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Open Educational Practices as Digital Public Goods: Promoting Resilience, Equity and Innovation in Higher Education Ecosystems

COLLECTION:
OPEN EDUCATION & OPEN SCIENCE IN THE DIGITAL AGE

ARTICLE

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ABSTRACT

Open Education (OE) plays a crucial role in advancing the United Nations' vision for Digital Public Goods by fostering equitable, inclusive, and resilient higher education systems. While the global policy discourse often centres on Open Educational Resources (OER), OE encompasses a wider spectrum of Open Educational Practices (OEP) that include co-creation, inclusive pedagogies, care-centred teaching, and accessible learning design. These practices cultivate communities of open practice and promote systemic transformation in education through collaboration and innovation. This paper addresses policy-makers, institutional leaders, and educators seeking to better understand and support OEP within broader digital and open education agendas. It argues that to maximise OE's impact as a Digital Public Good, policies must move beyond an OER focus to engage with the full range of open practices emerging from grassroots and academic communities. Drawing on a thematic and integrative review of international frameworks—including UNESCO Recommendations and UN development agendas—we examine the conceptual evolution of OEP and its practical implementation across diverse contexts. By analysing existing policy frameworks and synthesising inclusive, ethics-informed models of openness, the paper contributes new insights into how OE governance can align more closely with the lived realities of educators and learners. In doing so, it offers evidence-based recommendations for rethinking OE policies to reflect the complexity, creativity, and transformative potential of OEP.

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INTRODUCTION

Open Education (OE) is recognised as a key component of the UN Digital Public Goods (DPG) framework (United Nations 2020), positioning open knowledge as a critical driver of equitable and resilient Higher Education (HE) ecosystems. While OE is often associated with the development and use of Open Educational Resources (OER) in particular, it encompasses a broader set of Open Educational Practices (OEP) that promote inclusivity, innovation, and collaboration in teaching and learning (Havemann 2020).

OEP, initially conceptualised as pedagogical approaches closely tied to OER creation and reuse (Ehlers 2011; Shareefa et al. 2023), are now understood as a framework that includes inclusive pedagogies (Havemann 2020), sharing-based approaches (Cronin 2017), care-centred teaching methods (Bali, Cronin & Jhangiani 2020), innovative teaching approaches (Ramírez-Montoya 2020) and accessibility considerations (Tlili et al. 2020). According to Cronin (2017), OEP extends beyond content development and access by fostering open pedagogies, participatory learning, and knowledge co-creation, ultimately building communities of open practice. Czerwonogora and Rodés Paragarino (2019) argue that OER and OEP should be viewed as interrelated components within a continuum of OE. Furthermore, Cox and Trotter (2017), Cronin (2020), and Campbell (2020) argue that OE should aim to enhance access, equity, and effectiveness in education by supporting the participation of marginalised and underrepresented groups.

Due to the fragmented OE infrastructure and governance ecosystem, in this paper, we examine OEP as a vital enabler of DPG and their role in shaping resilient and inclusive HE ecosystems, as articulated in the UNESCO Dubai Declaration on OER (2024), towards enabling more cohesive, inclusive, and context-sensitive OE governance. The declaration draws upon the UN's (2020) Roadmap for Digital Cooperation which asserts that DPG are "essential in unlocking the full potential of digital technologies and data to attain the Sustainable Development Goals" (2020:8). While open forms of digital content such as OER are understood to be DPG, it is essential to also recognise the open digital practices of educators which enable OER to be created, modified and shared, alongside other activities which enhance connectivity and community in and for education.

In order to harness the full potential of OEP as DPG, policies and governance structures must integrate OE within broader open knowledge ecosystems, alongside Open Science approaches such as citizen science, open data, and open-source software (FOSS). OE policies should extend beyond the promotion of OER activities to actively support diverse forms of OEP, enabling both educators and students to engage in open, collaborative, and adaptable learning practices (Atenas et al. 2019).

Historically, the 2012 Paris OER Declaration (UNESCO 2012) has already highlighted the importance of fostering open knowledge-sharing environments, calling on member states to enhance the accessibility and interoperability of OER. However, the policy discourse since then has remained largely OER-centric (Havemann et al. 2023; Shareefa et al. 2023), as exemplified by the 2019 Recommendation on OER (UNESCO 2019a), which recognises the importance of capacity building in open practices as an enabler for OER, but does not fully reflect the evolving landscape of grassroots OEP or the broad spectrum of openness in educational practice. While these international developments have represented foundational steps for the OE movement, it is now imperative to move beyond OER-centric policy approaches to fully embrace OEP, fostering open communities of practice, enabling collaborative knowledge creation and expanding participation in education, particularly among marginalised and underrepresented groups, around the driving concept of DPG. To meet these goals, policy and governance frameworks within HE must prioritise inclusivity, adaptability, and ethical considerations in the adoption of technologies, including digital platforms and data and AI-driven educational tools. Responsible innovation requires that AI and other technologies be embedded within educational and OE strategies in a manner that ensures transparency, accountability, and alignment with the values of openness and equity.

To encompass both the theoretical and practical dimensions of OEP when considering open education as a DPG, the paper examines how open educators implement OEP, and considers the role of critical and innovative open practices in advancing educational equity and resilience

beyond content access. We conclude by advocating for inclusive and forward-thinking policy and governance models, highlighting the necessity of policies that support both openness and responsible technological integration in HE.

ETHICS STATEMENT

This paper is based on a conceptual and policy analysis and does not involve human participants, personal data, or empirical fieldwork. As such, formal ethical approval was not required. The research adheres to established ethical standards for academic scholarship and Open Science, including the responsible use and citation of sources, transparency in methodology, and commitment to inclusivity, equity, and integrity in knowledge production. Particular care was taken to critically engage with diverse literature and to mitigate potential biases in source selection.

METHODOLOGY

In order to synthesise normative patterns, surface gaps, and offer recommendations for a more cohesive, inclusive, and context-sensitive model of OE governance, for this conceptual paper we employed an integrative approach in reviewing key literature and thematic analysis to examine global frameworks shaping the governance of OE. Our analysis is grounded in a critical reading of key international policy documents selected for their relevance, normative influence, and potential to shape institutional and national strategies. These include the United Nations' Sustainable Development Goals (SDGs), DPG, and Digital Cooperation Agendas, and UNESCO's Recommendation on OER (2019a), Recommendation on Open Science (2021) and the UNESCO Recommendation on the Ethics of Artificial Intelligence (2022c), alongside other declarations and standards with international recognition. The rationale for selecting these documents lies in their broad adoption, normative authority, and explicit focus on openness, equity, and inclusion in education policy.

We applied a thematic analysis to these texts, focusing on the following categories: governance, ethical principles, equity, sustainability, and capacity building. The analytical lens guiding our interpretation draws on critical policy studies and OE research, with particular attention to power dynamics, representation, and the operationalisation of openness. To support this analysis, we conducted an integrative review of academic and grey literature, guided by the need to mitigate algorithmic biases in search results, and reduce reliance on a single algorithmic logic (Atenas, Havemann & Timmermann 2023). Keywords included "open education", "governance", "policies", "framework", "principles", and "recommendations", and we limited our inclusion to frameworks and literature produced by internationally recognised authors.

To ensure a more inclusive and representative review, particular attention was paid to selecting literature that foregrounds gender-balanced and diverse voices within the OE research community. This intentional inclusion aimed to counteract the historical marginalisation of certain perspectives and to ensure that our analysis reflects the pluralism necessary for equitable OE governance models.

BACKGROUND

While this paper does not present new empirical data, its value lies in the theoretical synthesis and conceptual contribution it offers to the evolving field of OE. By integrating diverse international frameworks, policy discourses, and critical perspectives, the analysis provides a grounded understanding of how OEP intersect with broader issues of governance, ethics, and equity. This conceptual work is particularly timely given the growing prominence of AI governance debates, where questions of openness, transparency, and agency are increasingly relevant. By linking advances in OEP with emerging discussions on ethical AI and digital public goods, the paper contributes to a forward-looking vision of OE governance that is both principled and responsive to current global challenges.

The evolution of the OER and OEP discourse has been shaped by key international policy frameworks. The Paris OER Declaration (UNESCO 2012) marked a foundational moment by advocating for the open licensing of educational resources to enhance access and equity.

This was further developed in the Ljubljana OER Action Plan (UNESCO 2017), which stressed the need for capacity building, policy support, and the integration of OER in teaching and learning practices. The OER Recommendation (UNESCO 2019a) strengthened this agenda by encouraging member states to adopt policies that promote open knowledge-sharing and collaborative educational practices. Most recently, the Dubai Declaration on OER (UNESCO 2024) reinforced the role of OER within the broader concept of DPG, calling for resilient and inclusive governance frameworks that ensure the ethical adoption of AI and digital innovations in HE, demonstrating the shift from a narrow focus on OER towards a more comprehensive approach. Table 1 outlines the key aspects of these documents, categorised under Governance, Policy, and Practice.

Table 1 Key Aspects of UN Instruments on OER and OEP.

FRAMEWORK	GOVERNANCE	POLICY	PRACTICE
UNESCO Paris OER Declaration (2012)	Urges national frameworks to support OER; promotes international cooperation on OER governance.	Recommends open licensing policies and integration of OER into national education strategies.	Supports educator capacity building, research on OER impact, and development of interoperable standards.
UNESCO Ljubljana OER Action Plan (2017)	Advocates multi-stakeholder governance including government, institutions, and civil society; promotes public-private partnerships.	Calls for national and institutional OER policies ensuring inclusive and sustainable implementation.	Emphasises teacher training, innovative pedagogies, and adoption in diverse cultural and linguistic contexts.
UNESCO OER Recommendation (2019a)	Establishes a framework for aligning OER policy at national and international levels; highlights sustainable funding models.	Recommends integration of OER into inclusive education policies and the creation of funding mechanisms.	Focuses on building capacity for OER creation and adaptation; promotes peer collaboration and robust monitoring systems.
UN Road Map for Digital Cooperation – Digital Public Goods Agenda (2020)	Positions OER within global digital public goods; supports open, cross-sector governance models.	Calls for publicly funded educational content to be openly accessible; promotes interoperability, transparency, and ethical AI.	Encourages open knowledge, open data, and inclusive digital tools; supports digital and AI literacy for educators.
UNESCO Dubai Declaration on OER (2024)	Expands OER governance under broader digital public goods governance; prioritises responsible AI in education.	Urges integration of OER into AI and digital strategies; promotes policies for equity, resilience, and accessibility.	Supports AI-enabled OER tools, inclusive digital learning environments, and interdisciplinary research on AI, OER, and Open Science.

Openness is an important concept across various domains, including education, science, cultural heritage, and government. For instance, Open Government initiatives promote transparency by providing public access to official data and policy co-creation (Ramírez-Alujas & Cruz-Rubio 2025), while Open Science fosters collaborative research by making scientific outputs freely available (Crüwell et al. 2019). These approaches share the belief that, from an ethical standpoint, knowledge produced by publicly funded institutions—including governments, universities, research centres, and schools—should be accessible without barriers, ensuring that knowledge remains a public good, available for anyone engaged in learning, teaching, research, and innovation.

OEP hold transformative potential for equity and innovation in education. To realise this potential in an era of rapid digitalisation, strategic governance is essential. UN frameworks converge on three key imperatives: building shared understanding, supporting educators, and linking openness to inclusion. These are expanded in Table 2 through interconnected actions that align with responsible innovation and equitable digital transformation.

GOVERNANCE PRIORITY	STRATEGIC ACTION	PURPOSE AND POLICY RELEVANCE
Shared Understanding of OEP	Bridge theory and practice in OEP.	Align research frameworks with technology-enhanced pedagogy to foster meaningful openness in teaching and learning.
	Define and communicate conditions for effective OEP.	Promote clarity around availability, accessibility, licensing, and adaptability of resources (e.g., as stated in the Paris OER Declaration, 2012).
Support and Capacity Building for Educators	Provide professional development and institutional incentives.	Empower educators to engage in OEP through recognition, training, and ongoing support.
	Cultivate a culture of openness in institutions.	Embed openness as a shared pedagogical value that benefits all learners, not only those at risk of exclusion.
Linking OEP to Equity and Inclusion	Promote critical and inclusive pedagogies.	Ensure that OEP address inequalities and do not replicate existing digital divides.
	Support responsible innovation in digital education.	Guide OEP adoption through ethical frameworks that ensure technology serves educational and societal equity.
	Establish open governance frameworks.	Enable participatory and transparent decision-making for resilient, rights-based educational ecosystems.

Table 2 Governance Priority, Strategic Action and Purpose and Policy Relevance.

Sustainable and inclusive governance of OEP must be grounded in ethical, participatory, and future-oriented principles:

I. The creation of inclusive digital learning environments demands policies that promote responsible computing and environmentally sustainable digital infrastructures, particularly in under-resourced contexts.

II. Governance models must prioritise equity by addressing the specific needs of marginalised populations, including learners in rural or low-bandwidth areas, refugees, and displaced communities—groups often overlooked in digital policy and practice.

III. OEP governance should include robust protections for indigenous knowledge systems, recognising their epistemic value and ensuring their use is governed by ethical and culturally appropriate frameworks.

IV. As AI and digital technologies become increasingly embedded in education, there is an urgent need to ensure their deployment supports education for peace, inclusion, and sustainable development.

These elements must be interwoven through open, transparent, and participatory governance mechanisms that uphold the principles of social justice, epistemic diversity, and human rights.

TOWARDS INCLUSIVE, RESILIENT AND SUSTAINABLE OPEN EDUCATION GOVERNANCE

OE policies represent a transformative educational approach to enable educational access, inclusivity, and innovation through the considered application of digital technologies. They are not necessarily a standalone policy of a government or organisation, and indeed may not even be formally displayed or communicated; they can best be understood as

> written or unwritten guidelines, regulations and strategies which seek to foster the development and implementation of Open Educational Practices, including the creation and use of Open Educational Resources. Through such policies, governments, institutions and other organisations allocate resources and orchestrate activities in order to increase access to educational opportunity, as well as promote educational quality, efficiency and innovation (Atenas et al. 2020).

However, with the current societal, economical and technological changes, it is key to integrate OEP into broader open governance frameworks, so countries and institutions can bridge digital divides, promote ethical and sustainable AI use, and ensure that education remains a global DPG.

As Sebriam, Markun and Gonsales (2017) argue, open technologies play a key role in facilitating collaboration, interactivity, and adaptability within learning environments. This is reinforced by Inamorato dos Santos and Punie (2016) and Inamorato dos Santos, et al. (2017), who argue that OE strategies should prioritise flexible, learner-centred education, supporting diverse pathways into both formal and non-formal learning environments.

Thus, by embedding open governance within the broader DPG ecosystem, policies can be more effectively aligned with global digital cooperation efforts, ensuring that education remains accessible, equitable, and resilient in an increasingly data-driven world (Atenas et al. 2022; UNESCO 2022a). With the publication of the 2019 Recommendation on OER and the 2024 Dubai Declaration OER, UNESCO calls for the development of supportive and enabling policies at national level to implement regulatory frameworks for OER, allocate resources, and promote communities of practice. It also highlights the importance of embedding open education policies within broader frameworks such as Open Access, Open Data, FOSS, and Open Science, while ensuring adherence to the highest data protection and privacy standards when designing such policies. Furthermore, UNESCO stresses the need for inclusive and equitable strategies to promote open education and robust mechanisms for assessing impact and fostering further research within a spectrum of open practices, as shown in Figure 1.

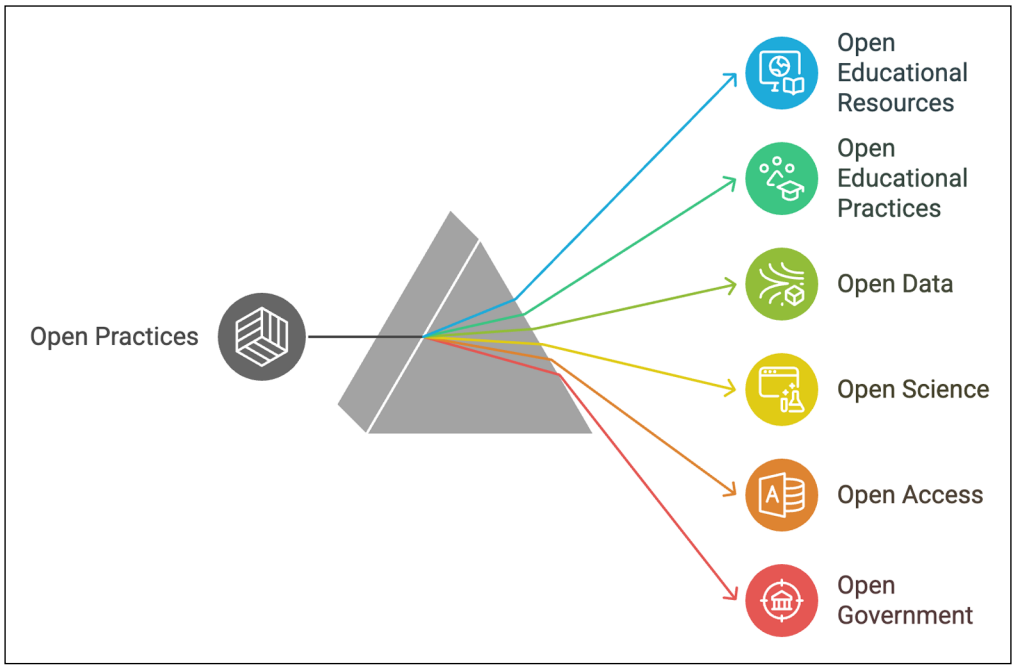

Figure 1 Spectrum of Open Practices.

From a governance perspective, advancing OEP as part of the broader DPG agenda requires the development of transparent, ethical, and participatory frameworks aligned with the principles of Open Science, digital sovereignty, and sustainability. This entails embedding within policy the value of interoperable infrastructures that support ethical data use, sustainable OER ecosystems, and green computing strategies within open education. Policy frameworks must also reflect epistemic diversity and uphold legal integrity, ensuring transparency in attribution and the protection of intellectual property rights. As highlighted in Table 3, global frameworks such as the ROAM-X principles (UNESCO 2022b) provide essential guidance for inclusive governance through rights-based, open, and multi-stakeholder approaches. These principles underpin ethical, AI-enabled OEP models that are accessible, culturally responsive, and environmentally responsible. In this context, multi-stakeholder engagement is key to fostering cross-border collaboration, advancing open licensing practices, and ensuring that AI and open platforms are interoperable, equitable, and rooted in shared values of social justice and educational equity.

ELEMENT	SUMMARY	CONNECTION TO OEP
UN Global Digital Compact	Sets shared principles for an open, inclusive, and secure digital future.	Supports OER as digital public goods advancing global education equity.
Digital Public Goods (DPGs)	Open solutions that promote equity and shared knowledge.	OER function as DPGs, enabling unrestricted, equitable learning access.
Open Educational Resources (OER)	Freely licensed educational materials for reuse and adaptation.	Ensure inclusive access to quality learning resources.
ROAM-X Framework	Promotes reuse, openness, accessibility, multilingualism, and quality.	Reinforces inclusive, adaptable, and high-quality open practices.
Open Licensing	Enables free use, adaptation, and sharing of content.	Facilitates equitable and collaborative creation of OER.
Inclusive Governance	Advocates participatory and transparent decision-making.	Ensures OEP reflect diverse voices and needs.
Educational Equity	Aims to remove barriers to quality education.	OER and OEP advance fairness in access and outcomes.
Lifelong Learning	Supports continuous learning throughout life.	OEP expand flexible access to learning across life stages.
Global Collaboration	Encourages international cooperation and resource sharing.	OEP promote cross-cultural exchange and mutual benefit.
Security & Trust	Ensures safe, ethical digital environments.	Builds trust in open platforms and protects learners' rights.

Table 3 Global Initiatives and OEP.

From a policy perspective and as shown in Figure 2, it is essential to promote and reinforce inclusive international cooperation through multi-stakeholder engagement, fostering collaborative AI-OER platforms where educators, learners, policymakers, and technologists can co-create knowledge. This participatory approach ensures that AI-enhanced OER development benefits from diverse perspectives and expertise, incorporating inclusive feedback mechanisms to meet varied educational needs (EU Digital Competence Framework, European Commission Joint Research Centre 2025).

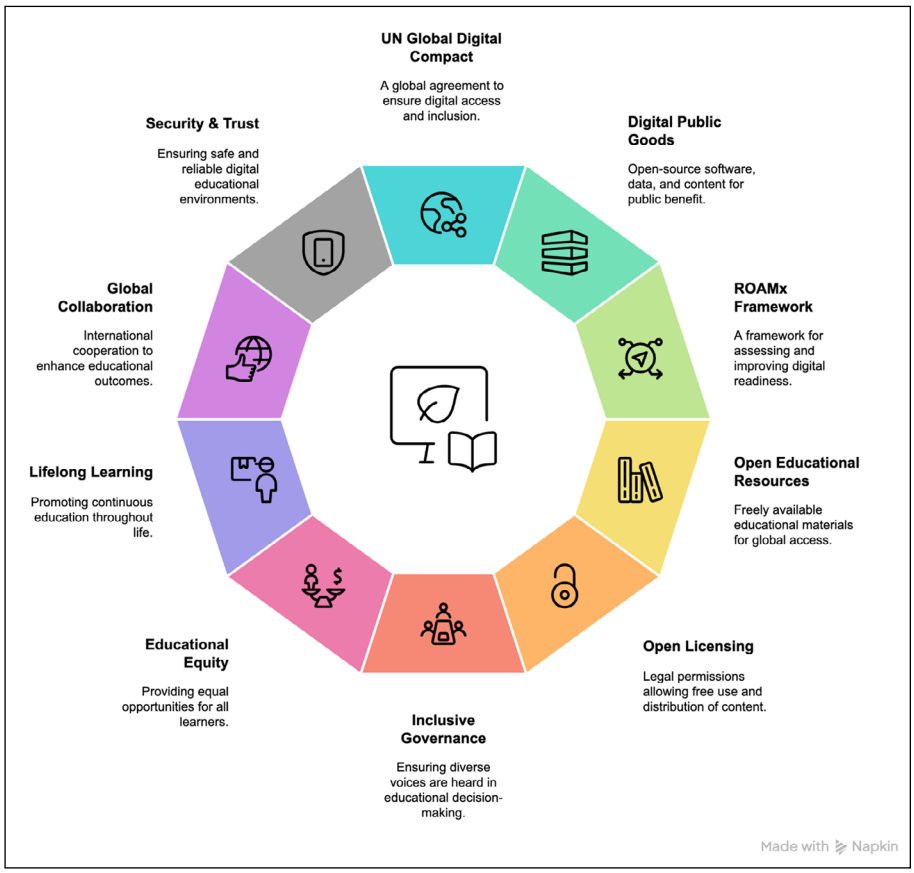

Figure 2 Sustainable Open Education Framework.

Additionally, the inclusion of cross-cutting indicators within OE policies is crucial to promoting gender equality, sustainability, and social justice (Bali, Cronin & Jhangiani 2020). These indicators ensure that OER initiatives actively address gender biases, support inclusive digital learning environments, and contribute to SDGs (UNESCO 2023).

OEP FROM THE PERSPECTIVE OF EDUCATORS

Among the various stakeholders that contribute to the development of OEP, educators play a key role, acting as the principal agents of pedagogical transformation. While policymakers shape enabling conditions and institutional leaders provide structural and strategic support, it is the pedagogical agency of educators that ultimately determines whether OEP is adopted and meaningfully integrated. Their decisions around curriculum design, content creation, and classroom practices shape how openness is enacted in teaching and learning. As outlined by Nascimbeni et al. (2018), educators are the *conditio sine qua non* for OEP. This perspective is reinforced by longstanding evidence, including UNESCO's early calls for faculty engagement (Albright 2005), and research highlighting that sustainable educational transformation must be driven and owned by teachers (Price 2015). Scholars such as Pearce et al. (2010) and Weller (2012) similarly stress that educators are central to enabling digital and open innovation in learning environments.

To realise the full potential of OEP within the framework of DPG, educators must be supported through capacity building initiatives that encompass not only technical and pedagogical competencies but also critical and ethical literacies (Atenas, Havemann, & Timmermann 2020). This includes fostering critical data literacy and reflective teaching practices aligned with values of openness, equity, and co-production of knowledge, as cornerstones for academic development in a datafied society. Engagement with frameworks such as the Global Digital Compact (2024) further positions educators as essential actors in shaping equitable access to education through open solutions, such as the use of OER, open data, FOSS, and open access, which are closely linked to the development of essential literacies and lifelong learning capabilities.

Such capacity building should not be limited to technical competencies, but instead must build the foundations of lifelong learning and societal impact, ensuring that teaching approaches are not only open but also critically and reflectively aligned with the values of equity, transparency, and shared knowledge. In this sense, Table 4 describes the key elements of OEP to foster capacity building, literacies and skills within the context of DPG and related open practices in HE.

Table 4 Key Elements of OEP to Foster Capacity Building and Literacies and Skills.

DIGITAL PUBLIC GOOD	PURPOSE	KEY LITERACIES AND SKILLS
OER	Provide free, adaptable learning content; foster collaboration; reduce costs.	Digital literacy, collaboration, critical thinking.
Open Access to Scientific Information (OA)	Ensure unrestricted access to research; support knowledge sharing and academic inquiry.	Research skills, information literacy, analytical thinking.
Free and Open-Source Software (FOSS)	Enable customisation of tools; support innovation; reduce software costs.	Coding, algorithmic thinking, technical proficiency, problem-solving.
Open Data	Provide accessible datasets; promote transparency and data-informed decision-making.	Data and AI literacy, statistical analysis, research design.

OEP represent a transformative approach to education that centres on collaboration, inclusivity, and digital equity. Grounded in the principles of openness and social responsibility, OEP encourages the development of learner-centred, participatory pedagogies that span disciplinary and geographical boundaries (Atenas, Havemann & Timmermann 2023). Realising the full potential of OEP requires not only access to OER and enabling technologies, but also deliberate capacity building, ethical awareness, and alignment with global goals (Bali, Cronin & Jhangiani 2020).

From a policy perspective, implementing OEP demands a shift toward institutional structures that support openness through funding, training, and incentives. At the practice level, educators

must be empowered to enact open teaching, assessment, and collaboration models that reflect the values of equity, inclusion, and shared knowledge creation. This involves cultivating a mindset that values openness and recognises the societal impact of education (Ballatore et al. 2023).

According to Huang et al. (2020), OEP can be understood through four, deeply interrelated, core openness conditions—OER, Open Assessment, Open Collaboration, and Open Teaching—supported by one enabling technology condition. These dimensions form a relational framework that helps educators embed openness ethically and meaningfully into their work. Educators are central in operationalising this framework. For instance, through OER and Open Teaching, they can foster collaborative knowledge production by encouraging students to engage with resources, rather than being passive consumers, for example, using commentable open textbooks (Garcia-Holgado et al. 2020). Through Open Teaching and Open Collaboration, educators can facilitate interdisciplinary, co-creative projects using digital tools and platforms, enhancing learners' readiness for collaborative environments (Atenas, Havemann & Timmermann 2023).

In the area of Open Collaboration and Open Assessment, the educator's role transforms into that of an "assessment facilitator", supporting students in working with external communities on real-world assessment tasks—such as contributing to Wikipedia or creating public-facing content—that validate diverse forms of knowledge (Huang et al. 2020; Archer, Morley & Souppez 2021). Finally, Open Assessment and OER converge in practices where students co-create artefacts like blog posts or open articles, positioning assessment as a dynamic learning process that contributes back to the public domain (Ballatore et al. 2023).

Crucially, ethical implementation of OEP requires the development of critical and digital literacies. As Atenas, Havemann and Timmermann (2023) argue, navigating the complexities of a datafied society requires students and educators to build competencies in data literacy, source evaluation, and the ethical use of AI and digital tools. This aligns with global educational goals to empower learners as informed digital citizens. Moreover, accessibility and equity are central to OEP's mission. By integrating OER and open pedagogies, educators can significantly lower barriers to learning—improving affordability, broadening access, and supporting inclusion for learners from marginalised or underserved communities (Bali, Cronin & Jhangiani 2020). These practices also promote cultural responsiveness and recognise local knowledge systems.

To sustain the shift towards open, ethical, and equitable education, capacity building must be prioritised. This includes ongoing professional development, institutional support, and community networks that enable educators to navigate the cultural, pedagogical, and technological aspects of OEP (Ballatore et al. 2023). Capacity building is not simply about adopting tools; it is about creating a culture that values collaboration, reflexivity, and socially engaged teaching as showcased in Table 5.

Table 5 Ethical and Societal Dimensions of OEP in Policy and Practice.

OEP DIMENSION	POLICY & PRACTICE FOCUS	ETHICAL & SOCIETAL CONTRIBUTION
OER & Open Teaching	Encourage student participation in co-creating and refining educational content.	Promotes collaborative knowledge; reduces cost barriers; enhances agency.
Open Teaching & Collaboration	Use enabling technologies to support transdisciplinary and co-creative student projects.	Supports global citizenship; prepares learners for collaborative knowledge economies.
Open Collaboration & Assessment	Design real-world, community-engaged assessments with external stakeholders.	Validates lived experience and informal knowledge; strengthens public engagement.
Open Assessment & OER	Reimagine assessment as knowledge creation (e.g., blogs, open articles).	Links learning to social contribution; shifts assessment to formative, inclusive practice.
Critical & Digital Literacies	Build skills in data ethics, AI use, information literacy, and source evaluation.	Prepares students for a datafied world; fosters ethical engagement with technology and knowledge production.
Capacity Building	Provide training, incentives, and networks for educators to adopt and sustain open practices.	Develops an open mindset; promotes equitable and inclusive pedagogical innovation.

OEP should therefore be understood not as a set of tools, but as a value-driven educational paradigm. Its successful implementation hinges on ethical awareness, institutional commitment, and the active engagement of educators and learners in co-creating more inclusive, collaborative, and socially responsive educational futures. Educators therefore need support, not only in technical aspects of OEP, but also in developing the cultural and pedagogical competencies necessary to implement these practices effectively, fostering a mindset that values openness, collaboration, and critical engagement.

OEP FROM A SOCIETAL IMPACT PERSPECTIVE

The integration of OEP into HE is a value-driven decision that goes beyond the mere application of technology. As Pearce et al. (2010) state, digital scholarship provides an opportunity to make informed decisions about research, teaching, and collaboration. Embracing open values catalyses the potential of peer-to-peer technologies to benefit both academia and society. Therefore, openness in education should be seen as a progressive educational practice aimed at learner empowerment, educational change, and promoting unrestricted access to knowledge (Knight 2008; Spiro & Alexander 2012; Boudreau 2014). While technology plays a key role in enabling openness, it is not neutral; it can either facilitate or hinder student success, depending on how it is applied (Brunton & Brown 2020).

The adoption of OEP is part of a broader transformation in educational practices that must be deliberate, sensitive to social contexts, and inclusive of epistemological diversity. This transformation is underpinned by institutional cultures of openness and critical reflection (Ehlers 2020; Mays 2017). The process of integrating OEP should embrace flexibility and responsiveness to diverse learning environments, ensuring that education becomes more inclusive and socially responsive. Educators are not merely integrating technology into their teaching; they are shifting towards open, inclusive pedagogies that are grounded in societal impact and are designed to address global educational challenges.

Educators' engagement with OEP is driven by multiple motivations, most notably the desire to innovate and reduce educational barriers. As Nascimbeni and Burgos (2016) note, open educators adopt open approaches to eliminate learning barriers, while Tur et al. (2020) describe them as critical participants in open practices throughout the teaching process—ranging from design to assessment—with the potential for transformative impacts. Cronin (2017) further highlights that OEP adoption involves cultivating a robust open digital identity, using open tools alongside traditional pedagogical environments, and balancing openness with privacy concerns.

Equity and innovation emerge as powerful motivators for educators engaging in OEP, fostering both personal and professional growth. By adopting OEP, educators contribute to a more equitable and dynamic educational landscape, expanding access to knowledge, and supporting educational transformation that directly benefits learners. These practices are grounded in the goal of empowering students and providing them with the tools and knowledge to participate meaningfully in society.

As Nascimbeni and Burgos (2016) suggest, the implementation of OEP requires continuous engagement across various components of the teaching process. Educators must adopt open learning design, share teaching plans transparently, and actively involve students in knowledge co-creation. By incorporating these practices, educators empower students to contribute to public knowledge resources, and adopt open assessment practices, such as open badges and e-portfolios, which engage both students and external stakeholders in the learning process.

Ultimately, by embedding these OEP into their pedagogies, educators can build a resilient and responsible education that promotes equity, inclusivity, and societal impact. As we move toward a more digitally connected world, the integration of OEP into teaching and learning represents a critical step toward the recognition of a more open and equitable HE ecosystem that benefits both individuals and communities.

DISCUSSION: CRITICAL AND INNOVATIVE ANGLES ON OEP

While at the outset of the term's introduction, OEP was understood as primarily referring to the development, adaptation, utilisation and sharing of OER, contemporary perspectives

are shifting the focus toward inclusive pedagogical practices that 'open up' and enhance accessibility and participation. This expanded view of OEP highlights its potential to foster not only access to resources but also social equity, inclusivity, and collaborative learning and teaching environments (Havemann 2020). Through this paper we reaffirm the importance of responsible AI, equity, and AI ethics in shaping the future of OE governance through pluralism, inclusivity, and the contextual sensitivity required for equitable and sustainable models of OE and OE policies—particularly in relation to data use and emerging AI-driven practices—this is essential to uphold the rights, agency, and diverse needs of learners and educators globally.

At the heart of these shifts is the understanding that Open Education should serve as a tool for addressing systemic barriers to education and promoting social participation. Bali, Cronin, and Jhangiani (2020) underscore the growing recognition of OEP's social value, arguing that OEP should not merely facilitate resource sharing but also champion broader issues such as equity, social justice, and cultural inclusivity. In this way, OEP not only reshapes how educational resources are shared but also redefines how teaching and learning can be more participatory and inclusive (Cronin 2017).

Despite the evolving definitions of OEP, one common thread is the integration of human rights principles aimed at ensuring education is equitable, accessible, and responsive to diverse global contexts. Open pedagogies must therefore be designed with cultural sensitivity, addressing issues of gender, language, and global diversity (Hockings, Brett & Terentjevs 2012). This broadens the role of OEP in promoting a more just, inclusive, and participatory educational landscape, aligning with a global vision of social justice in education (Nascimbeni & Ehlers 2020; Tur et al. 2020).

However, it is critical that OEP be institutionalised through academic development programmes that enhance educators' capacities to design and engage with open practices (Tur et al. 2020). These programmes should not only focus on technical skills related to OER but also foster an understanding of the societal value of openness, helping academics to engage with communities of practice, promoting shared pedagogical approaches that emphasise collaboration and co-creation of knowledge (Cronin 2017; Havemann 2016). In doing so, educators can adapt and contextualise open practices within their unique educational environments, while simultaneously promoting inclusive and participatory learning.

Institutional support for OEP also requires enabling policies that facilitate the integration of open practices in teaching and research. Atenas et al. (2020) highlight the need for universities to adopt open policies that empower educators to make informed decisions about engaging with OEP, while Campbell (2020) argues that publicly funded institutions should be mandated to make the outcomes of their research and teaching freely available to the public. OE policies must also incentivise the integration of OEP into academic careers by recognising the impact of open practices on teaching, research, and community engagement (Reed & Turner 2018).

The integration of emerging technologies, particularly AI, into OEP presents both opportunities and challenges. AI has the potential to significantly enhance OEP, particularly in the creation, adaptation, and translation of OER. AI tools can facilitate the personalisation of educational resources, offering learners tailored content that aligns with their learning needs (Clinton-Lisell 2021). Furthermore, AI can enhance the accessibility of OER by providing automated translation and generating multimodal resources that cater to diverse learning needs (UNESCO 2019a). However, the use of AI in OEP raises important ethical considerations. AI systems must be designed and implemented responsibly to avoid perpetuating biases, particularly regarding race, gender, and socioeconomic status, otherwise they may create educational resources that reinforce existing stereotypes, exacerbating educational inequalities (Sebriam, Markun & Gonsales 2017).

Moreover, the integration of AI into OEP requires careful attention to privacy and data security. AI tools must adhere to ethical guidelines that ensure transparent data practices and protect the rights of learners and educators (Atenas et al. 2020). As emerging technologies, particularly AI, continue to reshape educational landscapes, it is essential to prioritise responsible, human-centred practices that empower learners to actively participate in both the current and future democratic society (Albright 2005, UNESCO 2019b). Additionally, reliance on proprietary AI technologies could limit open access to OER, narrowing opportunities for adaptation and reuse, especially in regions with limited resources (Atenas et al. 2020). Therefore, the integration of

AI into OEP must be approached responsibly, ensuring that AI-driven tools promote inclusivity, equity, and fairness, and that the rights and needs of learners remain central to the development process.

CONCLUSION AND RECOMMENDATIONS: ADVANCING A SUSTAINABLE, RESILIENT, AND PARTICIPATORY HIGHER EDUCATION ECOSYSTEM

Each country faces its own unique educational challenges, shaped by diverse socio-cultural and economic contexts. In parallel, the dynamic nature of technology presents additional challenges for policymakers, as technological advancements outpace policy development, educational policies must be flexible and responsive. Realising the vision of UNESCO's OER Recommendation and Dubai Declaration on OER, alongside the UN DPG framework, will require adoption of open practices and policies as foundational elements for sustainable and inclusive education systems, and advocacy for education as a collaborative and participatory process which promotes civic engagement and empowers marginalised communities.

Through OEP, universities can become hubs to foster inclusive knowledge co-production, especially in areas such as AI ethics, data literacy, and critical engagement with emerging technologies. OEP and open governance offer transformative potential for creating more inclusive, transparent, and sustainable HE ecosystems, ensuring education remains resilient in the face of global disruptions such as pandemics, climate crises, and rapid technological changes (Morgan et al. 2021).

Within the DPG agenda, OEP can ensure that knowledge and research remain accessible to all, empowering educators and students to collaborate, addressing real-world challenges, and enhancing educational equity. By embedding these practices into HE, universities can create inclusive, adaptable learning environments that respond to the evolving needs of society and prepare students to navigate complex global challenges, through curricula that are contextually relevant and responsive to local and global issues, while also reducing dependency on expensive commercial resources, contributing to long-term educational sustainability.

To support the achievement of the UN SDGs—particularly Principle 2: *Leave No One Behind* and SDG4: *Quality Education*—it is essential to frame OEP within inclusive, participatory, and adaptive governance systems. These systems must promote openness, equity, and sustainability, creating an enabling environment for responsible and ethical educational practices that foster social justice, protect indigenous knowledge, and advance inclusive digital transformation.

The conceptualisation of OEP must move beyond resource sharing, to encompass policy, pedagogy, and practice rooted in critical and creative approaches (Atenas, Havemann & Nerantzi 2025). This requires promoting responsible use of technology, but also engaging educators, learners, and communities in knowledge co-creation, curriculum design, and policy development. Institutions must align their policies and curricula with national priorities in education, science, and technology, ensuring that capacity building strategies support both local development and global cooperation.

To ensure that AI is integrated responsibly into OEP, we must advocate for trustworthy, inclusive, and sustainable digital ecosystems that prioritise learner privacy, data protection, and algorithmic transparency. Furthermore, educational AI must be designed and deployed with ethical safeguards that promote digital equity and respect for human rights, and with the involvement of diverse stakeholders, particularly those from marginalised or underrepresented communities.

In this context, the following actions are essential:

- Promote digital cooperation by fostering cross-sectoral, cross-border, and multistakeholder collaborations in the co-creation of AI-enhanced OER and data-informed practices.
- Ensure institutional alignment with national and regional policies on education, science, and technology, while embedding OEP in strategic planning and academic governance.

- Protect authorship and intellectual property rights (IPR) through transparent and sustainable open licensing frameworks that respect creators and ensure the long-term viability of OER as digital public goods.
- Respect and represent indigenous and local knowledge systems, ensuring culturally sensitive and contextually relevant educational content.
- Adopt robust data governance frameworks to safeguard learners' privacy and ensure that AI-generated content adheres to copyright law and ethical standards.
- Foster capacity building in digital, AI, and data literacy for educators, learners, and administrators, grounded in participatory pedagogies and responsive to local needs.

Given the current fragmentation of the global OE ecosystem across policies, platforms, and priorities, the OE community faces challenges in achieving ethically governed, equitable, and sustainable practices. Addressing these requires the co-development of inclusive governance models that integrate ethical policy-making with green computing principles to minimise environmental impact.

We therefore call for stakeholder action to advance coordinated policy and development strategies that:

- Promote responsible and transparent AI in OEP to enhance inclusive and equitable access to education.
- Adopt sustainable open licensing that balances copyright protection with openness and transparency.
- Ensure the accessibility and relevance of OER for vulnerable and marginalised communities, including refugees and rural populations, with a commitment to representing indigenous knowledge respectfully.
- Promote eco-friendly digital practices to reduce the environmental footprint of AI, OER and associated technologies.
- Strengthen global and regional cooperation to tackle shared challenges and support capacity building among learners, educators, and institutions.
- Educate all stakeholders—from policymakers to learners—on the ethical, legal, and pedagogical dimensions of OER, open licensing, and data rights.

To overcome digital inequalities and support the recognition of OEP in HE as a practice to democratise access to knowledge, and of OEP as DPG, national governments, international organisations, and HE institutions must commit to multistakeholder, intergovernmental digital cooperation. Therefore, the OE community is invited to collectively co-create a roadmap to promote equitable access to knowledge, uphold human rights, and implement the UN Open Solutions initiative effectively in HE.

From our praxis, future research will focus on reviewing national and institutional examples of policy and practice to support the co-development of localised, inclusive strategies that foster digital cooperation, OE, Open Science, Open Data and responsible AI integration, as well as capacity building in HE to support the development of such a roadmap for digital cooperation (Atenas & Stefanelli 2025).

COMPETING INTERESTS

The authors have no competing interests to declare.

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