non-Indigenous users might appreciate, PreVET can publicly and politically re-frame the stereotypes of



Figure 5: Positions of authority and responsibility challenge the deficit narrative in the clips (<http://prevet.net.au/>).

Indigenous 'deficit' to that of 'success' through stories of employment, dignity and parity of participation.²

Indigenous Fisheries Training Framework: Authentic open knowledge sharing

The Indigenous Fisheries Training Framework (IFTF) features videos produced by Indigenous partners to support Indigenous fisheries and aquaculture enterprise development. Vimeo, the free online video sharing platform, hosts the ten short videos, some narrated in Indigenous languages with English subtitles. They provide practical knowledge concerning a variety of aquaculture topics, including water bacteriology, salinity, sampling and longline maintenance. The voices of Indigenous practitioners have priority. The videos are shared as Open Educational Resources (OER) with a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

Video production was negotiated between governmental, academic and Indigenous community groups,³ supporting Aboriginal peoples' aims related to self-sufficiency, and includes high level technical information (Wallace & Funk 2016). The use of language in this resource promotes

strongly affirmative cultural and political forms of social justice due to highlighting historical aquaculture practices in the region (**Figure 6**).

Cultural protocols and knowledge authority are exercised due to business on traditional territory being determined by kinship structures. Representing Indigenous people enjoying work on Country restores an affirmative response despite the broader economic and political system requiring higher level restructuring. Occupying the digital cultural interface between disadvantage and privilege begins to work towards a more transformative parity of rights over fisheries and aquaculture work. These resources achieve a re-acculturation and re-framing by making science and enterprise work for the benefit of remote communities in a highly contentious licensing sector dominated by commercial and recreational stakeholders. Authors chose the language and information they would include, resulting in several dialects being used (as in the water testing video in **Figure 7**), common in metalinguistic communities (Christie 2007).

Science articulated in local language and contexts, recognises legitimate practices on Country (Country et al. 2015; Fogarty 2010) and embeds knowledge in a collaborative relation of power (Cummins 1996, 2000).

The videos keep economic enterprise, science knowledge and business development in place, with historically based employment. Situated enterprise development uses western science to turn traditional sustenance and social enterprise into mainstream business (Smith 1999; Landline 2019). The use of familiar and accessible technologies (iMovie, slideshows) also increases the likelihood that authorship can be continued without non-Indigenous or expensive institutional interference.

The clips' licenses were chosen by the authors, exercising authority over their knowledge work. Choosing how the clips were licensed (**Figure 8**) acknowledges ownership over intellectual property in authentic, situated and culturally appropriate ways. This licence choice claims more responsibility for relations of power from within the cultural interface.

Authors' choice of a moderately restrictive 'open' licence claims ownership over the resource, making it closed to external commercial exploitation while remaining fully open to the knowledge authority Indigenous authors have. Wealth and access to economic processes are redistributed by the knowledge authority in this resource. The business is Aboriginal owned, run and represented, and their intellectual labour is protected and valued.

By placing their videos on the free, public Vimeo platform, the authors have ensured a potentially broad reach for their resources. By outsourcing the hosting and maintenance of the videos to a free external service provider, they have saved a lot of time and money. But Vimeo has quite limited functionality beyond hosting services, a fact that necessitated the authors to create a free supplementary WordPress website⁴ to talk about the project and offer more educational information (blog posts, downloads, links, etc.). This is pedagogy on the cheap, a strategy that, while yielding less 'professional-looking' resources than, say, PreVET, is relatively sustainable for communities with limited means.



Figure 7: Some language use combined local, traditional terminology with scientific or sequential phrases.



Figure 6: Authors chose language, footage and content to create instructional videos.

These are learner-created Open Educational Resources (OER). They bear a creative commons license which protects the content from being changed or used for profit, but allows learning and sharing. They cover Aquaculture Skills taught in training by CDU Aquaculture, and are examples of Open Educational Practice (OEP) that the Indigenous Fisheries Training Framework (funded by the FRDC) promotes. For more information, please go to <https://indigenousfisheriestrainingframework.wordpress.com/>

Figure 8: Authors chose more restrictive licenses for their work; demonstrating and exercising redistribution of authority over knowledge production.

Table 2: Affirmative and Emergent Transformative examples from each resource.

Dimension	Affirmative responses	Emergent Transformative responses
Economic	<p>Redistribution</p> <p>Djurwurr: Indigenous ontology privileged in the knowledge 'economy'</p> <p>PreVET: choice presented as relevant to school children's realities</p> <p>IFTF: chose license to protect intellectual labor in resources</p>	<p>Restructuring</p> <p>Djurwurr: western scientists can learn from and with Indigenous Science</p> <p>PreVET: work shown to be a positive possibility</p> <p>IFTF: Indigenous owned enterprise, licensed as they chose, business language and practice on Country</p>
Cultural	<p>Recognition</p> <p>Djurwurr: claimed space with language and ontology in contested spaces</p> <p>PreVET: Indigenous work culture depicted positively</p> <p>IFTF: traditional industries thriving with situated language and knowledge</p>	<p>Re-acculturation</p> <p>Djurwurr: technology being designed and used by Indigenous people for their own purposes</p> <p>PreVET: work culture can be familiar, relevant and in situ</p> <p>IFTF: Indigenous managed and meaningful work in home community</p>
Political	<p>Representation</p> <p>Djurwurr: refused prescription and claimed space for Indigenous science and displaced western science</p> <p>PreVET: changes narrative from deficit to parity</p> <p>IFTF: situates enterprise digitally and ontologically</p>	<p>Re-framing</p> <p>Djurwurr: technology appropriated by Indigenous ontology while also digitally legitimizing through publication</p> <p>PreVET: participation legitimized by Indigenous people</p> <p>IFTF: manages fisheries and aquaculture on traditional sea Country in a discriminatory landscape, parity of rights to intellectual property</p>

Discussion

All these resources were developed in remote northern and central Australia in the NT. Roughly 30% of the NT's population is Indigenous (compared to 3% nationally), most of whom live in remote to very remote communities (ABS 2016). These statistics reveal the challenging circumstances facing Indigenous peoples in Australia, but don't even begin to illuminate the long history of economic, cultural and political assault faced by Aboriginal and Torres Strait Islanders.

This fact helps make sense of the strategies employed by the authors of the resources. While all of them were hosted on different types of platforms, with varying opportunities and limitations, the authors focused primarily on affirmative forms of social justice that don't necessitate a platform; but a decision to centre Indigenous ontology and language. (see **Table 2**). These represent the most feasible, practical and sustainable types of practice at this time. Over time, these may gradually build to a more transformative outcome, but radical change in this context is a real challenge.

As **Table 2** shows, all three resources promoted predominantly affirmative aspects of social justice but also present some overlap into other dimensions and responses. Some redistributive forms were interpreted as beyond monetary economies and considered for their social capital

value and worth and distribution of authority. Some other responses were interpreted as emergent transformative due to the long-term potential they have. Via situated, culturally informed and collaborative authorship, the redistribution of resources, representation of plurality and parity of rights to civic and social belonging can propagate. It can be argued though that emergent transformative processes are also performed by these resources; making their actions more than optional, inclusive gestures and embedding social justice into the process of knowledge management ultimately inviting wider societal transformations.

Conclusion and Recommendations

Many of the recommendations here are phrased as transformative rather than affirmative; ensuring the knowledge management decisions and subsequent platform designs centre and privilege Indigenous knowledge holders and authority.

The following recommendations therefore follow from the main forms of social justice discussed here for educational processes and demand the most labour from the privileged.

Educational Institutions need to:

Cede digital territory possessiveness and preference for technology-centred production models. Centre Indigenous content and authors to claim platforms

with ontology and language. This can support re-acculturation knowledge management, re-framing of the success story around parity of participation, re-acculture and re-structure to reclaim value over business and enterprise.

Let go of fixation over outcome-focused and expensive technology that undermines presence of knowledge authority and ontologies and excludes use by people on Country and in remote communities.

Government administrators need to:

Restructure systems so that Indigenous Authority is authentically represented and centred in bigger programs and projects. Develop strategies and political agendas characterised by ongoing, co-negotiated and sustained cultural, economic and political participation and enrichment of broader knowledge interactions in policy areas which affect Indigenous people's science, Country, resource management, livelihood, education and health.

Non-Indigenous allies in the fight for social justice need to:

Recognise that social justice is practiced and not always served as an outcome; that this won't necessarily be won *for* Indigenous people, yet allies need to take due responsibility and work alongside Indigenous people towards decolonisation adjusted ways (Nehrez 1991).

Occupying digital territories with different forms of knowledge authority and authorship is free; it's the offline cost of ceding control over dominant ontological assumptions that institutions need to bear in order to continue developing socially just and evolved knowledge practice.

Aboriginal and Torres Strait Islander knowledge can continue to claim digital territory for Indigenous authorship, *as informed by Indigenous leaders* in examples around the world such as *Virtual Songlines* and *Mukurtu*. While these practices are online, the impacts of offline social justice actions and decisions can instruct digital systems to evolve their openness to authority structures of cultures with much more experience at exercising knowledge sovereignty offline and on Earth.

Notes

¹ In Australia the term 'Country' is used to refer to the regions and land from which Aboriginal peoples' languages, lives and ontologies are defined. As such it is capitalised and used reverently to acknowledge the spiritual and ancestral connections people have to their Country. It even takes the first Author's position in an article referenced here.

² All materials on the PreVET site are licensed by the "Creative Commons Attribution-Noncommercial-No Derivs 3.0 Licence Australia". See <http://prevet.net.au/copyright.html>.

³ The Framework's wider set of materials is at: <https://indigenoufisheriestrainingframework.wordpress.com/>.

⁴ <https://indigenoufisheriestrainingframework.wordpress.com/>.

Acknowledgements

I acknowledge the traditional owners of the lands on which this work was done. Without the knowledge generously shared with me, I would not be able to transfer this learning into practice that hopes to transform learning and knowledge relations within my sphere of influence. As a non-Indigenous, open educational practitioner, it is my goal to focus my efforts within my own institutional, cultural and intellectual remit. Under the authority and guidance of my colleague and supervisor Dr Kathy Guthadjaka, I have learned and am still learning to direct my focus for the benefit of Indigenous knowledge and learners.

Competing Interests

Johanna Funk and Kathy Guthadjaka completed paid work from The Northern Institute as part of the data acquisition for the studies discussed in this paper. Each project was cleared by ethics committee at Charles Darwin University. The authors declare that they have no other competing interests.

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How to cite this article: Funk, J and Guthadjaka, K. 2020. Indigenous Authorship on Open and Digital Platforms: Social Justice Processes and Potential. *Journal of Interactive Media in Education*, 2020(1): 6, pp. 1–13. DOI: <https://doi.org/10.5334/jime.560>

Submitted: 01 December 2019

Accepted: 28 February 2020

Published: 11 May 2020

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