



Towards Sustainable Vocational Education and Training: Thinking beyond the formal

Simon McGrath, University of Glasgow; Jo-Anna Russon, University of Nottingham

Abstract

Mainstream vocational education and training (VET) has been complicit in unsustainable practices due to its longstanding relationship with productivism, extractivism and colonialism. However, it is beginning to address the need to balance its dominant focus on skills for employability with a growing awareness of the imperative to promote environmental sustainability, in terms of skills for sustainable production. There is also a sense that vocational institutions must also be sustainable in the wider sense of viability, durability, etc. While these positive steps are welcome, careful analysis is needed regarding how far recent initiatives are limited both by institutional capacities and wider disabling environments, and how far they are meaningful steps towards sustainable VET for just transitions. Moreover, the current debate is also limited in its overwhelming focus on formal spaces of learning and work. Yet, most vocational learning and work sits outside this formal realm.

We contribute to this debate by exploring four case studies of complex skills ecosystems with varying levels of (in)formality taken from both rural and urban settings in Uganda and South Africa. We consider how the dynamics of each ecosystem generate complex mixes of sustainability and employability concerns. We suggest that, in cases like the more formalised ones presented here, there is a possibility to look at the development of centres of skills formation excellence grounded in sector and place but that this also requires thinking about bigger challenges of just transitions. More radically, by highlighting the contexts of less formalised skills ecosystems in two other cases, we point towards new ways of thinking about supporting such ecosystems' work on sustainable livelihoods in ways that enhance their durability. Although context always matters, we suggest that our arguments are pertinent beyond the countries or region of this research and have international salience.

Keywords: *vocational education and training, Africa, green skills, sustainable development, skills for sustainability*

Introduction

Current vocational education and training (VET) systems were established to address a challenge experienced under industrialisation regarding worker productivity. Previous artisanal forms of working and training could no longer compete outside small niches but the industrial revolution's initial, though huge, productivity advances were unsustainable without greater attention to formalising industrial skills development. This provoked reform of older apprenticeship models and the rise of dual learning between formal workplace and formal, public training institutions, most developed in the Germanic tradition (Deissinger & Gonon, 2021).

With these origins, mainstream, formal VET is complicit in unsustainable practices. In Africa, this emerged through both the globalised negative effects of industrialised capitalism and the particular inflection of colonialism in different settings. Parts of Southern Africa experienced a form of 'settler VET' where formal provision developed relatively rapidly in response to concerns about the social and political positions of a large white population. The core occupations of formal vocationalism, moreover, were tied to the extractive logic of colonial capitalism and to the wider Northern paradigm of carbon capitalism, leading to VET focused on metals, mining, motors and manufacturing.

From the 1980s, neoliberalism led to public VET adopting a skills for employability discourse. Here, employability is concerned with the personal ability to gain initial employment, maintain employment, move between roles within the same organisation and obtain new employment if required (Hillage & Pollard, 1998). It downplays labour market contexts and places the responsibility for failure on learners (and providers) rather than employers and governments (McGrath et al., 2010). It has little to say about work's decency or sustainability.

This makes conventional public VET even more productivist:

Cast within the ethos of productivism and the ideological framework of neoliberalism, the institution of TVET is based on a restricted and instrumental view of lifeworlds which reduces people and the environment to the status of human and natural resources for economic exploitation. (Anderson, 2009, p. 44)

More recently, there is a growing awareness that VET needs to engage more seriously with the climate crisis. Approaches have emerged that look variously at green jobs, green skills and green institutions. However, we need to consider how VET might support just transitions and we need to bring the economies of subsistence agriculture and informal trade and production into the discussion. After briefly exploring the existing literature, we discuss our research, looking at social skills ecosystems in South Africa and Uganda (VET Africa 4.0 Collective, 2022). While these cases reveal that we still have far to go in conceiving of and delivering VET for just transitions, we argue they offer useful insights into both challenges and possibilities in moving in that direction in both formal public VET and vocational learning in the informal economy.

Concepts of sustainable VET

There has been limited engagement between the VET and education for sustainable development (ESD) communities. Indeed, this is one of the attractions of this special issue. For instance, in 74 years, the *Journal of Vocational Education and Training (JVET)* has only published two articles with titles including sustainab* and both are narrowly focused (Coll, Taylor & Nathan, 2003; Liu et al., 2020). Green skills appear neither in JVET titles or in keywords (but are discussed in McGrath et al., 2020) and only appear three times in the other leading VET journals (*Journal of Education and Work, Vocations and Learning, International Journal of Training Development, International Journal of Vocational Research*). There remains an apparent reluctance from VET academics to write about the issue. From the ESD side too, there is little engagement; the recent book on green skills in South Africa by Rosenberg, Ramsarup and Lotz-Sisitka (2020) is an important exception, although it is focused on skills formation systems more than public VET provision.

What is much more prevalent in the literature is two groupings of writings linked to development actors. First, there is work more focused on green jobs and skills (e.g., Cedefop, 2012; International Labour Organisation [ILO], 2011; Organisation for Economic Co-operation and Development [OECD], 2011; United Nations Environment Programme[UNEP], 2008). Second, there is work on VET associated with the UNESCO-UNEVOC International Centre in Bonn (e.g., Fien, Maclean & Park, 2008; Majumdar, 2010; Pavlova, 2018). The timing of the first references here is not coincidental. The 2008 financial crisis was catalytic for many international agencies in their considering how to stimulate growth while reducing environmental impact.

In contrast, Majumdar (2010) focused more on the supply side of VET providers, proposing a five-stage model of greening VET institutions, as outlined in Table 1.

Table 1: *Greening VET institutions (Source: Majumdar, 2010, p. 6)*

Green campus	Green curriculum	Green community	Green research	Green culture
Managing campus	Integrating ESD into the curriculum	Adapting community	Fostering research	Promoting culture
<ul style="list-style-type: none"> ▪ Energy management ▪ Water management ▪ Waste management ▪ Pollution management 	<ul style="list-style-type: none"> ▪ Green technology ▪ Clean technology ▪ Green jobs ▪ Greening existing jobs 	<ul style="list-style-type: none"> ▪ Capacity building ▪ Renewable technology ▪ Resource support ▪ Unique practices 	<ul style="list-style-type: none"> ▪ Renewable energy ▪ Water treatment ▪ Green innovations ▪ Waste recycling 	<ul style="list-style-type: none"> ▪ Green values ▪ Green attitude ▪ Green ethics ▪ Green practices

Table 1 is a comprehensive model and moving through these dimensions would appear to generate the kind of sustainable education institutions proposed by Sterling (2008, p.65) which have the following elements:

- sustaining (“helps sustain people, communities and ecosystems”);
- tenable (“ethically defensible, working with integrity, justice, respect and inclusiveness”);
- healthy (“a viable system, embodying and nurturing healthy relationships and emergence at different system levels”); and
- durable (“works well enough in practice to be able to keep doing it”).

However, in bringing an ESD debate to VET we must acknowledge that there is a fragility to VET institutions across much of the globe, given VET’s marginal location in both educational and economic fields. Allais (2020) argued that three interrelated factors undermine VET across Africa. First, the slow pace and limited spread of industrialisation mean that there are few formal sector jobs, with majorities engaged in survivalist activities. Thus, second, formal VET has almost nowhere to send its graduates. Third, the massive growth in secondary education has resulted in massified poor quality education. Not only are those entering formal VET less well prepared than they might be, but they are also coming in substantial numbers due to the breakdown in the formal school-to-work transition. Public VET institutions are expected to do the impossible, or at least delay the inevitable. Moreover, we also need to acknowledge that most vocational learning takes place outside the formal public college system. This is most apparent in highly informalised economies and learning systems (West Africa might be the most paradigmatic case here) but it is also a feature of formalised Northern skills systems where learning and work are far more complex than the orthodox story would allow.

New literature is emerging on skills for just transitions in complex labour market and vocational learning contexts (e.g., McGrath, 2020; Rosenberg et al., 2020). Let us clarify what we mean by just transitions:

a process of increasingly radical incremental changes that accumulate over time in the actually emergent transformed world envisaged by the SDGs [Sustainable Development Goals] and sustainability. The outcome is a state of wellbeing founded on greater environmental sustainability and social justice (including the eradication of poverty). These changes arise from a vast multiplicity of struggles, each with their own context-specific temporal and spatial dimensions. (Swilling, 2020, p. 7)

McGrath (2020) argued that taking this challenge seriously means abandoning staples of conventional VET research such as school-to-work transitions, and skills for employability, productivity and growth. Rather, he argued, VET research needs to shift focus to questions of how vocational learning can “promote decent work that contributes both to sustainable

livelihoods for individuals and communities, and to wider efforts to restructure work and economic activities so that we live within our planetary boundaries” (McGrath, 2020, p. 8).

In stressing sustainable livelihoods over jobs, we follow Scoones (1998). For him, ‘livelihoods’ have three elements: more days of productive work, less poverty and enhanced capability. He argued that these are ‘sustainable’ if they increase the resilience of individuals, households and communities, and enhance the natural resource base available to poor people. The achievement of sustainable livelihood portfolios is seen as being shaped by the agency of rural people, structure and institutions.

Our emergent approach to skills for sustainable livelihoods (Wedekind et al., 2021) adapts Hodgson and Spours’ (2013) social ecosystems approach. This has three key elements:

- Facilitating verticalities, policies that are intended to support learning, living and working;
- Collaborative horizontalities, networks between providers and other actors at the local level; and
- 45° activity, the connecting skills development activity that mediates between these two dimensions, centred on ‘anchor institutions’ and those offering ‘skills planning leadership’.

This facilitates a shift from the institutional frame to thinking more about multilevel systems and the roles of actors and organisations within networked arrangements. This moves the focus beyond the sustainable provider of Majumdar’s approach and addresses the limitations of a single institution gaze. Nonetheless, provider institutions are important and Hodgson and Spours (2018) highlighted the key role that leading (or ‘anchor’) institutions can play in anchoring the whole ecosystem through their ability to convene conversations and be exemplars of change. Moreover, they remind us that we must consider the key actors in such institutions and networks who are driving transformation, and what this costs them. We need to look at how moves towards sustainable VET are experienced by staff, students, communities and employers and how all are kept in sustainable relationships and activities.

Methods

We draw on a three-year collaborative project between researchers at four universities in Uganda, South Africa and England. Although this paper is written by members of the English team, it draws on wider collaborations and sits alongside other papers from team members. The team co-constructed a multi-methods approach through a series of workshops, which was then refined iteratively due to COVID-19. It is based around four case studies, discussed in the next section. Each case team developed a context-specific suite of data collection approaches, including face-to-face and online interviews and focus groups (with vocational learners and staff, formal and informal sector employers, government officials, civil society

actors and youth); participatory action research with community groups and staff revising formal curricula; analysis of social media interactions in learning networks; surveys of lecturers; and analysis of policy texts and official statistics. Some team members were also insiders in the cases, in a variety of activist, institutional and consultant roles. We analysed data collectively and developed interpretations across a series of task-based writing groups and workshops.

We look at four very different cases of complex skills ecosystems in South Africa and Uganda, with varying levels of formal and informal VET in both rural and urban contexts. By doing so, we are able to consider how the dynamics in each generate complex mixes of sustainability and employability concerns. While regional and national contexts always matter, we suggest that the case insights on sustainable VET have regional and international salience.

Case studies

Gulu

Gulu, and the surrounding Acholiland region of Uganda, faces a series of major economic and environmental challenges. A series of conflicts in Northern Uganda (c.1981-2005) had profound physical and mental health effects and concentrated land ownership in few hands. This has forced many into farming unsustainably. The (largely illegal) market in charcoal is encouraging deforestation, further exacerbating land degradation. Local agricultural markets are limited as are opportunities to export nationally and internationally. In response, the Government of Uganda and several donors are encouraging large-scale agro-industry with little apparent concern for environmental issues.

The formal VET system is characterised by small, poorly-resourced institutions that are not easily sustainable in the longer-term. Public sector providers have little capacity for innovation due to a powerfully bureaucratic culture and centralised decision-making. Nonetheless, awareness is growing among staff and students of environmental issues, largely driven by a few senior managers who have seen green campus initiatives on international study tours.

There are other potentially significant signs of hope. While incorporating an environmental agenda into the national skills system moves slowly, several international agencies and national NGOs are working hard in this area, particularly in the agricultural sector. Moreover, Gulu University is trying to live up to its motto of “for community transformation” and is increasingly promoting organics and sustainability through its Faculty of Agriculture. Many Gulu graduates are environmentally aware and are looking to adopt sustainable farming practices. The University’s UNESCO Chair in Lifelong Learning, Youth and Work also animates a network between youth, civil society organisations (including the traditional authority), international NGOs and training providers. Some formal public providers are involved, but as noted above, the system is poorly equipped

to be responsive. Where responsiveness is happening, it is largely due to external partner support.

Against the drive for modern agro-industry, the traditional authority, the Ter Kwaro Acholi, advances a cooperative model of development, focusing on the household and broadening to clans and communities. They have a significant long-term plan to return to the traditional Acholi cooperative model of living, which existed in closer harmony with the surrounding world, and see skills development as crucial to this endeavour.

Additionally, several initiatives are addressing food sovereignty, and related skills needs. A mechanised agriculture programme emphasises conservation agriculture, including not cutting all trees, leaving fallow fields, understanding where to plough, and which ploughs to use in which soil and terrain. This was set up by a woman who had worked in development agencies. A local farm is another example, promoting small-scale, organic farming for high yields and maintaining fertile soil. It is a popular place for student placements and has started providing training. Several local entrepreneurs are starting to make money from recycling and reusing goods. For example, one business collects plastic and converts it into building tiles. It started making plastic visors in response to COVID-19. Another example sees entrepreneurs making crafts, artwork and household items (such as sponges and mats) out of recycled goods. These innovators network with the University, particularly through key individuals and the UNESCO Chair holder who have forged connections with local youth groups, entrepreneurs (especially former alumni), local NGOs and informal traders as part of an emerging (though non-formalised) sustainable skills learning network.

This activity is enhancing the natural resource base available to poor people, although within the structural constraints noted above. It is typically more about sustainable livelihoods than decent jobs. Though nascent, some elements of Sterling's schema are evident in provision that is seeking to sustain people, communities and ecosystems, and which appears ethically defensible. However, institutional viability is harder to see in a poor, post-conflict, aid-dependent context, with many sustainability initiatives currently dependent on key individuals to drive and sustain them.

Equally, several initiatives are trying to adopt institutional greening strategies, though formalisation is limited. Indeed, we found evidence that projects (e.g., community or NGO led work-based training) were being used to move faster on environmental issues than was deemed possible if working fully through the national system. This points to the complexity surrounding facilitating verticalities. National policy more allowed rather than facilitated steps towards sustainability, but international organisations were able to bring other vertical benefits. However, collaborative horizontalities are much more apparent, although examples of 45° activity appear very dependent on both charismatic leadership and external resourcing. How sustainable these steps towards sustainability are remains unclear.

Hoima

The development imperative in the Albertine Region of Western Uganda is linked to large oil deposits. Unsurprisingly, core tropes around employability are central, with environmental concerns effectively relegated to some window-dressing.

The British-German-Norwegian Skills for Oil and Gas programme (SOGA) has been a key actor here, providing external mediating activities, with three projects in the region.

First, there was a programme for creating jobs through business development and skills training for micro and small enterprises, delivered by a Ugandan NGO. Second, staff at local VET providers and some students were trained to international standards in welding, electrical engineering and scaffolding. This training was offered by an international consultancy firm and a local Catholic vocational provider. Third, upgrading support was provided to the local public training provider in Hoima through an international NGO.

These interventions were not aimed at direct employment in the international oil companies, or their principal sub-contractors. Rather, they were about increasing employability lower down the sub-contractor chain, and sustainable livelihoods (for instance, for women farmers supplying labour camps).

Furthermore, SOGA seeks also to build a skills response to the wider multiplier effects on the local economy of the oil investments. However, with delays in the final investment decision (FID) to start oil production, these multiplier effects have been reduced and postponed. While programme graduates may be more employable, their actual employment and livelihood improvements are limited. As of June 2021, the Ugandan NGO in charge of delivering project 1 reported only four supported enterprises had been registered.

While most vocational graduates in the region are clearly being trained without a deep sense of labour market dynamics, the second SOGA intervention was specifically organised around anticipated growth trades within the sector and the delivery of industry-required international certification. However, the FID delays have meant that these jobs have not yet appeared, while these internationally certificated graduates are overqualified for local skills markets. SOGA has sought to address this, and the bulk of the graduates are employed in their relevant trades with contact lists being maintained so that they can be contacted when better jobs do emerge. In phase two, SOGA is planning to train another 300 welders with one of the oil companies by the end of 2021. Decent work is clearly aimed at here, but its achievement has proved challenging primarily due to broader system challenges in increasing household and community resilience, issues that will also undermine sustainable VET.

Project 3 seems to have been largely unsuccessful, with interventions such as the introduction of System Analysis Programme (SAP) software doing little to address the real needs of the institution, which has not become markedly more sustainable in environmental or wider senses.

SOGA has worked hard to ensure employability despite the FID delay, but sustainability concerns feel more muted, both in terms of these employability programmes and as a direct response to the negative environmental effects of oil production.

The Ugandan NGO is responsible for another internationally-funded project which has a radically different feel to their SOGA work. It targets communities in several protected areas, such as community wildlife reserves and national parks, likely to be impacted by oil-related activities. It seeks to support them to generate income through biodiversity-related livelihood opportunities and has an explicit focus on the economic opportunities and green skills that should come from mitigation of environmental risks by the oil sector. The project is still in the initial stages of implementation but could be an interesting example of building sustainable livelihoods both in economic and environmental terms. Clearly this is closer to aspects of the visions of both Sterling (2008) and Majumdar (2010) though very much non-formal in nature.

The Catholic provider involved in SOGA project 2 has a degree of sustainability in terms of Sterling's four criteria, with its successes leading to considerable external support from the development community, thus reinforcing its financial viability. In contrast to the weak public, generalist vocational institution unsuccessfully supported by SOGA, it appears to have leadership and systems that work.

Another contrast with the all-purpose public provider is a new public Petroleum Institute. This was designed to meet skills needs closer to the core of the new oil and gas sector, although its engagement with the key sectoral players has been slow to develop. Without this, its sustainability will be limited. It is also mandated to work with the regional, general public VET institutions, but it will struggle to be any more effective than SOGA here.

However, in neither of these two stronger institutions does environmental sustainability loom large, and neither would fit any of Majumdar's (2010) five characteristics of a green VET provider. This is a continuation of the longer-standing extractive VET tradition.

Beyond the focus on oil and gas, there has been a wider raft of national VET reforms that impact regionally. The policy documents are very clear about the need to enhance employability or, rather, entrepreneurship, but there is little about environmental concerns. Staff also have little sense of such issues. Even if they do, the broader context is disabling. This is equally true of curriculum changes intended to support decent work opportunities. In key local economic sectors such as catering, training has improved but livelihood opportunities largely have not. An eventual oil boom would change this, of course, although it would bring further problems and environmental challenges in its wake.

One funded project that has sought to build skills for sustainable livelihoods is a World Bank project on cage fishing, implemented by Gulu University's Hoima Campus. From 2017 to 2020, community groups were trained in cage fishing techniques, with a strong emphasis on environmental protection and conservation oriented towards restoring a natural resource base that is accessible to the poor. While some groups were successful in producing high yields within the first year, the project was designed with insufficient attention to market availability. Thus, the positive sustainable livelihood effects were muted, and the project's durability undermined. Though the project generated some good examples of local collective agency, there were also complaints about local politicians seeking to use access to the project as a way of rewarding supporters.

Durban

KwaZulu-Natal Province in South Africa has seen major declines in manufacturing and agro-industrial employment. Transportation has become relatively more important as a result with the province home to the country's two largest ports. As befits a maritime province, marine resources sustain much economic activity, both through the ports and tourism. However, this is undermined by a history of problematic settlement patterns, poor land management and ineffective regulation that has generated large areas of environmental distress, undermining the potential economic benefits of the maritime economy.

In response, Durban has been the site of a series of major infrastructural development projects in the recent past, including stadium and airport developments linked to the FIFA World Cup in 2010. These form part of a wider set of government infrastructural development plans through the National Development Plan (National Planning Commission, 2012), the National Infrastructure Plan (Presidential Infrastructure Coordinating Commission, 2012) and the Oceans Phakisa initiative (Oceans Phakisa, n.d.). The National Infrastructure Plan contained 18 Strategic Integrated Projects, SIP2 being the Durban-Free State-Gauteng corridor. Key early provincial priorities in this were the development of two Special Economic Zones (Dube TradePort at King Shaka International Airport and the Richards Bay Zone); the expansion of container handling facilities in the Port of Durban; and the development of a new 'dig-out' port to the south of the existing Port of Durban. Oceans Phakisa is supposed to balance employment and environment imperatives. However, the economic imperative is clearly paramount, and this is located within a green growth paradigm, although tinted blue in this case. In practice, developments across all these initiatives have been far slower than intended (cf. Hoima), with Durban's developmental project receiving a further shock in 2021 during the Zuma riots.

When we turn to the skills system, we can see robust evidence of a provision that is viable, at least while the wider maritime economy is. This is organised around some specialist, private-for-profit institutions, and key industry players, such as Grindrod (private sector) and Transnet (parastatal), doing substantial amounts of formal in-house training. The eThekweni Maritime Cluster appears to play a strong coordinating role between these actors. However, this is an exclusive network, with limited engagement with both public skills providers and local environmental groups.

The public vocational system has faced a series of governance crises over the past decade, although there are centres of historical excellence, particularly linked to the automotive industry. As in Hoima, public providers face a challenge because they are not perceived as being serious actors by employers in a sector where international certification plays a big part.

In this light, the most interesting new skills initiative around the blue economy is a new Maritime Academy, opened in 2019 with funding by the National Skills Fund and the Transport Education and Training Authority. Oceans Phakisa support helped ensure Transnet's active involvement and initial programme development and delivery support

from Durban University of Technology. All programmes are accredited by the South African Maritime Safety Authority, ameliorating industry concerns.

In skills ecosystem terms, this Maritime Academy is an example of facilitating verticalities from the national state, which brought together a range of actors behind the project. However, what is striking is that the Academy is located at the public TVET college in Richards Bay, the province's other main port, 170km north of Durban. Given this location away from the main centre of maritime and wider economic activity, and the existing strengths of the private maritime skills ecosystem, it remains to be seen how viable this initiative will be. In skills ecosystem terms, it is less clear that the right collaborative horizontalities are present or that the Academy can function as an anchor institution.

The Academy has an explicit mandate to reach historically-disadvantaged learners, pointing towards at least further aspirations to be sustainable in Sterling's terms. However, our interviews with current students revealed considerable concerns about their prospects for decent work on graduation.

Although the Marine Academy is badged under Oceans Phakisa, which has a rhetoric of blue economy and a marine protection and governance stream, to date there is little sense that Majumdar's notions of green campuses or green curricula are emerging. Ironically, where innovations for green skills training and green jobs do occur within private sector training academies, there can be a disincentive for collaborating with public providers where this may be seen as providing training for competitors. Indeed, Masie and Bond (2018) have argued that the whole Oceans Phakisa model is one of extractivism with a very thin greenwashing.

Alice

Located in the former 'homeland' of Ciskei in South Africa, the Alice area remains profoundly influenced by the legacy of the colonial Land Act of 1913. This established such areas as labour reserves to exclude black Africans from urban residence while providing migrant labour for mining and manufacturing. Such areas were never economically viable as small-scale farming regions, remaining permanently dependent on transfer payments from migrant workers or, later, the state. These lands were set aside for black African habitation precisely because they were not productive enough for commercial farming. This engineered combination of high population densities and marginal agricultural land set up an inevitable environmental challenge. This has been exacerbated by climate change, with water availability a huge constraint. At the same time, economic opportunities in the area remain extremely limited. The food sector dominates the local informal economy but there is limited scope for growth in scale due to the intense supermarketisation of the South African food system.

Several state agencies are active in the region. These include the Department of Rural Development and Land Reform, the Department of Agriculture, Forestry and Fisheries (DAFF), the National Youth Development Agency and the Water Research Commission (WRC). In contrast to the focus on industrial skills policies in the Durban case, the Alice policy

environment is dominated by natural resources and community development, including those policies oriented towards issues specific to the agricultural sector in the National Development Plan. However, policies are experienced as top-down and uncoordinated.

Here too, the local public TVET college is a minor player in place-based networks. Strikingly, however, another public institution, a tertiary institute under DAFF, is a significant actor in local agricultural learning networks. Its location under a national department other than the Department of Higher Education and Training is significant. Unlike many of the institutions across the case studies that are under education ministries, it has considerable autonomy due to education not being its parent department's main activity.

The institute is currently reviewing its curriculum to increase its relevance to the local agricultural sector, to natural resource management, and to sustainable livelihoods. Very few graduates end up in agricultural professions, particularly not as farmers and, increasingly, nor as agricultural extension workers (traditionally an aspirational destination for many graduates). Instead of catalysing the local farming economy, existing agricultural qualifications are commonly used to gain an advantage over others in accessing non-related, but more readily available jobs, in the formal sector, for example, as supermarket till operators or as teachers. The current curriculum review process is intended to counter this. However, as in the cases above, curriculum change cannot easily translate into better livelihoods or jobs without wider structural changes.

The tertiary institute is also an important actor in the Imvotho Bubomi Learning Network (IBLN), animated by Rhodes University and funded by the WRC. Central to the IBLN model is the need for a closer relationship between formal and non-formal learning systems, in a way that resists hierarchical approaches prevalent in agricultural extension.

IBLN is a powerful example of a learning network. It brings together these academic organisations with local economic development officers, extension services, farmers' associations, community radio and smallholder farmers around rainwater harvesting and conservation. This is a crucial issue in a low rainfall area experiencing warming at approximately four times the global mean.

A training of trainers' programme was established to mediate new knowledge from the WRC and to support the stakeholders in the agricultural learning system to utilise this knowledge. In the agricultural institute, lecturers were supported to develop curriculum innovation projects which included shared demonstration site development. Smallholders also participated in the course and were supported to mobilise their prior knowledge, experience and expertise in a local context, drawing on new knowledge from the WRC. This contributed to improved knowledge exchange and farming practice amongst farmers. Members subsequently intensively used social media to share knowledge.

This is an example that is environmentally strong, and which would meet several of Sterling's criteria. While its impact in terms of formal sector jobs is muted, it points towards more sustainable livelihoods and the potential emergence of innovative smallholder farmers into a third space within the agri-food system between subsistence and large-

scale commercial production. However, as in our other cases, the economic niches available for those engaging in improved practices are limited and much of the wider context is disenabling.

This case shows a relatively strong set of collaborative horizontalities and mediating actors. While the state believes itself to be a generator of facilitating verticalities, the reality is one of overlapping and sometimes contradictory policy initiatives, and a failure to address many of the biggest constraints on rural sustainable livelihoods. In the education sphere, the marginal role of the local public vocational TVET college, in contrast to more active roles from tertiary institutions, reflects the oft-reported lack of local autonomy of such providers. As with the other cases, the core set of public VET institutions appears to play a tenuous role in nascent efforts to make VET more sustainable.

While the case is a positive one in important ways, it is also necessary to note that the learning network is built around the contributions of a small group of what we might call anchor individuals. While several have institutional bases, we need to be aware of the potential difference between anchor individuals and anchor institutions when thinking about the sustainability of skills ecosystems. Durability is far from certain.

Discussion

The set of concepts we introduced at the start of the paper are deliberately ambitious. They sketch out aspects of an approach to skills and development that supports a transition towards greater social justice and environmental sustainability. Therefore, it is not surprising that evidence of progress towards them is limited in all four cases. Nonetheless, they are useful tools with which to evaluate current and, especially, emergent practice.

Majumdar's (2010) model is focused on the single institution. In none of our cases can we see much meaningful progress by formal public VET providers relating to any of Majumdar's five pillars of campus, curriculum, community, research and culture. Where there are signs of institution-building, it is around sectoral centres of excellence in both the Hoima and Durban cases. While such centres have potential to build better industry relations, the grounding of both the oil and maritime examples here is somewhat uncertain, partly due to the strength of existing private sector skills arrangements. Moreover, in neither case is there considerable evidence of any greening of the approaches, located as they are in sectors with poor environmental records. However, our drawing on ecosystems thinking makes it clear that a single institution focus will only get us so far. Rather, it needs to be complemented by an exploration of networks. Moreover, the wider political economy is also crucial. Where there are strong or emerging economic sectors, the building of greener providers may be possible. However, it is imperative to understand the nature of the global skills formation system for those sectors and ensure industry buy-in. Beyond that, though, lie even greater challenges of addressing inclusion and environmental sustainability.

Part of our intention in this project was to explore skills formation systems beyond the conventional gaze of the industrial economy. In both Gulu and Alice, we found evidence of skills ecosystems bringing together diverse actors and which have significant concerns

regarding sustainable livelihoods. Although public VET institutions are largely absent from these ecosystems, formal education providers are key, but in the form of two universities and an agricultural institute.

In Sterling's terms, durability is perhaps the biggest question regarding the sustainability of both these skills ecosystems. External funding has been enabling, more so than national policies, but there are legitimate questions regarding whether it is really anchor institutions that are animating the networks or, rather, anchor individuals therein. The importance of nurturing such institutions, but also of realising when they are no longer able to play an anchoring role, points to a very different way of looking at skills formation systems and how to nurture them.

Hodgson and Spours' (2018) vision is of what could be rather than what is. What is apparent across all four cases is relatively weak facilitating verticalities supporting moves towards skills for just transitions at the local level. Policies are often contradictory, for instance, effectively greenwashing by talking about environmental imperatives but overriding these with the economics of business-as-usual. This is evident in both large-scale formal development cases, in Durban and Hoima. Often donors, NGOs and certain state agencies (e.g., the South African WRC) are providing support from above to more sustainable practices. As noted above, while there are some policy and funding opportunities in all the cases, this is far from a well-established enabling environment. Crucially, skills development has little ability to change the possibilities for decent work and sustainable livelihoods on its own. Too often, wider economic and labour market realities are uncondusive to the changes being attempted.

The focus on social skills ecosystems as a site to examine VET sustainability does important work in moving us towards a better understanding of the possibilities and challenges of building skills for just transitions. Place is at the centre of this, but place must be enacted by social actors. All four cases show networks of actors, but participation varies hugely and is of crucial importance. The notion of anchor institutions is important too, but we need to be conscious that the actions of these institutions is often highly dependent on individuals who themselves anchor institutional involvement in networks. The approach also highlights the importance of thinking in networked ways around collaborative horizontalities, rather than in the very thin official approaches of state hierarchies that both preach engagement with limited stakeholder groups and are deeply suspicious of the threats such engagement brings to these hierarchies. It also frames these state VET system hierarchies through the notion of facilitating verticalities, the extent to which the wider policy and political economy environments are conducive to local developments. Any transition towards sustainability is necessarily disruptive of power and hierarchy, and will be very challenging to existing vertical relationships. Perhaps most crucially, the notion of ecosystems contains within it an implicit awareness of dynamic rather than static reality. Ecosystems can flourish but they are always subject to change and a finite existence. Taking this into account when thinking about the transition to sustainable VET is crucial.

Conclusion

While we highlighted the importance of thinking about VET for just transitions at the start of the paper, we must be honest about progress in that direction. There is a long way to go, and our collective practical and theoretical steps have been tiny in the face of the enormity of the journey.

Yet, perhaps what these cases show is the need to start prioritising VET, sustainability and just transitions, as the current academic literature is shamefully silent on this subject. If we are to break out of VET's complicity in the Capitalocene and extractivism, we need to start reframing how we think about VET and its purposes.

Two opportunities emerge from our deliberately diverse case studies. First, in more formalised cases, like Durban and Hoima, there is a possibility to look at the development of centres of skills formation excellence grounded in sector and place but this also requires thinking about bigger challenges of just transitions. More radically, by highlighting the contexts of less formalised skills ecosystems in Alice and Gulu, we point towards new ways of thinking about supporting such ecosystems work on sustainable livelihoods in ways that enhance their durability. While the details of the dynamics of each skills ecosystem necessarily are unique, we suggest that these new ways of thinking are useful well beyond the cases themselves in allowing new questions to be raised about regional skills systems globally.

Acknowledgements

This article derives from research funded by ESRC/GCRF – award number ES/ S004246/1.

Notes on Contributors and their Contributions

Lead author

McGrath, Simon

Simon McGrath holds the established Chair in Education at the University of Glasgow. A Fellow of the UK Academy of Social Sciences, he works on the relationships between education and development, both as an academic and as a policy advisor for organisations such as UNESCO and the Commonwealth Secretariat.

Co-author

Russon, Jo-Anna

Jo-Anna Russon is a Senior Research Fellow in the School of Education, University of Nottingham. Her work focuses on the role of business in international development, situated in critical Corporate Social Responsibility.

Percentage contribution

Areas of contribution	Author	% Contribution per area, per author (each area = 100%)
Conception or design of the paper, theory or key argument	McGrath	65%
	Russon	35%
Data collection	McGrath	50%
	Russon	50%
Analysis and interpretation	McGrath	50%
	Russon	50%
Drafting the paper	McGrath	80%
	Russon	20%
Critical review of paper	McGrath	65%
	Russon	35%

References

- Allais, S. (2022). Skills for industrialisation in sub-Saharan African countries: Why is systemic reform of technical and vocational systems so persistently unsuccessful? *Journal of Vocational Education & Training*, 74, 3, 475-493, doi: 10.1080/13636820.2020.1782455
- Anderson, D. (2009). Productivism and ecologism. In J. Fien J., R. Maclean, & M.-G. Park (Eds.), *Work, learning and sustainable development*. Dordrecht: Springer.
- Cedefop. (2012). *Green skills and environmental awareness in vocational education and training*. Luxembourg: European Union.
- Coll, R., Taylor, N., & Nathan, S. (2003). Using work-based learning to develop education for sustainability. *Journal of Vocational Education and Training*, 55(2), 169–182.
- Deissinger, T. & Gonon, P. (2021). The development and cultural foundations of dual apprenticeships. *Journal of Vocational Education and Training*, 73(2), 197–216.
- Fien, J., Maclean, R., & Park, M.-G. (Eds.) (2009). *Work, learning and sustainable development*. Dordrecht: Springer.
- Hillage, J., & Pollard, E. (1998). Employability. Research Brief 85, Department for Education and Employment, London.
- Hodgson, A., & Spours, K. (2018). A social ecosystem model. ELVET Research Briefing No. 3, Centre for Post-14 Education and Work, Institute of Education, University College London.
- International Labour Organisation. (2011). *Skills for a Greener Future*. Geneva: ILO.
- Liu, X., Chen, Y-S, Yang, Y., Liu, B., Ma, C-Y, Craig, G., & Gao, F. (2020). Understanding vocational accounting students' attitudes towards sustainable development. *Journal of Vocational Education and Training*, 74(2), 249-269. doi:10.1080/13636820.2020.1760333.
- Majumdar, S. (2010). Greening TVET. Paper presented in IVETA-CPSC International Conference, Manila, Philippines.
- Masie, D., & Bond, P. (2018). Eco-capitalist crises in the 'blue economy'. In V. Satgar (Ed.), *The climate crisis*. Johannesburg: Wits University Press.
- McGrath, S. (2020). Skilling for sustainable futures. TEF Background Paper Series, University of Bristol. doi:10.5281/zenodo.4022328
- McGrath, S., Needham, S., Papier, J. & Wedekind, V. with Attwal, H., Calitz, M. & Van der Merwe, P. (2010). *Employability in the college sector*. School of Education, University of Nottingham.
- McGrath, S., Ramsarup, P., Zeelen, J., Wedekind, V., Allais, S., Lotz-Sisitka, H., Monk, D., Openjuru, G., & Russon, J.-A. (2020). Vocational education and training for African development. *Journal of Vocational Education and Training*, 72(4), 465–487.
- National Planning Commission. (2012). *National Development Plan*. Cape Town & Pretoria: Government Printer.
- Organisation for Economic Co-operation and Development. (2011). *Towards green growth. A summary for policy makers*. Paris: OECD.

- Oceans Phakisa. (n.d.) <https://www.operationphakisa.gov.za/pages/home.aspx>
- Pavlova, M. (2018). Fostering inclusive, sustainable economic growth and 'green' skills development in learning cities through partnerships. *International Review of Education* 64, 339–354.
- Presidential Infrastructure Coordinating Commission. (2012). *National Infrastructure Plan*. Cape Town & Pretoria: Government Printer.
- Rosenberg, E., Ramsarup, P., & Lotz-Sisitka, H. (Eds.) (2020). *Green skills research in South Africa*. Abingdon: Routledge.
- Scoones, I. (1998). Sustainable rural livelihoods. Institute of Development Studies Working Paper 72. Brighton: IDS.
- Sterling, S. (2008). Sustainable education. *Policy and Practice*, 6, 63–68.
- Swilling, M. (2020). *The age of sustainability*. Abingdon: Routledge.
- United Nations Environment Programme. (2008). *Green jobs: Towards decent work in a sustainable, low carbon world*. Nairobi: UNEP.
- United Nations Environment Programme. (2011). *Towards a green economy*. Nairobi: UNEP.
- VET Africa 4.0 Collective. (2023). *Transitioning vocational education in Africa*. Bristol: Bristol University Press.
- Wedekind, V., Russon, J.-A., Ramsarup, P., Monk, D., Metelerkamp, L., & McGrath, S. (2021). Conceptualising regional skills ecosystems. *International Journal of Training and Development*, 25(4), 347-362.