

The Impact of Education on Achieving the Sustainable Development Goals

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Abstract

This article explores the critical role of education in achieving the Sustainable Development Goals (SDGs), with a particular focus on SDG 4: Quality Education. Through an analysis of the challenges and opportunities inherent in the current educational landscape, this paper highlights the need for innovative, inclusive, and contextually appropriate educational strategies. The discussion extends to the impact of education on other key SDGs, including SDG 13: Climate Action, SDG 16: Peace, Justice, and Strong Institutions, and SDG 8: Decent Work and Economic Growth. Drawing on a conceptual and literature-based analysis of interdisciplinary scholarship in education, development studies, and public policy, the article argues that education's impact on sustainable development is contingent upon the alignment between pedagogical approaches and the socio-economic, cultural, institutional, and technological contexts in which learning takes place.

Abstrak

Artikel ini bertujuan mengeksplorasi peran penting pendidikan dalam mencapai Tujuan Pembangunan Berkelanjutan (SDGs), dengan fokus khusus pada SDG 4: Pendidikan Berkualitas. Melalui analisis tantangan dan peluang yang melekat dalam lanskap pendidikan saat ini, makalah ini menyoroti kebutuhan akan strategi pendidikan yang inovatif, inklusif, dan sesuai konteks. Diskusi meluas ke dampak pendidikan pada SDGs utama lainnya, termasuk SDG 13: Aksi Iklim, SDG 16: Perdamaian, Keadilan, dan Lembaga yang Kuat, dan SDG 8: Pekerjaan Layak dan Pertumbuhan Ekonomi. Berdasarkan analisis konseptual dan literatur dari kajian interdisipliner di bidang pendidikan, studi pembangunan, dan kebijakan publik, artikel ini berpendapat bahwa dampak pendidikan terhadap pembangunan berkelanjutan bergantung pada keselarasan antara pendekatan pedagogis dan konteks sosial-ekonomi, budaya, kelembagaan, dan teknologi tempat pembelajaran berlangsung.

Keywords

Education, Initiative, Institutions, Policy, SDGs

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Introduction

Education is universally recognised as a fundamental human right and a cornerstone of sustainable development. The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, set an ambitious agenda for global development, with education playing a central role in achieving these goals. SDG 4: Quality Education aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2024).

However, the impact of education extends beyond SDG 4 to many of the other 16 SDGs. This paper discusses strategies for making education more inclusive and working towards achieving SDG4. It subsequently explores the role of education in influencing outcomes related to SDG 13 climate action, SDG 16 peace and justice, SDG 8 economic growth and SDG 10 inequalities. It argues for the importance of education in achieving the SDGs, focusing on the need for contextually appropriate and innovative educational strategies. Throughout the paper, the issues of context and approach will be argued to be key in maximising education's impact on the SDGs.

A growing body of research has explored the relationship between education and sustainable development over the past decade. Existing studies can broadly be grouped into three dominant strands. The first strand focuses on access and participation, highlighting persistent inequalities related to poverty, gender, disability, geography, and language (UNESCO, 2015; UNICEF, 2022a, 2022b; OECD, 2018a). While this literature provides strong empirical evidence of unequal educational opportunities, it often treats education as a uniform intervention, paying limited attention to how different educational approaches function within specific social and institutional contexts.

The second strand examines education as a mechanism for skills development and economic outcomes, particularly in relation to employability, transferable skills, and labour market alignment (Mason et al., 2009; Hurrell, 2015; World Economic Forum, 2023). Although these studies emphasise the importance of skills such as critical thinking, communication, and problem-solving, they frequently identify a persistent “skills gap” between education systems and labour market needs. However, much of this literature remains focused on outcomes, offering less analytical clarity on how pedagogical approaches and learning environments shape the development of such skills across different contexts.

A third strand addresses education's role in broader social and political outcomes, including climate action, civic engagement, democratic resilience, and social cohesion (Project Drawdown, 2024; Guess et al., 2020; European Commission, 2018). While these studies underscore education's potential societal impact, they often adopt a normative stance, assuming that expanding education will automatically produce positive outcomes. Less attention is given to the conditions under which education successfully contributes to social resilience, critical citizenship, or sustainable behavioural change.

Taken together, these strands reveal a key limitation in existing research: education is frequently discussed as an abstract or universal solution, rather than as a set of practices that operate differently depending on context and pedagogical approach. This limits our understanding of why similar educational interventions may succeed in some settings while failing in others, and why expanded access to education does not always translate into meaningful progress toward the SDGs.

This article seeks to address this gap by arguing that the impact of education on achieving the SDGs depends not only on *whether* education is provided, but *how* it is designed and *where* it is situated. Specifically, the article advances a context–approach perspective, which distinguishes between the socio-economic, cultural, and institutional conditions in which education takes place (context) and the pedagogical strategies, learning designs, and modes of delivery employed (approach). By analytically separating and then reconnecting these two dimensions, the article offers a framework for understanding variation in educational outcomes and for identifying conditions under which education can most effectively contribute to sustainable development.

Accordingly, this article examines how educational context and pedagogical approach interact to shape education's contribution to the achievement of the SDGs. It specifically investigates the key conditions under which education can support outcomes related to climate

action, economic development, social inclusion, and democratic resilience, while also exploring how innovative and inclusive educational approaches may strengthen education's role as a cross-cutting enabler of sustainable development.

Methodologically, the article adopts a conceptual and literature-based analytical approach, drawing on interdisciplinary scholarship from education studies, development studies, and public policy, complemented by illustrative policy examples and an applied initiative in higher education. Rather than offering a single-country empirical study, the article aims to develop an integrative analytical perspective that can inform both academic debates and policy-oriented discussions on education and the SDGs.

The remainder of the article is structured as follows. The next section develops the analytical framework by elaborating the concepts of context, pedagogical approach, inclusivity, and transferable skills, and by linking these to existing theories of education and development. The subsequent sections examine how education contributes to selected SDGs, specifically SDGs 13, 16, 8, and 10, through illustrative examples and applied initiatives. The final section concludes by summarising the key findings, outlining the article's theoretical contributions, and proposing directions for future research and policy development.

Analytical Framework

This article adopts a conceptual analytical framework that centres on the interaction between educational context and pedagogical approach to explain how education contributes to the achievement of the Sustainable Development Goals (SDGs). Rather than treating education as a uniform or universally effective intervention, the framework conceptualises education as a situated social practice whose outcomes depend on how pedagogical strategies are aligned with specific socio-economic, cultural, technological, and institutional conditions. This perspective responds directly to critiques in the literature that highlight the tendency to frame education normatively, without sufficient analytical attention to variation in outcomes across contexts.

Educational Context

Educational context refers to the structural and situational conditions within which education takes place. These include, but are not limited to, socio-economic conditions, cultural norms, linguistic environments, political and policy frameworks, technological infrastructure, and institutional capacity. Prior research has demonstrated that factors such as poverty, geographic location, disability, gender, and language of instruction significantly shape access to and outcomes of education (UNESCO, 2015; UNICEF, 2022a; OECD, 2018a). However, much of this work treats context as a background condition rather than as an active component of educational effectiveness.

In this framework, context is understood as dynamic and relational rather than static. Educational interventions do not simply operate *within* contexts; they interact with and are shaped by them. For example, the availability of digital infrastructure, levels of digital literacy, and cultural attitudes toward technology influence whether online or hybrid learning environments enhance access and inclusion or instead exacerbate existing inequalities. Similarly, political stability, institutional trust, and policy coherence condition the extent to which education can contribute to democratic resilience and social cohesion. Recognising context as an analytical variable allows for a more precise understanding of why similar educational models may generate divergent outcomes across different settings.

Pedagogical Approach

Pedagogical approach refers to the design of teaching and learning processes, including modes of delivery, assessment practices, learner–teacher relationships, and the extent to which learners actively participate in knowledge production. Traditional teacher-centred and content-driven approaches remain dominant in many education systems, despite growing evidence that such models are limited in their capacity to foster transferable skills, critical thinking, and learner engagement (Laurillard, 2012; OECD, 2018b).

This article focuses on innovative and inclusive pedagogical approaches, including playful learning, co-creation, problem-based learning, and hybrid or digitally mediated models. These approaches are characterised by active learning, collaboration, reflexivity, and adaptability, and they are increasingly associated with the development of transferable skills relevant to economic participation, civic engagement, and sustainable behaviour (Kuh, 2008; Guo et al., 2020). Importantly, pedagogical approaches are not assumed to be inherently effective; their impact depends on how they are adapted to specific contextual constraints and opportunities.

The core analytical contribution of this framework lies in its integration of context and pedagogical approach. The framework posits that educational outcomes relevant to the SDGs emerge from the *alignment* between these two dimensions. Misalignment—such as technologically sophisticated pedagogies introduced in contexts lacking infrastructure or support—can undermine educational effectiveness, while well-aligned approaches can mitigate contextual constraints.

This interactional perspective is particularly important for understanding education’s role as a cross-cutting enabler of sustainable development. For instance, the development of critical thinking and media literacy (relevant to SDG 16) requires not only curricular emphasis but also learning environments that encourage dialogue, questioning, and reflexivity. Similarly, education’s contribution to climate action (SDG 13) depends on pedagogies that connect abstract knowledge to lived experience and collective problem-solving within specific socio-environmental contexts.

Within this article, the analytical framework is operationalised by examining how educational interventions address four interrelated conditions for effective learning: affordability, accessibility, engagement, and relevance. These conditions serve as analytical lenses through which the contribution of education to selected SDGs is assessed. Rather than functioning as normative criteria, they are used to analyse how specific pedagogical approaches interact with contextual constraints to enable or limit educational impact.

The framework is applied across discussions of SDGs 13, 16, 8, and 10, using illustrative policy examples and an applied higher education initiative to demonstrate how context-sensitive and pedagogically innovative education can contribute to sustainable development outcomes. By foregrounding the interaction between context and approach, the framework provides a coherent conceptual basis for analysing education not merely as a goal in itself, but as a differentiated and contingent driver of social transformation.

Methods

This article adopts a conceptual and literature-based research design aimed at developing an analytical framework for understanding how education contributes to the achievement of the Sustainable Development Goals (SDGs). Rather than presenting primary empirical data from a single country or case, the study synthesises and critically analyses existing interdisciplinary scholarship to advance a theoretically informed and policy-relevant perspective on education and sustainable development.

The study is positioned as a conceptual paper, drawing on established traditions in education studies, development studies, and public policy analysis. Conceptual research is

particularly appropriate where the objective is to clarify concepts, identify analytical relationships, and propose integrative frameworks that can inform both future empirical research and policy debates. In this article, the conceptual approach is used to move beyond normative claims about the importance of education and to systematically examine the conditions under which education functions as an effective enabler of sustainable development.

The primary sources of data for this study consist of peer-reviewed journal articles, reports from international organisations, and selected policy-oriented publications produced over approximately the last 10-15 years. The literature was selected based on four criteria. First, sources were required to engage substantively with education, skills development, or learning processes in relation to sustainable development or related social and economic outcomes. Second, priority was given to studies published in high-impact international journals and reports produced by recognised global institutions such as UNESCO, UNICEF, the OECD, and the World Economic Forum. Third, the literature needed to provide either theoretical insight or empirical evidence relevant to one or more of the SDGs examined in this article. Finally, sources were selected to reflect a diversity of geographical contexts, including both Global North and Global South perspectives, in order to avoid a contextually narrow analysis.

The analysis proceeded in three stages. In the first stage, the literature was thematically reviewed to identify recurring debates and limitations in existing research on education and the SDGs, particularly regarding access, pedagogical innovation, skills development, and social inclusion. In the second stage, key concepts, such as educational context, pedagogical approach, inclusivity, and transferable skills, were analytically refined and integrated into a coherent framework centred on the interaction between context and approach. In the third stage, this framework was applied analytically to selected SDGs (SDGs 13, 16, 8, and 10) in order to examine how different educational strategies contribute to sustainable development outcomes under varying conditions.

To strengthen the analytical discussion, the article incorporates illustrative policy examples and an applied higher education initiative as analytical material rather than as formal empirical case studies. These examples are used to demonstrate how the proposed framework can be applied to real-world contexts and to clarify the mechanisms through which educational approaches interact with contextual conditions. The I-HEDU initiative, in particular, is treated as an illustrative applied initiative that provides insight into inclusive and co-creative educational practices in higher education, rather than as a comprehensive evaluative case study.

The scope of the study is intentionally broad, reflecting its conceptual orientation and its focus on education as a cross-cutting enabler of multiple SDGs. While this approach allows for analytical integration across policy domains, it also entails certain limitations. The study does not claim to provide causal empirical evidence for specific educational interventions, nor does it evaluate outcomes using quantitative indicators. Instead, its contribution lies in offering a structured analytical lens that can inform future empirical research, comparative studies, and context-sensitive policy design. By making its conceptual assumptions and analytical procedures explicit, the article aims to provide a transparent and rigorous foundation for subsequent research on education and sustainable development.

Result and Discussion

This section applies the context-approach analytical framework to explain how education contributes to the Sustainable Development Goals (SDGs). It synthesises interdisciplinary research findings and theoretical literature to address the study's research focus, organising the discussion around four analytical conditions such as affordability, accessibility, engagement, and relevance

The Role of Education in Achieving the SDGs

SDG 4: Quality Education

Education's importance is highlighted by its explicit inclusion as SDG 4. This goal emphasises the need for inclusive and equitable quality education, which is seen as a vehicle for achieving broader social and economic development. However, the effectiveness of education in different contexts is contingent upon various factors, including access, relevance and the approach to teaching and learning. There are two key components to educational interventions, the context in which education occurs and the approach taken to that education. The context is the where and when of education, and the approach is the how. The success of educational initiatives depends on the relationship between these two elements. Education occurs within specific cultural, social, and economic contexts, and its success is influenced by these factors. In the same way that different approaches within the same context can have radically differing results, the same approach within different contexts can also result in extremely varied results.

Confusion between these two concepts can lead to approaches being blamed where the context was flawed or vice versa. For example, the emergency online transformation of education that took place during the COVID 19 pandemic is widely acknowledged as having had a negative impact on educational outcomes internationally (UNESCO, 2020) with the most significant impacts on those in already disadvantaged communities (Mahon & Mahon, 2023). The post pandemic rapid re-adoption of face to face teaching implies that the context of pandemic period education was the problem.

However, in many cases the problems were caused by the approach taken to online education rather than the context. Issues such as inadequate infrastructure, lack of digital literacy and a focus on content delivery over skills development led to feelings of isolation, reduced engagement, and a widening of existing educational inequalities (Shahriar et al., 2021; UNESCO, 2020). Successful instances of online education, both prior to (Ally, 2004; Means et al., 2014) and during the pandemic (Sato et al., 2023; Turnbull et al., 2021), demonstrate that differing approaches to online delivery can increase engagement and make education more accessible. So when considering the effectiveness of educational interventions it is important to consider both the context and the approach.

Despite significant progress in increasing access to education globally, challenges remain. Among those challenges, there are several that are particularly relevant when considering achieving the UNSDGs. One clear piece of evidence for the impact of these challenges is that there is a deficit internationally in children achieving 12 years of quality schooling. It is clear that human beings possess a great potential to learn. As an example of this potential, language acquisition is widely regarded as a universal human capability, with almost 100% of humans achieving proficiency in at least one language by the age of seven (P. Bloom, 2002; Hoff, 2013). However, this learning potential is not universally utilised. Completion rates for primary, lower secondary, and upper secondary education vary widely, with global averages of 82%, 70%, and 45%, respectively (UNICEF, 2022a). So, while approximately 100% of humans demonstrate the capability to learn and use highly complex concepts such as language, less than 50% actually

complete 12 years of formal quality schooling. These issues in access and quality of education can be attributed to a wide range of factors, and these in turn vary from country to country. However, this paper will focus on the challenges of cost, access, engagement and relevance and how they may impact education's role in achieving specific UNSDGs.

Cost is clearly a significant impediment to education. Even in countries where education is officially free, hidden costs such as uniforms, textbooks, transportation and exam fees can be prohibitive for families, particularly those living in poverty. A UNESCO report (UNESCO, 2015) highlighted that in many developing countries, these additional costs force families to choose between basic necessities and their children's education, often leading to dropout rates, particularly among girls. UNICEF (UNICEF, 2022b) highlights poverty and child labour as two significant barriers to the development of the foundation skills of numeracy and literacy which have significant consequences for success in later life both in terms of educational and work place success.

Cost in turn contributes to the problem of access. At a practical level, the physical infrastructure connected with education such as school buildings, supplies and well paid and qualified teachers are expensive. In remote areas there may be access to a primary school but not a secondary one. Travelling to the nearest school may then be a further financial burden. Further issues face those from minority communities where the language of instruction may not be minority children's first language. This has negative impacts for the resilience and capabilities of these communities (Mahon & Mahon, 2023). Access to educational resources is also a particular problem for disabled students. Disability is a third significant barrier to developing foundational skills (UNICEF, 2022b). This highlights the interconnected nature of certain SDGs, where factors addressed by specific SDGs have reciprocal impacts on education, and education itself influences the achievement of those SDGs. Key challenges for the education sector include ensuring affordability for individuals from lower-income backgrounds and improving accessibility for students with disabilities. Addressing these issues is essential to advancing both educational outcomes and broader global development objectives.

Engagement in and the relevance of education are additional variables that impact the success of educational interventions. Engagement is often hindered by the educational context and methodology. Post-pandemic, there has been a preference for face-to-face learning, accompanied by scepticism towards the use of digital tools meaning that there has been a rush back to the class room often without the consideration of how lessons learned during the pandemic might expand access to education. Traditional teacher-centred approaches may further limit student engagement and effectiveness in learning, as they often fail to accommodate diverse learning styles (Czerniewicz et al., 2020). Additionally, there are growing concerns about the relevance of education, particularly in relation to the skills gap. In the UK, for instance, there is ongoing debate about the value of higher education, with questions arising over whether it adequately prepares students for the evolving demands of the workforce (Tomlinson, 2018). This debate recently manifested with the idea of reintroducing national service as a way of developing the transferable skills previously thought to be generated during the UK's 12 year education system. The implication being that the education system was seen as being deficient in developing those competencies. These challenges highlight the need for more adaptable, inclusive and skills-focused education systems.

The contemporary educational landscape faces a paradox in that while subject disciplines readily embrace innovation, pedagogy remains rooted in traditional, didactic methods (OECD, 2018a, 2018b). In the UK, for instance, the A-level physics curriculum includes advanced topics like quantum mechanics, demonstrating the integration of modern scientific developments into academic content. Yet, despite this progressive content, the prevalent teaching and assessment

methods remain focused on lectures and examinations, limiting opportunities for student-centred learning. This contrast highlights a need for pedagogical innovation that mirrors the advances within academic disciplines. A shift towards more dynamic, learner-centred approaches, such as project-based learning, formative and authentic assessments, could better prepare students for the complex challenges of the modern world (Kuh, 2008; Laurillard, 2012). Academic content that embraces new ideas, encourages experimentation and takes risks is essential for preparing students for a future that addresses the SDGs. Traditional approaches that fail to acknowledge the hybrid nature of modern work environments and resist integrating technologies, such as mobile devices, which are essential in every other aspect of life, prepare students for a world that no longer exists, rather than equipping them for the demands of the present and future.

Education should then be affordable, accessible, engaging, and relevant to the diverse needs of learners. The pandemic has demonstrated the potential of online and hybrid learning environments, offering significant insights into improving accessibility and affordability in education. As the costs associated with developing digital infrastructure are considerably lower than those required for building and maintaining physical educational institutions, digital platforms offer a practical solution for enhancing access to education, especially in remote areas (Pokhrel & Chhetri, 2021). Synchronous online learning enables teachers to engage with students in geographically distant locations, while AI-driven personalisation can further enhance the learning experience by tailoring educational content to individual needs (Zawacki-Richter et al., 2019). Additionally, asynchronous learning strategies provide greater flexibility for learners with time constraints, such as working professionals and parents, thus improving access to education (Hrastinski, 2008).

Importantly, online platforms can also play a crucial role in making education more inclusive for disabled students, not only by offering greater accessibility features but also by helping to reduce stigma and create a more equitable learning environment (Batanero et al., 2019). Innovative strategies such as playful learning, co-creation and problem-based learning offer promising ways to address the challenges of student engagement and educational relevance. Playful learning promotes mastery, autonomy, creativity and collaboration through low-stakes, engaging activities, helping students to explore concepts in a hands-on, experiential manner (Arnab et al., 2021). This approach also encourages teamwork and problem-solving, skills crucial for success in dynamic, real-world contexts (Johnson et al., 2014; Kolb, 1984). Co-creation involves active collaboration between educators and students, breaking down traditional hierarchies and fostering a more inclusive, learner-centred environment (Healey et al., 2014).

This method allows students to apply their knowledge to practical problems, thereby increasing their sense of ownership over their learning experience. Furthermore, problem-based learning (PBL) aligns education with real-world applications, emphasising practical, skills-based education that prepares students for future challenges (Bell, 2010; Guo et al., 2020). PBL fosters critical thinking and problem-solving, as students work in groups to solve complex, real-world issues. Education therefore has the potential to address the issues of relevance and engagement, if there is impetus to move away from traditional approaches to learning.

Innovative approaches and technology also offer solutions to the problem of access. Ivan Illich's (Illich, 1971) concept of "deschooling" offers another radical reimagining of the education system. Illich proposed creating learning webs or networks that connect learners and provide them with resources and mentors. With the advent of generative AI, there is the potential to realise this vision by facilitating personalised learning pathways, connecting learners with resources, and fostering peer-to-peer learning. AI tools could match learners based on their needs and interests, thereby creating networks of knowledge exchange. However, for such systems to

align with Illich's humanistic principles, their implementation would need to prioritise personal agency, equity and meaningful learning experiences over mere technological efficiency.

Education has an important role to play in achieving other of the SDGs. The following section will consider four more, looking at the role education can play and what that might look like citing the results of a project involving innovative educational approaches to advance the interest of disabled people in higher education.

SDG 13: Climate Action

Education has the potential to play a pivotal role in addressing climate change, as evidenced by Project Drawdown. Project Drawdown is a non-profit organisation focused on identifying and promoting scalable climate solutions to help achieve "drawdown," the point where atmospheric greenhouse gas concentrations begin to decline (Project Drawdown, 2024). It is funded by a mix of international donations and philanthropic support, and offers an evidence-based roadmap with approximately 100 ranked solutions that are practical and already within reach to tackle climate change effectively. The initiative considers two achievable future scenarios, the first aligning approximately with a 2°C temperature rise by 2100, the second with a 1.5°C temperature rise at the end of the century. Within each scenario there are a series of actions that if taken would reduce CO2 emissions, including the use of renewable energy, recycling and agricultural changes. Considering the first scenario of Project Drawdown, the impact of education on climate change is more than the impact of electric cars, nuclear power, recycling, insulation, concentrated solar power and offshore wind turbines combined (see Table 1).

Table 1: Comparison of impact of solutions in Gigatons CO2 Equivalent Reduced/ Sequestered (2020–2050)

Electric Cars: 7.66	
Nuclear Power: 3.17	
Recycling: 10.36	
Insulation: 15.38	
Concentrated Solar power: 18	
Offshore Wind Turbines: 10.22	
Combined: 64.79	Family Planning and Education: 68.90

Source: Project Drawdown, 2024

Providing 12 years of quality education for all children, particularly girls, and enhancing access to voluntary family planning are projected to reduce CO2 emissions by 68.9 gigatons by 2050 (Project Drawdown, 2024). Education not only equips individuals with the knowledge and skills needed to engage in climate action but also fosters resilience, health, and sustainable practices. Key to the success of this however are the issues of access to education and skills development. Education can address climate change through creating awareness, empowerment and fostering responsible citizenship and resilience. By integrating climate education and promoting transferable skills, particularly critical thinking, schools can empower students to make sustainable choices and advocate for climate action. Education delays marriage and childbearing, promotes gender equality (SDG 5) and enhances economic opportunities, which in turn lead to reduced population growth rates (Bongaarts et al., 2017; Project Drawdown, 2024). This deceleration helps lower greenhouse gas emissions by lessening pressure on energy, transportation and food systems. So increased investment in quality education to make it more accessible to all children, especially those in

underprivileged communities, supports societal resilience and adaptation to climate-related challenges.

SDG 16: Peace, Justice, and Strong Institutions

Education, and in particular its role in developing the transferable skill of critical thinking, has a significant role to play in achieving SDG16. The spread of disinformation, particularly through social media, poses a significant threat to peace, justice and strong institutions. Disinformation can lead to poor decision-making, undermine trust in institutions and have serious societal consequences, such as public health crises and political instability.. Individuals with less formal education often lack the critical thinking and media literacy skills necessary to evaluate online information sources critically. For example, a study published by Guess et al. (2020) found that individuals with lower education levels were more likely to share false news during the 2016 US presidential election. Similarly, a report by the European Commission: Directorate-General for Communications Networks (2018) noted that people with lower education levels are more susceptible to believing and spreading disinformation, particularly on platforms like Facebook.

The UK in particular has seen the impact of this disinformation. The 2016 Brexit vote was influenced by significant misinformation and lies, particularly around the supposed financial savings for the National Health Service, with claims that the UK sent £350 million a week to the European Union, a figure later debunked. Additionally, exaggerated fears around immigration were used to sway public opinion, often based on misleading data about the economic and social impacts of EU migration (Portes, 2016). The resulting societal divisions, both during and after the vote, have had profound and lasting effects, exacerbating polarisation and negatively impacting the UK economy through reduced trade, investment, and a decline in GDP growth compared to pre-Brexit forecasts (Springford, 2022). More recently, disinformation about the murders of children in Southport led to the summer 2024 riots in the UK.

Education is critical in combating disinformation by developing critical thinking skills, promoting digital literacy and fostering informed citizenship. Strengthening these skills through education is essential for advancing sustainable development by ensuring that citizens can make informed decisions in an increasingly digital world. Once again, the conditions for the successful development of critical thinking and other transferable skills, involve increasing access to education, reaching those communities where educational opportunities are limited and creating learning environments that are relevant and engaging.

SDG 8: Decent Work and Economic Growth

Education also has a role to play in international economic development and achieving SDG 8. Key to this economic aspect is the development of transferable skills such as communication, problem-solving, teamwork, critical thinking, and creativity (Mason et al., 2009; World Economic Forum, 2023). Education and skills development are strongly associated, with skills typically part of constructively align curricula (Biggs & Tang, 2011) and the vocabulary of skills (Bloom, 1956) usually associated with the composition of course and program level learning outcomes. In the context of higher education, graduate attributes are strongly associated with transferable skills development (Mahon, 2022).

However, despite this theoretical alignment, the gap between the skills developed through education and the needs of the labour market is a persistent challenge internationally (Hurrell, 2015; Mason et al., 2009; QS, 2018; Wilson, 2016) with employers often reporting that graduates lack essential skills. The reasons for this are varied, however, one key element is that despite the shared vocabulary of skills across education and industry (problem solving, communication and

so on) the practical manifestation of these skills varies considerably across academic disciplines and industrial context. The communication skills of a medical student vary considerably from those of a law student. This misalignment of expectations contributes to the skills gap, making cooperation between education and industry and the measure of skills development more complicated than on the surface it might appear (Mahon et al., 2024). The development of learning environments that acknowledge this complication and that develop transferable skills are then key to achieved SDG 8. Innovative educational approaches, such as problem-based, playful and co-creative learning, can help bridge this gap by promoting hands-on activities, teamwork and real-world problem-solving.

SDG 10: Reduced Inequalities

The final area for consideration is the impact that education can have on SDG 10 and in particular how it can work to reduce inequalities experienced by disabled people. Globally, 1.3 billion people experience significant disability, representing 16% of the world's population (World Health Organisation, 2023). As noted above, disabled students are significant disadvantage in the development of the foundation skills of literacy and numeracy (UNICEF, 2022b). Regarding tertiary education, there is significant evidence suggesting that participation rates for disabled students in higher education do not proportionally reflect their share of the population internationally (OECD, 2018a; UNICEF, 2022b).

Funded by the British Council and the Indonesian ministry of education, the I-HEDU project is a collaboration between the University of Surrey and Coventry University in the UK and the Universitas Negeri Malang and the Universitas Muhammadiyah Ponorogo in Indonesia. The project aims to establish the "Indonesia HE Disability Union" (I-HEDU), focusing on developing and sharing best practices for improving access to higher education for disabled students in Indonesia. It utilises playful, co-creative approaches to facilitate knowledge exchange and foster innovation. Its primary goal is to collaboratively develop strategies that inform higher education policy, ensuring equitable access for disabled students. The anticipated outcome is to expand the project's impact across Indonesian higher education institutions, driving sustained policy change that supports inclusivity for disabled students. The focus of these interventions address the issues of accessibility and approach discussed throughout this paper.

The project employs a range of strategies, including workshops focused on playful design and skills building to engage participants creatively. It also uses reverse mentoring to encourage mutual learning between different stakeholders with their varied levels of expertise and authority. Co-creation is at the heart of the approach, ensuring that solutions are collaboratively developed. Additionally, social media engagement is utilised to broaden outreach and increase participation, fostering a sense of community and extending the project's impact. Preliminary findings indicate several areas of successful impact, with strategies to create accessible infrastructure, adjustments to learning media, enhanced guidance and counselling services and the introduction of student buddy programmes being identified as effective measures. Obstacles that disabled students face in higher education include inconsistent disability classifications, technical barriers, psychological challenges such as low self-esteem and poor coordination between support programmes and institutions. There is also a lack of awareness regarding the diverse needs of disabled students, and bureaucratic hurdles further complicate accessibility.

Education as a Contextually Conditioned Enabler of the SDGs

Education plays a fundamental role within the SDG agenda, especially in promoting quality education (SDG 4) and fostering connections with other goals such as reduced inequalities, gender equality, and social cohesion (UNESCO, 2017). However, recent scoping reviews note *variation* in how SDG-aligned education is operationalised across contexts, and highlight gaps in how curricula and educational systems embed sustainability content meaningfully (Osorio-Saez et al., 2025). This reinforces arguments that educational impact is not automatic but emerges through interaction between pedagogical design and contextual conditions (Alfathy et al., 2024). From a theoretical perspective, this challenges linear models of education policy transfer and aligns with a *situated social practice* view of education: outcomes are mediated by institutional capacity, socio-economic constraints, cultural norms, and policy coherence (González-Salamanca et al., 2020). A systems approach that links SDGs with educational processes helps scholars conceptualise these interactions holistically rather than as isolated inputs and outputs (da Silva et al., 2019).

Affordability refers to learners' capability to participate in education when accounting for direct and indirect costs (e.g., fees, transport, opportunity costs). Cost-related barriers are strongly linked to persistent inequalities that counteract SDG targets on equity and inclusion (UNESCO, 2017). Systematic literature on SDG integration in education highlights that *structural economic inequalities* often limit access and disproportionately affect marginalised groups (Osorio-Saez et al., 2025). From a theoretical standpoint, affordability must be seen relationally: cost barriers intersect with contextual resource availability and pedagogical choices. For example, digital or blended learning strategies can theoretically reduce some costs, but without supportive infrastructure and equitable access, they may deepen divides instead of closing them (Alfathy et al., 2024). This “double-edged” nature of technological affordances aligns with capability theory, which emphasises that real opportunities to learn depend on contextually grounded resources and supports (Sen, 1999, as applied in SD research).

Accessibility extends beyond physical access to include cognitive, social, linguistic, and technological dimensions of participation (Rončević & Rieckmann, 2025). Recent scoping reviews show that research on *inclusive Education for Sustainable Development (ESD)* is still emerging, with most work highlighting normative connections between inclusion and sustainability rather than detailed analytical models (Rončević & Rieckmann, 2025). Additionally, inclusive pedagogy is increasingly conceptualised through frameworks such as Universal Design for Learning, which emphasises adaptability to learner diversity at both curricular and pedagogical levels (Treviranus, 2025). Theoretically, accessibility must be linked to learners' *meaningful engagement* in educational processes. This resonates with capability approaches to education, which prioritise what learners can *do and be* rather than mere attendance rates (González-Salamanca et al., 2020). Inclusive ESD, by combining sustainability content with access-focused pedagogy, offers a model where accessibility and inclusion reinforce each other.

Engagement reflects how learners connect with content and develop capacities for critical thinking, participation, and action, dimensions crucial for SDGs like SDG 16 (Peace, Justice, and Strong Institutions). Literature on ESD emphasises that *transformative and participatory pedagogical strategies*, including dialogue education, problem-based learning, and experiential learning—are effective in fostering deeper engagement (Hussain et al., 2024). These approaches align with constructivist theories of learning, which argue that knowledge and meaning emerge through active participation and reflection (González-Salamanca et al., 2020). Empirical evidence from sustainability education research also underscores the importance of community and lived experience as engagement catalysts. For example, studies on community-based learning show that engagement increases when learners interact with real-world social and environmental challenges,

linking education to civic agency and democratic participation (Ruiz Simón et al., 2025). Such findings resonate with critical pedagogies that foreground power relations and learner agency in educational settings.

Relevance pertains to how educational content and pedagogies prepare learners to navigate and shape complex socio-environmental realities. Research on *21st-century skills and ESD* highlights competencies such as critical thinking, systems thinking, collaboration, and ethical decision-making as essential for sustainable futures (González-Salamanca et al., 2020; Osorio-Saez et al., 2025). These competencies extend beyond labour market readiness to include *social purpose*—enabling learners to address interconnected challenges across SDGs.

The integration of sustainability perspectives into curricula, especially through experiential and thematic learning, has shown positive effects on relevance perception. For instance, embedding SDG challenges in business or engineering education promotes both technical and ethical competencies relevant to transformative societal outcomes (Alfathy et al., 2024; da Silva et al., 2019). Such pedagogical designs emphasise *learning as participation in futures-making*, integrating learners' experiences with broader sustainability concerns.

Taken together, the analysis confirms that education's contribution to the SDGs is shaped by interactions between context and pedagogical approach, mediated through affordability, accessibility, engagement, and relevance. This framework challenges reductionist, input–output models and reframes education as a *situated social process* that unfolds within specific socio-economic, cultural, and institutional environments. It contributes theoretically by providing an integrative model that bridges education theory, sustainable development studies, and policy research. By foregrounding these conditions, the framework explains why broad policy endorsements (e.g., SDG 4) do not automatically translate into meaningful learning outcomes. Instead, pedagogies that are context-sensitive, inclusive, participatory, and purpose-driven offer pathways through which education can support transformative change across multiple SDGs.

Conclusion

Education is a powerful tool for achieving the Sustainable Development Goals. However, to be effective, education must be contextually relevant, inclusive and innovative. This paper has highlighted the importance of adopting hybrid, learner-centred and engaging educational strategies that leverage digital tools and artificial intelligence. By focusing on the development of critical thinking, digital literacy, and transferable skills, education can play a central role in addressing global challenges with particular impact on climate change, disinformation, economic growth and inequality.

This article has examined the role of education as a cross-cutting enabler of the Sustainable Development Goals (SDGs) through a conceptual and literature-based analysis grounded in a context–approach framework. Responding to gaps in existing research that often treats education as a uniform or inherently effective intervention, the article has argued that education's contribution to sustainable development is contingent upon the alignment between pedagogical approaches and the socio-economic, cultural, institutional, and technological contexts in which education is embedded.

By addressing the research focus articulated in the introduction, the analysis demonstrates that education supports outcomes related to climate action (SDG 13), decent work and economic growth (SDG 8), reduced inequalities (SDG 10), and peace, justice, and strong institutions (SDG 16) only when four interrelated conditions are met: affordability, accessibility, engagement, and relevance. These conditions operate as mediating mechanisms through which educational context and pedagogical approach interact to shape learning processes and outcomes. Education,

therefore, should not be understood as a linear input into development agendas, but as a situated social practice whose impacts vary across contexts.

The principal theoretical contribution of this article lies in the development of an integrated analytical model that bridges education studies and sustainable development scholarship. By foregrounding interaction rather than linear causality, the framework advances conceptual clarity regarding why similar educational reforms may generate divergent outcomes across settings. It also challenges normative assumptions within SDG-related education discourse by demonstrating that inclusion, skills development, and innovation are not outcomes in themselves, but processes that must be contextually enabled through appropriate pedagogical design and institutional support.

From a policy perspective, the findings underscore the limitations of education reforms that prioritise access, technology, or curriculum content in isolation. Policies aimed at leveraging education for sustainable development should instead adopt a systemic orientation that considers how affordability, accessibility, engagement, and relevance are jointly produced within specific contexts. This has particular implications for initiatives targeting marginalised populations, where misalignment between context and pedagogical approach risks reinforcing existing inequalities rather than reducing them.

The article also offers a basis for future research. Empirical studies could apply the context–approach framework to comparative or case-based analyses across different national, institutional, or disciplinary settings in order to test and refine its explanatory value. Methodologically, mixed-methods research could explore how the four analytical conditions operate in practice and how they interact with policy environments and institutional cultures. Theoretically, further work could extend the framework by integrating perspectives from political economy, critical pedagogy, and postcolonial studies to deepen understanding of power, inequality, and knowledge production in education for sustainable development.

In conclusion, education has significant potential to contribute to the achievement of the SDGs, but this potential is neither automatic nor universal. Realising education’s transformative capacity requires sustained attention to context-sensitive and pedagogically innovative approaches that foreground inclusion, learner agency, and social purpose. By offering a coherent conceptual framework, this article contributes to ongoing debates on how education can meaningfully support sustainable development in diverse and unequal global contexts.

References

- Alfathy, R. M., Saputro, S., Sarwanto, & Ramli, M. (2024). Implementation of sustainable development goals in higher education modalities: A literature review. *Journal of Turkish Science Education*, 21(1), 22–43. <https://doi.org/10.36681/tused.2024.002>
- Ally, M. (2004). Foundations of Educational Theory for Online Learning. In T. Anderson & F. Elloumi (Eds.), *Theory and Practice of Online Learning* (pp. 3–31). Athabasca University.
- Arnab, S., Mahon, D., Masters, A., Morini, L., Minoi, J.-L., & Mohamad, F. (2021). Towards the mapping of learning, playful, and frugal aspects for developing 21st century competencies and resilience. In *Proceedings of the European Conference on Games-Based Learning*. <https://doi.org/10.34190/GBL.21.043>
- Batanero, C., De-Marcos, L., Holvikivi, J., Hilerá, J. R., & Otón, S. (2019). Effects of new supportive technologies for blind and deaf engineering students in online learning. *IEEE Transactions on Education*, 62(4), 270–277. <https://doi.org/10.1109/TE.2019.2899545>

- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 83(2), 39–43. <https://doi.org/10.1080/00098650903505415>
- Biggs, J. B., & Tang, C. S. (2011). *Teaching for quality learning at university : what the student does* (Fourth ed). McGraw-Hill/Society for Research into Higher Education/Open University Press.
- Bloom, B. (1956). *Taxonomy of educational objectives; the classification of educational goals*. <https://search.worldcat.org/title/28003975>
- Bloom, P. (2002). *How children learn the meanings of words*. MIT Press.
- Bongaarts, J., Mensch, B. S., & Blanc, A. K. (2017). Trends in the age at reproductive transitions in the developing world: The role of education. *Population Studies*, 71(2), 139–154. <https://doi.org/10.1080/00324728.2017.1291986>
- Czerniewicz, L., Agherdien, N., Badenhorst, J., Belluigi, D., Chambers, T., Chili, M., de Villiers, M., Felix, A., Gachago, D., Gokhale, C., Ivala, E., Kramm, N., Madiba, M., Mistri, G., Mqquwashu, E., Pallitt, N., Prinsloo, P., Solomon, K., Strydom, S., ... Wissing, G. (2020). A Wake-Up Call: Equity, Inequality and Covid-19 Emergency Remote Teaching and Learning. *Postdigital Science and Education*, 2(3), 946–967. <https://doi.org/10.1007/S42438-020-00187-4/METRICS>
- Czerniewicz, L., Agherdien, N., Badenhorst, J., Belluigi, D., Chambers, T., Chili, M., ... Wissing, G. (2020). A wake-up call: Equity, inequality and COVID-19 emergency remote teaching and learning. *Postdigital Science and Education*, 2(3), 946–967. <https://doi.org/10.1007/s42438-020-00187-4>
- da Silva, J. F. F., Nunes, A. A., & Borges, J. (2019). Education for sustainable development: A systemic framework for connecting the SDGs to educational outcomes. *Sustainability*, 11(21), 6104. <https://doi.org/10.3390/su11216104>
- European Commission: Directorate-General for Communications Networks, Content and Technology. (2018). *A multi-dimensional approach to disinformation: Report of the independent high-level group on fake news and online disinformation*. <https://doi.org/10.2759/739290>
- González-Salamanca, J. C., Agudelo, O. L., & Salinas, J. (2020). Key competences, education for sustainable development and strategies for the development of 21st century skills: A systematic literature review. *Sustainability*, 12(24), 10366. <https://doi.org/10.3390/su122410366>
- Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research*, 102, 101586. <https://doi.org/10.1016/j.ijer.2020.101586>
- Healey, M., Flint, A., & Harrington, K. (2014). *Engagement through partnership: Students as partners in learning and teaching in higher education*. Higher Education Academy.
- Hoff, E. (2013). *Language Development* (5th ed., Vol. 28, Issue 6). Cengage. <https://search.worldcat.org/title/843489860>
- Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *EDUCAUSE Review*. <https://er.educause.edu/articles/2008/11/asynchronous-and-synchronous-elearning>
- Hurrell, S. A. (2015). Rethinking the soft skills deficit blame game. *Human Relations*, 69(3), 605–628. <https://doi.org/10.1177/0018726715591636>
- Illich, I. (1971). *Deschooling society*. Calder & Boyars.
- Illich, I. D. . (1971). *Deschooling society*. Calder & Boyars. <https://search.worldcat.org/title/154591>
- Johnson, D. W., Johnson, R. T., & Smith, K. A. (2014). Cooperative Learning: Improving University Instruction by Basing Practice on Validated Theory. *Journal on Excellence in College Teaching*, 25, 85–118.

- Kolb, David. A. (1984). *Kolb, Experiential Learning: Experience as the Source of Learning and Development* (2nd ed.). Prentice-Hall.
- Kuh, G. D. (2008). *High Impact Education Practices G. Kuh 2008.pdf*. 1–35. <https://www.aacu.org/publication/high-impact-educational-practices-what-they-are-who-has-access-to-them-and-why-they-matter>
- Laurillard, Diana. (2012). *Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology*. 273.
- Mahon, D. (2022). The role of graduate attributes in higher education. *Interchange*. <https://doi.org/10.1007/s10780-022-09457-5>
- Mahon, D., & Mahon, A. (2023). Educational responses to COVID-19 and minority communities. *Globalisation, Societies and Education*, 21(1), 102–113. <https://doi.org/10.1080/14767724.2021.2017859>
- Mahon, D., Arnab, S., & Jones, A. (2024). Graduate attributes, soft, transferable or transversal skills? In A. McNamara et al. (Eds.), *Inspire: Learning for teaching in higher education*. Nova Science.
- Mason, G., Williams, G., & Cranmer, S. (2009). Employability skills initiatives in higher education. *Education Economics*, 17(1), 1–30. <https://doi.org/10.1080/09645290802028315>
- Means, B., Bakia, M., & Murphy, R. (2014). Learning online: What research tells us about whether, when and how. In *Learning Online: What Research Tells Us About Whether, When and How*. Routledge. <https://doi.org/10.4324/9780203095959/LEARNING-ONLINE-BARBARA-MEANS-MARIANNE-BAKIA-ROBERT-MURPHY>
- OECD. (2018a). *Education at a glance 2018*. OECD Publishing. <https://doi.org/10.1787/eag-2018-en>
- OECD. (2018b). *What does innovation in pedagogy look like?* OECD Publishing.
- Orosio-Saez, N. A., Leal Filho, W., & Shulla, K. (2025). Exploring SDGs and curriculum adoption: A scoping review (2020–2025). *Social Sciences*, 15(8), 212. <https://doi.org/10.3390/socsci15080212>
- Pokhrel, S., & Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *Journal of Education and Health Promotion*, 8(1), 133–141. <https://doi.org/10.1177/2347631120983481>
- Portes, J. (2016). Immigration, free movement and the EU referendum. *National Institute Economic Review*, 236(1), 14–22. <https://doi.org/10.1177/002795011623600103>
- Project Drawdown. (2024). *Project Drawdown*. <https://drawdown.org>
- QS. (2018). *The Global Skills Gap in the 21st Century*. <https://www.qs.com/reports-whitepapers/the-global-skills-gap-in-the-21st-century/>
- Rončević, K., & Rieckmann, M. (2025). Education for sustainable development and inclusive education. *Frontiers in Education*, 10. <https://doi.org/10.3389/feduc.2025.1593060>
- Sato, S. N., Condes Moreno, E., Rubio-Zarapuz, A., Dalamitros, A. A., Yañez-Sepulveda, R., Sato, S. N., et al. (2023). Navigating the new normal. *Education Sciences*, 14(1), 19. <https://doi.org/10.3390/educsci14010019>
- Shahriar, S. H. B., et al. (2021). Transformation of education during the COVID-19 pandemic. *Asian Association of Open Universities Journal*, 16(2), 161–176. <https://doi.org/10.1108/AAOUJ-02-2021-0025>
- Springford, J. (2022). *The cost of Brexit to June 2022*. <https://www.cer.eu/insights/cost-brexit-june-2022>
- Tomlinson, M. (2018). Conceptions of the value of higher education. *Higher Education*, 75(4), 711–727. <https://doi.org/10.1007/s10734-017-0165-6>

- Turnbull, D., Chugh, R., & Luck, J. (2021). Transitioning to E-Learning during the COVID-19 pandemic: How have Higher Education Institutions responded to the challenge? *Education and Information Technologies*, 26(5), 6401–6419. <https://doi.org/10.1007/S10639-021-10633-W/FIGURES/4>
- UNESCO. (2015). Education for All Global Monitoring Report. In *Education for All Global Monitoring Report 2015: Education for All 2000-2015: Achievements and challenges*. GEM Report UNESCO. <https://doi.org/10.54676/LBSF6974>
- UNESCO. (2017). *Education for sustainable development goals: Learning objectives*. UNESCO.
- UNESCO. (2020). *National education responses to COVID-19: summary report of UNESCO's online survey*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000373322>
- UNICEF. (2022a). *Are Children Really Learning? Exploring foundational skills in the midst of a learning crisis* -. <https://data.unicef.org/resources/are-children-really-learning-foundational-skills-report/>
- UNICEF. (2022b). *Technology in education | Global Education Monitoring Report*. <https://www.unesco.org/gem-report/en>
- Wilson, J. (2016). *Work experience as a gateway to talent in the UK: Assessing business views*. June. <http://www.ncub.co.uk/reports/work-experience-as-a-gateway-to-talent-in-the-uk-assessing-business-views.html>
- World Economic Forum. (2023). *Future of Jobs: These are the most in-demand core skills in 2023*. <https://www.weforum.org/agenda/2023/05/future-of-jobs-2023-skills/>
- World Health Organisation. (2023, March 7). *Disability*. <https://www.who.int/news-room/fact-sheets/detail/disability-and-health>
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of AI in higher education. *International Journal of Educational Technology in Higher Education*, 16(1), 1–27. <https://doi.org/10.1186/s41239-019-0171-0>