DOI: 10.2478/dcse-2026-0001

Discourse and Communication for Sustainable Education,
vol. 17, no. 1, pp. 1-6, 2026

Towards More Expanded Sustainability Curriculum Pathways in the Era of Deep Cultural Transitions Worldwide

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This volume contains papers from the authors from South Africa, Algeria, Germany, the Philippines, China, Argentina, Turkey and Indonesia. The issues discussed in this volume range from sustainable University mission statements and conceptual frameworks for Inclusive and Sustainable Universities, sustainable planning in cooperation with multi-stakeholders to practical solutions and critical conversations on sustainability in designing curriculum, acquisition of life skills among Algerian secondary school students within the framework of Education for Sustainable Development (ESD), developing water literacy as a key competence for both individuals and societies to sustainability of building ethical relations with AI and the use of immersive technologies. Despite ongoing efforts and initiatives to integrate the sustainability agenda in both school and university settings, much remains to be done. The commitment of universities and schools to advance sustainable development needs to be implemented not only on an individual level or as an abstract idea but as a whole institutional approach by creating an inclusive learning environment for all, introducing transdisciplinary design in research and teaching, ensuring ongoing teacher education towards sustainability and applying strategies for changes of particular areas, including teaching, research and outreach. The cover photo quietly shows how subtle environments can expand our horizons.

The paper by **Lesley Le Grange and Leila Laubscher** refers to sustainability science that has emerged as a vital interdisciplinary field in response to escalating ecological crises. Yet, its integration into school curricula remains is uneven. Le Grange and Laubscher's analysis of South Africa's Life Sciences CAPS document reveals that sustainability science topics are present, but coverage is limited and fragmented across Grades 10–12. Using Bernstein's pedagogic device, they examined how knowledge is recontextualised and produced within the curriculum. Their findings show that while teachers can draw on existing topics to initiate critical conversations on sustainability,

the curriculum does not yet reflect the breadth of sustainability science. This gap underscores the urgent question of what knowledge is most worth teaching in an era of environmental destruction. National curricula are revised only every five to ten years, risking lagging behind emerging interdisciplinary fields. Teacher agency is crucial, but systemic support is needed to expand the representation of sustainability science and ensure coherent progression across grade levels. Further research into Bernstein's field of reproduction is essential to understand how teachers enact sustainability science in classrooms and how this shapes student learning. Ultimately, the study highlights both the promise and the limitations of current curriculum design, calling for bold revisions to prepare learners for the challenges of the Anthropocene.

The paper by **Petro Preez and Anja Visser** presents a human-AI intra-action structured as a post-qualitative thought experiment on sustainability, ethics, and curriculum. The human authors engaged with ChatGPT as a "co-author," emphasising that agency and meaning emerge relationally. ChatGPT first generated a speculative vignette about a future AI classroom addressing global sustainability issues. Using tracing as a post-qualitative approach, the human authors traced the vignette from the middle, followed by ChatGPT's opinion on the implications for sustainability, ethics, and curriculum. While the experiment did not yield new insights, it demonstrated AI's potential to expose connections, generate alternatives, and prompt reflexivity. However, ChatGPT largely reproduced the dominant Western discourses and struggled to challenge hegemonic knowledge systems. The Intra-action highlighted risks of reinforcing dehumanising technologies through uncritical use, while simultaneously revealing human anthropomorphic projections onto AI. The authors conclude by advocating for a shift in our focus from (an obsession with) prediction and control, to exploring relational, indeterminate possibilities and experimenting with new methodological pathways for human~AI intra-actions.

This study by **Abdenacer Rebbouh and Bentoumi Zinelabedine** examines the acquisition of life skills among Algerian secondary school students within the framework of Education for Sustainable Development (ESD). Using a descriptive-comparative design, data were collected from 414 students in Ouargla Province using a validated questionnaire that assessed physical, cognitive, psychological/ethical, and teamwork skills. Findings show overall moderate-to-above-moderate life-skills levels, with psychological and ethical competencies strongest and cognitive skills weakest. Gender differences are significant: males score higher in physical and mental domains, whereas females excel in psychological/ethical and teamwork skills. Life skills increase across grade levels, confirming a positive association between school progression and holistic development. Effect sizes are small to moderate, indicating practical but not large differences. The results highlight the tension between character formation and higher-order thinking in Algerian curricula, which are still shaped by rote pedagogy. Recommendations include integrating inquiry-based modules, strengthening teacher training, and ensuring gender-responsive, developmentally progressive approaches. These insights extend the international literature on life-skills education to a North-African context and provide concrete strategies for aligning Algerian secondary education with Sustainable Development Goal 4 and UNESCO's ESD agenda.

Geert Franzenburg analyses the experience of "Ostarbeiter" – forced labourers primarily from Eastern Europe and the Soviet Union during their time in Nazi Germany, 1939-45, concerning their resilience and coping strategies. Following the approaches of Adler (role of self-efficacy), Cyrulnik (role of community), and Frankl (role of sense in life), he shows how these strategies are expressed through metaphorical concepts with an emotional orientation, based on the conceptual metaphor theory (CMT) proposed by Lakoff and Johnson. The evaluation of resilience and coping strategies among former Ukrainian and Russian (child) "Ostarbeiter" in Muenster, as revealed by in-depth interviews conducted 60 years later, shows their sustainability, providing a compelling argument for incorporating resilience training in contemporary war and conflict contexts.

The paper by **Jerd Mutia Dela Gente, Diether Cabugos Montejo, Vanessa Enanoria Asaias-Yncierto, Roy Guanco Ponce, Jhonnel Pancho Villegas** highlights the socio-economic impacts of the Mindanao inter-university games held in the City of Mati, Southeastern, the Philippines. Employing both quantitative and qualitative methods, the study analyses residents' perceptions through surveys and focus group discussions. Results show strong community support driven by social benefits, economic gains, and enhanced community image. However, challenges such as fare hikes, price increases, traffic congestion, and plastic pollution were documented. Applying the Event Support Model through the lens of the Social Exchange Theory, the study highlights that support grows when perceived benefits outweigh social costs. This research fills a gap by focusing on subnational event tourism in the Philippines. It provides empirical evidence on the importance of sustainable planning to balance benefits and drawbacks. Multi-stakeholder cooperation is needed to rigorously monitor price controls, transport management, and solid waste disposal.

Lydia Mbati in her paper asserts that epistemic access is a fundamental right in the field of education. Current literature on epistemic access, particularly in higher education, remains fragmented and deficit-oriented, calling for more inclusive, context-specific approaches that democratize knowledge creation and challenge institutional and digital inequities. In this regard, Open Pedagogy (OP) was considered a possible approach to include epistemic justice in teaching and learning. Using thematic synthesis, this article addressed the question, *How can epistemic access be achieved in the classroom using open pedagogy?* A total of 59 resources were reviewed and found to meet the predefined inclusion criteria for the study. These criteria were established to ensure that only materials directly relevant to the research question were considered. A thematic synthesis was conducted, and the findings identified practices at the macro, meso, and micro levels of educational decision-making and practice that affect open pedagogy for epistemic access in educational contexts. At the Macro level, they inform policy development and systemic reform; at the Meso level, they influence institutional strategies and curriculum design; and at the Micro level, they shape classroom interactions and teaching methodologies. These multi-layered implications highlight the transformative potential of open pedagogy in fostering inclusive and participatory learning environments.

The paper by **Liu Yufei** explores the potential of interconnected Virtual Reality (VR) classrooms to transform discourse and communication patterns within ESD. These immersive technologies establish a shared experiential groundwork, enabling learners to transcend geographical and temporal boundaries. By facilitating perspective-taking, visualising intricate systems, and enabling collaborative co-creation, VR-enhanced discourse progresses beyond knowledge dissemination to cultivate essential competencies for sustainable development. The article offers a framework for understanding how immersive environments can enrich ESD discourse and contribute to the emerging field of technology-mediated sustainability education. It also addresses challenges and ethical considerations associated with integrating VR into ESD and proposes strategies for educators to effectively harness this potential.

The paper by **María Belén Arias-Valle and Frederic Marimon, Belen Arias** presents the first systematic semiotic and discursive analysis of mission statements across all 132 Argentine Higher Education Institutions (HEIs) to map the formal integration of sustainability. The census-level study reveals that only 15% of HEIs explicitly mention sustainability, signifying a critical "institutional bottleneck" that impedes systemic implementation. Public HEIs encode sustainability through the lens of social justice and equity, aligned with the 1918 University Reform tradition. In contrast, Private HEIs frame it primarily in terms of innovation, competitiveness, and global leadership. This discursive gap between sectors, coupled with the low overall formalization, translates into fragmented efforts across core university functions (governance, research, and outreach). The study underscores the urgent need for HEIs to enhance the coherence between their declarative mission and operational practice to effectively contribute to the 2030 Agenda in Argentina.

The paper by **Çiğdem Çıngıl Barış, Filiz Avcı, Seda Usta Gezer, Yakup Ayaydın, Hilal Aslangiray** discusses critical global challenges, positioning water literacy as a key competence for both individuals and societies. Teachers, as primary agents of educational change, play a decisive role in fostering awareness, attitudes, and behaviours related to sustainable water use. This study addresses an important gap in the literature by examining elementary teachers' water comprehension, literacy levels, and attitudes following a structured water literacy training program. Through an eight-week, practice-oriented professional development project, teachers were supported not only in strengthening their conceptual understanding of water-related issues but also in translating this knowledge into classroom-based activities. While quantitative findings revealed no statistically significant differences between pre- and post-test measures, consistent increases in mean scores suggest meaningful positive trends in teachers' knowledge, literacy, and attitudes. Qualitative findings further highlight notable changes in teachers' awareness, daily water-use practices, and intentions to implement water-related educational activities. Overall, this study underscores the importance of sustained, practice-based teacher training in advancing water literacy and contributes valuable insights for sustainability-oriented teacher education initiatives.

The paper by **Ediyanto, Rizqi Fajar Pradipta, Nayla Amalia Salsabila, and Annisa Zahra Salsabila** explores the concept of inclusive education and offers a conceptual framework for a holistic, integrative, and sustainable model for higher education institutions. Anchored in the Sustainable Development Goals (SDGs), the authors argue that inclusion must be understood as a cross-sectoral strategy grounded in equity, social justice, and respect for diversity, with relevance extending beyond formal education into broader social systems. These pillars are presented as interdependent components that collectively form a sustainable inclusion ecosystem. The paper emphasizes that inclusion cannot be achieved through isolated policies or sectoral programs. It requires systemic integration across institutional structures and individual practices. The study positions inclusion as a transformative and sustainable strategy that integrates education, research, community participation, and cultural change. The framework contributes to academic discourse by providing a holistic conceptual model and has strong practical implications for implementing inclusive policies.

The study by **Dilek Çelikler, Zeynep Aksan, Ayhan Yılmaz** aims to determine the awareness levels of pre-service science teachers regarding sustainable development. Conducted using a descriptive survey model, the study group consisted of 41 volunteer fourth-year pre-service teachers at a state university in Türkiye's Black Sea Region. Data were collected via the 37-item "Sustainable Development Awareness Scale" and analyzed using frequencies, percentages, and descriptive statistics. The results revealed that the pre-service teachers achieved high, above-average awareness levels across the overall scale and its factors. Analysis of sub-dimensions indicated that the highest average scores were in the "society" factor, while the lowest were recorded in the "economy" factor. Based on these findings, it is recommended that teacher education curricula place greater emphasis on the economic dimension of sustainability to foster a more balanced and holistic perspective.

The study by **Daniela Fabiana Gámez Figueroa and María Belén Arias-Valle** discusses issues related to the transition of Higher Education Institutions (HEIs) to become proactive agents for the United Nations' 2030. The study positions of the Argentine public university are a critical laboratory for decolonising global sustainability narratives through the lens of social justice and knowledge democratisation. The proposed Strategic Plan serves as a communicative and navigational tool to shift from fragmented outreach activities to systemic institutional learning, offering a replicable framework for HEIs in Latin America and beyond.

Higher education institutions and schools need to embrace diverse educational pathways to sustainability by making inclusion and sustainability core values. We would like to thank all the authors who have contributed to this volume of the Journal, as well as to all the reviewers. All small initiatives matter for restructuring education and research to move toward more holistic, integrated approaches in academia. All the declarations and initiatives indicate that universities and schools have a moral obligation to work towards sustainability goals and agendas to build more sustainable

and ethical communities. The growing functional importance of the research community and its outcomes in terms of Sustainability cannot be ignored.

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