Consortium of Asia-Pacific
Education Universities (CAPEU)
Journal of Education

Vol.2, No.1, July 2026
Available online at: https://ejournal-dppm.upi.edu/capeu

Empowering Sustainability for Future Education: A Culture–Community–AI Framework for a More Humane Learning Society

Phan Thi Hong Xuan[1*]

[1]*University of Social Sciences and Humanities, Viet Nam National University, Ho Chi Minh City, Viet Nam*
**Corresponding author: xuan.pth@hcmussh.edu.vn*

Abstract
Education is being reshaped by climate change, urbanization, social inequality, digital transformation, and the growing influence of artificial intelligence. Education for sustainable development cannot be reduced to the transmission of environmental knowledge; it also needs to build learners' capacity to interpret complex problems, engage with cultural diversity, participate responsibly in communities, and use emerging technologies without surrendering human agency or ethical judgment. This conceptual paper proposes a Culture-Community-AI framework for sustainability-oriented future education, drawing on an integrative review of scholarship on sustainability action competence, culturally grounded and community-connected learning, Indigenous and local knowledge, teacher competence, and human-centered artificial intelligence. The review identifies a persistent fragmentation among these bodies of literature: sustainability knowledge does not automatically translate into action, culturally situated meaning is often treated as peripheral rather than foundational, and the educational role of AI remains under-theorized. The framework addresses this gap through three propositions: cultural grounding makes sustainability learning contextually meaningful, community participation provides a pathway from knowledge to action competence, and AI creates value when it augments rather than substitutes for human judgment. The framework is translated into a proposed Learning Community for Sustainability, illustrated through a Learning Ward model developed for Ho Chi Minh City, Vietnam. The paper concludes that culture, community, and AI generated educational value are not separate components but are connected within a relational ecology centered on human agency, collective responsibility, and locally meaningful action, offering a conceptual foundation for sustainability curricula, teacher preparation, and place-based learning.
Keywords: artificial intelligence; community-connected learning; culture; education for sustainable development; learning city; sustainability action competence.
Article history: Received 14 August 2026, accepted 18 August 2026, available online 18 August 2026.

INTRODUCTION

Education is entering a period of profound transformation. Climate change, biodiversity loss, rapid urbanization, migration, widening inequalities, changing labor markets, digital transformation, and artificial intelligence are reshaping how people learn, work, communicate, and live together. These changes create significant opportunities for innovation, but they also generate environmental, social, cultural, and ethical challenges that technological development alone cannot resolve. Education, therefore, faces a question deeper than how to prepare learners for future employment: what capacities do people need to live responsibly and act collectively in an increasingly interconnected and uncertain world?

The international sustainability agenda already points toward a broad understanding of education. Sustainable Development Goal 4.7 connects education for sustainable development with sustainable lifestyles, human rights, gender equality, peace, global citizenship, cultural diversity, and recognition of culture's contribution to sustainable development (United Nations General Assembly, 2015). UNESCO's *Education for Sustainable Development: A Roadmap* likewise identifies policy, learning environments, educator capacity, youth engagement, and local-level action as key areas for advancing ESD (UNESCO, 2020). Such frameworks suggest that sustainability education cannot be confined to environmental knowledge. Understanding climate change, biodiversity, waste, or renewable energy remains essential, but knowledge alone does not ensure the capacity to act. Sustainability also requires learners to understand interdependence, consider long-term consequences, negotiate competing interests, work across cultural differences, and take responsibility for decisions affecting others.

ISSN 2443-2555 (online) 2598-6333 (print) © 20XX The Authors. Published by Universitas Pendidikan Indonesia.
This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/)
http://doi.org/10.17509/capeu.X.X.26–35

This concern is especially relevant to higher education. A systematic review of 74 publications by Vargas-Merino et al. (2024) identifies persistent gaps in the theoretical foundations and implementation of ESD in higher education and calls for stronger frameworks that connect educational objectives, institutional conditions, and practice. The International Commission on the Futures of Education (2021) reinforces this shift by calling for a new social contract for education based on human rights, dignity, cultural diversity, reciprocity, solidarity, and education as a public and common good. Such a perspective challenges approaches that define educational success mainly through competition, standardized performance, employability, or technological efficiency.

The present paper develops ideas first articulated in the ICER 2026 presentation titled "*Empowering Sustainability for Future Education: Culture, Community, and AI for a More Humane Learning Society"* (Phan, 2026). The presentation proposed that sustainability should be understood not merely as a subject to be taught but as a way of thinking, living, connecting, and acting together. The present study develops that argument into a conceptual framework.

Three tensions motivate the analysis. The first is the gap between sustainability knowledge and sustainability action competence. Learners may understand environmental and social problems yet have few opportunities to participate in decisions or develop solutions. Olsson et al. (2022), using a three-wave longitudinal study involving 760 upper-secondary students, found that students' experiences of ESD were related to the development of self-perceived sustainability action competence and emphasized that such competence develops over time.

The second tension lies between globally articulated sustainability goals and culturally situated knowledge. Sustainability problems may be global, but people interpret them within particular histories, places, livelihoods, identities, and value systems. Research on Indigenous and cross-cultural learning demonstrates that alternative knowledge systems can broaden understandings of human–nature relations and support deeper sustainability learning (Gray & Manuel-Navarrete, 2021; Zidny et al., 2020).

The third tension concerns AI and human agency. AI can expand access, translation, analysis, accessibility, and creative production, but it also raises questions about autonomy, privacy, fairness, accountability, cultural representation, and human judgment. Nguyen et al. (2023) identify ethical principles including transparency, privacy, fairness, accountability, autonomy, and human agency, while Mouta et al. (2024) highlight the importance of participation and the non-neutral character of AI technologies in educational settings.

These tensions reveal the principal gap this paper addresses. ESD research examines competencies and transformative learning; culturally grounded scholarship emphasizes Indigenous and local knowledge; community-based education focuses on participation and experiential learning; and AI-in-education research increasingly addresses ethics and agency. However, these bodies of literature are commonly discussed separately.

Accordingly, the paper asks four questions: How can future education move from sustainability knowledge to sustainability action competence? How can culture and community function as foundations rather than supplementary elements of sustainability education? Under what conditions can AI support education without weakening human agency, ethical judgment, and cultural diversity? Finally, how can these dimensions be integrated into a framework relevant to Vietnam and other rapidly transforming Asian societies?

The paper responds by developing a Culture–Community–AI (CCA) framework and translating it into a proposed Learning Community for Sustainability, illustrated through the concept of a Learning Ward in Ho Chi Minh City. Its contribution is conceptual rather than empirical. Culture, community, and AI are not individually new topics; the contribution lies in specifying their relational functions within sustainability education.

LITERATURE REVIEW

Sustainability Education in a Changing World: Culture, Community, and Human-Centered Technology

The movement from conventional environmental education toward ESD reflects an important conceptual change. Sustainability challenges rarely belong to a single domain. Climate adaptation connects infrastructure, livelihoods, inequality, public policy, scientific knowledge, local experience, and cultural values. Sustainable food systems

combine agriculture, ecology, nutrition, economics, household practices, identity, and social justice. Urban sustainability brings together housing, mobility, heritage, migration, public space, environmental quality, and social cohesion.

Education that separates such issues too rigidly by discipline risks obscuring the interdependence that defines them. Sustainability-oriented education therefore involves more than learning about sustainability. Learners also need to learn through sustainability, using interdisciplinary, participatory, and problem-oriented approaches, and ultimately to learn for sustainability by developing the capacity to deliberate, collaborate, make responsible decisions, and participate in change.

The concept of *action competence* is useful here because it distinguishes education from behavioral prescription. Rather than asking whether students know the "correct" sustainable behavior, action competence asks whether they can understand a problem, assess alternatives, recognize competing interests, make informed judgments, cooperate with others, and act purposefully. Olsson et al. (2022) provide empirical support for this competence-oriented perspective.

Multiple-perspective learning offers one practical route toward such competence. Consider the example of a father catching fish to feed and support his family. From a livelihood perspective, fishing represents labor, survival, dignity, and family responsibility. From an ecological perspective, it may raise concerns about depleted fish stocks. A governance perspective introduces questions of regulation and resource rights, while a social-justice perspective asks whether conservation policies impose unequal costs on poorer households.

It also leads directly to culture. Concepts such as prosperity, nature, responsibility, family, livelihood, sacredness, and the good life are not culturally neutral. Cultural contexts influence how a sustainability problem is understood before a solution is proposed. This broader role of culture across sustainable-development domains is also recognized in UNESCO's Culture|2030 framework (UNESCO, 2019).

In Southeast Asia, rice offers a simple example. Rice is simultaneously an agricultural product, an economic resource, a form of food, a symbol of family life, a component of ritual and festivals, and an expression of relationships among people, land, water, and seasonal cycles. Studying rice can therefore connect ecology, economy, history, anthropology, climate, food security, religion, and cultural heritage. Traditional housing provides another example. Vernacular structures, including stilt houses found in parts of Southeast Asia, can be examined not only as architectural heritage but as accumulated experience concerning climate, flooding, ventilation, locally available materials, domestic organization, and community relations. The point is not that traditional practices are automatically sustainable. That assumption would romanticize tradition and weaken analysis. Rather, cultural practices can be treated as repositories of situated knowledge that should be examined critically.

Research supports this more nuanced approach. Zidny et al. (2020) show that indigenous knowledge can widen perspectives on nature and science and contribute to sustainability-oriented science education, while Gray and Manuel-Navarrete (2021) identify cross-cultural learning as a potential leverage point for changes in learners' relationships with other people, non-human life, and themselves. Noguchi (2022) similarly emphasizes local knowledge, informal learning, and community participation in rethinking ESD from the perspective of local communities. Culturally grounded sustainability education should therefore neither reject traditional knowledge nor celebrate it uncritically. It should ask what knowledge a practice contains, under what historical and ecological conditions it developed, whose interests it served, whether it remains appropriate, and how it can enter into dialogue with science, human rights, contemporary ethics, and technological change.

If culture provides contextual meaning, community provides the setting in which sustainability becomes relational and practical. Waste management, urban heat, flooding, public-space design, heritage conservation, migration, aging, or multicultural coexistence involve actual actors with different interests, knowledge, resources, and authority. Their complexity cannot be reproduced fully through textbooks. Community-connected learning, therefore, requires movement in two directions: learners move from the classroom to the community, while community questions move back into the classroom. Field experience introduces real places and perspectives; academic reflection provides concepts, evidence, comparison, and analytical discipline. Neither is sufficient alone.

This approach also has an ethical implication. Community members should not be treated simply as sources from whom students "collect data." They possess experience, memory, practical knowledge, networks, and priorities.

Community-connected learning becomes stronger when local actors are treated as knowledge partners. The community-garden study by Apanovich et al. (2023), for example, found psychosocial and environmental benefits associated with university students' participation in community-based learning, including social interaction and connection with nature. Although a single case cannot establish general effects, it illustrates the educational possibilities created when sustainability learning is embedded in lived environments.

Artificial intelligence introduces a third dimension. AI can support multilingual communication, organize large volumes of information, identify patterns, improve accessibility, produce preliminary visualizations, and help learners explore alternative scenarios. These capabilities can be valuable in interdisciplinary and culturally diverse settings. However, technical capacity and educational value are not equivalent. UNESCO's guidance on generative AI calls for a human-centered approach grounded in pedagogical purpose, privacy, ethical validation, and human agency (Miao & Holmes, 2023). UNESCO's AI competency framework for students similarly places a human-centered mindset and ethics alongside technical understanding and system design (Miao et al., 2024). These principles are consistent with UNESCO's broader ethical framework for AI, which emphasizes human dignity, human rights, fairness, inclusion, transparency, and human oversight (UNESCO, 2022).

The relevant educational question here is therefore not simply how much AI can be used, but what human capability a particular use of AI strengthens, and what it may weaken. This reframing broadens AI literacy beyond technical competence. Learners need to verify information, recognize bias and uncertainty, understand ethical consequences, identify representational gaps, and determine when human judgment is indispensable. Culture sharpens this problem further. Digitally dominant languages and societies are likely to be more visible in AI-mediated knowledge environments than communities whose knowledge is transmitted through oral history, embodied skills, rituals, crafts, or local networks. Digitization may support preservation and access, but the ability to digitize cultural knowledge does not confer an automatic right to circulate or decontextualize it. Consent, attribution, interpretation, ownership, and community involvement remain human questions.

An educational paradox follows: as AI becomes more capable of describing the world, direct engagement with it becomes more important, not less. AI can describe a market, temple, mosque, river community, heritage site, or cultural festival. It cannot replace listening to residents, reading social relationships, negotiating disagreements, or taking responsibility for decisions affecting a community. These arguments point toward the need for an integrated framework rather than four parallel educational agendas.

METHODS

This paper employs a conceptual research design grounded in an integrative, concept-driven literature review and framework development. An integrative review is appropriate where relevant knowledge is distributed across distinct but related fields and the objective is conceptual synthesis rather than statistical aggregation. Torraco (2005) emphasizes the potential of integrative reviews to generate new conceptual perspectives, while Snyder (2019) argues that literature reviews can operate as research methodologies when their purpose, selection logic, and analytical process are explicit.

The review is therefore not presented as systematic or exhaustive. Sources were purposively selected for their relevance to four analytical domains: ESD and sustainability action competence; culture, Indigenous and local knowledge; community-connected and place-based learning; and human-centered or ethical AI in education. Priority was given to peer-reviewed scholarship, authoritative UNESCO and United Nations frameworks, and official policy documents relevant to Vietnam and Ho Chi Minh City.

The analysis proceeded in three stages. First, propositions emerging from the original ICER presentation were identified. Second, these propositions were compared with recurring concepts across the four bodies of literature, particularly action competence, cultural meaning, situated knowledge, participation, human agency, ethical judgment, and technological augmentation. Third, these relationships were synthesized into the CCA framework.

RESULTS

The framework assigns a distinct educational function to each dimension. Culture provides grounding: it situates sustainability within values, meanings, histories, identities, and forms of local knowledge. Community provides participation: it confronts learners with real actors, competing interests, institutional constraints, and consequences. AI provides augmentation: it extends selected human capacities but does not determine educational purposes or ethical outcomes.

Conceptually, the relationship can be expressed as:

Cultural grounding + Community participation + Human-centered AI → Sustainability action competence

The framework generates three propositions.

Proposition 1: Cultural grounding strengthens the contextual meaning of sustainability education. Sustainability becomes more educationally meaningful when learners can relate global challenges to particular places, histories, identities, livelihoods, and knowledge systems. Culture, therefore, functions not merely as additional curriculum content but as part of the interpretive structure through which sustainability itself is understood.

Proposition 2: Community participation creates the conditions through which sustainability knowledge can be translated into action competence. Knowledge does not automatically produce action. Community settings expose learners to stakeholders, disagreement, limited resources, institutional constraints, and responsibility for consequences. Participation, therefore, creates conditions in which abstract knowledge can be mobilized and tested.

Proposition 3: AI contributes educational value when it augments rather than substitutes for human judgment, cultural interpretation, and participation. AI should be evaluated not by the maximum number of tasks it can automate but by whether its use expands capacities that matter educationally while preserving agency and accountability. Ethical AI research supports the importance of autonomy, fairness, transparency, accountability, human agency, and participation in educational contexts (Nguyen et al., 2023; Mouta et al., 2024).

The three dimensions are complementary but not symmetrical. Culture and community help establish educational meaning and social purpose; AI provides the technical capacity to support those purposes.

This distinction is important because it prevents technological determinism. Without community engagement, cultural knowledge can become symbolic rather than lived. Without academic reflection, community activities may remain experiential but conceptually shallow. Without cultural and social grounding, AI can encourage technological solutionism, the assumption that complex human problems are principally problems of information processing or optimization.

Teachers and institutions function as mediating conditions, rather than a fourth component of the framework. Brandt et al. (2022) show that ESD-specific professional action competence involves knowledge, skills, and attitudes and that the design and context of teacher education matter for its development. UNESCO's teacher-oriented AI framework similarly emphasizes human-centered values and ethics alongside technical and pedagogical competencies (Miao & Cukurova, 2024).

The institutional environment matters as well. Verhelst et al. (2022), using data from 629 students and 207 school staff, found significant relationships between dimensions of students' sustainability action competence and organizational characteristics, including sustainable leadership, pluralistic communication, adaptability, and democratic decision-making. CCA should therefore be understood as a conceptual architecture rather than a standardized teaching method. Its application must remain sensitive to place, educational level, institutional capacity, and community context.

From Learning City to Learning Community: A Proposed Learning Ward Model

Vietnam offers an appropriate context for translating the CCA framework into a place-based educational proposition. Rapid urbanization, technological transformation, international integration, environmental pressures, demographic change, and cultural transformation intersect particularly visibly in major cities. Vietnam's Education Development Strategy to 2030, with a vision to 2045, emphasizes modernization, comprehensive human development, creativity, cultural traditions, international integration, and adaptation to scientific and technological development (Prime Minister of Viet Nam, 2024).

Ho Chi Minh City provides a useful case because of its scale, cultural diversity, educational network, and, since 2024, its membership in the UNESCO Global Network of Learning Cities (UNESCO Institute for Lifelong Learning, 2024). The city's UNESCO profile emphasizes lifelong learning, digital technologies, expanded learning opportunities, and community-based approaches (UNESCO Institute for Lifelong Learning, n.d.).

The paper therefore proposes a Learning Community for Sustainability, operationalized at the neighborhood scale through the concept of a Learning Ward. A ward is more than an administrative territory. It contains residents, schools, universities, businesses, markets, streets, public spaces, religious institutions, cultural facilities, associations, local authorities, historical sites, and informal networks. Each of these entities contains knowledge, relationships, resources, and potential learning opportunities.

Rather than beginning with community deficits alone, the Learning Ward begins with an asset-oriented question: What knowledge, relationships, cultural resources, spaces, memories, and capabilities already exist here, and how can they contribute to shared learning for sustainability?

Different places would therefore generate different learning agendas. A heritage-rich urban neighborhood might focus on urban memory, conservation, tourism, redevelopment, and public space. A Chinese-Vietnamese neighborhood could offer opportunities to learn about multilingualism, religious life, migration, trade culture, festivals, foodways, local livelihoods, and intercultural relations. A riverside area could bring together water culture, flooding, pollution, climate adaptation, transport, and livelihoods. A highly multicultural community could focus on migration, religious diversity, identity, coexistence, and shared participation.

The model thus follows a principle of place-based differentiation within common sustainability purposes. A Learning Ward project could operate as a cycle of community mapping, issue identification, multiple-perspective inquiry, co-design, action, and reflection. Community mapping would identify local actors, environmental conditions, cultural resources, existing initiatives, social networks, and places of interaction. Digital technologies and AI could help organize or visualize this information, while direct observation and local verification would remain essential. Participants would then identify a manageable question: waste at a market, neighborhood flooding, urban heat, a neglected public space, disappearing cultural memory, accessibility for persons with disabilities, digital exclusion among older residents, or communication across cultural groups.

Students would examine the issue before proposing solutions. A public-space intervention, for instance, may be perceived differently by children, older residents, street vendors, businesses, planners, persons with disabilities, visitors, and environmental groups. This stage makes a difference analytically productive. It teaches learners that "the community" is never a homogeneous actor. Co-design would then bring students, educators, community participants, and relevant institutions together around a realistic intervention. The objective need not be a large-scale social transformation. A project might document neighborhood heritage, improve waste communication at one market, create multilingual cultural interpretation, organize an intergenerational digital-learning activity, or test a small-scale environmental intervention. AI can then support translation, information organization, visualization, comparison, or accessible communication. It does not decide which interpretation is culturally appropriate or which intervention is socially legitimate.

The treatment of cultural knowledge is especially important. Oral histories, family images, ritual knowledge, religious practices, and community memories should not become freely circulating digital content simply because they can be recorded. Participants should have a voice in deciding what is documented, how it is interpreted, who may access it, and how contributors are acknowledged. The model also allows for intergenerational reciprocity. Younger participants may share digital and AI-related skills, while older residents may contribute language, historical memory, cultural knowledge, traditional skills, foodways, and experiences of urban change. Expertise becomes reciprocal rather than one-directional.

The same principle applies to the relationship between universities and communities. Universities contribute theories, research methods, disciplinary knowledge, technologies, students, and institutional networks. Communities contribute situated knowledge, practical experience, social memory, relationships, and understandings of local constraints. The preferred model is therefore not simply knowledge transfer, but knowledge co-production.

Reflection completes the learning cycle. Students need to ask not only whether an intervention succeeded, but whose perspective changed the original proposal, what assumptions proved incorrect, who benefited, who remained

excluded, how technology affected the process, and what they would change in the next cycle. The Learning Ward is deliberately presented as a proposed contextual application rather than an empirically validated model. Its value should be tested through implementation. A pilot could examine changes in sustainability action competence, systems thinking, intercultural competence, ethical AI literacy, learner agency, and community connection. Mixed methods would be appropriate, combining learner measures with interviews, observations, reflective outputs, project artifacts, and evaluation by community partners.

Community outcomes should be assessed alongside student outcomes. A project that produces learning for students while placing excessive demands on community partners cannot automatically be considered successful.

In this sense, the Learning Ward offers a micro-level translation of the learning-city idea: community becomes a learning environment, while sustainability becomes a shared problem of inquiry and action.

DISCUSSION

The contribution of the CCA framework does not lie in introducing culture, community, or AI as new educational topics. Its contribution lies in assigning them distinct but connected functions within sustainability education.

First, the framework moves culture from the margins of sustainability education to its interpretive core. Culture is often included as additional content, such as heritage, diversity, or Indigenous knowledge. CCA instead treats cultural grounding as part of the process through which sustainability problems acquire meaning. This matters because a sustainability solution that appears technically effective may fail when it disregards local values, identities, histories, or social relations. The theoretical shift is therefore from culture as content to culture as context for judgment. Second, the framework provides a stronger explanation of the knowledge–action relationship. Sustainability education frequently assumes that better knowledge will lead to more sustainable decisions. Action-competence research complicates this assumption. CCA argues that community participation provides one of the key environments through which knowledge becomes actionable because it exposes learners to people, constraints, disagreement, consequences, and responsibility. The shift here is from community as a site of application to community as a mechanism of learning. Third, the framework clarifies AI's position. AI should neither be rejected as incompatible with humane education nor embraced as an autonomous driver of innovation. Ethical AI research shows that autonomy, fairness, participation, inclusion, transparency, and accountability are central educational concerns (Nguyen et al., 2023; Mouta et al., 2024).

CCA, therefore, treats AI as augmentative rather than determinative. As information becomes easier to generate, the value of education increasingly lies in the ability to evaluate, contextualize, compare, challenge, and take responsibility for conclusions. In this sense, information abundance increases rather than reduces the value of human judgment. These three contributions also clarify the role of teachers. Teachers do not form a fourth element of CCA. They mediate relationships among its elements: connecting global sustainability knowledge with culturally situated meanings, designing responsible community engagement, and determining when technology supports or undermines educational purposes.

Institutional conditions determine whether this mediation can occur sustainably. The evidence reported by Brandt et al. (2022) and Verhelst et al. (2022) indicates that teacher competence and organizational context both matter to ESD outcomes. Sustainability-oriented education, therefore, requires more than isolated innovative teachers; it requires institutional environments that enable collaboration, participation, reflection, and responsible experimentation. The Learning Ward adds a spatial dimension to the framework. Many sustainability problems are experienced locally, in streets, markets, rivers, schools, places of worship, workplaces, and households, even when their causes and consequences extend far beyond the neighborhood. The local scale can therefore provide a productive meeting point between global sustainability principles and lived experience.

The model is not intended to be standardized. A Learning Ward in Ho Chi Minh City, Bangkok, Kuala Lumpur, Jakarta, or Seoul would necessarily draw on different histories, cultural resources, environmental challenges, and institutional arrangements. What may be transferable is not content but process: identify local assets, recognize multiple actors, frame a meaningful problem, bring different forms of knowledge into dialogue, use technology selectively, co-design feasible action, and reflect on consequences.

However, several limitations remain. First, CCA is a conceptual framework. Its three propositions are theoretically grounded but have not yet been tested together empirically. Second, the review is integrative and purposive rather than systematic. It is intended for conceptual synthesis, not exhaustive coverage or bibliometric representation of the literature. Third, the Learning Ward remains a design proposition. Claims regarding feasibility, effectiveness, scalability, cost, or long-term institutional sustainability require empirical evidence. Fourth, neither culture nor community should be treated as homogeneous. Communities contain differences of generation, gender, ethnicity, religion, class, occupation, migration experience, resources, and political influence. Future research, therefore, needs to examine whose knowledge is represented and who has the authority to define a community's priorities. Fifth, community engagement involves power. Universities can unintentionally dominate project agendas, extract local knowledge, or prioritize student learning over community benefit. Reciprocity, informed participation, continuity, and community benefit should therefore become explicit evaluation criteria. Finally, AI is evolving rapidly. Future research should examine not only efficiency or immediate learning outcomes but also cognitive independence, teacher professionalism, privacy, academic integrity, cultural representation, inequality, environmental costs, and longer-term changes in human relationships.

These limitations make the CCA propositions empirically testable. Future studies could examine whether culturally grounded sustainability education improves learners' ability to contextualize problems and recognize plural knowledge systems; whether sustained community participation contributes to measurable action competence; and whether particular forms of AI-supported learning expand problem-solving capacity without reducing learner agency or critical judgment. A Learning Ward pilot could provide one setting for such research. Comparative studies across ASEAN would be especially useful because the region combines rapid modernization, cultural diversity, climate vulnerability, expanding digital economies, and strong community traditions.

CONCLUSIONS

In conclusion, sustainability-oriented future education becomes more meaningful when culture grounds interpretation, community connects knowledge with action, and technology expands human capability without displacing human responsibility. Future education should prepare learners not only to function effectively in a digital economy but also to become responsible citizens, culturally informed actors, community participants, critical users of technology, and co-creators of sustainable futures. Sustainability, in this perspective, is not simply another subject added to the curriculum. It is an organizing principle for interpreting knowledge, connecting learning with society, and judging technological innovation.

DECLARATIONS

Author Contributions: Phan Thi Hong Xuan: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – Original Draft, Writing – Review & Editing. As sole author, she is responsible for all aspects of the work.

Funding: [To be confirmed by the author] This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflicts of Interest: The author declares no conflict of interest.

Data Availability: This is a conceptual paper based on an integrative review of secondary, publicly available scholarly and policy sources; all sources consulted are listed in the reference list. No new datasets were generated or analyzed.

Informed Consent: Not applicable. This study did not involve human participants, primary data collection, or fieldwork.

Institutional Review Board Statement: Not applicable.

ORCID: Phan Thi Hong Xuan: [ORCID iD to be provided]

REFERENCES

Apanovich, N., Okyere, S. A., Mensah, S. L., & Frimpong, L. K. (2023). Education for sustainable development: Societal benefits of a community garden project in Tucson, Arizona. *Societal Impacts, 1*(1–2), 100011. https://doi.org/10.1016/j.socimp.2023.100011

Brandt, J.-O., Barth, M., Hale, A., & Merritt, E. (2022). Developing ESD-specific professional action competence for teachers: Knowledge, skills, and attitudes in implementing ESD at the school level. *Environmental Education Research, 28*(12), 1691–1729. https://doi.org/10.1080/13504622.2022.2064973

Gray, K., & Manuel-Navarrete, D. (2021). Leveraging inner sustainability through cross-cultural learning: Evidence from a Quichua field school in Ecuador. *Sustainability Science, 16*(5), 1459–1473. https://doi.org/10.1007/s11625-021-00980-5

International Commission on the Futures of Education. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO.

Miao, F., & Cukurova, M. (2024). *AI competency framework for teachers*. UNESCO.

Miao, F., & Holmes, W. (2023). *Guidance for generative AI in education and research*. UNESCO.

Miao, F., Shiohira, K., & Lao, N. (2024). *AI competency framework for students*. UNESCO.

Mouta, A., Pinto-Llorente, A. M., & Torrecilla-Sánchez, E. M. (2024). Uncovering blind spots in education ethics: Insights from a systematic literature review on artificial intelligence in education. *International Journal of Artificial Intelligence in Education, 34*, 1166–1205. https://doi.org/10.1007/s40593-023-00384-9

Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B.-P. T. (2023). Ethical principles for artificial intelligence in education. *Education and Information Technologies, 28*, 4221–4241. https://doi.org/10.1007/s10639-022-11316-w

Noguchi, F. (2022). *Rethinking education for sustainable development in a local community context*. Springer Singapore. https://doi.org/10.1007/978-981-16-9464-6

Olsson, D., Gericke, N., & Boeve-de Pauw, J. (2022). The effectiveness of education for sustainable development revisited: A longitudinal study on secondary students' action competence for sustainability. *Environmental Education Research, 28*(3), 405–429. https://doi.org/10.1080/13504622.2022.2033170

Phan, T. H. X. (2026, May 23). *Empowering sustainability for future education: Culture, community, and AI for a more humane learning society* [Conference presentation]. The 12th International Conference on Educational Reform (ICER 2026), Maha Sarakham, Thailand.

Prime Minister of Viet Nam. (2024, December 31). *Decision No. 1705/QĐ-TTg approving the Education Development Strategy to 2030, with a vision to 2045*. Government of Viet Nam.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research, 104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review, 4*(3), 356–367. https://doi.org/10.1177/1534484305278283

UNESCO. (2019). *Culture|2030 indicators: Thematic indicators for culture in the 2030 Agenda*.

UNESCO. (2020). *Education for sustainable development: A roadmap*.

UNESCO. (2022). *Recommendation on the ethics of artificial intelligence*.

UNESCO Institute for Lifelong Learning. (2024, February 14). *UNESCO Global Network of Learning Cities: 64 new members from 35 countries.*

UNESCO Institute for Lifelong Learning. (n.d.). *Ho Chi Minh City, Viet Nam.* UNESCO Global Network of Learning Cities.

United Nations General Assembly. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development* (A/RES/70/1). United Nations.

Vargas-Merino, J. A., Ríos-Lama, C. A., & Panez-Bendezú, M. H. (2024). Critical implications of education for sustainable development in HEIs: A systematic review through the lens of the business science literature. *The International Journal of Management Education, 22*(1), 100904. https://doi.org/10.1016/j.ijme.2023.100904

Verhelst, D., Vanhoof, J., de Maeyer, S., Sass, W., & Van Petegem, P. (2022). Enabling effective education for sustainable development: Investigating the connection between the school organization and students' action competence. *The Journal of Environmental Education, 53*(4), 171–185. https://doi.org/10.1080/00958964.2022.2072797

Zidny, R., Sjöström, J., & Eilks, I. (2020). A multi-perspective reflection on how Indigenous knowledge and related ideas can improve science education for sustainability. *Science & Education, 29*, 145–185. https://doi.org/10.1007/s11191-019-00100-x