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"WEAVING REGIONAL LEARNING ECOSYSTEMS: A CONCEPTUAL FRAMEWORK AND TOOL FOR GOVERNMENT LEADERS AND POLICYMAKERS"

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ABSTRACT

This article describes the outcome of a first, conceptual stage in a global project led by NetEduProject and UNESCO. The goal is to design a tool targeting government leaders and policymakers that would weave together Regional Learning Ecosystems. A tentative grounded ecosystem approach and tool concept is developed from a literature review, comparison of current stakeholders maps, case studies and through global workshops and collective good practices analysis. Through an initial collaboration between the concept tool development team and a prototyping process being carried out in Ghana, this new approach led to the creation of the first digital version tool. The tool is intended to be inherently flexible and evolutive while also offering structure to broaden the decision-making space. And so, it is the overall aim to support government leaders and policymakers in weaving together, alongside, and in partnership with others the learning processes across their country—from schools to workplaces - so the tool motivate and assist leaders in building relationships that will have a lasting impact on organizations, regional economies and communities. In other words, the overall purpose of creating spaces is to shift people's awareness and expand what they already know—but don't necessarily see as relevant or

connected. This lens change has the potential to seed positive interdependencies, mobilize diverse stakeholders from multiple sectors and disciplines beyond traditional educational systems and strengthen communities.

Key words

National learning ecosystems, mapping, digital tool, stakeholders, weaving.

INTRODUCTION

We are living in a time of great upheaval and change, as global systems break down and leaders struggle to cope with rising challenges. The old view of volatility, uncertainty and change (VUCA), defined by complexity and ambiguity has been replaced. Some institutions and companies have noted that the new world is not only complex and ambiguous, but also chaotic (BANI)(Godoy and Ribas, 2021). Workplace stress, disruptive innovation, resource scarcity, political extremism and social inequality are all common in today's world. People face frequent competition for top talent while being expected to change constantly. This complexity encompasses multiple dimensions and is already influencing learning and educational priorities.

In wishing for our education to more than merely survive, but actually thrive in the volatile times ahead, there is an urgent push into a new way of leading the existing rigid, underfunded and consolidated school-centered system across nations and regions. The UNESCO report: A new social contract for education. Reimagining our futures together (2021), highlights that the COVID-19 pandemic has served to prove both our fragility and interconnectedness, and urgent action is needed to change course. Our standardized educational systems remain based on unidirectional and transmissive learning and academic achievement dominated by hyper-competition, power-and-control hierarchies and rising stress, favoring passive and disengaged learners (Global Education Futures, 2020).

In this sense Mehta (2020) states that there is a need for humanizing educational structures to become more caring and inclusive. International evidence suggests that effective policies to attend infancy and education must be holistic (UNESCO, 2021; Osher, et al., 2020; Darling-Hammond et al., 2019; OECD, 2021; UNICEF, 2021; Díaz-Gibson et al., 2020; WISE, 2021). Schools and other learning stakeholders are still fragmented, isolated and work alone in addressing educational challenges, drastically reducing our collective capacities to change and evolve as a synergistic whole (Gourlay et al., 2021). In today's world, systems thinking is critically important for achieving goals. To address an issue like school failure, it is necessary to consider the larger system effects that help to create and reinforce this multifaceted problem and find more systemic ways to collaboratively address the school failure and be able to harness ideas, people and resources from across disciplinary and organizational boundaries.

Therefore, it is imperative to become aware of the interdependence of dimensions that influence learning to connect stakeholders from different sectors and disciplines around shared purpose and practices for the transitioning from a short-lived learning and school-centered system to a life long learning and learner-centered ecosystem (Catalyst, 2030). In this sense, collective focus and policies must shift towards decentralizing our learning educational systems and advancing towards public-private and third sector partnerships with the collective purpose of enhancing learning and wellbeing opportunities for all (Gourlay et al., 2021).

The present article assumes learning ecosystems as a leading approach for new cross-system organization and deepening in its evolutionary nature can support leaders and policymakers to respond to complex challenges. The objective of this study and its associated efforts is to establish a comprehensive framework that links novel tools and relational processes currently emerging and being tested globally and co-design a Learning Ecosystem Diagnostic Online Tool prototype to support government leaders and policymakers in weaving, alongside and in partnership with the other actors in the learning and digital Ecosystems. In short, the ultimate goal is to motivate and assist decision makers and leaders in building purposeful and enduring connections through purpose-driven network weaving in a regional learning ecosystem, resulting in a positive and lasting impact.

Accordingly, this research applies the solid theory about learning ecosystems in the designing of a tool concept and procedures to help communities to make presence and consciousness of what already exists to better organize and understand their learning ecosystems and find points of improvement. Therefore, the paper describes the prototyping process of the tool in Ghana for stakeholder mapping and project engagement to make a case for the way in which national leaders, working with all the professionals and leaders who have a significant role in education and technology, can contribute to these efforts.

The Learning Ecosystem's approach is grounded through a comprehensive research and design process conducted by the NetEdu team between September 2021 and January 2022. This process aimed to achieve four main objectives. The first objective is to develop a directory of existing resources and tools for learning ecosystem evaluation through a documentary analysis. The second objective is to identify the needs and aspirations of ecosystems from the perspective of international experts. The third objective is to test the prototype tool and gather initial data to map the Ghanaian ecosystem and co-construct the tool. Finally, the tool concept is designed in a playbook format. This objective aims to lay the foundation for the ecosystem tool development. By achieving these four objectives, the NetEdu team is better equipped to develop a tool that can support and enhance learning ecosystems around the world.

FRAMEWORK

Western culture has grown and developed installed in a dual look on the world, understanding what us in terms of pairs of opposites, for example, the opposition that exists between culture and nature or the opposition that exists between the mind and the body (Herrero, 2020): Practically, human beings are the only ones who raised an impassable wall between themselves and the rest of the living world. People are reduced to a measurable network that can be counted, weighed or measured and governed by geometric law.

The separation of inner and outer creates a wounding duality that divorces us from our vast potential, immense richness of knowledge and wisdom—but only when we are integrated can we access this. Even today, many people lack an inner connection or awareness of their bodies (Brown, 2010).

The nature of human beings

Humans are social creatures who thrive when they have healthy relationships and close connections to others(Lee et al., 2020). Sense of belonging has been considered a basic human need since Maslow's work on human development. Maslow (1962) locates belonging in the third hierarchy in the Pyramid of human needs, meaning that belonging and relationships needs must be met before any motivations higher on the scale. One of these higher motivations is the desire to learn and individuals could not move toward the acquisition of knowledge and self-actualization without first feeling as if they are part of a group. In order to satisfy this need, it is important to form and maintain relationships as Bowlby (1973), mentioned by Furrer and Skinner (2003), posited in his attachment theory. Accordingly, building interpersonal relationships is at the core of satisfying the need of belonging and the need of belonging leads people to build social bonds.

Because of our codependence, interdependence and vulnerability as a species, it is possible to define us in these terms (Herrero, 2022).

- Human beings are codependent species. In other words, it is impossible to think about human life without considering the ecosystems that support us and our biosphere—the planet's natural environment. Earth is part of nature, so we depend on its resources and dynamics

- Human beings are radically interdependent. Occidental society, unlike many other communities with different cosmovisions, has been built over time on ignorance—ignoring the fact that human life is deeply codependent and

interdependent. We shaped a culture that believed that knowledge, technology and human progress itself was capable of overcoming all the social problems that had been appearing. It is impossible to think of a human being existing in solitude; certainly during the first years of upbringing we cannot conceive of the survival of a creature if it is not because there are people around dedicating time and energy toward its welfare. It is difficult to imagine a worthwhile old age that does not include the presence of people around. Without care, we cannot survive. Throughout our lives, people need care, on which our survival and our physical and mental well-being depend on others, especially at certain points in the life cycle, such as early childhood, advanced old age, or serious illness, and in the case of people with functional diversity (Herrero, 2020).

- Human beings are vulnerable. We live incarnated in bodies that are vulnerable, which is a great invisible element in our cultures. The bodies get old, die and are finite and therefore in their evolution these vulnerable bodies need this work of other people that are around us (Brown, 2012).

A shift in consciousness, which can be neatly articulated as a transition from separateness to interconnectedness, is at the heart of organizational transformation. However, the collaboration movement has been systematically and is still devalued, that is to say, it generates a lot of nervousness and tension in general, this isn't an easy process: it involves personal growth just as much as organizational change (Hutchins and Storm, 2019).

Post pandemic living systems logics in education

Essentially, ecosystems refers to the natural process of attuning oneself with nature. A leader committed to ecosystemic practices enriches all of its stakeholders—including society and the environment—throughout all its facets. It is a shift in consciousness from a reductive and mechanistic way of leading into a living-systems approach to business and

human interactions—a more holistic, whole person centered perspective on reality (Hutchins and Storm, 2019).

Systems change involves identifying and addressing the underlying factors that drive or impede progress on a societal issue. This may involve changes to policies, practices, power structures, societal norms, or attitudes. It typically requires collaboration among a diverse group of stakeholders. The process can occur at a local, national, or global level. To achieve a more equitable and sustainable world, it is crucial to understand the current state of systems and how they interact and evolve over time (Catalyst 2030).

To meet the multifaceted, wide-ranging needs of SDG4—which is a challenge as complex and far reaching as it is critical to all future generations—regions and cities must bring diverse stakeholders together. In support of this objective, UNESCO promotes the involvement of new actors in formal education systems beyond traditional contributors (UNESCO, 2019). Since the 1980s, resources have been invested around the world to reform and connect educational systems by re-imagining new organizational models, methods and tools for learning in the 21st century (Diaz-Gibson et al., 2020; Global Education Futures, 2020; UNESCO, 2021). This emerging phenomenon has been driven by a combination of internal and external forces, many resulting from grassroots organizing. These efforts have been sustained and co-led through collaborative approaches involving stakeholders from diverse sectors, disciplines and levels of administration. They have worked to strengthen the systems' abilities—to provide children with the fundamental experiences and skills needed for success in today's world (WISE, 2021).

This curiosity and exploration have been motivated by numerous studies over this crisis period that show that education environments that have weathered this storm most successfully are those that exhibited the most resilience and effectively managed the transition to the remote learning model (UNESCO, 2021). The COVID-19 pandemic with its long term lockdowns and schools' reopening afterwards has further highlighted the need for stakeholder dialogue and collaboration across sectors and disciplines to effectively respond to complex social challenges (UNESCO, 22; UNESCO, 2021; OCDE, 2020; United Nations,

2020; Economist Intelligence Unit, 2021). This success has been credited to a strong level of connection and cooperation among the key players needed to facilitate such a transition.

These key actors, and their constructive and effective relationships, are located not just within traditional educational structures, but extend beyond them, leading to swift planning and iterative and effective innovations in finding unconventional pathways to learning, coupled with an ability to design for the complexity observed among actors operating in very diverse spaces (WISE and the Qatar Foundation, 2021). These spaces span from traditional community learning hubs to technology, civil society, and corporate sectors, echoing the African philosophy of Ubuntu, which emphasizes interconnectedness and community, and the Native American belief in regeneration and holistic community wellness.

While cross-functional teams are known to be effective in tackling complex issues, teams made up entirely of hyperspecialists may lack a broader perspective. A singular focus on one area can also lead to employees working in isolation (Kerres and Heinen, 2015). To overcome this, it is important to provide opportunities for learning that connect hyperspecialists from different fields, helping them understand the broader business objectives and how to incorporate them into their work.

Learning ecosystems

According to Global Education Futures' (2020), Learning Ecosystems are emerging worldwide as an interdisciplinary response to the increasing complexity of the 21st century at a time when humanity is changing the very trajectory of evolution on Earth, and needing to reckon with our choices to date as a species. In this report, Lucksha et al. (2020) define learning ecosystems as intentional webs of relational learning which are dynamic, evolving, and enable greater diversity when fostering lifelong learning opportunities. The purpose of learning ecosystems is to offer pathways for learners to actively co-create thrivable futures for people, places and our planet. The WISE Living Lab Playbook: Designing Learning Ecosystems (2022) reflects that entities such as these are already in existence, providing education and learning directly to learners, and comprising open and evolving communities

of diverse providers that cater to the variety of learner needs in a given context or area. Such existing systems may be at a variety of different stages in their levels of efficacy, connection and growth, and are usually supported by an innovative credentialing system or technology that replaces or augments the traditional linear system of examinations and graduation.

Additionally, research shows that enhanced school-community and/or district collaboration between interdisciplinary stakeholders is correlated with multiple positive outcomes such as systems innovation, innovative climates in schools and communities, greater achievement in deprived areas, enhanced parent involvement in child learning, greater levels of social capital and trust development, and increased personalized learning and learner participation in school and community governance (Díaz-Gibson et. al, 2020; Azorín and Harris, 2020; ; Luksha et. al, 2020;Henderson et al, 2022, Longás et al, 2019, among others). Furthermore, the global COVID-19 pandemic with the resulting long term lockdowns, and the experience of schools' reopening worldwide has increased the need for stakeholder dialogue and collaboration across sectors and disciplines - such as education, technologies, health, social services, culture, media and so on- and sectors -public, private and civil society-, to effectively respond to the complex social challenges that are impacting on the progress towards SDG4, and that have been highlighted by the pandemic (UNESCO, 2021).

This approach is under construction globally, grounded in diverse evidences, experiences and reports, such as United Nation's Transforming Education Summit in September 2022, the work of UNESCO's International Commission on the Futures of Education, and the recent World Innovation Summit in Education special publication Education Reimagined: Leadership for Transformation (presented at the UN in September of 2022), the OECD Handbook for Learning Innovative Environments; World Innovation Summit in Education Learning Ecosystems Playbook; The Learning Ecosystems Framework from the Impact Economist and Jacobs Foundation. It is perceived that these learning ecosystems are able to more effectively support the meaningful exchange of ideas and resources, and to facilitate collaboration and shared learning. Thus, local and regional Learning Ecosystems models have been rapidly emerging over the past two decades and have shown remarkable resilience and depth in terms of their ability to deliver on the compelling educational needs for current

times. Some examples of such models may be found in Remake Learning, the PAL Network, Dream a Dream, Education Reimagined, RELI, Teach for All, Africa Voices Dialogue, MIET Africa's Care & Support for Teaching and Learning, among others.

According to the WISE Living Lab Playbook: Designing Learning Ecosystems (2022), there are already existing systems that provide education and learning directly to learners. These systems are made up of open and continually evolving communities of diverse providers that cater to the various needs of learners in a particular context or area. These existing systems may differ in terms of their effectiveness, connection, and development and typically include an innovative credentialing system or technology that supplements or replaces the traditional linear system of exams and graduation. Additionally, in the report "A Learning Ecosystem Framework" (2022) authored by Economist Impact and commissioned by the Jacobs Foundation, the authors provide a thorough research on the topic, defining learning ecosystems as a diverse, collaborative, and dynamic network of stakeholders that enables greater access to a range of learning opportunities and helps young people attain positive learning and wellbeing outcomes.

However, the idea of Learning Ecosystems is still evolving and there is not a widely accepted definition of what constitutes a learning ecosystem (Díaz-Gibson et al, 2020). Despite this, studies in recent years suggest that creating strong and effective learning ecosystems in our regions, cities, communities, and schools has become one of the most significant global challenges and opportunities for our systems. This is to allow them to focus on promoting lifelong, lifewide and lifedeep learning and increasing access and equity in education.

Such efforts between stakeholders in education and technology have taken a variety of forms, such as collaborative programs or partnerships. The evolution of these experiences has yielded positive learning and social outcomes. However, there are still strong resistances to such collaborations - system rigidness and fragmentation inhibit deep change and development (Mehta, 2020).

In order to transition successfully from the current education system into a more resilient one, we must first create spaces where people can come together and heal harmful divisions

within our society, from memorization and certification tests to learning in life and for life, from the traditional approach to learning, which is based on formal education and ends when one graduates from school, to a lifelong process of learning that begins at birth and lasts throughout a person's life. It also includes learning that takes place in informal settings as opposed to only those taking place in schools or other educational institutions. Thus, rethinking educational systems demands efforts for healing and unlearning. This transition is profound and complex, but it is also a necessary step towards building a sustainable future in which education plays a key role. Consequently, researchers, policy makers and leaders from around the world have come together to map best practices for local learning and design an approach that reflects systemic needs.

Mapping stakeholders and tools

The process of mapping stakeholders and their connections is a crucial step towards comprehending the complex dynamics of an ecosystem. This understanding can have a significant impact on communication, collaboration, and decision-making, leading to improved outcomes. A visualization tool that allows for the mapping of stakeholders and their connections can provide individuals and organizations with a better understanding of the relationships between various stakeholders in an ecosystem (Bourne and Walker, 2006). This knowledge can be used to identify potential allies, partners, and areas of conflict (Taylor and Logo, 2008)

By mapping stakeholders and their connections, it is possible to identify the key actors in an ecosystem who hold significant power or influence. This information can be leveraged to optimize the allocation of efforts or resources towards specific objectives. Furthermore, it can facilitate the identification of communication pathways between distinct entities within an ecosystem, enhancing cooperation and communication between stakeholders, resulting in superior outcomes (Learning Economy Foundation, 2021).

Ecosystem mapping can also reveal deficiencies within the ecosystem, such as absent participants or links. This understanding can assist in identifying pivotal decision-makers

within the ecosystem, enabling the facilitation of decision-making and ensuring the involvement of critical stakeholders throughout the process (Bourne and Walker, 2005; Mitchell et al., 1997) . Lastly, by evaluating the impact of specific actions or decisions on diverse stakeholders, ecosystem mapping can contribute to enhancing future decision-making processes.

In addition, ecosystem mapping can also be utilized to bridge the gap between employers and educators. By assigning demands and needs to educators, employers can gain a better understanding of their future workforce and adopt a more holistic approach. This connection can be created through ecosystem mapping, ultimately leading to improved outcomes for all stakeholders involved (Learning Economy Foundation, 2021).

Unless we take a more comprehensive approach to data collection and analysis, we will continue to measure only what is easily observable—and thereby perpetuating systems that are less than effective (Economist impact, 2022).

RESEARCH PARADIGM

The purpose of the study expresses the assumptions of an interpretivist researcher in attempting to understand and describe an educative reality through the analysis of perceptions and interpretations of the subjects that intervene in the situations that are the object of the study. Interpretative studies stand out for having a positive impact in the development of contextualized educational practices (Latorre et al., 2005). Accordingly, the description will help for the later development of a tool concept.

Method

This cross-sectional study uses qualitative methodologies, allowing more valuable results due to the opportunity to have concrete procedures to analyze data as well as explain issues

that are hardly affordable only through a quantitative investigation (Pérez, 1994). In order to best achieve our research goals of iterative design and large-scale implementation of the Learning Ecosystems tool, we utilized a Design-Based Research (DBR) approach. This methodological approach emphasizes ongoing analysis, design, development, and implementation of educational practices in real-world settings. Through our research, we have found that involving users in the design process and prioritizing their concerns is essential for designing sustainable tools. This approach, known as participatory design, has become increasingly recognized in the field (Tinoca et al.,2022).

Analysis dimensions

The Learning Ecosystem Tool is being developed by the NetEduProject (FPCEE, Blanquerna) in collaboration with Teach MIllions, Kaleidoscope lights and the Jacobs Foundation. The tool is being commissioned and supported by UNESCO and will be built in the context of the GEC Global Education Coalition, aimed at achieving a resilient and sustainable recovery from the pandemic. The team coordinates efforts, gathers and analyzes data over the course of 20 working sessions. This covered the four objectives in two phases as follows:

Phase 1:

In order to ground the Learning Ecosystem's approach, develop the concept for the tool and accomplish the first aim, the NetEdu team conducted a comprehensive research and design process between September 2021 and January 2022. The first aim is to elaborate a tools directory. The team breaks down already existing resources and tools for learning ecosystem evaluation through a documentary analysis to elaborate a tools directory. From the documentary analysis, a content document is generated specifying learning and digital ecosystem mapping resources from literature.

In parallel, to respond to the second objective, two global workshops were held, each one consisting of six focus groups, with a total of 59 participants from government, private sector, and civil society. The purpose of the two workshops and subsequent breakout rooms was first to explore the necessity and key elements required for a national/regional learning

ecosystem approach to improve education access, equity, and learning outcomes, as well as the role of technology and digital ecosystems in this approach. Second, participants discussed the key elements and conditions necessary to allow national/regional learning ecosystems to thrive. These workshops provided a valuable opportunity to gather input, helping to inform the development of the tool. The same day is communicated orally to the participants an accurate description of the objectives and general information of the project. The focus group is recorded following the presentation guide for qualitative data treatment (see Annex 1).

Phase 2:

As regards the third objective, a series of six consultations were held in Ghana from March 2022 to June 2022. Led by local leaders within the NetEdu team, in partnership with the UNESCO Ghana team and the Ministry of Education in Ghana, these consultations engaged with a total of 187 stakeholders from four regions in two selected districts. These consultations focused on the mapping of stakeholders who are contributing in various ways to the education system with the aim of creating a visual representation of the existing and potential involvement of diverse stakeholders from multiple sectors and disciplines beyond the traditional educational system. The consultations held to enhance stakeholders' participation and understanding utilized mixed methods. The methods used included presentations on the Learning Ecosystem concept and mapping toolkit, general plenary and discussions among stakeholders, grouping participants based on their backgrounds, choosing SDG4 indicators and supporting groups to work on initiatives to achieve SDG4. A plenary presentation is made by participants to get feedback from other group members and a hands-on session is conducted where participants work with the toolkit to fill in information from the group activity they presented. The focus group is recorded following the presentation guide for qualitative data treatment (see Annex 2).

All the instruments help us to collect the necessary data, through the detection of the specific needs found during the process, from both team and stakeholders perspective, to

respond to the last objective: to design the tool concept in a playbook format. This objective lays the foundation for the ecosystem tool development.

DATA COLLECTION AND ANALYSIS

Results and discussion

With regard to the **objective one**, the resources and tool research has first enabled the differentiation between tools, methods and processes. While tools are helpful in making our living ecosystems visible, they alone are insufficient in facilitating ongoing engagement, understanding, insight, and evolution required for a collective to function effectively over time. To achieve this, any tools used need to be situated within a conscious and intentional process that allows for the development and evolution of our visualization and understanding, alongside the changing dynamics of the ecosystem.

In the given context, the difference between tools, methods, and processes can be understood as follows:

Tools refer to the tangible or technological instruments utilized to make living ecosystems visible. They are helpful in providing a means to observe, measure, or analyze various aspects of the ecosystem. However, tools alone are insufficient to facilitate the ongoing engagement, understanding, insight, and evolution of the ecosystem. They serve as aids or instruments in the larger process of ecosystem development and understanding.

Methods are the approaches, techniques, or strategies employed to facilitate engagement with the tools and what they reveal about the ecosystem. Methods provide a structured framework for utilizing the tools effectively, interpreting the data or information generated by the tools, and deriving insights from it. Methods enable individuals or collectives to

interact with the tools in a systematic and meaningful way, fostering deeper understanding and analysis.

Process refers to the overall conscious and intentional framework within which the tools and methods are situated. It involves the dynamic and iterative journey of visualizing, understanding, and evolving alongside the changing dynamics of the ecosystem. The process is not static but adapts to the evolving ecosystem, including the methods and tools used. It is characterized by ongoing engagement, learning, and growth, guided by a collective purpose and intent to deepen the understanding of both individuals within the collective and the collective itself.

In summary, tools are the instruments used to make ecosystems visible, methods are the approaches employed to engage with and interpret the tools, and processes encompass the conscious and intentional framework for ongoing engagement, understanding, and evolution of the ecosystem, integrating both tools and methods.

The progressive nature of the reflective cycles allows our initial understanding to form the basis of the next cycle of reflection, but also to dissolve as new insights and understanding emerge. The goal is to provide a continuing process for the evolution of understanding. The structure of the process must allow for the collection and visualization of reflections to become visible, shared, and co-reflected without becoming static. The structure should surrender to the process of evolving understanding, restructuring, and evolution.

Visibility can only come when one is a participant, so all actors within the system who want to understand and view it as a whole must participate and co-reflect to move towards a shared understanding. So, in the instance of what the team is developing, this approach is designed to deliver a lived, co-reflected understanding that develops within the process of deepening relationships, rather than a unidirectional static picture of the system.

Consequently, a directory of learning and digital ecosystem mapping resources is designed divided in the three types of tools described previously. It offers a variety of approaches for improving education and community development outcomes by providing decision-makers

with data and knowledge to strengthen policies and institutions, visualizing complex data, and promoting collaborative learning and innovation.

Tools	Methods	Processes
World Bank Education Ecosystem Mapper	Social Networks Playbook (inHive)	Tamkeen Astrolabe
Center for Global Equity	Harambee	Care & Support for Teaching and Learning (CSTL/MIET)
Visible Network Labs	PSET Cloud	Educraftor Teach Millions
School Weaver's Tool	T-Tel Ghana	
Local Weavers Tool		
Kumu Network Visualisation Tool		
Flourish		
inHibe		
DebateGraph		
The Greenlight Movement		
A Better Africa		
LinkedTo		
EdVision		
Data Driven Districts		
Dark Matter Labs		

Table 1. Directory of Learning and Digital Ecosystem Mapping Resources.

In respect of **objective two**, and for the designing of the tool concept, it follows a coding strategy (see table 1) where it recreates a system of categories with the same categories previously discussed in the focus groups. This strategy enables the identification of the most repeated ideas and an easier analysis and a better reader's understanding. Moreover, it makes possible the detection and relation of several expressions with all the factors reviewed from literature.

During the sessions, we explored two main areas around the following specific questions:

1. Is a national / regional learning ecosystem approach necessary to support improved education access, equity and learning outcomes? Why?

2. What key elements and conditions are needed to allow national / regional learning ecosystems to thrive?What role does technology and a digital ecosystem play in this?

Question	**Category**	**Dimensions**	**Number of ideas**	**Total category ideas**
1	Needs	Connect layers Builds positive relationships Enables equity attainment Makes education visible	6 5 3 8	22
2	Dreams	Ecosystem building direction Dream conceptualization Diagnosis Nodes Relationships Training Resources: human, financial, infrastructural, Data use Communication and diffusion Tech approach	7 8 3 4 7 3 5 5 4 12	58

Table 2. International focus groups category ideas.

In general terms, participants have got clear ideas of the learning ecosystem approach importance and describe several needs that are covered thanks to the development of a tool that promotes this type of approach (22 ideas). Participants have, in addition, more ideas

(58) referring to how tools to support learning ecosystems be built. This result demonstrates that they are assuming an active and practical role rather than passive and theoretical.

From here, two tables summarize the key ideas included in each dimension. The first table takes into account dreams dimension and second takes into account the dream dimension.

NEEDS		
01	Connects layers	Helps connection between and within micro, meso and macro levels. Minimize the gap between policy makers and practitioners Capacity to activate the whole system at all levels
02	Builds positive relationships	Establishes more communication channels for people to connect. Coordination between initiatives allows giving value to each other. Helps to find what transformations need to happen on a relational level. Enables growth. Develops a mindset of collaboration instead of competition. Allows to continue building community.
03	Enables equity attainment	Enables change initiatives to reach many people. Helps to develop a unified and more equitable level of development. Minimizes the gap of resources and capacities between and within countries.
04	Makes education visible	Identify the edges. Recognises where learning and the most innovative activity occurs Support an understanding of 'what my part of the ecosystem is'. Support an understanding of present connections and possible future connections. Allows a diagnosis of duplication, overlaps, underuse of resources and poor or lost connections. Creates a lifelong learning perspective in which diverse actors and inputs are involved.

Table 3. Developed dimensions regarding needs.

DREAMS		
01	Ecosystem building direction	Balance between top down decisions and bottom up. Multi-directional feedback loops and data co-owed.

		Formulating policies in collaboration with the network. Support governments to supervise their policies. Bring the representatives of the key target beneficiaries into the project community.
02	Conceptualization	Share a conceptual comprehension of what is a learning ecosystem. Active learning environment. Learning and reflecting tool rather than just a visualization tool. Map out what a healthy network is to come out with a participant's meaning. Identify and reflect the key pillars of the local educational system in each region. Develop a common understanding of the real purpose of a tool to enable learning ecosystems beyond sharing best practices. Need for a pluralistic view.
03	Diagnosis	Mesure expectations and needs from stakeholders. Ability for stakeholders to see, reflect and understand their own data. Having a diagnostic tool which centralizes data for decision making. Grow shared understanding and empowerment.
04	Nodes	Awareness of who the actors (both formal and informal) in the systems are. Understand the role of each actor and how they evolve over time. Governamental awareness of other stakeholders - enhance Government ability to engage with, communicate and learn from other nodes. Facilitate engagement across and between nodes.
05	Relationships	Bridging between peers in a multi-directional and fluid way. Nurture relationships between individuals. Support people to realize they belong to an ecosystem that everyone can join. Seek to build and facilitate trust among actors. Create a shared culture building collective intelligence. Need for an infrastructure that deepens the relationships and connections.
06	Training	Build collective capacity and skills. Facilitate knowledge and resources. Facilitating thinking and learning partnerships. Address the mismatch of skills
07	Resources	Resource people. Infrastructure provision. Investment from institutions. Support startups. Reward to the actors.
08	Data use	Data visualization and availability. Create data sets that are later open and comparable. Build interoperability in mind.

		Practice the habit of reflecting, learning and engaging with data. Building capacity to absorb, analyze and share data. Think on insights such as visual and data mapping can and should bring.
09	Communication and diffusion	Use of marketing and publicity. Visibility, communication and transparency. Embrace the concept of “porous borders” and shifting dynamics. Grow an understanding of systems, living dynamic ecosystems and an ability to work within complexity.
10	Tech approach	Not only a diagnostic tool but a methodological approach, facilitation process and shared learning. Needs relevant and comprehensive content, use friendly, technology and accessibility. Human-centered approach is required. Not expect tech to do what ministers should do. Tech enables, human beings do. Variations in communication channels and digital infrastructure have to be considered in extracting quality, contextual data. The complexity requires a level of collaboration between the tech team and the community organizing and using the tech.

Table 4. Developed dimensions regarding dreams.

In conclusion, the concepts and strategies outlined in the text provide valuable insights into building and nurturing learning ecosystems. However, to truly realize the potential of these ecosystems, it is crucial to go beyond the mentioned points and consider additional aspects. Firstly, a strong emphasis should be placed on fostering a sense of ownership and empowerment among all stakeholders. This can be achieved by involving key beneficiaries in the decision-making processes, enabling them to shape the direction of the ecosystem and ensuring that their voices are heard. Furthermore, there is a need for a more pluralistic view that recognizes and embraces diverse perspectives, experiences, and knowledge systems. By acknowledging and valuing the multiplicity of actors and their contributions, learning ecosystems can become more inclusive, innovative, and effective in addressing complex challenges.

Moreover, a comprehensive understanding of a learning ecosystem should go beyond conceptualization and visualization. While mapping and identifying key pillars are important, it is essential to focus on creating an active learning environment that fosters continuous reflection and adaptation. This requires developing tools and processes that facilitate ongoing learning and collaboration, encouraging participants to engage with the ecosystem

as a dynamic and evolving entity. Additionally, the role of technology should be seen as an enabler rather than a substitute for human interaction. A human-centered approach should guide the development and implementation of technology, ensuring that it complements and enhances the relationships and connections within the ecosystem rather than replacing them. Furthermore, efforts should be made to bridge gaps in digital infrastructure and accessibility, allowing all participants to fully engage and benefit from the ecosystem.

In summary, the construction and growth of learning ecosystems require a holistic and inclusive approach that prioritizes stakeholder empowerment, embraces diversity, fosters active learning, and leverages technology as an enabler. By going beyond the mentioned points and considering these critical aspects, learning ecosystems can become vibrant and transformative spaces that facilitate lifelong learning, foster collaboration, and drive positive societal change.

To clarify the **third objective** a list of stakeholders was created to enable the visualization of existing and potential relationships between stakeholders within the ecosystem (see Annex). The workshops were deemed largely successful due to several factors. Firstly, participants gained an enhanced knowledge and understanding of the learning ecosystem. Secondly, they realized the importance of engaging and including other sectors and sub-sectors that work directly or indirectly with education to achieve the Sustainable Development Goal 4 (SDG 4). Thirdly, participants were given details on how the ecosystem will shape the development of education plans and other critical national documents such as policies across the country. Fourthly, they appreciated the critical role of the mapping tool in terms of its value for national development. Furthermore, participants were informed about the need for buy-in from Government and stakeholders to effectively use the tool. They also benefited from the knowledge sharing exercise, which resulted in significant feedback and responses. Most notably, participants showed significant enthusiasm in the discussion and actively contributed to filling the toolkit (see Annex 3).

Selected comments and questions from participants reflect the appreciation and optimism for the development of the learning ecosystem and the mapping toolkit. Participants

expressed gratitude for the exercise and the potential of the system in achieving education goals. One district participant from the Volta Region expressed gratitude for the exercise, recognizing its potential to set the pace for a brighter educational future for the country. They added *"we have long waited for such an initiative that will bring all education stakeholders together to work towards a common goal. This exercise has provided us with an opportunity to have a holistic view of the education system in Ghana and identify potential areas for improvement".*

Regional participants from the Northern Region in Accra echoed this sentiment, emphasizing the opportunity to locate and connect with all those directly and indirectly involved in supporting education. They expressed their appreciation, stating *"this is an excellent opportunity to map out all actors working towards the same objective. It will help to identify gaps and overlaps in the education sector, which will ultimately help in improving education quality in Ghana."*

Participants from the Northern Region in Tamale described the exercise as interactive and interesting, giving them hope for the future of education in Ghana. They also expressed a desire to put into practice what they had learned, building a well-connected system that would allow them to focus on the positives of what they can do to support education and alleviate concerns of not meeting SDG 4. One participant noted, *"this exercise has given us a comprehensive understanding of the education system in Ghana, and we can now identify specific areas that need intervention. It is a great initiative, and I am hopeful that it will help in achieving SDG 4 in Ghana".*

In addition to positive feedback, participants had questions about the initiative's structure, sustainability, and inclusivity. The participants raise several valuable areas of improvement for the learning ecosystem project. Firstly, they emphasize the need for a clear structure to absorb new stakeholders into the system as it evolves. This requires establishing mechanisms that can identify and integrate emerging stakeholders in a timely and efficient manner, ensuring that the ecosystem remains adaptable and inclusive. Secondly, participants express concerns about the Ministry of Education's capacity to effectively lead and pioneer the initiative. They suggest the importance of providing the ministry with the

necessary convening power, resources, and support to ensure its effectiveness in driving the project forward. Additionally, participants highlight the significance of establishing a strong connecting link for new stakeholders, fostering meaningful collaboration and engagement among all actors involved in the learning ecosystem.

Furthermore, participants stress the need for sustained engagement and action, highlighting the importance of avoiding past experiences where meetings and profiling of organizations did not result in tangible outcomes. One participant suggested *"the Ministry of Education should consider integrating this initiative into the education curriculum at all levels to ensure its continuity and sustainability. It will help to create awareness among learners about the importance of education and the roles different actors play in the education ecosystem".*
They advocate for concrete measures to ensure that the project goes beyond mere discussions and actively involves NGOs, education providers, and other stakeholders in the implementation and decision-making processes. Lastly, participants emphasize the criticality of community-level engagement and the importance of considering local teams and communities in the development of the toolkit, ensuring that the project's benefits reach a wide range of individuals and that the engagement is meaningful and impactful.

Also participants inquired about how the toolkit would be implemented at the local and community levels, and how it could be sustained beyond the initial mapping phase. They also expressed the need to strengthen capacities for emerging groups and ensure that the engagement with the initiative continued beyond the gathering. One participant suggested *"the Ministry of Education should consider integrating this initiative into the education curriculum at all levels to ensure its continuity and sustainability. It will help to create awareness among learners about the importance of education and the roles different actors play in the education ecosystem".*

Several recommendations and a way forward were also highlighted during the workshops. One of the recommendations was to develop criteria and processes for the inclusion of new organizations in the ecosystem. Secondly, it was recommended to develop and disseminate the timelines for building and developing the mapping toolkit. Thirdly, if there is a separate core team to develop and work on the tool, then there is a need to consider other groups

that can join the core team to develop the mapping toolkit. Fourthly, it was recommended to review the "Discipline" column for multiple options, as some stakeholders do multiple things, and this should be noted and captured. Fifthly, it was suggested to review the "Geography" column to include international, Africa, etc. as the current design appears ambiguous for the participants, and they do not understand what geography means.

Additionally, it was recommended to operationalize some of the terms as the meaning may differ from context to context, for instance, civil society, private civil society, etc. These can be confusing if not explained well. It was also noted that the departments under the ministry at the national level become organizations when they are operating at the district level. Therefore, it is important to note this in the toolkit. Participants expressed a need for more time to understand the mapping tool before they can complete it effectively. Finally, it was discovered that most participants appear not to know the SDG 4 indicators and priority areas, and a session was introduced to introduce participants to SDG 4 priority areas and indicators.

Finally, thanks to the natural process of co-reflection and evolution, the concept tool is designed and presented in a Playbook. The key questions answered are:

- What is the UNESCO-NetEdu Tool?
- What is the learning ecosystem for SDG4?
- Why is learning ecosystem development crucial for countries to achieve SDG4?
- What specific outcomes and processes are supported by the UNESCO-NetEdu Tool?
- Who is the Country Tool Team that will colead the UNESCO-NetEdu Tool?
- What are the Stages of the UNESCO-NetEdu Tool Process?
- How will the UNESCO-NetEdu Tool will support the National Learning Ecosystem growth over time?

See Annex 4 for the complete UNESCO-NetEdu Tool Playbook.

CONCLUSIONS

The PBME Directorate has announced plans to collaborate with UNESCO in order to fully deploy the tool that was developed during the workshop. The tool will enable the Ministry to map out all critical stakeholders who contribute to the education system in Ghana and the relationships that exist between them. Through this exercise, the Ministry will be able to categorize stakeholders based on the support they provide or the roles they play within the educational system.

Furthermore, the stakeholders who were mapped during the tool development phase will be engaged in the development of the Education Sector Medium Term Development Plan for 2022-2025. This is a critical step towards ensuring that the stakeholders' voices are heard and their contributions are taken into consideration when developing the plan. It is important to note that other ministries and departments, aside from the Ministry of Education, need to be engaged in order to further develop the tool for wider coverage. This will enable the Ministry to fully understand the complexities of the education ecosystem and ensure that all relevant stakeholders are included in the mapping process.

Overall, the mapping of stakeholders in the education system proved to be an effective way of visualizing the existing and potential involvement of diverse stakeholders from multiple sectors and disciplines beyond the traditional educational system. The workshops provided participants with an enhanced understanding of the learning ecosystem and the importance of collaboration to achieve the SDG 4. The mapping tool was also recognized as a critical component for national development. Recommendations and a way forward were provided to ensure that the mapping tool is used effectively and that the momentum of the workshops is maintained. In conclusion, the Learning Ecosystem and Mapping Toolkit initiative has generated significant interest and curiosity from education stakeholders in Ghana. As the initiative moves forward, addressing these inquiries and concerns will be essential in ensuring its success and impact in Ghana's educational landscape. Participants expressed their willingness to support and collaborate in the implementation of the initiative, which is a positive sign for the future of education in Ghana.

In conclusion, engaging in the work of designing and developing the Learning Ecosystem Diagnostic Online Tool has been a transformative journey for me both personally and professionally. It has reinforced my deep-rooted belief in the profound importance of relationships, connections, and the harmfulness of feeling and being alone.

In today's rapidly changing world, marked by volatility, complexity, and chaos, it is evident that our traditional educational systems are in need of significant transformation. The COVID-19 pandemic has exposed our fragility and interconnectedness, highlighting the urgency for change. The standardized, rigid, and fragmented school-centered system no longer serves the needs of learners or society as a whole. Humanizing educational structures and embracing a more caring and inclusive approach is essential.

To address these challenges, a holistic and collaborative approach is required. Our research and design process have underscored the significance of interconnectedness and collective efforts. The learning ecosystems approach has emerged as a leading approach, recognizing the interdependence of various dimensions that influence learning. By connecting stakeholders from different sectors and disciplines, we can create purposeful and enduring connections that foster a learner-centered ecosystem.

The development of the Learning Ecosystem Diagnostic Online Tool prototype in Ghana has been a significant step towards realizing this vision. Through stakeholder mapping and project engagement, we have witnessed the power of collaboration and the value of understanding the existing learning ecosystem. This tool concept and procedures serve as a catalyst for purpose-driven network weaving, empowering government leaders and policymakers to make informed decisions and drive positive change.

Throughout the process, our focus has been on creating enduring connections and building strong partnerships. We have conducted comprehensive research, engaged international experts, and tested the prototype tool to ensure its effectiveness. The collaborative effort of the NetEdu team has laid the foundation for the development of a powerful tool that can support and enhance learning ecosystems globally.

In conclusion, the journey of developing the Learning Ecosystem Diagnostic Online Tool has filled me with encouragement and joy. It has reinforced the importance of relationships, connections, and the detrimental effects of isolation. By embracing the principles of interconnectedness and collective action, we can pave the way for a transformative shift in education. I am confident that with purposeful collaboration and the use of innovative tools, we can create a lifelong learning and learner-centered ecosystem that fosters growth, well-being, and success for all.

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