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Reframing skills ecosystems for sustainable and just futures☆

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ABSTRACT

The current dominant approach to vocational education and training (VET) does not work in theory, policy or practice in current contexts of unsustainability and global inequality. Nor is it fit for future purpose. Drawing on a large-scale research collaboration between four universities, funded by the UK's Global Challenges Research Fund, with co-funding and funding in-kind from global south partners, this paper is a contribution to imagining new VET futures. It looks iteratively, reflexively and expansively at how our experience of VET system development involving boundary crossing between formal and informal VET systems interfaces with recent Northern work on the conceptualisation of social skills ecosystems, and how this concept can be expanded to address the challenge of skills for just transitions in the global South. We advance the skills ecosystems approach ontologically by drawing on critical realism (a growing trend in VET and development research). This allows us both to move beyond the structure-agency divide that has bedeviled the field, and with it the tendency to monoscalar analysis. Rather, we argue that accounts of VET and development must address both structure and agency, and their interplay, and must be multiscalar. This reading allows us to focus on the central importance of relationality. We argue that it is through networks and relationships that the precarious worlds of learning and work are brought together.

1. Introduction

The current dominant approach to vocational education and training (VET) does not work in theory, policy or practice in current contexts of unsustainability and global inequality. Nor is it fit for future purpose. This particularly relates both to the environmental crisis and to the inclusion of all those who are excluded from formal VET systems, yet who are involved in, and needing, VET for livelihoods and smaller scale enterprise development. VET approaches have been largely inadequate in responding to the multidimensional nature of the contemporary social and ecological sustainability crises, partly because these issues have been treated as externalities to mainstream economic activity and work practices, a problem that results from separating economy from ecology and society (VET Africa 4.0 Collective, 2023). These problems with VET and development are global but can perhaps be seen most clearly from vantage points and experiences of people in the global South.

Both the education and sustainable development and a VET literatures were slow to address the skills and work dimension of sustainability challenges (Fien et al., 2008; McGrath, 2012). Indeed, in spite of concerns raised more than a decade ago, the VET literature largely continues to sidestep questions regarding whether human and wider ecological systems flourishing (on which human flourishing depends), rather than employability and productivity, should be the appropriate goal of VET (McGrath et al., 2020b). The environmental crisis, coupled with ongoing social systemic inequalities and exclusions, serves to put this narrowness in even greater relief.

In response, we need to imagine new VET futures, and this paper is an attempt to move this process forward, looking iteratively, reflexively and expansively at how our experience of VET system development involving boundary crossing between formal and informal VET systems (cf. Lotz-Sisitka et al., 2016, 2021; Pesanayi, 2019; VET Africa 4.0 Collective, 2023) interfaces with recent Northern work on the conceptualisation of social skills ecosystems, and how this concept can be expanded to address the challenge of skills for just transitions in the global South (Rosenberg et al., 2020; Ramsarup et al., 2022; VET Africa 4.0 Collective, 2023).

This paper draws on a large-scale research collaboration between four universities, funded by the UK's Global Challenges Research Fund,

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with co-funding and funding in-kind from global south partners. It is not intended to provide a detailed empirical account of the larger project (cf. VET Africa 4.0 Collective, 2023). Rather, here we are providing an overview of our expansion of the skills ecosystems approach and its implications for an expanded and enhanced account of VET and development, based on our iteratively developed experience and analysis of social skills ecosystems development in African contexts.

One way in which our analysis moves the skills and development debate forward is through an engagement with political ecology accounts. In another article (Lotz-Sisitka et al., 2023), we build an argument for a political–economy–ecology of skills (cf. VET Africa 4.0 Collective, 2023). For the moment, we will follow Leff's argument that political ecology is a response to political economy's failure to address the effects of industrialisation on nature:

> political ecology goes beyond the proposal for conservation of nature … and policies of environmental management … to enquire on the conditions for a sustainable life in the ecological stage of economic and technological hegemonic domination (Leff, 2015, 33).

Building on the vast body of research and policy that seeks to address global environment and development challenges so well summarised in the Leff citation above, this leads us to argue that the continued dominance of a conventional political economy of skills needs to take much better account of issues of ecology and contemporary challenges of social inclusion.

Despite the scale of the environmental crisis and associated social injustices (IPPC, 2018), there has been a paucity of articles that look at the question of what skills and skills systems are needed to respond to the crisis and even fewer from a critical perspective. 15 years on, Anderson's critique of VET as productivist remains largely unanswered. In his words,

> VET uncritically mirrors the dominant logic of industrial society and produces its subjects as compliant and compulsive agents of economic growth, largely inured to the environmental consequences of their habitual behaviours. Located at the interface between education, the labour market and civil society, VET performs a crucial role in the constitution, population and legitimisation of the vocations and professions, the main generators of economic growth …
>
> cast within the ethos of productivism and the ideological framework of neoliberalism, the institution of VET 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, 2008, 106 and 121).

In responding, we must start with an acknowledgement of skills development's role in contributing to the crisis. Conventional VET is deeply embedded in the wider 'Capitalocene'[1] system (Moore, 2016) and has been largely oriented to producing skills for driving the fossil-fuelled industrial economy. Today's understanding of the impacts of a fossil-fuelled industrial economy on the changing climate and earth system reveals its contemporary inadequacy (IPPC, 2018).

In African contexts, skills formation systems were developed, and largely remain defined, along extractivist, racist and exploitative lines in support of major industrial and infrastructure development projects of the colonial and postcolonial state, and the continuing interests in offshore resource flows (such as oil) (Allais, 2020, in this issue). The modern history of VET in Africa is also profoundly shaped by the skills needs of post-independent state formations, which were increasingly shaped by neo-colonial development discourses and aid practices (McGrath et al., 2020a; Yamada and McGrath, in this issue). Any future account of skills needs to acknowledge this past.

Moreover, in reimagining VET, we need to guard against a formalist fallacy that VET equates to formal learning in public colleges, for work in formal firms. Both vocational learning and work are much more complex and diverse than this and transitions between the two are rarely simple and linear (cf. Ramsarup, 2017b). Hence, we need to both reconstitute the notion of work and the relational system of education and training. The latter must be done for broader educative purposes but also to make VET better at providing access to knowledge, learning pathways and pedagogical encounters for a changing concept of work. In constituting a notion of VET that resonates with current and emergent realities in the global South, it is necessary to explore an educational account that extends beyond incrementalist discourses on green economic transformation aims to ensure that vulnerable individuals are better off through the transition process, or at least not negatively impacted by it. As such, it has economy- and society-wide relevance, i.e., such deliberations and ethics for just transitioning to more sustainable futures should influence all VET programming and approaches (IPPC, 2018; Montmasson-Clair, 2021; VET Africa 4.0 Collective, 2023).

Conventional approaches to VET (both human capital and political economy based) are weak at working across scales. A focus on the individual is a constraint in enabling transitions and contradicts the deep systemic co-evolution needed for a just transition. However, focusing on national systems alone is also inadequate. Rather, we need a multi-scalar and relational approach that acknowledges the myriad of relevant actors and institutions involved in skills development (Ramsarup, 2017a). As we explain in more detail below, we are informed here by critical realism and the work of Bhaskar (e.g., 1993) in particular (see Ramsarup et al., 2022, for a more detailed exploration of this).

We also need to be clear that many diverse skills are needed for driving the transition to a low carbon economy. As Rosenberg et al. (2016) argue, these are technical, relational and transformational in nature; for example, the kind of modelling required for greening the economy would also have a transformative dimension (visioning, ethical valuing). Moreover, they do not necessarily reside in individuals alone but may be distributed across teams of people.

Here we draw primarily on Spours (2019) work on the skills ecosystem as a place-based perspective that foregrounds context within skill development planning. It helps us to give attention to the history, social context, institutions and actors comprising the ecosystem, as well as the community and collaborative networks (Wedekind et al., 2021). Hence, skills ecosystems thinking brings relationality centrestage and provides a useful lens to investigate and explore relational dynamics with the skills ecosystem. It asks us to think about how these dimensions are connected to policy and government structures. We expand this work, and, in this paper, we review and document the evolution of skills ecosystems research and its potential for rethinking VET in Africa within a just transitions framing (cf. VET Africa 4.0 Collective, 2023).

The framing of skills ecosystems provided in this paper explores the skills needed for a just transition, conceptualising the role of skills within the ecosystem as an enabling factor between the vertical and the horizontal dimensions of the skills ecosystem, as explored below. It draws on empirical work to share key learnings regarding how the skills ecosystems approach can advance our understanding of skills that can support a just transition and hence expand our accounts of the VET – development relationship.

We next provide a brief note on the nature of the empirical work on which this paper is based, before providing a brief introduction to the skills ecosystem literature. Then, in the main part of the paper, we explore what we learned in adopting and through adapting the

[1] Moore (2016) uses this term to qualify a defining shift in geological epochs, from Holocene (meaning a relatively stable period in earth system conditions in which humans were able to settle and flourish) to Anthropocene (meaning the recent period in geological history in which humans are altering the earth systems). Moore, writing from a political ecology perspective indicates that the shifts in earth system balance (i.e. most visible through climate change) are related to the way in which capitalism functions and has led to pollution, dominance and exploitation of natural systems to the extent that this is now shifting the natural earth system equilibrium, at least as known in the period of human existence on the planet.

approach, and outline some of the key lessons we believe this offers for the wider debate on VET and development.

2. Our empirical base

This paper draws on a three-year collaborative project between 20 researchers at four universities in Uganda, South Africa and England. It used a mixed method approach, including several hundred face-to-face and online interviews and focus groups (with learners and staff in vocational institutions, employers in the formal and informal sectors, civil society actors and youth); participatory action research with community groups and VET college staff; analysis of social media interactions in learning networks; surveys of vocational lecturers; analysis of policy texts (ranging across industrial strategy, spatial strategy, sectoral policies, and skills policies); and critical reflections by key team members on their existing work as policy and practice actors (including as ministerial advisors and advisors to international development agencies).

The project was organised around four case studies. These were consciously designed to look across VET contexts, including both rural-urban and formal-informal spectra. They were selected in order to examine how VET systems were undergoing pressures/possibilities for change due to wider political-economic imperatives, rather than being focused on 'steady state' VET. They were chosen to generate a wide range of insights that could move theory forward rather than intended to 'represent' the VET sector as conventionally understood.

The Durban-KZN North Coast region of South Africa (hereafter called eThekwini) is a large urban and industrial conurbation. The selection was based on the South African state identifying it as having a strategic gateway function through its port and airport, and developing interventions to build its capacity, including a skills dimension. Hence, we were concerned with questions of whether formal public VET could both be transformed by the wider actions of a would-be developmental state and could be a vehicle for spatial policy.

The case of the small town of Alice in rural, former homeland, Eastern Cape, South Africa was selected due to prior involvement of some of the team in a programme of support to small-scale agriculture through a learning network centred on water conservation (Lotz-Sisitka et al., 2016, 2021). Here, we were consciously moving away from conventional notions of formal VET but focusing instead on key processes of vocational learning within a district, and the network of actors that had come into being to support this.

The case of the Bunyoro-Kitara Kingdom of Western Uganda, located around Hoima, was chosen as the site of major ongoing development activity linked to the opening of a new oilfield. As well as national investment, the area has seen donor support to skills development from the World Bank and a consortium of bilateral agencies. This consortium, in particular, had a clear theory of change regarding how VET could support the wider development process in ways that could maximise local benefits and address inequality and poverty. We wanted to examine this case form the ground up rather than in the top-down manner of the agency intervention.

Finally, the city of Gulu in Northern Uganda, formerly the centre of international humanitarian efforts in the wake of the infamous Lord's Resistance Army uprising, was selected as it is in the process of transitioning to a new developmental model, whilst remote from much formal economic activity in East Africa. Here we focused on the intersections between the formal and informal economy, and the experiences of Gulu University in mediating relationships between them. At the heart of our interest here was the potential benefit of examining a skills ecosystem from the perspective of young people rather than institutions.

This paper draws upon these empirical cases in Uganda and South Africa to consider the key areas that we identified as critical for a reimagined VET in Africa: inclusivity, VET pedagogy, learning pathways and occupational progression for VET graduates, networking and community engagement, and formal and informal VET (VET Africa 4.0 Collective, 2023). Within each case, specific examples of VET systems were explored (e.g., agricultural extension, catering). This enabled a consideration of how they can be understood within a reimagined skills ecosystem. As noted above, we were not seeking to develop a representative account of VET but to develop an immanent critique of the limitations of more orthodox ways of looking at this and generate an alternative reading that was pregnant with possibilities for future development.

3. Skills ecosystems research

The policy and practice challenges of transforming VET point to the need to not simply 'match' supply and demand for skills, but also to the need to support educational and occupational progression as well as social justice, wellbeing, resilience to climate change and sustainability. We believe that the social skills ecosystem approach can offer a way of theorising better both the challenge and the possible ways forward in this regard.

Finegold (1999) defined skills ecosystems as regional or sectoral social formations in which human capability is developed and deployed for productive purposes. He explained further that skills ecosystems elevate the importance of understanding the context or setting within which skills are developed and used, the wider array of determinants associated with workforce development, and how workforce development is connected with trajectories of social and economic development. He showed that high skills ecosystems comprised four elements – 1) catalysts which can trigger development; 2) nourishment to provide a stream of new talent; 3) a supportive environment; and 4) interdependence between ecosystem actors (Finegold, 1999).

At its most basic, a skills ecosystem is akin to a biological system, with all separate parts connected, interdependent and working together to function well as a whole. The skills ecosystem is a dynamic concept that recognises the intersection of low, intermediate and high skill segments in a system, and their continual inter-development.

Formal and informal, organic and intentional, skills ecosystems have pushed discussion beyond narrow skills supply and demand approaches and highlighted the importance of the following four features in understanding local skills systems: 1) development, 2) supply, 3) demand, and 4) deployment of skills. Brown (2022: 10) argues that skill ecosystems illustrate that:

> policy focused exclusively on supplying skills through vocational training risks poor labour market outcomes, while policies driven exclusively by linking skill development to industry demand cannot address the problem of skills' underutilisation in the workplace.

This raises the need for a much more nuanced investigation of skills actors, institutions and the dynamics between them.

Spours makes a vital contribution to this debate by expanding the notion beyond its high skills and economistic origins through considering what social skills ecosystems might look like. Here he is explicitly concerned with questions of inclusion, justice and sustainability. His approach attempts to look

> beyond the worn-out binaries of market and top-down state; urban centre and periphery; skills supply and skills demand. At its core lies a more connective, devolved and sustainable view of the world that sees rich potential in the synergy of diverse social forces and their respective specialisms to produce a new economic, social and educational dynamic. In this sense, social ecosystems are a form of civil society building and a form of transitioning away from current neoliberal realities. (Spours and Grainger, 2018)

Spours (2019) argues these social ecosystems have four elements. First, facilitating verticalities, those policies and actors intended to support learning, living and working. These verticalities are often top-down and in the policy sphere. Second, collaborative horizontalities,

the networks between various actors at the local level. Spours argues that individual VET institutions can only be strengthened effectively as part of wider networks. Third, mediation refers to the points of connection between these two dimensions constructed by individuals and organisations. This includes system leadership by anchor institutions, which may include VET institutions. Fourth, ecological time, a sense that skills ecosystem development should be understood as a long-term project.

Based on the formation of networks across different sectors and involving a wide range of social partners (Hall and Lansbury, 2006), the skills ecosystem approach attempts to produce a strong synergy between education, training and workforce development and living in a variety of production settings, both high skill and at more foundational levels. In using the Spours framework, Lotz-Sisitka (2020) working in South Africa, explains that in social-ecosystemic skills planning leadership should be place-based and should involve the capability to define the problem terrain, and the goal of inclusive sustainable social, economic and educational development. The framework thus allows researchers to include a focus on local economies, as well as the actual ecological context of the place-based skills ecosystem, as well as an in-depth sociological understanding of the histories of social marginalisation and ecological degradation, their emergence and contemporary cultural historical configurations thereof, all of which affect skills development realities.

However, this is clearly somewhat aspirational and the model perhaps should be best understood as pointing towards the possibilities that network relations bring. Moreover, it can be countered that relationships can also be characterised by confusion, miscommunication and conflict. These are not issues that the approach deals with adequately as yet, a point we will return to in the conclusion.

4. An expanded approach

4.1. Using Spours' model

Spours' four elements proved analytically very useful in our research, and allowed us to expand the analysis to consider very different contexts than his UK focus. In doing so, we deepened and widened his original approach.

We could find examples of collaborative horizontalities, for instance. However, what was more instructive was the limits of these and which actors were at the core and periphery. In the more formal sector settings of oil in Hoima and maritime in eThekwini, there existed a core group of employers with strong relations. In both, this reflects a wider ecology of the industrial sector, which exists at both global and local levels. In both, there is a clear hierarchy of firms, with well-understood specialisms. In terms of education and training, both industries used international qualifications and much of the labour market was international in nature. The existing networks of actors included in-house and specialist training contractors. This thick network and institutional architecture made it difficult for public VET providers to penetrate skills supply networks. Even though both the South African and Ugandan governments had borrowed the international notion of centres of sectoral excellence, they remained on the periphery of the skills ecosystem (cf. Kruss et al., 2015 for a similar finding regarding the South African auto industry). In the less formalised contexts of Alice and Gulu, collaborative horizontalities were necessarily less formal. However, they were more inclusive of communities and informal actors.

Spours' account suggests a strong role for a facilitating state. However, this was far harder to find evidence for across in the African contexts we studied. There are examples of facilitating verticalities across the cases but more that are nonfacilitiating. Policies are often contradictory and stated policy intentions are often poorly reflected in practices, due both to the nature of the policy process and implementational capacity. Moreover, we need to remember the effects of path dependence resulting from the legacies of fossil capitalism, colonialism and apartheid. This requires us to move beyond the flatter accounts of the northern skills ecosystems literature. Looking specifically towards just transitions, we see a strong disjuncture between economic and environmental policies and significant contradictions that exist between these policies and their implementation due to limited options for development, strong international influences (e.g., in the oil industry) and weak governance commitments to environmental regulation in most cases. Skills for sustainability efforts need to be read in this light.

Mediation and leadership were crucial notions informing our work and we will explore these in greater detail below. We found examples of organisations seeking to play a leadership role, including some of the universities at which team members were employed. However, we also found that often this was centred on key individuals rather than being embedded fully in organisational structures and processes, although strong commitments from universities to community engagement substantively strengthened ongoing relations within the skills ecosystems. However, resources for this work were also relatively limited.

The notion of time also appeared to be crucial. The concept of ecosystem implies that we are examining dynamic processes that evolve or de-evolve over time. Even where they appear currently to be in equilibrium, this may be disrupted by dynamic forces. Giving attention to time in skills ecosystems research, reminds us that the temporality of development and research are important. As Braudel (1986) argued, we experience multiple temporalities simultaneously and interdependently in a manner akin to the playing out of lamination we shall explore below. Thus, in the case of Hoima, for example, we saw the very particular timescales of a major oil investment (c. 25 years with very well-defined phases in terms of activities, employment and skills needs); interacting with the volatility of the global oil price (dictating when the final investment decision would be made that would start the 25 year clock); and Ugandan government and international donor attempts to intervene in the skills system (shaped particularly by budgetary cycles and the time needed to build skills infrastructure). The interplay of these led to suboptimal decision-making regarding skills interventions but also interacted with various further decision-making processes within local communities and VET institutions regarding what skills were likely to be in demand and when. Attempts to maximise local skills content, therefore, were rendered very problematic. Market forces probably will eventually ensure that the skills gap is closed but with the risk of this being through the importation of much of those skills, in contrast with the more inclusive strategies that firms, donors and government all espoused to be working on given that adequate time is needed for developing the scope of skills required for introducing such industries in local contexts.

4.2. Expanding the model through empirical investigation

A crucial element of our attempt to expand the social ecosystem of skills approach was through our empirical work. The richness of working across four case contexts, offered opportunity to examine, in more detail and in a diversity of settings, how social skills ecosystems are constituted in these African contexts. As well as having four cases, we developed a set of four lenses for exploring each. The initial impetus for these was an awareness that previous work on skills ecosystems was relatively shallow empirically and, in particular, lacked depth regarding the complex processes and engagements of actually existing skills ecosystems. Again, the choice of which aspects to target for more in-depth analysis was not seen epistemologically as being about a process of modelling VET systems. Rather, we were informed by the team's judgements as engaged academics as to which aspects of the cases might be most generative of new theoretical insights. Moreover, this process of focusing was also quickly in tension with the pragmatics of researching under a pandemic, lockdowns beginning approximately a month after most of the team were together for a design workshop. Across the four cases and four thematic lenses, we used the four dimensions of Spours' model to inform our data collection and analysis.

Our first lens was that of informality. Whilst informality and formality always exist alongside and in relationship to each other, our focus on predominantly informal economies in Alice and Gulu permitted us to see ecosystems differently than in the 'high skill' original skills ecosystems cases. What we encountered, especially in Gulu, was an ever-shifting pattern of thousands of individuals, families and micro-enterprises operating in complex webs of relationality. There were aspiring anchor institutions, most notably Gulu University, but their reach was limited (though it expanded through participation in the project). This led us back to Finegold's notion of catalysts and conceptualising these actors as network catalysts, engaged in "fractal processes of deepening relationality" (VET Africa 4.0 Collective, 2023: 164).

We also returned to an older debate about education and training in the informal sector (McGrath et al., 1995; King, 1996). In keeping with some of that work, we noted that informality is not simply about abject survivalism or heroic entrepreneurialism but includes many who are making decent, though always somewhat precarious lives, as producers and trainers. As well as seeing much relational agency from young people trying to navigate towards better possible futures, we saw a fluidity in the relationships between informal, nonformal and formal learning that has not been stressed previously. For instance, we saw one farmer in the Ugandan formal sector (with advanced qualifications) increasingly repositioning himself as a trainer for small-scale, would-be and new farmers. Having worked in the state science system previously, he was taking the unusual route of getting his study programme nationally accredited. Elsewhere in Gulu and Alice, we saw how interactions with universities that were initially research-driven were leading to attempts to upgrade nonformal learning without fully formalising it.

This leads to our second lens, that of VET teachers. We started from the premise that VET is an educative process and that we should give a central role to those facilitating learning. Here we were consciously talking back to much of VET research, which ignores or berates teachers. In contrast, we sought to explore the extent to which they were playing important roles in facilitating and maintaining ecosystems. Here, we took an expansive view of who counted as a vocational teacher, attempting to get beyond the overused binary of public sector vocational lecturer and industry trainer. Our contention is that such teachers should be central to vocational learning in skills ecosystems as they *can* be mediators between the worlds of learning and work, interpreting curriculum, scaffolding learning and negotiating access to workplaces. However, the reality is often less positive. Here, we suggest that the power of the ecosystems approach lies both in showing what is possible and in identifying some of the policy-induced limitations of the current approach. For instance, in the public system, we can point to the top-down bias of too many interventions in vocational teacher development, including attempts to upgrade qualifications levels that drive experienced teachers out of the system. We can also highlight the many ways in which policy rhetoric about public VET responsiveness and innovation are undermined by a lack of trust and a refusal of teacher autonomy.

Our third lens is that of the education-to-work transitions debate. We argue that such transitions need to be researched critically as they are central both to policy concerns and, more importantly, the lives of young people and their families and communities. Here we follow Sawchuk and Taylor (2010), who highlight nonlinear and blocked transitions, and how these are shaped by intersectional inequality. Our data reinforces these arguments and the importance of contexts. Our main messages though are about system leadership and relationality. In the challenging labour markets of South Africa and Uganda, anchor organisations are crucial to facilitating learner navigation of the system. The young people we interacted with generally had a very good sense of the challenges of navigating transitions to better futures. They were conscious that gatekeepers and networks were often key, both directly for the relations necessary to secure and maintain employment but also, more indirectly, as sources of crucial knowledge that could open up access to better work and lives. Indeed, we were drawn to reflect ethically and methodologically on our importance to young people as sources of information and knowledge. This was particularly evident when younger African members of the research team interacted with youth from similar backgrounds. Here, interactions could be more about interviewing the researcher on their navigational journey than formal data collection.

Our fourth lens may seem rather strange for a VET-oriented project as we looked at universities as actors in social ecosystems for skills and, particularly, in localised co-learning networks. This decision was driven by our awareness that two of the partner universities (Gulu and Rhodes) were engaged consciously in trying to act as anchor institutions, whether at unit or institutional level. We came to realise that universities are well-placed to be key actors in skills ecosystems due to their ability to work at both national and local levels (hence across the horizontal and vertical). Moreover, in relatively informal contexts, they represent an unusual level of formalisation and status that grants them convening power.

We sought to expand the concept ontologically as well as empirically. Practice and policy tend to create a binary between formal and informal and macro and micro, and making links between micro and macro level data has always been problematic within skills research, creating a bifurcated research terrain (cf. Ramsarup, 2017a; Lotz-Sisitka and Ramsarup, 2017; Yamada and McGrath, in this issue). While skills ecosystem research has started to shift away from this binary, it has still largely focused on productive purposes. Our model of an expanded skills ecosystem, with its multi-level sustainability-focused ontology (see Fig. 1 below, and Ramsarup et al., 2022), facilitates the connecting of macro and micro domains and data. We consider macro and micro as separate only as analytic categories while fully acknowledging that they represent different layers of empirical reality. Through our cases, we explored the relations between these layers enabled by the laminated system framework, depth ontology and emergent properties, all of which we situated within the framing of a transitioning skills ecosystem. Our expanded multi-levelled skills ecosystem lens also enabled us to transcend the dualism between the system and individual through a refocusing on its emergent properties in open systems ontology (Sayer, 2000). The stratified ontology (Sayer, 2000) of the multilevel skills ecosystem enabled us to work with skills ecosystems as a laminated totality (Bhaskar, 1993). This allowed us to work with social phenomena like learning and work transitions, and livelihood creation, by explaining them at different levels or scales and acknowledging that in "open systems a multiplicity of mechanisms (conditions, agencies), emergent at different levels of reality, is always involved" (Price, 2012).

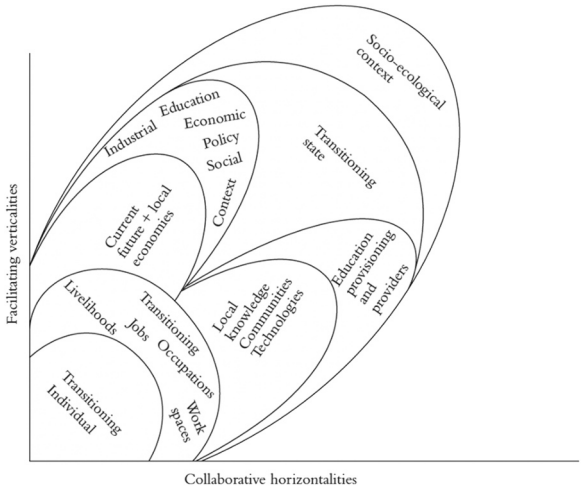


Fig. 1. Expanded social ecosystem for skills model. (VET Africa 4.0 Collective, 2023: 72).

4.3. A stronger focus on relationality

Previous ecosystems work, particularly that of Spours, surfaces the importance of relationality between different skills system actors in a place-based framing. We sought to probe this further, through explicit discussion and application of the notions of relational agency (Edwards, 2005) and relational capability (DeJaeghere, 2020).

Within the project, the expanded skills ecosystem provided us with a conceptual and theoretical framework that could capture issues of relationality, in terms of VET networks and connections between individuals and institutions within the geographic bounding of each case and help us to understand how such relationships are hindered or facilitated by regulations, policies and key local actors and institutions. Both the Alice and Gulu cases provide examples of the kinds of rich relational networks centred on actors within the informal economy and the power of such networks to act as an integrative force, softening and stretching traditionally rigid boundaries between everything that has typically constituted the formal systems of education, and the vast landscape of learning that exists beyond it. It also highlighted the need to give more attention to relational agency, as well as knowledge and its dissemination in VET.

Another area where our work dismantled the binary that practice and policy tend to create between formal and informal was within learning and work transitioning. Hence, the 54 individual pathway stories we collected reflected both formal–informal interactions and colearning, illustrating the need to explore transitions as a relational phenomenon, a type of (nonlinear) continuum. This observation works against policy and development imperatives that continually seek to support the transition from informal to formal, largely without success.

Our data reveals clearly that a transformed VET sector that is inclusive and oriented towards sustainability cannot be built by separate actors in splendid isolation. The need for regional horizontal connectivity between VET institutions, universities, NGOs, business foundations, youth organisations and other societal actors is pivotal. Joint learning networks and communities, as found in Alice and Gulu, are promising examples of that type of connectivity.

It is in the formation of learning communities that relational agency proves to be a useful concept when attempting to understand how people can come together, however fleetingly, to interpret a problem and respond to it. Relational agency focuses more directly on the nature of the relationships that comprise a network of expertise (Edwards, 2005). This means an approach of viewing skills as residing in an individual without the other is a simplistic representation and will not leverage change. Importantly, this is not a top- down imposition of interventions, but rather a relational expansion outwards from the local context to draw in influential partners, funding, knowledge resources and potential development partners that can help with expanding the local economy as well as the knowledge and learning system.

4.4. Skills for just transitions

The social ecosystem for skills model encapsulates much of our thinking about the necessity of going beyond productivist notions of skills for work and the economy to thinking more sustainably and holistically about reimagining the purpose and functionings of VET towards just transitions in diverse African contexts. In this section, we explore how this work on skills ecosystems advances VET in supporting just transitions.

Swilling et al. (2015) argue that a just transition would consist of a dual commitment to human wellbeing (with respect to income, education and health) and sustainability (with respect to decarbonisation, resource efficiency and ecosystem restoration). Proposed dimensions of a just transition include procedural, distributive and/ regenerative justice (Montmasson-Clair, 2021). However, a just transitions perspective does not provide a sufficiently complex, multi-layered, and nuanced epistemic framing with which to examine inevitably complex and interconnected social systems and structures. This is especially true if that which is being examined is in a state of flux due to endogenous and exogenous factors almost continuously interacting and intersecting.

Just transitions require an approach to skills development that is strongly place-based and which can play a transformative role in local communities. Lotz-Sisitka (2020) argues that a paradox exists between the top-down approach to training policies, and the primarily regional implementation platforms of, for example, local job opportunities, skills and training, and their developmental intent. Seeking ways to reconcile this paradox, while giving attention to the intention of the skills development interventions, social ecosystem skills research offers potential for a conceptual and theoretical framework for guiding skills research for a just transition.

In framing skills responses for a just transition, we need to be wary about the individualistic fallacy in the skills discourse (which dominates development responses), which assumes that people apply their skills and knowledge in decontextualised situations. Few, if any, individuals will have all the knowledge and skills required to undertake the complex and often drawn-out work required to advance the greening of the economy in a particular context. Rosenberg et al. (2016) also found in investigating champions in government that sustainability policy actions occurred in a distributed format among collectives of professionals and other practitioners. Instead, the abilities people need to respond to complex sustainability challenges and opportunities are activated in relation to the specific, shared object at hand from groups of people who need to function together, to be successful. That is, the competencies are distributed among groups of people, and never reside only in an individual, and are called forth in real-world situations that are almost always unique in their particular set of challenges. Hence, skills for a just transition need to facilitate distributed agency that is needed across individuals, organisations and systems to drive regime change and work against the lock-ins that hinder structural and systemic change. This has implications for how training is conceptualised, as learning networks or individualised delivery.

The cases illustrate the argument that context and community change is central. Decontextualised notions of skills and training cannot facilitate local transitions. Our work highlights the role of networks and situating and conceptualising skills so that they facilitate and strengthen these networks. The cases also show that local network-building is critical to supporting institution-building. The future stability of any social ecosystem will depend not only on networks and relationships, but also on robust, agile, and inclusive anchor organisations like local skills providers that are core to networks. However, any attempt to develop local educational and training institutions needs to consider the community they are embedded in, and the nature of existing education and labour market relations.

An expanded skills ecosystem approach can assist with providing a framework which, to some extent at least, allows for the examination of complex, interconnected and multilayered social reality. It can illuminate one piece of the puzzle of what a just transition would entail. From a justice perspective, we can begin to look in new ways at who is recognised and included within skills ecosystems, and who is excluded and rendered silent and invisible. This is relevant both on the horizontal and vertical axes of the model. Whilst there is normative intent in imagining skills systems for just transitions, the use of skills ecosystems in this context allows for descriptive and analytical work regarding the current system and its absences, exclusions and silences.

By utilising skills ecosystems as an analytical framework, we were able to contribute to justice as recognition which is a core component/ element of a just transition of any system. By unpacking in more detail and depth who (or what) is excluded and potentially why these human and non-human groups are excluded we can surface opportunities for recognition as a critical first step towards a just transition. A similar argument can be made for the concept of participation, another key focus of a just transition.

By foregrounding the focus on relationality in our understanding of

skills ecosystems, we are able to de-emphasise various binaries: rural and urban, formal and informal education, etc. Once focus shifts from a single domain to the relationship between domains, a whole new realm of understanding and analysis opens up. Without sufficient understanding of a system or part thereof, it is unlikely that informed, careful and high impact interventions can be made.

What is needed is an examination of the boundaries (Lamont and Molnar, 2002) and boundary crossing work between the various domains and levels and associated activity systems in a skills ecosystem (Pesanayi, 2019). Pesanayi's work shows that explicit boundary crossing work in skills ecosystems, can enable an engagement with and examination of relationality, as well as advancement of relations to strengthen the skills ecosystems. We took this further, both in the Alice context in which he had been working and in Gulu, where youth and businesspeople both demonstrated complex patterns of relationality and boundary crossing as they navigated their challenging environments. Recognising and describing boundaries, and engaging in boundary crossing work, offers ways of advancing relations in the social skills ecosystem, and for understanding these as complex social systems. However, it is likely that there needs to be a constant guarding against reductionism. An expanded skills ecosystem has already built into it a recurrent recognition and awareness that there are various domains at various levels constantly interacting via relations of emergence (cf. Ramsarup et al., 2022) with at times even the whole complex system in transition.

4.5. An expanded model

The figure below reflects the key elements that we considered in conceptualising our expansion of the skills ecosystem notion with a strong just transitions orientation.

In the figure, we show the complex, multiactor and multiscalar relationships that were operating within our case study skills ecosystems. These include individuals navigating learning and work transitions within VET institutions and systems. However, these work transitions are not static and a simple matter of relatively stable patterns of supply and demand. Rather, some are moving into jobs and occupational roles that are themselves transitioning. These are not simply the high-end jobs of the utopian futures of work literature. For instance, in the Alice and Gulu cases we examined these current and future jobs and provisioning related to formal and informal contexts.

From examining the changing worlds of work and education, we could then derive the related stakeholders, intermediaries and policy contexts connecting the vertical and horizontal axes within the ecosystems. We then needed to consider the relationships between levels and the extent to which what emerges at one level is contingent on mechanisms at other levels.

The multiple processes of transitioning ecosystems depicted across our cases involve multiple actors and systems that are coevolving. This awareness requires new tools to examine systemic transitions, agents, their agential capacity and what enables and constrains this capacity.

A critical realist ontology allows us to see that societies pre-exist the human agents who live in them and are a pre-existing condition for human activity. However, these societies consist of structures, practices and conventions that are reproduced or transformed (Bhaskar, 1979; Archer, 1998). In this understanding, agency cannot be understood separately from structure. Hence, the agency of young people in building their own learning, work and life pathways requires an understanding of social structures. It requires us to both understand how these structures shape learners' choices, and how the actions and beliefs of learners in turn shape the education system. Overall, in a social skills ecosystem, it requires us to understand how different position-practice systems in the skills ecosystem provide the 'contact points' where structure and agency intersect, as these are also the spaces where changes occur (e.g., a college lecturer can change aspects of the curriculum or extension services can introduce new programmes) (Ramsarup et al., 2022). All of this inevitably moves with complex temporality. Hence, alongside Spours' emphasis on ecological time, there is more of a sense of multi-temporality, reflected in the interactions of a laminated system.

Drawing on the elements represented above, skills are framed as a continuum between the vertical and horizontal domains and seen as a critical enabler to linking these distinctive elements of the skills ecosystem. Constructing the vertical domain involves policies, hierarchical structures, and leadership structures that exist at different levels, and how they may shape activity at the local level. In constructing the horizontal domain, the relationships between actors are examined, including the complex dynamic and multi-layered nature of relationships which may sit within and across various clusters as well as nested relationships associated with the cases.

Our model moves beyond a notion of a set of mediation as being primarily the domain of system leaders and anchor institutions. Such individuals and institutions are sometimes present (in institutions such as Gulu and Rhodes Universities, for instance). However, a more radical relational view of ecosystems (cf. Capra, 1996) shifts the emphasis from actors and moments of coordination to a relative continuous modality.

5. Conclusions

Through this paper, we advance the argument that the ecosystem metaphor is a useful one for thinking about skills and development. Nonetheless, let us begin our conclusions with some acknowledgment of limitations. Above all, the metaphor can be taken too far. Skills systems are social, not natural. As we argue elsewhere:

> They exhibit social phenomena such as power and mistrust and are partially shaped by conscious actions and by structural and cultural histories and emergent properties as well as agentive dynamics of those involved in the processes of building local social skills systems. (VET Africa 4.0 Collective, 2023: 168)

We follow Spours in using the metaphor both to describe the present and to imagine the future. But, in so doing, we do run the risk of blurring empirical, analytical and normative, and what is, what might be and what should be. As noted above, there is a tendency in this literature (and we are guilty of it too) of assuming that relations are always positive, which is patently not true.

Nonetheless, we do want to argue that our approach is an important contribution to thinking about skills and development. At an analytical level, our expansion of the conceptual frames of both Finegold and Spours allows us to develop a rich and multidimensional account of vocational education and development in diverse African contexts. We believe that this is a useful approach that others can take and develop further. Here we acknowledge the work of others in starting to apply this approach to questions of VET and development (e.g., Brown, 2022; Wignall et al., in this issue).

We advance the skills ecosystems approach ontologically by drawing on critical realism (again a growing trend in VET and development research: cf. Powell and McGrath, 2019; Aldinucci et al., 2021; Maurer et al., in this issue). This allows us both to move beyond the structure-agency divide that has bedeviled the field, and with it the tendency to monoscalar analysis. Rather, we argue that accounts of VET and development must address both structure and agency, and their interplay, and must be multiscalar.

This reading allows us to focus on the central importance of relationality. We argue that it is through networks and relationships that the precarious worlds of learning and work are brought together.

This includes the actions of individuals and organisations that provide systemic leadership at the ecosystem level. This has great significance for the rather stale debate about the autonomy of public VET institutions against greater performative pressures and central control, stressing that we need to get beyond the educational strategies of the state and donors.

We also want to highlight the deeply relational way in which young

Africans are navigating their lives through multiple forms of learning and working. This helps us to build on capability approach accounts that increasingly stress the relational alongside the individual (DeJaeghere, 2020) through offering the great ontological depth provided by critical realism, something that DeJaeghere acknowledges but does not pursue.

Moreover, it appears to us that a relational understanding of how policy and practice intersect and the range of actors involved in these processes offers a way beyond the failings of much of VET/skills policy over the past 25 years. In this issue, Allais returns to a critique in the last special issue of the failed use of a "VET toolkit" (McGrath and Lugg, 2012). Our argument is that such approaches are top-down and privilege structure. As a result, they do not adequately vertically facilitate possibilities for the collective horizontal actions that are necessary for their success.

Teleologically, we build on the arguments of McGrath (2012) and Powell (2012) in the previous IJED special issue on VET and development, where they call for a broadened understanding of VET's purpose. Their call is intimately linked to the transformational effect that Sen's work has had on the field of development studies, including his insistence that work and economic development be seen as means towards the end of human flourishing rather than ends in themselves (Sen, 1999). We reiterate the importance of this argument for the VET and development debate.

However, more than a decade on from those papers we cannot ignore the existential threat of the climate emergency. Hence, we *must* build a concern about just transitions into our accounts of skills for development. We have suggested elsewhere that one way forward here is building a political-economy-ecology of skills (VET Africa 4.0 Collective, 2023). Here we offer our model for how this can be included in an expanded notion of the social skills ecosystem, an ambition that is consistent with Spours' own ambitions (Spours, 2023).

At the heart of our expanded account is a strong position on what constitutes VET. This has been a matter of disagreement in the field as well as considerable talking past others through exclusionary definitions. Indeed, the introduction to this special issue points to the uncomfortable tension of tendencies to use VET and skills development interchangeably against other positions that see these as clearly distinct. Part of what we claim for our laminated, relational approach to skills ecosystems is that can move the debate beyond binaries and towards a view that acknowledges the multiple forms of work and of vocational learning. This is not to claim that all forms are equal. Rather, we continue to insist that there are powerful hierarchies between forms of learning and forms of work, and that there are systematic processes of exclusion operating here. Nonetheless, we also wish to insist that the real world of vocational learning is one of considerable agency and innovation and this should not be lost through more formalised understandings of what is happening. One implication here is that the policy fascination with formalising the informal sector misses the point by insisting on a false binary.

In generating better theory for vocational education and training for development and, hence, the potential for better policy and practice, it is vital that we are able to deal with the complexity of the issue. Whilst there is merit in research that focuses on aspects of the relationship in detail, it is essential also to keep the bigger picture in sight. This requires us to remember that economic development, employability and productivity are only means to greater ends; and that public VET is a fraction of the overall practices of vocational learning. To address this complexity, we require approaches that can address multiscalarity and the complex interplay between scales. We need to be able to comprehend relationality as well as individuals and organisations. We argue that our expanded approach to social ecosystems of skills is a fruitful way forward in attempting to theorise vocational education and training for development better.

CRediT authorship contribution statement

Ramsarup: Conceptualization, Methodology, Formal analysis, Writing – original draft. **McGrath:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Funding acquisition. **Lotz-Sisitka:** Conceptualization, Methodology, Formal analysis, Writing – original draft.

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