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Exploring E-Learning for Sustainable Development: Integrating SDGs in Management Education at Philippine Higher Education Institutions

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Abstract

Higher education institutions (HEIs) are central to advancing the United Nations Sustainable Development Goals (SDGs), yet their role in embedding sustainability through e-learning remains underexplored in the Philippine context. This study addresses that gap by investigating how digital platforms are being utilized in management education and the extent to which SDGs are integrated into online curricula. The objective is to assess current practices, identify strengths and weaknesses, and propose pathways to strengthen the contribution of e-learning to sustainable development. A qualitative research design was employed, drawing on 154 institutional documents and reports from HEIs offering business and management programs. Sources included mission-vision statements, program educational objectives, student outcomes, and curricular materials. Thematic and content analysis was conducted using a coding schema adapted from Brugmann et al. (2019) and Otto & Becker (2019), focusing on (1) forms of e-learning (Formalis) and (2) SDG coverage in digital curricula (Materialis). Keywords linked to the 17 SDGs were systematically applied to identify representation and patterns within institutional content. Findings reveal that digitalization is widely adopted, but often framed as a pragmatic tool for instructional continuity rather than as a strategic platform for sustainability education. MOOCs and advanced e-learning models remain limited, typically reflecting individual rather than institutional initiatives. SDG coverage is uneven: SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth) are strongly represented, alongside SDG 9 (Industry, Innovation, and Infrastructure) and SDG 11 (Sustainable Cities and Communities). In contrast, SDG 2 (Zero Hunger), SDG 13 (Climate Action), and SDG 14 (Life Below Water) are minimally addressed, despite their relevance to Philippine vulnerabilities. These gaps highlight a tendency toward institutional isomorphism, where HEIs prioritize goals aligned with global competitiveness while neglecting those tied to local development needs. The analysis further shows fragmented application of the whole-institution approach, underscoring the need for systemic integration of sustainability into governance, pedagogy, and research. The study concludes that while Philippine HEIs have made progress in adopting digital platforms, sustainability integration remains selective and incomplete. Strengthening curriculum audits, cross-institutional collaborations, and faculty development is essential to close gaps, while government agencies such as CHED and DOLE must provide fiscal support and quality assurance frameworks. Implications extend beyond academia, pointing to the need for coordinated policy, institutional innovation, and inclusive digital strategies to ensure that e-learning becomes a catalyst for achieving the SDGs by 2030.

Keywords: Institutional Research, E-learning methodologies, Sustainable Development Goals (SDGs), Integration, Higher education institutions (HEIs), Blended learning, Fiscal support, Curriculum, qualitative, Philippines, Massive Open Online Courses, MOOCs

1. Introduction

The global education landscape is undergoing profound transformation, driven by the twin forces of digital innovation and the urgent need to achieve sustainable development. Across all regions, higher education institutions (HEIs) are increasingly recognized as pivotal actors in advancing the United Nations' 2030 Agenda, particularly the 17 Sustainable Development Goals (SDGs). As centers of knowledge creation, skill formation, and civic responsibility, universities hold a unique responsibility to produce graduates who are not only competent in their fields but also committed to building a sustainable and equitable future. Against this backdrop, the integration of sustainability principles into pedagogy, research, and institutional practice has become not merely an option but a necessity.

In recent years, the proliferation of digital platforms has reshaped educational delivery, with e-learning, blended learning, and Massive Open Online Courses (MOOCs) enabling access to knowledge beyond traditional boundaries of time and space. The COVID-19 pandemic accelerated this transition, forcing universities worldwide to experiment with virtual classrooms and digital ecosystems on an unprecedented scale. While initially a crisis response, these changes have revealed both opportunities and persistent inequities. For the Philippines—an archipelagic nation characterized by socio-economic disparities, infrastructure challenges, and vulnerability

to climate change—the adoption of digital education is not only a pedagogical innovation but also a developmental imperative. E-learning has the potential to democratize access, embed sustainability into curricula, and bridge gaps between education and national development.

However, the promise of e-learning for sustainable development has not been fully realized. Despite policy endorsements such as ASEAN 2015 integration frameworks and the Philippine government's Voluntary National Reviews of SDG progress, many HEIs remain limited in their integration of SDG-aligned content into digital education. Filipino universities' underrepresentation in global MOOCs platforms such as Coursera, Udemy, and edX signals a missed opportunity to showcase their contributions to sustainability education at an international scale. The lack of institutional presence on these platforms raises questions not only about global visibility but also about the depth of curricular alignment with sustainability imperatives.

This gap is particularly concerning given the Philippines' developmental context. As a lower middle-income country, the nation faces multifaceted challenges: food insecurity, environmental degradation, rapid urbanization, governance gaps, and persistent inequalities. These are precisely the issues encapsulated in the SDGs—yet, paradoxically, they are the goals least emphasized in Philippine HEI curricula delivered through e-learning. For example, while institutions frequently highlight SDG 4 (Quality Education) and SDG 9 (Industry, Innovation, and Infrastructure), there is far less evidence of robust curricular engagement with SDG 2 (Zero Hunger) and SDG 13 (Climate Action). This uneven distribution of emphasis underscores the need for a more holistic and intentional approach to integrating sustainability across disciplines and platforms.

The central problem, therefore, lies not in the absence of policy rhetoric but in the limited translation of sustainability commitments into concrete e-learning strategies. Barriers include inadequate faculty training, inconsistent institutional frameworks, underdeveloped digital infrastructure in rural areas, and insufficient fiscal support from government. Moreover, the fragmented documentation of sustainability efforts hampers accountability and prevents the sector from fully leveraging its role in national development. Without systematic integration, HEIs risk perpetuating a piecemeal approach to sustainability that overlooks critical interlinkages among SDGs.

This study seeks to address that gap. By analyzing institutional documents, reports, and curricular offerings of Philippine HEIs, it examines how e-learning platforms are currently utilized to promote Education for Sustainable Development (ESD). The focus is twofold: first, to identify the extent and nature of e-learning methods deployed; and second, to assess the degree to which these digital initiatives align with specific SDGs. In doing so, the research contributes to both local and international conversations about the role of higher education in sustainability transitions.

Beyond diagnosis, this research emphasizes the stakes. The integration of SDGs into digital curricula is not an abstract exercise—it directly influences the competencies of future managers, policymakers, and community leaders. Management education in particular stands at a crossroads: graduates must be equipped not only with technical expertise but also with ethical frameworks and sustainability mindsets. By embedding SDGs into e-learning, universities can cultivate leaders who recognize the interconnectedness of economic, social, and environmental systems and who can drive organizational and societal change.

Equally significant is the question of equity. The COVID-19 pandemic revealed stark disparities in access to digital resources, disproportionately affecting students from disadvantaged backgrounds. Unless accompanied by deliberate strategies to expand access, e-learning risks reinforcing existing inequalities rather than mitigating them. Thus, the integration of SDGs into digital curricula must be coupled with infrastructural investment, inclusive design, and fiscal support from the state. This underscores the need for a multi-stakeholder approach, wherein government agencies, academic institutions, industry partners, and civil society co-create solutions.

The study also situates the Philippine experience within a broader regional and global context. In Southeast Asia, countries such as Indonesia, Malaysia, and Thailand have experimented with embedding SDGs into STEM, engineering, and business curricula. Comparative insights highlight both best practices and pitfalls, offering valuable lessons for Philippine HEIs. At the global level, the rise of sustainability-oriented MOOCs in Europe and North America illustrates how digital platforms can serve as laboratories of innovation for SDG education. Yet, it also raises questions about inclusivity and the visibility of Global South perspectives in global knowledge networks.

In this sense, the contribution of this research is threefold. First, it documents the current landscape of e-learning for sustainable development in Philippine

HEIs, providing a baseline for future reforms. Second, it identifies underexplored areas—particularly SDGs 2 and 13—that require urgent attention in curricular design. Third, it underscores the need for fiscal support, policy frameworks, and institutional strategies that can enable universities to scale and sustain their efforts. By addressing these dimensions, the study aligns itself with the global call for a "whole-institution approach" to sustainability, wherein governance, pedagogy, research, and outreach are all synchronized with the SDGs.

Ultimately, this paper argues that the integration of SDGs into e-learning is not merely an academic requirement but a strategic necessity for national development. As the Philippines navigates economic volatility, climate vulnerability, and social inequities, HEIs must act as catalysts for sustainability transitions. Leveraging digital education platforms offers a powerful mechanism to amplify this role, but only if coupled with deliberate alignment, equitable access, and government support. By making these interventions, Philippine higher education can transform e-learning from a reactive pandemic measure into a proactive engine of sustainable development, positioning itself as a regional leader in the global educational transformation toward 2030.

2. Review of Literature

E-learning has emerged as a crucial method in higher education, especially when aligned with the Sustainable Development Goals (SDGs). Research highlights that effective e-learning programs offer substantial benefits for sustainable development education. For instance, experiences from Portugal's distance learning university indicate that students achieve high satisfaction and effective learning outcomes in sustainability science, suggesting that well-implemented e-learning can significantly enhance life-long education in a flexible, collaborative, and interactive manner while accommodating full-time employment (Azeiteiro et al., 2015).

Further, the integration of Information and Communication Technology (ICT) through Technology Enhanced Learning (TEL) provides quick and sustainable access to quality education, as evidenced by the PETRA Erasmus+ project's success in enhancing faculty skills and fostering collaborative academic research (Orozco-Messana et al., 2020). Nonetheless, challenges such as quality assurance remain, with studies noting that addressing these is crucial for the effective utilization of e-learning in developing countries (Ghanem, 2020).

Additionally, the acceptance of e-learning technologies is pivotal, highlighted by research that developed and validated a User Experience-based E-Learning Acceptance Model emphasizing satisfaction, ease of use, and usefulness (Zardari et al., 2021). Moreover, integrating gamification into e-learning enhances learner engagement and education equity, supporting the creation of more engaging and equitable digital learning environments (Sofiadin et al., 2021). These findings collectively underscore that e-learning, with proper technological frameworks and quality assurance measures, is instrumental in advancing sustainable development within higher education, making the findings relevant not only to the Philippines but also to global educational practices in the digital age.

Integration of SDGs in Curriculum in Philippine Higher Education

A detailed analysis at Universiti Teknologi MARA (UiTM) revealed significant integration of SDGs in their engineering and computer science curriculum. This study highlights the percentage of SDGs elements incorporated into courses, with a strong emphasis on SDG9 (Industry, Innovation, and Infrastructure) and SDG4 (Quality Education), showcasing a strategic approach to curriculum design that promotes sustainability (Noor, Mustafa, & Said, 2023).

A pedagogical approach in Indonesia integrates SDGs into STEM education by addressing real-world issues through the curriculum. This method enhances students' and teachers' awareness and interest in STEM and sustainable development, underscoring the effectiveness of contextual education (Nugroho, Juwita, & Febrianti, 2022).

Meanwhile, **r**esearch involving science teachers at SMP (Sekolah Menengah Pertama) indicates mixed results in the implementation of SDGs within science curricula. While there is high agreement on the importance of integrating SDGs, the actual application varies, suggesting a need for further training and curriculum development to enhance teachers' ability to embed SDG values effectively (Fitri, 2020).

These studies collectively illustrate that while there are innovative approaches to integrating SDGs into higher education curricula, challenges remain, particularly in ensuring uniform application across different subjects and increasing teacher engagement with SDG concepts. Continued efforts are needed to enhance curriculum frameworks and teacher training

to fully realize the potential of education in promoting sustainable development.

The integration of digital platforms in Philippine education has been increasingly vital, especially with the challenges and shifts prompted by the COVID-19 pandemic. Studies have explored various aspects of this integration, focusing on the usability of educational platforms, the challenges in rural and underserved areas, and the innovative approaches to include indigenous and local contexts in digital learning.

Research has highlighted significant challenges in implementing e-learning platforms in areas with poor internet infrastructure. In Eastern Samar State University, although the e-learning platform was found to be highly acceptable and adhered to ISO standards for usability, the lack of internet access remained a significant barrier. This indicates that while the platform was technically sound, practical issues such as internet access and affordability of devices hindered effective utilization (Casillano, 2019).

Another study focused on the development and evaluation of localized digital learning modules tailored for indigenous populations in Pampanga. These modules, which emphasized hygiene education, were developed with the involvement of indigenous teachers and evaluated as very satisfactory by educational technology experts. This approach not only incorporated local cultural contexts into digital learning but also promoted inclusivity and relevance in educational content (Tolentino et al., 2020).

The broader challenges of open and distance e-learning, termed ODeL in the Philippines, were discussed with perspectives from practitioners at the country's open university. This study encapsulated the institutional and policy adjustments needed to foster innovative teaching practices that accommodate new forms of distance education characterized by the integration of open learning philosophies, e-learning technologies, and distance education pedagogies (Arinto, 2016).

These studies underscore the potential of digital platforms to enhance educational access and quality in the Philippines. They also highlight the need for infrastructural improvements, localized content development, and institutional policies that support the effective adoption of digital education technologies.

Implementing the Sustainable Development Goals (SDGs) in higher education in the Philippines presents a set of challenges and opportunities, notably within state universities and colleges (SUCs). Research from a state university in Central Philippines underscores a substantial implementation of Education for Sustainable Development (ESD) through its greening program. Despite achieving significant adherence to the ESD framework, the university continues to encounter challenges such as resource limitations and the need for enhanced faculty training. The study suggests a continual improvement approach, utilizing a whole institution method to address these challenges effectively (Violanda, Claur, & Madrigal, 2023).

The broader context of these challenges includes both logistical and systemic barriers. For instance, integration of SDGs within the curricula often clashes with existing academic structures and financial constraints, hindering the holistic adoption of sustainability practices. Furthermore, while some institutions have made progress, the uneven implementation across various departments and faculties suggests a piecemeal approach, which may undermine the overall effectiveness of sustainability education (Sen & Pookayaporn, 2018).

To overcome these obstacles, institutions are recommended to foster a more integrated approach, enhancing cross-departmental collaborations and ensuring that sustainability goals are embedded across all aspects of university operations, from governance to student engagement. Such strategies not only address the practical aspects of SDG implementation but also foster a cultural shift towards sustainability within the academic community.

The impact of the COVID-19 pandemic on educational strategies in the Philippines has been profound and multifaceted, presenting both challenges and opportunities for innovation. The shift to online and remote learning has been a central response, impacting teachers, students, and the educational system at large.

Studies have documented significant psychological impacts on students due to the abrupt shift to online learning. For example, university students in the Philippines experienced various degrees of stress, anxiety, and depression, influenced by the sudden changes in their educational environment and the general uncertainty of the pandemic situation (Miranda & Tolentino, 2023). This emotional toll underscores the need for comprehensive support systems to address mental health in academic settings during crises.

Furthermore, the pandemic has accelerated the adoption of digital education technologies, necessitating rapid adaptations by educational

institutions. However, this transition has not been without difficulties. Issues such as digital divide, lack of proper infrastructure, and insufficient training for educators in remote teaching methodologies have posed significant barriers (Joaquin, Biana, & Dacela, 2020). These challenges highlight the disparities in access and quality of education, particularly affecting students from economically disadvantaged backgrounds.

On a positive note, the crisis has spurred educational innovations and prompted schools and universities to rethink their teaching approaches, curricula, and assessment methods to better suit remote learning contexts. These changes aim to build resilience in the educational sector, making it more flexible and responsive to students' needs during unforeseen events (Dabrowski et al., 2023).

3. Objectives of the Study

3.1 Problem Statement

The current scenario brings to the fore the necessity to evaluate the extent to which the Philippine education sector embraces these 17 SDGs, particularly in the realm of online courses. A firm commitment to the SDGs has been established; however, the comprehensive integration of these principles into the digital educational sphere remains an ambitious challenge, one further complicated by the unsatisfactory performance of Filipino universities on Massive Open Online Courses (MOOCs) platforms such as Coursera, Udemy, and Lynda.

Therefore, it becomes essential to explore the inhibiting factors and challenges that educational institutions encounter when attempting to incorporate the SDGs into their online curricula effectively. A thorough understanding of the reasons behind the underwhelming representation of Filipino universities on MOOCs platforms also requires investigation, with the goal of identifying and implementing strategies to ameliorate this circumstance.

3.2 Purpose of the Study

This multifaceted examination will provide valuable insights and actionable recommendations for educational institutions and policy-makers, aiding in the enhanced alignment of online curricula with all 17 SDGs. Identifying and overcoming the barriers to incorporating the principles of sustainable development into the virtual educational realm is a crucial step towards actualizing the SDGs in the Philippines.

By laying bare the issues hampering progress and by offering clear strategies for improvement, the results of this study will aid educators, institutions, and policy-makers in crafting a comprehensive framework and strategy that prioritize the integration of the SDGs into online education.

The goal is to foster sustainable development while equipping students with the knowledge and skills required for the future, thereby contributing to the broader achievement of the SDGs in the Philippines. This endeavour becomes especially critical considering the recent pressures of the ASEAN 2015 integration and the ongoing impact of the COVID-19 pandemic.

Ultimately, the goal is to use the lens of development economics for sustainability to drive this research, thus contributing to the broader discourse on sustainable development. The education sector plays an essential role in creating a society that can sustainably develop and thrive. By aligning online education with the SDGs, we can create a powerful tool for change, one that equips learners with the skills and knowledge necessary to drive sustainable development and contribute to the 2030 Agenda for Sustainable Development.

Building on these insights, the present study seeks to investigate how Philippine HEIs are utilizing e-learning methodologies to advance the SDGs in management education. Specifically, it examines:

- The extent and types of e-learning methods and tools used to support Education for Sustainable Development (ESD) in higher education institutions.
- The ways in which sustainability principles can be embedded into governance, education, research, outreach, and campus operations.
- The connections between higher education, national development, and global sustainability agendas.
- The opportunities for expanding and enhancing management education to accelerate sustainability transitions.
- The degree to which the 17 SDGs are represented in higher education curricula, with particular attention to those most emphasized and those underrepresented.

4. Methodology

4.1 Research Design

This study employs a **qualitative research design**, specifically thematic and content analysis, to investigate how Higher Education Institutions (HEIs) in the Philippines utilize e-learning platforms in advancing Education for Sustainable Development (ESD). A qualitative approach was selected because it allows for in-depth exploration of meanings, patterns, and institutional practices embedded in documents, rather than reducing them to numerical measures. By analyzing narratives and textual content, the study captures the nuanced ways in which the Sustainable Development Goals (SDGs) are integrated—or neglected—within online management education.

4.2 Data Sources and Sampling

The corpus of data consists of 154 institutional documents and reports drawn from publicly available sources, including university websites, business program descriptions, curricular maps, program educational objectives, student outcomes, and institutional mission-vision statements. These materials were purposively sampled from HEIs offering business and management programs, as these are directly relevant to sustainability transitions in organizational practice. The sample size reflects breadth across diverse institutions while remaining manageable for qualitative analysis.

4.3 Data Analysis Approach

The analysis proceeded in two stages.

1. **Thematic Analysis**: Documents were read repeatedly to identify recurring themes related to digital education practices, pedagogical strategies, and sustainability orientations. Codes were inductively generated and later organized into categories such as "digitalization strategies," "MOOCs integration," "blended learning," and "SDG alignment."
2. **Content Analysis**: To systematize the mapping of SDGs, the study employed a keyword-based coding schema inspired by Brugmann et al. (2019) and Otto & Becker (2019), as synthesized in Hueske et al. (2022). This deductive strategy ensured that each of the 17 SDGs was operationalized through a set of search terms embedded in the institutional texts.

Phase 1: Formalis — Forms of E-Learning

Codes were developed to capture the **forms of digital education** employed:

- **Digitalization**: "digital," "digital learning," "e-learning," "digital teaching," "online education," "distance learning," "ed-tech," "learning platforms," "blended learning," "blended teaching."
- **MOOCs**: "MOOC," "online course."
- **Other digital tools**: "virtual classroom," "digital campus," "flipped," "technology."

This coding allowed the study to distinguish between institutions offering general online content and those adopting more advanced or innovative digital models.

Phase 2: Materialis — SDG Coverage

The second phase coded for explicit or implicit references to the **17 SDGs**. Each goal was operationalized with keywords. For example:

- **SDG 1: No Poverty** — "poverty," "income," "distribution," "wealth," "socioeconomics."
- **SDG 3: Good Health and Well-being** — "health," "wellbeing."
- **SDG 4: Quality Education** — "educat*," "inclusive," "equitable."
- **SDG 13: Climate Action** — "climate," "greenhouse gas," "environment," "global warming," "weather."

This keyword schema ensured comprehensive coverage of the goals and reduced researcher bias by providing systematic markers for SDG representation in curricula.

4.4 Ensuring Rigor and Trustworthiness

To enhance the **credibility and reliability** of findings, the following measures were adopted:

- **Triangulation of sources**: Data were drawn from multiple document types (vision-mission statements, curricular maps, program outcomes) to avoid single-source bias.
- **Codebook refinement**: Initial coding was iteratively revised, with definitions clarified to ensure consistent application.

- **Peer debriefing**: Coding decisions and thematic interpretations were reviewed by colleagues familiar with sustainability education and qualitative methods.
- **Audit trail**: All coding files and analytic memos were documented, enabling transparency of the research process.

4.5 Ethical Considerations

The study relied exclusively on publicly available documents from institutional websites, ensuring no direct engagement with human participants. As such, it posed minimal ethical risks. Nevertheless, institutional identities were handled respectfully, and findings are presented in aggregate to avoid reputational harm to individual HEIs.

Link to Research Objectives

Through this two-phase thematic and content analysis, the methodology enables the study to:

1. Assess the **extent and types of e-learning practices** among Philippine HEIs.
2. Map the **distribution of SDGs** across digital curricula.
3. Identify **gaps and challenges** in sustainability integration.
4. Generate actionable insights for **policy and institutional reform** in management education.

By combining inductive thematic exploration with deductive SDG coding, the methodology provides both **breadth and depth**, ensuring that the analysis is rigorous, systematic, and aligned with the study's objectives.

5. Results and Discussion

5.1 Overview of Analysis

Thematic and content analysis of 154 institutional documents and reports from Philippine higher education institutions (HEIs) reveals both progress and persistent gaps in the integration of Sustainable Development Goals (SDGs) into e-learning curricula. The findings are presented in two dimensions: (1) the forms of e-learning employed (Formalis), and (2) the coverage of SDGs in institutional documents (Materialis).

Forms of E-Learning in HEIs (Formalis)

The study confirms that digitalization has become a standard feature of higher education delivery. Terms such as "e-learning," "blended learning," and "online education" appeared consistently across program descriptions and curricular offerings. This reflects the acceleration of digital learning triggered by the COVID-19 pandemic, which made online platforms indispensable for continuity of instruction.

Despite this progress, the integration of e-learning remains largely pragmatic rather than strategic. Digitalization is often framed as a tool for accessibility and continuity, with limited articulation of its role in advancing Education for Sustainable Development (ESD).

For instance, references to Massive Open Online Courses (MOOCs) were sparse and generally associated with individual faculty initiatives rather than institutional strategies. Similarly, advanced models such as flipped classrooms or virtual campuses were identified in only a few cases, and without explicit linkage to sustainability outcomes. These findings align with previous scholarship noting that Filipino universities remain underrepresented in global MOOCs platforms, thereby missing opportunities for international collaboration and visibility (Arinto, 2016; Joaquin, Biana, & Dacela, 2020).

Coverage of SDGs in Curricula (Materialis)

The analysis of institutional documents highlights uneven attention to the 17 SDGs.

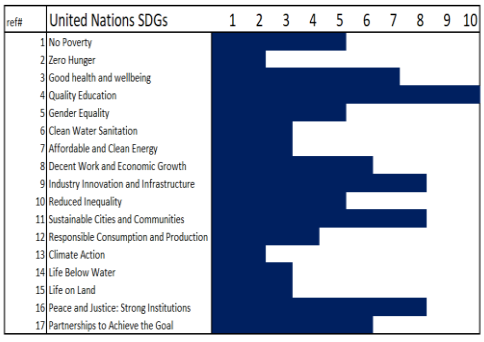

Figure 1 SDGs covered by HEIs

Highly Addressed SDGs: SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth) emerged as the most consistently integrated. This reflects the dual mandate of HEIs to provide inclusive education and contribute to workforce development. Strong representation was also noted for SDG 9 (Industry, Innovation, and Infrastructure) and

SDG 11 (Sustainable Cities and Communities), aligning with national priorities for innovation and urban resilience.

Moderately Addressed SDGs: Goals such as SDG 3 (Good Health and Well-being), SDG 5 (Gender Equality), and SDG 7 (Affordable and Clean Energy) appeared in several curricula but lacked depth. The rise of references to health and well-being can be linked to the pandemic's impact, while moderate attention to gender equality reflects ongoing societal discourse. However, energy-related content was often peripheral, suggesting limited institutional focus on sustainable energy transitions.

Minimally Addressed SDGs: Critically, SDG 2 (Zero Hunger), SDG 13 (Climate Action), and SDG 14 (Life Below Water) were rarely mentioned. This is a concerning gap given the Philippines' vulnerabilities to food insecurity, climate change, and marine ecosystem degradation. The lack of integration of these goals indicates a missed opportunity for HEIs to leverage e-learning in addressing the country's most pressing sustainability challenges.

These patterns confirm earlier findings (Violanda, Claur, & Madrigal, 2023) that while some Philippine HEIs have made progress in ESD, resource constraints and uneven implementation lead to a piecemeal approach rather than systematic alignment.

5.2 Discussion

The results suggest that while HEIs demonstrate commitment to selected SDGs, integration is uneven and limited by structural, financial, and pedagogical barriers. Three implications are notable:

Alignment with Institutional Mandates: The prominence of SDG 4 and SDG 8 shows that HEIs prioritize areas directly tied to their mission of education and employability. However, this narrow focus risks preparing graduates for jobs without equipping them to address systemic sustainability challenges.

Neglect of Climate and Food Security: The weak representation of SDG 2 and SDG 13 is particularly problematic. As an agricultural and climate-vulnerable nation, the Philippines urgently requires graduates who are literate in food systems, climate resilience, and environmental stewardship. Their absence in curricula reveals a critical misalignment between educational content and national development needs.

Need for Policy and Fiscal Support: Gaps in SDG coverage are linked to limited resources and fragmented institutional efforts. Without stronger government support—through funding, policy frameworks, and quality assurance—HEIs may continue to adopt isolated or short-term approaches rather than holistic sustainability strategies (Sen & Pookayaporn, 2018).

Advancing Sustainability Transitions in Management Education

Beyond documenting gaps, the findings highlight opportunities to leverage e-learning for deeper sustainability integration. Several strategic pathways emerge:

1. Curriculum Integration: Embedding sustainability principles into the core of management programs ensures that students understand the intersections of business, society, and environment.
2. Interdisciplinary Approaches: Collaboration across business, science, and engineering disciplines can foster innovative solutions to complex sustainability challenges.
3. Experiential Learning: Internships, fieldwork, and real-world projects allow students to apply theory to practice, deepening their problem-solving and leadership skills.
4. Industry Partnerships: Engagement with organizations committed to sustainable practices exposes students to applied strategies and networks that reinforce classroom learning.
5. Research and Innovation: Faculty and student research on sustainable management practices can generate local solutions while positioning HEIs as thought leaders.
6. Leadership Development: Programs designed to cultivate sustainability leadership can prepare graduates to act as change agents within organizations.
7. Stakeholder Engagement: Dialogue with communities and civil society ensures that curricula remain socially responsive and grounded in real-world challenges.
8. Continuous Faculty Training: Ongoing professional development ensures educators remain current with evolving sustainability frameworks and pedagogical innovations.

These strategies echo global best practices while responding to the Philippine context, where sustainability education must simultaneously address local vulnerabilities and global competencies.

Future Directions

To address underrepresented SDGs, HEIs must develop targeted e-learning modules on climate action, food security, and marine sustainability. Transparent reporting of SDG initiatives would enhance accountability and allow institutions to benchmark progress. Collaboration between government, academia, and industry is also critical to create supportive ecosystems that provide resources, incentives, and recognition for SDG-aligned education.

Global Contrasts, Theoretical Anchors, and Broader Implications

A deeper examination of the findings in light of global literature reveals important contrasts that help situate the Philippine experience within broader patterns of sustainability education. Whereas Philippine HEIs emphasize SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth), many Western and European institutions highlight SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy) as central to their e-learning curricula.

For instance, universities in the United Kingdom and Scandinavia have launched climate-focused MOOCs that directly address mitigation, adaptation, and sustainability leadership (Zint, et al. 2023). This divergence suggests that while Philippine HEIs align their digital education with economic and workforce development priorities, Western counterparts prioritize global environmental challenges, reflecting differences in national policy agendas and institutional capacities.

Similarly, African HEIs have shown growing interest in SDG 2 (Zero Hunger), given the region's acute food security concerns. Studies from Kenya and South Africa demonstrate curricular innovations in agricultural sciences and sustainable food systems (Osumba et al, 2021).

By contrast, Philippine HEIs—despite being an agricultural nation—rarely integrate Zero Hunger into digital curricula. This paradox underscores a missed opportunity: while some contexts leverage e-learning to confront their most pressing development challenges, Philippine HEIs appear to underutilize digital platforms for issues most relevant to their national vulnerabilities.

This pattern can be interpreted through the lens of institutional isomorphism (Zapp and Ramirez, 2019). Philippine universities, like many in developing countries, may mimic global higher education trends emphasizing employability, entrepreneurship, and innovation—hence the strong focus on SDG 4, SDG 8, and SDG 9. Such mimicry reflects pressures to conform to international rankings, accreditation frameworks, and donor expectations. However, this institutional alignment with global economic discourses may inadvertently sideline goals like climate action and hunger alleviation, which are less visible in competitive higher education metrics but deeply relevant to local realities.

The findings also resonate with the whole-institution approach to Education for Sustainable Development (ESD), which emphasizes integration of sustainability into governance, pedagogy, research, and outreach (Ron et al., 2020). Philippine HEIs demonstrate fragmented adoption, with sustainability embedded in selected courses or initiatives but not across the entire institutional ecosystem. For instance, the emphasis on Quality Education is often expressed in mission-vision statements, while Decent Work and Innovation goals appear in program descriptions. Yet critical cross-cutting goals like climate resilience are often absent from institutional strategies. This piecemeal adoption highlights the difficulty of moving from rhetorical commitment to systemic transformation.

Another relevant theoretical lens is change management in higher education. Kotter's model of organizational change (1996) (cf. Appelbaum, et al 2012) stresses the importance of vision-setting, leadership, and institutional buy-in for sustainable reform. In the Philippine case, the lack of explicit integration of SDGs into digital curricula suggests limited top-level direction and insufficient incentives for faculty to develop sustainability-focused e-learning modules. Without coordinated leadership and supportive policy, sustainability integration risks remaining peripheral rather than mainstream.

Globally, these contrasts point to the need for more context-sensitive approaches to sustainability education. For example, universities in disaster-prone regions such as Japan have systematically embedded disaster risk reduction into their curricula, reflecting both national policy and local need (Mendoza, K. 2025). Philippine HEIs, similarly exposed to climate-related disasters, could learn from such models to integrate resilience and adaptation into digital courses. Likewise, the Brazilian experience of embedding environmental justice into business education demonstrates how curricula can be tailored to reflect pressing societal issues while still meeting global academic standards (Suarez-Perales et al., 2021).

These international comparisons suggest that Philippine HEIs have an opportunity to reposition themselves by aligning digital curricula with their unique national vulnerabilities. Instead of mirroring Western models focused primarily on economic outcomes, Philippine universities could lead in embedding climate resilience, food security, and marine sustainability—fields where their geographic and socio-economic context gives them both urgency and authority. Such repositioning would not only make their e-learning content more relevant locally but also elevate their visibility in global sustainability debates.

The implications for management education are particularly significant. Globally, management schools have been criticized for overemphasizing profitability and shareholder value at the expense of sustainability and ethics (Greenland, et al. 2022). In response, leading institutions have begun to incorporate courses on corporate social responsibility, ethical leadership, and sustainable business models. Philippine HEIs can build on this momentum by using e-learning platforms to integrate sustainability principles into business curricula, ensuring graduates are prepared not only for employment but also for leadership in sustainable development.

Specifically, embedding SDG 2 (Zero Hunger) into management education could prepare students to develop sustainable agribusiness ventures, addressing both national food security and global supply chain resilience. Likewise, integrating SDG 13 (Climate Action) could equip future managers with the skills to design climate adaptation strategies, a critical competency in a country highly vulnerable to typhoons and sea-level rise. By aligning management education with these neglected goals, Philippine HEIs can produce graduates with distinctive sustainability competencies that set them apart in both domestic and international labor markets.

Moreover, digital platforms provide an opportunity to democratize access to sustainability education. Unlike traditional classroom-based learning, e-learning can reach diverse learners, including working professionals, rural students, and overseas Filipino workers. By developing SDG-focused online modules, Philippine HEIs can expand their impact beyond enrolled students, extending sustainability education to a wider segment of society. This broadens the transformative potential of higher education, making it a vehicle not only for workforce development but also for civic and environmental consciousness.

Finally, the Philippine case contributes to the global discourse on the role of higher education in the 2030 Agenda. The findings illustrate that while progress has been made, sustainability education cannot be left to institutional discretion alone. It requires coordinated frameworks, policy support, and resource investment. Without these, HEIs risk delivering fragmented curricula that fail to prepare graduates for the interconnected challenges of sustainable development. In this sense, the study echoes international calls for a more holistic, systemic approach to sustainability in higher education—one that integrates pedagogy, governance, research, and outreach in pursuit of the SDGs.

Implications for Policy and Practice

The findings of this study carry important implications for both education policy-makers and higher education practitioners. The uneven integration of SDGs into e-learning curricula, with strong emphasis on SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth) but weak attention to SDG 2 (Zero Hunger) and SDG 13 (Climate Action), reveals a gap between institutional priorities and national development needs. Addressing this imbalance requires coordinated action at both the policy and institutional levels.

Policy Implications. At the policy level, the role of the Commission on Higher Education (CHED), the Department of Labor and Employment (DOLE), and regional frameworks such as ASEAN is crucial. First, there is a need for dedicated fiscal support to develop and sustain digital education initiatives that explicitly embed SDGs. This includes subsidies for digital infrastructure, faculty development, and research on sustainability pedagogy. Without long-term funding commitments, universities risk reverting to short-term, piecemeal integration.

Second, quality assurance frameworks should be expanded to include criteria on sustainability education in digital platforms. Accrediting bodies and CHED monitoring mechanisms could integrate indicators that measure how well institutions align their curricula with the SDGs. Such measures would incentivize universities to go beyond token mentions of sustainability and instead embed goals systematically into course content.

Third, policy harmonization within ASEAN could help Philippine HEIs benchmark themselves against regional peers. As neighboring countries such as Malaysia and Indonesia advance sustainability integration in STEM and business curricula, Philippine institutions stand to benefit from collaborative initiatives and shared standards. Regional cooperation on sustainability-oriented

MOOCs, for instance, would allow pooling of resources while elevating the visibility of ASEAN education in global platforms,

Practice Implications. At the institutional level, universities and faculty can act immediately to address gaps in e-learning for sustainable development. One concrete step is to conduct curriculum audits that map current course content against the 17 SDGs. Such audits would allow HEIs to identify underrepresented goals—particularly SDG 2 and SDG 13—and design targeted modules or electives to close these gaps.

Second, universities should explore cross-institutional collaborations in developing MOOCs or blended modules that focus on sustainability themes. Jointly designed online courses would not only reduce duplication of effort but also ensure wider reach, including to students in rural or under-resourced areas.

Third, enhancing faculty capacity remains critical. Regular training on sustainability pedagogy and digital learning design would empower instructors to embed SDG concepts into teaching, beyond surface-level inclusion. Partnerships with industry and civil society could provide faculty with practical case studies and real-world projects that enrich course content.

Finally, attention must be given to digital equity initiatives. The study highlights the risk that e-learning may reinforce existing inequalities if access is limited to well-resourced students. HEIs, supported by government programs, should ensure affordable access to devices, connectivity, and inclusive content design so that disadvantaged learners are not left behind in the sustainability agenda.

Wherefore, the findings underscore that advancing e-learning for sustainable development in the Philippines requires both top-down policy support and bottom-up institutional innovation. By aligning fiscal incentives, accreditation standards, and faculty development with sustainability objectives, the Philippine higher education sector can more effectively leverage digital platforms to prepare students for the interconnected challenges of the 2030 Agenda.

6. Conclusions and Recommendations

6.1 Conclusions

This study examined how Philippine higher education institutions (HEIs) are utilizing e-learning platforms to advance Education for Sustainable Development (ESD) and align their curricula with the United Nations Sustainable Development Goals (SDGs). The analysis of 154 institutional documents and reports revealed three key conclusions.

First, while e-learning has been widely adopted—especially during the COVID-19 pandemic—the integration of sustainability principles within digital education remains fragmented. Digitalization efforts are primarily framed as tools for accessibility and instructional continuity, with limited articulation of their potential to drive sustainability education.

Second, the representation of SDGs across HEI curricula is uneven. Strong emphasis was found on SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 11 (Sustainable Cities and Communities). In contrast, critical goals such as SDG 2 (Zero Hunger), SDG 13 (Climate Action), and SDG 14 (Life Below Water) are minimally addressed, despite their direct relevance to the Philippines' socio-economic and environmental vulnerabilities.

Third, systemic barriers—including limited faculty training, resource constraints, weak policy frameworks, and inadequate fiscal support—continue to hinder holistic SDG integration. These challenges reflect a broader need for structural alignment between government policy, institutional strategy, and pedagogical practice. Without stronger coordination and sustained investment, HEIs risk perpetuating a narrow, compliance-driven approach to sustainability that falls short of the transformative vision of the 2030 Agenda.

Overall, the findings underscore both the progress and the gaps in using e-learning as a catalyst for sustainable development. Philippine HEIs have taken important steps toward digital transformation, but greater intentionality is required to ensure that online education not only transmits knowledge but also equips graduates with the competencies to address sustainability challenges.

However, this research has identified noticeable gaps, particularly concerning SDG 2 (Zero Hunger) and SDG 13 (Climate Action). This finding suggests a requirement for amplified attention and deliberate integration of these critical goals into e-learning initiatives, in order to foster a holistic and comprehensive approach to sustainable development.

6.2 Recommendations

In light of these findings, several recommendations are advanced for stakeholders in higher education and policy-making:

For Higher Education Institutions (HEIs):

- Develop comprehensive frameworks for integrating SDGs into digital curricula, ensuring coverage of underrepresented goals such as SDG 2 and SDG 13.
- Incorporate interdisciplinary and experiential learning modules that allow students to apply sustainability concepts in real-world contexts.
- Institutionalize e-learning innovations (e.g., MOOCs, virtual classrooms, flipped learning) not merely as technological add-ons but as strategic tools for sustainability education.
- Enhance faculty training and professional development in sustainability pedagogy and digital teaching methodologies.

For Government and Policy-Makers:

- Provide sustained fiscal support for e-learning initiatives, including subsidies for digital infrastructure, faculty development, and curriculum innovation.
- Establish clear quality assurance frameworks to evaluate how SDGs are embedded in digital education, ensuring accountability across institutions.
- Foster partnerships between HEIs, industry, and civil society to co-develop e-learning modules that address national priorities such as climate resilience, food security, and inclusive growth.

For Future Research

- Conduct comparative studies across ASEAN and other regions to benchmark the Philippines' progress in e-learning for sustainability.
- Explore the impact of SDG-focused e-learning on student competencies, employability, and civic engagement.
- Investigate models for integrating indigenous knowledge systems and local community perspectives into digital sustainability education.

By pursuing these strategies, HEIs in the Philippines can move beyond fragmented adoption of e-learning toward a systemic, transformative approach that empowers students as future leaders of sustainable development. Strengthening government support, institutional frameworks, and cross-sectoral collaborations will be critical in ensuring that digital education contributes meaningfully to the achievement of the SDGs and the broader sustainability agenda.

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