Multilingual Pedagogic Innovation for Epistemic Inclusion: Making education meaningful

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Introduction

Inclusion concerns who participates in and benefits from education. At its core, an inclusive education is one where all learners participate in learning activities. As learning activities are knowledge practices of meaning making, following Milligan (2022) we may term this epistemic inclusion. Epistemic inclusion has two aspects. One concerns learners' opportunities to engage with the curriculum offered in their schools. The other concerns how schools recognize learners as knowledge-holders and co-creators of knowledge (Barrett et al., in press). However, there is another hermeneutical dimension to inclusive education, which concerns how it contributes to providing learners and society more widely with concepts for articulating experiences of injustice and resources for addressing those injustices. As well as injustices experienced by individuals, this extends to injustices experienced across society and the beyond-human injustice of planetary environmental crisis. Language is central to epistemic inclusion. Which languages are used in the classroom, and how, has profound implications for learners' participation in meaning-making activities. At the same time, the language skills children and teenagers develop in school have implications for their participation in society and for how societies conduct debates around social and environmental justice.

Language practices are central to epistemic inclusion in all contexts, including contexts that are monolingual. Bernstein (2000) identified language as the key mechanism through which working-class children in England were excluded from educational success because the academic forms of English, used in classrooms and textbooks, were more distant from the colloquial forms of English they spoke outside of school than they were from the language practices of middle class homes. However, the contribution of language to epistemic inclusion is most apparent in multilingual contexts, where the main language used for most learning and teaching in school is different to the main languages that children use outside of school. This is the situation for nearly all secondary education across Africa. It is hard to identify a single example of a secondary school in East Africa that relies exclusively on an Indigenous language in the teaching and learning of non-language academic subjects. Nonetheless, teachers are widely observed to improvise multilingual strategies (Bagwasi and Costley, 2022; Benson, 2010). Sometimes, these multilingual practices are shared and developed by communities of educators, creating distinct multilingual pedagogic approaches.

In this article, I use language supportive pedagogy that has been developed in Tanzania (Barrett et al., 2021; Mtana and O-saki, 2017) and Rwanda (Milligan et al., 2016) as an example of pedagogic innovation for epistemic inclusion. I draw most extensively on the version developed in Tanzania in the context of science education for learners transitioning from Kiswahili-medium primary-school education to English-medium secondary-school education (Barrett and Bainton, 2016; Rubagumya et al., 2021). Although language supportive pedagogy has influenced many science-teachers' practice across four of Tanzania's 31 regions, it has not been taken up at the national level (Barrett, Sane, et al., 2024). This is not surprising. Very few innovations that are successful at the local level in Africa are successfully scaled up to a national level (Samoff et al., 2013). Drawing on Choppy's (2020) proposition that small island states can generate insights of global significance because of their small size and creative Creole culture, I argue that Seychelles has the potential to cultivate pedagogic innovation for epistemic inclusion. Further, because Creole cultures are creative of 'new, distinct way[s] of being in the world' (Baron and Cara, 2011, p.12), this extends to a potential to deepen and expand understanding of hermeneutical inclusion, a form of inclusion that makes society more inclusive.

I start by introducing myself and the research context as a form of reflexivity regarding my positionality and limits to the authority of this text, particularly with respect to education in Seychelles. The second section conceptualizes epistemic inclusion, drawing on concepts of epistemic justice informed by decolonial, Indigenous and Creole perspectives, leading to a discussion of the contribution that Creole cultures can make to an epistemic justice that meets the needs of repairing our planet. The third section conceptualizes and discusses pedagogic innovation, starting with the emergence of translanguaging and then moving on to the example of language supportive pedagogy in Tanzania. The article concludes by reflecting on the potential for endogenous multilingual education in Seychelles for meaningful inclusion at a time of planetary crisis.

Positionality: Introducing the author and context

This article sits uneasily with the aim of the Seychelles Research Journal's aim to showcase research undertaken in and about Seychelles. It is based on a keynote presentation at the *Innovation for Inclusion* conference, held in October 2024, by an author, who has spent very little time in Seychelles. As an academic, based in Europe, whose research is mainly conducted in collaboration with African researchers, I am mindful of Ndlovu-Gatsheni's (2018) call to provincialize Europe and deprovincialize Africa:

> …*'provincializing Europe' is meant to confront the problem of overrepresentation of European thought in knowledge, social theory and education, which resulted in… the 'Europeanization of the World'.*
>
> (Ndlovu-Gatsheni, 2018, p.4)

So, I start by situating, or provincializing, my scholarship, mapping out the relationships both in Europe and Africa that have influenced the argument presented in this article.

I am a professor at the University of Bristol. Bristol, which is my hometown, is a historic port city in the United Kingdom (UK), famous for its suspension bridge and its music scene. It is infamous for its history as a profiteering vertex of the transatlantic triangular trade in enslaved African people. At the current time, it is a city marked by profound educational disparities between different neighbourhoods, inequalities that are strongly associated with race and social class (Elahi et al., 2017). The University of Bristol is still struggling to acknowledge and respond to its history and current inequalities as it seeks to decolonize (Birdi, 2024; University of Bristol, 2023). I have for over 20 years been a researcher in the field of comparative and international education, a field of research with its own contested histories and colonial legacies (Shields and Paulson, 2024; Takayama et al., 2015). Throughout this time, much of my research has focused on problems of teacher professionalism, pedagogy and curriculum in Tanzania. For the last 12 years, I have been involved in partnerships with Tanzanian researchers, working on problems of language transition in the Tanzanian education system (see Ismail, Sane, et al. in this special issue). This article is informed by research towards inclusive pedagogy for multilingual learners (e.g. Barrett and Bainton, 2016; Barrett et al., 2021; Barrett, Sane, et al., 2024). Hence, my formative professional experience as both a teacher and researcher has been in two countries whose histories are violently entangled with that of Seychelles.

The example of pedagogic innovation presented in this article derives from a recent project, *Evaluating Language Supportive Approaches to Transition at Scale* (ELSATS), which was funded by the British Council through its Widening Participation grant scheme and is reported in full elsewhere (Barrett, Sane, et al., 2024). The project was a collaboration with the University of Dodoma, Tanzania, and Kotebe University of Education in Addis Ababa, Ethiopia. My previous research has involved collaborations with the University of Dodoma, St. John's University of Tanzania (also in Dodoma), the University of Rwanda and the British Council, Rwanda (Milligan et al., 2016). All these organisations have contributed towards the development of language supportive pedagogy. Language supportive pedagogy improves epistemic inclusion for learners, whose previous education has been through the medium of an African national language but, who are now transitioning to a year grade, where all learning, teaching and assessment is conducted through the medium of English. In Tanzania, the process of innovating language supportive pedagogy involved collaboration between university-based and college-based teacher educators, as well as numerous workshops in which the theory and practice of language transition was discussed with school-based teachers (the process of innovation is described in Barrett et al., 2021; Mtana and O-saki, 2017; Rubagumya et al., 2021). It was endogenous (Houndtondji, 1997), in the sense that it was developed by educators in response to a context-specific problem of exclusion but involved engaging with and adapting, or indigenizing, theory and ideas from international literature. The ELSATS project started eight years after we first started working on language supportive pedagogy

to gather evidence on the extent to which it was being taken up at scale within Tanzania and its potential to inform multilingual pedagogic innovation in another education system, namely Addis Ababa.

The language supportive research is pertinent to Seychelles within the context of an ongoing research project, *Understanding understanding – Supporting understanding in the classroom through the understanding of curricula structures*, which is a collaboration between Örebro University, the University of Seychelles, the University of Dodoma, the State University of Zanzibar and the University of Bristol, funded by the Swedish Research Council. The *Understanding understanding* project builds on the Tanzania research as it seeks to gain insights on how multilingual education enhances inclusion through a comparison between Seychelles, Tanzania Mainland and Zanzibar. The project design and purpose are elaborated further in Zelime and Deutschmann's contribution to this Special Issue.

The arguments in this article concern what we mean by epistemic inclusion and pedagogic innovation. The article is an attempt to take seriously the challenge of transforming education systems to be more epistemically inclusive of learners, who are marginalized by school knowledge practices, including language practices, that diverge from those of their home communities.

Epistemic inclusion

I have previously defined inclusive education through the lens of liberal social justice theories (Fraser, 2007; Sen, 2009) as an education where all learners benefit from learning outcomes that they have reason to value (Barrett, 2011; Tikly and Barrett, 2011). Drawing on Fraser's (2007) three-dimensional framework for social justice we described socioeconomic (redistribution), sociocultural (recognition) and political (representation) dimensions to quality and inclusive education. When inclusion is defined in terms of outcomes, this is about distributing resources equitably, according to the needs of schools and individual learners. This may mean, for example, that more money is allocated to attracting teachers or distributing textbooks to remote schools; or to resources and support for learners with special education needs. Recognition in education involves defining learning outcomes that are relevant to the histories, religions, languages and culture of the communities to which they belong. Representation concerns who is considered entitled to quality and inclusive education and who determines which learning outcomes are valued. So, for example, the question of whether children of illegal immigrants have access to quality education (see for example, Blessed-Sayah and Griffiths, 2024) is a question of political representation. So too are questions of accountability such as who sits on school committees, who controls the curriculum and participates in policy debate about the purpose and quality of education. Novelli et al. (2017), writing about education in conflict-affected contexts, expanded the 3R social justice framework to 4Rs adding reconciliation.

An alternative fourth 'R' is reparation, which concerns how education systems address and repair historical injustices (Myers et al., 2024). For example, in the UK, reparative justice requires attention to how violent histories of empire are taught in schools. It also concerns how we transform education systems that privilege white learners to be inclusive of black, Indigenous and other marginalized ethnic groups (Sriprakash et al., 2022).

Epistemic justice reframes recognition. The legal philosopher, Miranda Fricker, proposed the concept of epistemic justice in her book exploring the 'interdependencies of power, reason, and epistemic authority'. She defined epistemic injustice as 'a wrong done to someone in their capacity as a knower' (Fricker, 2007), and goes on to justify two essential forms of epistemic injustice. The first, testimonial injustice, occurs when a speaker is judged as not credible because of their identity. She offers the examples of the police not believing a person because they are black, or a woman's reasoned insight being dismissed as 'female intuition' (*ibid.* p.10). In education there can be various reasons why learners' legitimacy as knowers is not recognized. In the English school system, black Caribbean children with an additional learning need such as dyslexia have historically been miscategorized as 'educationally subnormal'. They continue to be more likely to be labelled as 'underachieving' than their peers due to systemic racism (Wallace and Joseph-Salisbury, 2022). The prior learning and multiliteracies of teenagers, who have migrated across national borders, may be misrecognized due to the monolingual norms of the education system that receives them (Sharples, 2020). Research from Africa (e.g. Kiramba, 2018; Sarr, 2013), South Asia (e.g. Phyak, 2024) and South America (e.g. Ames, 2012) has shown that using a European language in the classroom that is unfamiliar to learners prevents them from demonstrating their subject knowledge or from participating in meaning-making activities, such as discussion with peers. In Seychelles, Zelime et al. (2018) showed that Grade six children demonstrated a more extensive and detailed knowledge that drew from their learning outside as well as within school when they were assessed using Seychelles Creole compared to the textbook knowledge they reproduced when assessed through the medium of English. In other words, across contexts, children participate more actively in meaning making when engaged through the languages they use outside of school.

Fricker's (2007) second form of epistemic injustice is hermeneutical injustice. It occurs 'when a gap in collective interpretive resources puts someone at an unfair disadvantage when it comes to making sense of their social experiences'. Here, she gives the example of someone suffering sexual harassment, who is unable to express this because her society lacks that critical concept. Formal education is one of the main ways through which society constructs and shares 'collective interpretive resources', including the resource of language. This aspect of social justice is most explicitly addressed within debates around the curriculum. This includes debate over who has access to formalized curriculum knowledge (Kotzee, 2013) and what forms of knowledge are privileged within the curriculum (Young and Muller, 2013). Young and Muller (2013) use the phrase 'powerful knowledge' to refer to specialized knowledge that is constructed and revised over time by

disciplinary or scientific communities following systematic, accountable methods of inquiry. Wheelahan argues that powerful knowledge:

> *…provides access to society's conversation about itself. …students need access to knowledge if they are to participate in this conversation. …they need access to 'disciplinarity' or disciplinary styles of reasoning so that they understand how knowledge is used and the broad criteria that need to be applied in evaluating the validity of arguments.*

(Wheelahan, 2012, p.2)

Disciplinary knowledge is not just learned through language but constructed through language practices. As Daniels (2016) succinctly summarized, 'students do not learn science through talk, they learn to talk science'. We would add that they also learn to read, write and do science. In other words, disciplinary knowledge is synonymous with disciplinary practices of inquiry, including academic language practices. Acquiring powerful knowledge involves mastering powerful language practices of abstraction, technicality and argument. As Heugh and Stroud (2019, p.219) point out, 'access to the standardized variety of written and spoken languages' also 'open[s] doors to higher education and high-level employment opportunities'.

Understanding epistemic justice simply as access to powerful knowledge does not allow learners the agency to critically question unjust power structures. Both Young and Wheelahan share a common Western liberal perspective of social justice, within which distribution of wealth is the organizing metaphor for conceptualizing all aspects of social justice. Hence, 'powerful knowledge' is treated analytically as a resource and the imperative social justice question for curriculum design is how we ensure that all learners have access to powerful knowledge. The distributive paradigm does not have the conceptual tools to grasp hermeneutical injustice. When applied to education, hermeneutical injustice requires an analysis of how and whether the concepts and languages developed are adequate to articulate the lived experience of learners and their communities and to critically debate the issues they care about. For this analysis, I now turn to decolonial scholarship.

Epistemic justice in education: decolonial perspectives

Coloniality refers to the various disinheritances, alienations, erasures and oppressions that are the legacy of colonialism, and hegemonic world views that normalize these. This includes the disinheritance, removal and genocide of Indigenous people on colonized land (Tuck and Yang, 2012), as well as the racialization of colonized people (Fanon et al., 2008). Decolonial scholars highlight the epistemic injustice caused by distortion, belittling and erasure of the experiences, histories and languages of people alienated from their land, culture and Indigenous knowledge systems by colonialism (Grosfoguel, 2007; Mignolo, 2012). Bhargava (2013, p.413) argues that the economic and political control of colonialism depended on establishing and maintaining 'the pervasive belief in the cultural superiority of the colonizers'. Hence, he defines epistemic injustice as a form of cultural injustice that:

…occurs when the concepts and categories by which a people understand themselves and their world are replaced or adversely affected by the concepts and categories of the colonizers.

(Bhargava, 2013, p.414)

In Fricker's term, this is a form of hermeneutical injustice. Bhargava (2013) argues that in India colonialism distorted Indigenous knowledge systems by diminishing central organizing strands of Indigenous epistemic frameworks, whilst drawing attention to elements that were less significant and peripheral. Yunkaporta (2019, p.8) describes a similar process, whereby 'Indigenous patterns of thinking, being and doing' are 'obscured by a focus on exotic items and performances'. Ndlovu-Gatsheni (2018) discusses peripheralization of Indigenous knowledge, whereby the knowledge systems of African peoples are decentred or provincialized, whilst European knowledge systems are asserted to be universal. Linguisticide, the erasure of African Indigenous languages, is integral to this process.

Formal education has been and continues to be complicit in linguisticide. Schools, colleges and universities have from the colonial period onwards pursued official policies of monolingualism, often punishing and humiliating learners, for uttering an African language on the school campus, as described by Ngũgĩ (1986). Milligan et al. (2024) describe schools in Northern Uganda, which enforced strict 'English only' policies through use of corporal punishment or humiliation. We have observed similar practices in some schools in Tanzania (Barrett, Sane, et al., 2024). Phyak (2024) found that English-medium schools in Nepal created a language surveillance system using CCTV cameras and by encouraging teachers and students to 'spy on' (p.331) their peers. These hard linguistic boundaries exclude children from participating in meaning-making activities in the classroom, effectively silencing them, as described by Kiramba (2018) in Kenya and Kuchah et al. (2022) in Rwanda. They also remove the possibility of using learners' language abilities developed outside of school or, in transition systems, earlier in their education, as an asset for learning.

Across African countries south of the Sahara, secondary and higher levels of education almost exclusively use a European language, usually the language of the former colonizer, for teaching and learning of all or most non-language subjects. These language policies convey the message that only knowledge expressed in a European language is valid within formal education and professional contexts. At the same time, school curricula misrecognize scientific, mathematical and cultural knowledge as European in origin that should more accurately be described as 'part of the common heritage of humanity' (International Commission on the Futures of Education, 2021, p.64). For example, the study of physics is concerned with principles that apply across the universe. Yet, units of measurement are named after eminent European scientists (Newtons, Joules, Coulombs, Amperes) and the names of European scientists are memorializsed in formalized statements about phenomena experienced by everyone, such as Archimede's principle of

buoyancy (floating) and Boyle's laws about heating and expanding gases. Physics relies on algebra, a millennia-old mathematical semiotics that Europe inherited from Islamic scholars of the Middle East, who themselves learned it from Indian scholars (Al-Khalili, 2010). In the biological sciences, the contribution of Indigenous people to European botanical 'discoveries' are only just beginning to be recognized (Rose, 2025). When science in the school curriculum is called Western science, it is not the science that is Western but rather the way it is presented and organized in school curricula as an objective mode of inquiry, isolated from the social world (DeBoer, 1991).

Decolonial critiques highlight the limitations of 'powerful knowledge' as described in Eurocentric school curricula and the strong link between marginalization and erasure of Indigenous languages and of different ways of knowing and being. To consider the role of language in repairing the injustices of coloniality, I now turn to Indigenous and Creole perspectives on epistemic justice.

Epistemic justice: Indigenous and Creole perspectives

Capitalism and coloniality have brought us to a point of planetary crises that needs to be met with all the wisdom and insight that is available to humanity. Achilles Mbembe (2023, p.2), in a contribution to UNESCO's Futures of Education debate, argues that 'we need all the archives of the world to repair the earth'. In another Futures of Education paper, Tikly (2024) explores the implications for Mbembe's argument for education, arguing for an ecologies of knowledge approach that that draws on diverse knowledge systems and languages. Multilingual education, as argued below, is needed for the inclusion of learners, who speak minoritized languages outside of school. It also has the potential to contribute towards expanding our shared interpretive resource for understanding and repairing the multi-crises of climate change, biodiversity loss and the collapse of eco-systems. If, as Yunkaporta (2019) provocatively suggests, Indigenous knowledge can save the world, then 'Indigenous pattern thinking' (ibid., p.19) needs to be admitted into our schools and universities and used to critique and recreate our understanding of sustainability, economics and so much more. A similar argument can be mounted for Creole forms of reasoning and knowledge practices, which are inherently reparative (Choppy, 2020).

The abstracted language for formal scientific inquiry, associated with the West, adopts the grammar of the neutral observer. It positions the inquirer as external to the natural systems that we live within, that have created us and on which we depend for breath, for sustenance, for reproduction, for living. It has analytical power for understanding our current predicament, as the detailed data-rich, precisely worded reports from the Intergovernmental Panel on Climate Change (IPCC) (e.g. IPCC, 2023), as well as very many other rigorously evidenced scientific papers, demonstrate. This substantial body of scientific literature sets out the need for technological and social transformation on a global scale. However, as Facer (2020) points out, the all-encompassing nature of the change required goes beyond the technological level (new sustainable technologies) and indeed the structural level (new, more equitable, forms of social organization). It also demands a

response at the level of epistemology (new knowledge practices) and ontology (new stories about what it means to be human and our position in the world).

Conversations between school science and Indigenous knowledge perspectives may be one way to create these new knowledge practices and stories, but the gulf between them can seem too wide to bridge. Yunkaporta (2018) admits the impossibility of communicating Aboriginal knowledge that 'keep[s] moving in lands and Peoples' (p.20) in print and through the medium of English, which 'inevitably places settler worldviews at the centre of every concept, obscuring true understanding' (p.21). In a world where very few people belong to communities with a continuous history of living sustainably on a land-base, Creole communities and culture, who have a memory and stories of arriving, learning from and adapting to a land base, may be one of the greatest sources of global hope there is. Indeed, creolization is a form of indigenization that resists essentialism (Baron and Cara, 2011, p.12). Choppy (2020) elaborates on the insights that Creole culture can offer the world with specific reference to Seychelles. She describes Creole culture as the 'essence of the world diffracted and recomposed' (Bernabé et al., 1990, p.892, cited in Choppy, 2020, p.60) by people who have overcome historical violence and displacement and embrace difference whilst laying claim only to their islands as home. Creole culture demonstrates to the world that societies are able to respond to the challenge of 'creating and expressing a new, distinct way of being in the world' (Baron and Cara, 2011, p.12).

To summarize, epistemic inclusion in education entails three forms of epistemic justice and each is related to language. First, it entails testimonial justice for learners by recognizing them as knowledge holders and knowledge creators and this encompasses recognizing the value of the language practices they bring from outside school. Second, it entails a distributive form of hermeneutical inclusion that concerns access to the school curriculum and opportunity to develop standardized language practices of academic learning and professional practice. Third, it entails a collective form of hermeneutical justice so that educational institutions become spaces for creating new concepts and knowledge practices for articulating lived experiences of injustice and repairing our planet. This last demands engaging the full linguistic and epistemic resource available to an education system, university or school. Creole culture and language has a specific role to play, demonstrating the ability of societies to create new ways of being that are reparative and sustainable.

Pedagogic innovation for multilingual education

Border crossing and translanguaging for epistemic inclusion
Epistemic inclusion is not an argument for privileging one form of knowledge *over* another or for privileging minoritized languages *over* languages that are widely spoken across a country. Rather, epistemic inclusion requires movement between multiple knowledges, which may be accompanied by movement between different named languages, dialects or

registers. Within the field of science education, border crossing or cross-cultural pedagogies (Aikenhead, 1997; Jegede and Aikenhead, 1999) may be regarded as epistemically inclusive. Border-crossing pedagogies were initially a response to Indigenous students in North America and New Zealand opting out of sciences at secondary school (Ezeife, 2003, p.337). The concept has since been applied in a range of contexts where the culture of home (Rueter Veiga, 2020), community (Borgerding, 2017) or youth (Barton and Tan, 2009) is perceived to be distant from that of schools. In Africa, it has been proposed as an approach that contributes to meaningful sustainable development (Gitari, 2012), in other words it is hermeneutically inclusive of societal values and aspirations. Border- crossing pedagogies conceptualize science education as a cultural process and the teacher as a guide, who facilitates students as they navigate the cultural borders between school science and the 'funds of knowledge' (Barton and Tan, 2009) they bring from outside of school. It is vital the teacher recognizes and engages with the validity and richness of learners' Indigenous and everyday knowledge (Aikenhead, 1997). The movement between different forms of knowledge also entails a movement between the language practices through which they are expressed, as observed by sociolinguistic researchers (Halliday, 1993). Within multilingual education, teachers may also shift between the languages learners use most outside of school and the official language of learning and teaching (Lin and He, 2017; Msimanga, 2021).

A biology lesson described in Barrett, Sane et al. (2024) illustrates how multilingual education can facilitate border-crossing science education. The learners were all Maasai teenage boys, who belonged to rural communities and shared a first language, Maa. They had all completed seven years of primary education in which the national language, Kiswahili, was used for teaching and learning and were now in the first year of English-medium secondary education, being taught biology by a teacher, who was trilingual in Maa, Kiswahili and English. The teacher elicited students' Indigenous knowledge of plants by bringing some branches of a particular plant (Amaranthus) to the class. He invited students to name the plants in Maa and then elicited their knowledge regarding its uses, where it grows and so on through whole-class exploratory discussion in Kiswahili, before guiding them to make presentational statements in English. The presentational statement was much more limited than the breadth of knowledge demonstrated in the exploratory discussion. Nonetheless, students found it easier to recall and reproduce the statement, having related it to Indigenous knowledge, which they would normally express in Maa.

Movement between different languages in the classroom is often termed translanguaging. Rueter Veiga (2020) suggest that in the science classroom, translanguaging can be viewed as a form of border-crossing education. The term translanguaging is a translation of the Welsh word *trawsieithu*, which was coined by researchers to describe a specific pedagogic strategy they observed in Welsh-medium schools in the UK (Lewis et al., 2012). Teachers provided input in one language, for example Welsh, and asked bilingual learners to produce an output in another language, for example English. Translation was viewed by

teachers as a way to encourage deeper processing of new concepts and hence, learners' bilingualism was treated as an asset for learning non-language subjects. The term translanguaging has since been taken up globally to describe pedagogic processes where more than one language is used as a 'source of meaning' (Barwell, 2018, p.161). Translanguaging may involve movement back and forth between languages or a meshing of different language practices. As Probyn explains:

> *Translanguaging … stems from a heteroglossic ideology, the view that within multilingual classrooms languages comprise a common linguistic resource to draw on flexibly, strategically and deliberately to maximise learning opportunities.*

(Probyn, 2021, p.163)

Heteroglossia encompasses both diversity of languages or dialects and diversity of registers, that is the variously formal and abstracted language practices of different communities such as professions, disciplines or families (Barwell, 2018; McKinney and Tyler, 2024).

Despite the prevalence of monoglossic language-in-education policies, examples of teachers improvising multilingual teaching and learning strategies have been observed across different African countries (Bagwasi and Costley, 2022; Benson, 2010) and across contexts as diverse as Wales (Lewis et al., 2012), Nepal (Phyak et al., 2022) and English-medium schools in Hong Kong (Li, 2015). Multilingual practices are diverse. For example, Hattingh, McKinney et al. (2021) describe three very different multilingual science lessons, all observed in South Africa. The first is characterized as 'spontaneous translanguaging by learners in group work' (Hattingh et al., 2021, p.240), where multilingual students produced utterances in English and two African languages as they explored meanings and procedures. The second is an example of 'teacher-directed whole-class talk', where the dialogue shifted between consolidation using English and developing new ideas through exploratory talk in isiXhosa. In English, the dialogue patterns alternated between presentational statements and brisk question and answer series, known as Initiation–Response–Evaluation (IRE) interaction. Hattingh, McKinney et al.'s third example is planned or deliberate translanguaging through a collaborative translation task. Learners were provided with an explanatory definition of chemistry concepts in an African language isiZulu and invited to translate this into English and into the informal urban registers of isiZulu. This last example resembled *trawsieithu* in Welsh schools, as translation was used to deepen learners' understanding of the science concepts. It also has similarities to a mathematics approach, described by Essien (2025), that uses formal and informal registers of the African languages children use outside of school, as well as English.

Teacher-improvised multilingual practices described by research are the result of day-by-day minute-by-minute micro-innovation directed towards including the learners in their classroom in meaning-making processes. Warren-Lee et al. describe teachers' reflexive practice as:

…thinking independently in advance of the lesson about the plan and resources to be used, taking into consideration their own strengths, affordances, and any limitations in light of their knowledge of students' needs; it involves keen attention during the lesson and introducing adaptations where necessary; it also involves reviewing the lesson afterwards, specifically how the plan and resources were able (or not) to foster learning, informing the planning of the next one.

(Warren-Lee et al., 2024)

Teachers' classroom improvisation does not on its own constitute pedagogic innovation. As Alexander (2001, p.513) explains, pedagogy 'encompasses both the act of teaching and its contingent theories and debates'. Whilst classroom teaching is at the heart of pedagogy, pedagogy is also co-constituted by state- and school-level policy and curriculum, as well as society's conversation about education, which is represented in debates and theories. Pedagogy 'is the aspect of education which most tellingly brings together macro and micro' (Alexander, 2001, p.513). It may be viewed as a praxis, the dialectic relation between practice and theory, which is always realized within constraining policy and social contexts. Translanguaging, is an example of pedagogic innovation that has emerged through conversation between teachers' improvised practices and theorizing of researchers. In contexts where policy does not encourage multilingual education, it is much harder for multilingual pedagogic innovation to emerge. I illustrate this in the next section with the example of language supportive pedagogy in Tanzania.

Innovating a multilingual pedagogic approach in Tanzania

In Tanzania, language supportive pedagogy was developed by education researchers, who are also teacher educators, at the University of Dodoma and St. John's University of Tanzania, as an approach to language transition in lower secondary education. The innovation was a response to a widely-perceived problem that transition from Kiswahili-medium primary schools to English-medium secondary education slows down learning in non-language curriculum subjects (Rubagumya et al., 2021). The subjects we focused on were science and mathematics. The process of innovation started with collaboration between language and science educators to creating prototype textbooks designed for multilingual learners (described in, Mtana and O-saki, 2017; William and Ndabakurane, 2017). The objective was to make the books easy to read, by simplifying the language and including images to support interpretation of the text. We also included bilingual features to help learners make connections to their previous learning in primary schools and numerous activities that drew on techniques from language education to develop academic language practices. To understand this language supportive approach as a pedagogy and develop it further, we then embarked on action research, a methodology discussed in Barrett, Juma and William (2021) and Rubagumya, Sane and Ndabakurane (2021). Teacher educators used language supportive approaches with student teachers at the same time as teaching them about language supportive pedagogy and supporting them with implementation during periods of block teaching practice in schools (Gomezulu, 2021). At the same time, we conducted workshops with school teachers, sharing and discussing the language supportive pedagogy with them (Juma, 2021) .

The process of innovation was an outward-looking approach as researchers engaged with international literature on multilingual education, including content language integrated learning (CLIL) developed in Europe (Coyle, 2007), genre-based approaches developed mainly in Australia and Hong Kong (Polias, 2016), and research on multilingual education from South Africa (e.g. Msimanga and Lelliott, 2014; Probyn, 2015; Setati et al., 2002). We borrowed the term 'endogenous' from Houndtondji (1997) to describe a process of innovation that is situated within a specific locality by researchers within that context, who build on local knowledge whilst also adapting theories, ideas and technologies from elsewhere. In later research (Barrett, Sane, et al., 2024), we set out to trace the influence of the language supportive projects. The reach of its secondary school teachers' practice surpassed our expectations. We found that across two regions (Dodoma and Morogoro), where teacher education action research had been conducted, and a further two regions (Arusha and Zanzibar), where team members had conducted repeated teacher workshops, most teachers claimed to have had some training or exposure to language supportive pedagogy. Across our sample of 16 schools, nearly all science teachers recognized that multilingual strategies were necessary for their subject and most used Kiswahili in teacher-led whole-class dialogue to make connections to students' knowledge and experience from outside of school. Nearly all provided explicit instruction on scientific vocabulary but only a minority had strategies for integrating explicit instruction on writing academic English. In the same 16 schools, however, English teachers advocated an English-only policy across subjects and seven schools did impose this rule. To accommodate this policy, biology teachers reduced the content of lessons, teaching at a level that was more appropriate to primary school than lower secondary. In effect, an immersion strategy for teaching English was implemented at a cost to subject learning.

We also analysed national curriculum documents, in particular a new set of textbooks published in 2021-2022, focusing on the biology textbook for the language transition year (first year of lower secondary school) (reported in full in Barrett, Biseko, et al., 2024). Here we did not find any take up of language supportive pedagogy. The biology textbook used images throughout to support interpretation of text and included a glossary for scientific vocabulary, which is a new feature for government-authorized textbooks in Tanzania. However, there were no bilingual elements, no structured support for learning academic language practices, and the book assumed a level of proficiency in English far advanced of that targeted in the subject English language. Our findings showed that language supportive pedagogy makes possible border-crossing science education, which recognizes learners' funds of knowledge from outside school. However, very few science teachers have strategies for developing the academic language practices that are necessary for accessing 'powerful' curriculum knowledge through the globally powerful language of English. One of the main reasons for this is that curriculum and curriculum resources are not designed for learners who are using English for subject learning for the first time.

Whilst disappointing, the findings with respect to the curriculum materials were not surprising. Scale-up is notoriously difficult to achieve. Samoff, Dembélé and Sebatane

(2013) conducted a literature review over several years on scaling up reform in Africa. Their main finding was that although 'there have been many imaginative, exciting, and sometimes dramatic innovations in education in Africa, few that started small have been successfully scaled up'. They conclude that rather than reproducing the exact features of an innovation, what needs to be scaled up are the conditions that permitted the innovation to be successful and sustained. Samoff et al.'s finding is especially important for innovation directed towards improving inclusion. Leadership that nurtures local innovation focuses on providing teachers with time, resources and professional growth opportunities to reflexive practitioners who can adapt curriculum and their practice to the abilities, knowledge, creativity and lived experiences of the individual learners and communities of learners they teach. The capacity an education system has to innovate for inclusion depends on whether power acts to nurture reasoned reflexive autonomy or control practice.

Through reflection on the language supportive projects, we identified three key features of pedagogic innovation (elaborated in Barrett et al., 2021). First, it addresses a widely-recognized constraint on inclusion. Second, it opensd up conversations between researchers and practitioners with different sets of relevant expertise. For the language supportive project the conversations that stimulated innovation were between language experts and science educators. Collaboration across the subject boundaries generated ideas and expertise to address language transition across the curriculum. Third, innovation is endogenous. Fourth, it is attentive to learners, which means there is no single best way to be language supportive, just a set of principles and ideas that teachers share as they create and adapt multilingual strategies for their classrooms. In Tanzania, we have found that science teachers are ready to engage in multilingual pedagogic innovation towards meaningful inclusion of learners. However, more work needs to be done to create a policy environment at the national level and within schools that prioritises epistemic inclusion across the curriculum over and above the narrow goal of proficiency in English.

Conclusion

The number of teacher educators and secondary school science teachers that engaged in some way with the language supportive research in Tanzania is at least equal to the total number in Seychelles. It is possible that the small size of Seychelles' education systems opens up opportunities to innovate for inclusion in ways that go beyond teaching practice in the classroom to encompass the ideas and debates and system-level processes that also constitute pedagogy. Indeed, this was one rationale for including Seychelles in comparative study of multilingual education (see Zelime and Deutschmann in this Special Issue). However the capacity for creativity of an island education system that diffracts and recomposes knowledge and ideas from other places is more fundamental to the process of innovation. One way in which Seychelles' education system continues to diffract and recompose from elsewhere is through attracting internationally mobile teachers, including

secondary school science teachers, from mainland Africa. These are creative, reflexive professionals, many of whom have been educated, trained and previously practiced in multilingual contexts with similarities to Tanzania. The *Understanding understanding* research collaboration between the University of Seychelles, the University of Dodoma and the State University of Zanzibar is an additional thread to a conversation about pedagogy that is already being conducted in Seychellois secondary schools.

Research in Seychelles can also contribute to expanding and deepening understanding of the epistemic dimension of inclusion. The theoretical exploration of epistemic inclusion in this article has highlighted three ways in which inclusion is meaningful. First, meaningful inclusion has at its core learners' participation in meaning-making processes in the classroom (Milligan, 2022), through which they make sense of curriculum knowledge. Second, inclusive education recognizes and engages with the culture, language and forms of knowledge that are meaningful to learners and their communities. This involves weakening or transgressing the boundaries between schools and their communities. Finally, inclusive education can be meaningful through contributing towards creating new concepts and knowledge practices for society to comprehend and address past injustices and repair our planet. In this respect, Creole culture and language is globally meaningful, powerfully demonstrating that it is possible for a society to create new reparative forms of indigeneity.

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