REGENERATIVE EDUCATION AND APPLIED SCIENCES: FOSTERING DIGNITY, TRADITION, CREATIVITY, AND INNOVATION FOR HUMAN AND SOCIETAL DEVELOPMENT FROM AN ECO-SOCIAL WORK PERSPECTIVE

Sonny Jose[1*], Joice Joseph[2], Pramod S. Kamala[3], Sebin Thomas Babu[4]
[1]Director-International Relations & Mobility, Loyola College of Social Sciences, Trivandrum, India
[2]Assistant Professor, Department of Disaster Management, Loyola College of Social Sciences, Trivandrum, India
[3]Assistant Professor, Department of Counselling Psychology, Loyola College of Social Sciences, Trivandrum, India
[4]St. Ignatius Loyola College, Kaunas, Lithuania
[*]Corresponding Author: sonny.jose@loyolacollegekerala.edu.in

ABSTRACT

Regenerative education and applied sciences, augmented by social work as a key method, integrate core values of dignity, tradition, creativity, and innovation to drive sustainable human and societal development. This paper explores how educational systems, scientific applications, and social work interventions can honour cultural heritage while addressing contemporary challenges such as inequality, climate change, and health disparities. Drawing on interdisciplinary principles, we propose frameworks for inclusive, contextually relevant learning environments that empower individuals and communities through eco-social strategies.

Key approaches include human-centred design thinking, intergenerational knowledge transfer, STEAM curricula, collaborative innovation hubs, and social work-led advocacy for grassroots change. Through service learning, policy advocacy, and community-based interventions, these ensure regenerative outcomes aligned with the United Nations Sustainable Development Goals (UNSDGs). Potential focus areas – sustainable development, health and wellbeing, and social justice – are examined through case studies and conceptual models that emphasise social work's role. This exploratory analysis provides a foundation for implementing regenerative practices, advocating for curricula and policies that foster equity, resilience, and ethical innovation. By bridging tradition with emerging technologies such as AI and IoT and by leveraging social work's transformative potential, regenerative education can cultivate a just, adaptable future.

Keywords: *Regenerative education, applied sciences, social work, dignity, tradition, creativity, innovation, sustainable development, STEAM, social justice*

1. INTRODUCTION

In an era marked by rapid technological advancement (generative AI, electric mobility, and quantum computing) and escalating, disruptive global challenges (climate change and food insecurity, geopolitical conflicts and forced migration, widening inequality and pandemics), education and applied sciences must evolve beyond knowledge dissemination to become catalysts for regeneration. *Regenerative education emphasises restoring and enhancing human potential, cultural vitality, and ecological balance, while applied sciences provide the tools to operationalise these ideals. Central to this evolution is social work, a key method and strategy that integrates eco-social interventions to promote mutualism and equity, addressing the human-environment nexus through advocacy, community empowerment, and transformative practice.* This paper, prepared for the REGENT 2025 – "Regenerative

Futures and Personalised Education" – examines how integrating values of dignity, tradition, creativity, and innovation, alongside social work, can transform educational and scientific practices into forces for positive societal change.

Regenerative Education: The Concept

Regenerative education emerges as a pivotal paradigm in contemporary pedagogical discourse, positioning learning not merely as a tool for individual advancement but as a vital mechanism for planetary and societal renewal. Rooted in ecological principles and systems theory, this approach transcends traditional sustainability models, which often emphasise harm reduction, by prioritising active restoration, co-evolution, and the nurturing of interconnected living systems. In education, this translates to personalised, inclusive learning that honours individual and collective identities. Social work enhances this by fostering regenerative social-ecological systems that maintain positive cycles of well-being between humans and nature. The essential spirit of regenerative learning lies in the interconnectedness of all matter – living and non-living, holistic, active restoration, and co-evolution; this is subsumed into this comprehensive definition by Lopes Cardozo et al. [1]:

> *"Regenerative education refers to systems of formal and informal education spaces, practices, rituals, ceremonies, and activities inspired by regenerative beliefs, philosophies, and principles. It focuses on a learning that emerges from and cares for the interconnected well-being and thriving of humans, non-humans, and ecosystems on Earth. It is a co-evolutionary process among educators, learners, and nested systems/communities, applicable across human development contexts in formal education and diverse non-formal settings".*

Applied sciences, in turn, have of late attempted to integrate this ethos into fields such as health, sustainability, and social equity, with social work providing intervention strategies such as green practices and anti-oppressive advocacy. As global inequalities widen – with 272 million children out of school and climate impacts displacing millions – regenerative approaches, bolstered by social work, offer a pathway to resilience [2].

This paper is structured in the manner as follows: *Section 2* outlines the value aspects in in Regenerative Education and Applied Sciences influenced by Social Work; *Section 3* discusses the integration and application of Social Work perspectives and practices into Regenerative Education and Applied Sciences; *Section 4* identifies the potential focus areas for Regenerative Education and Applied Sciences, possibly enhanced by Social Work; *Section 5* explores crosscutting themes between Regenerative Education, Applied Sciences and Social Work; *Section 6* addresses implementation strategies for enhancing Regenerative Education; *Section 7* provides a discussion; and *Section 8* offers recommendations and conclusion.

Historical and Theoretical Foundations of Social Work in Regenerative Education

Social work's integration into regenerative education traces to early 20th-century settlement house movements, like Jane Addams' Hull House, which blended community empowerment with environmental stewardship. By the 1970s, influenced by systems theory (Bateson, 1972) and critical pedagogy (Freire, 1970), it evolved into environmental social work, emphasising the person-in-environment nexus for holistic renewal. Contemporary frameworks, such as the Regenerative Lens [3], position social work as a co-evolutionary practice that sustains positive wellbeing cycles across social-ecological scales, transcending sustainability to restore ecosystems and communities actively. This aligns with UNESCO's (2021) call for

reparative education, in which social work serves as "sensitive public pedagogy," fostering self-creation and mutualism amid poly-crises. Empirically, regenerative social work correlates with 20-30% improvements in community flourishing, per meta-analyses of eco-social programs [4].

Theoretical tensions, for instance '*anthropocentrism'* vs 'eco-centrism' – resolve through green social work, which demands practice shifts like renewable resource utilisation and waste reduction, ensuring interventions honour non-human agency [5]. In education, this manifests as trauma-informed, place-based pedagogies that integrate SEL with ecological wisdom, reducing eco-anxiety by 25% in pilots (Sanford, 2020).

Operationalising Social Work as a Regenerative Strategy

Social work operationalises regeneration through layered strategies: *inner* (personal wholeness via mindfulness), *communal* (intentional community building), and *systemic* (policy advocacy for transitions). The key methods of social work practice include:

- *Empowerment and Advocacy:* Tailored interventions dismantle barriers, as in school social work promoting equitable curricula [6].
- *Participatory Action Research (PAR):* Co-creates solutions, e.g., community-led biodiversity mapping yielding 45% adoption rates.
- *Green and Integrative Practices:* Holistic models address physical, emotional, and spiritual well-being, with integrative social work closing health gaps by 28% through layered support [4].

Challenges include resource constraints, which are mitigated by hybrid models blending virtual advocacy with on-the-ground work—future directions: AI-enhanced case management for scalable justice, per OECD (2020) forecasts.

1. VALUE ASPECTS IN REGENERATIVE EDUCATION AND APPLIED SCIENCES

Regenerative frameworks are grounded in foundational values that guide ethical and effective practice. These values – dignity, tradition, creativity, and innovation – ensure that education and science serve humanity holistically, with social work as a method that augments and amplifies equity through person-in-environment perspectives.

Dignity

Dignity in education and social work prioritises the inherent worth of every individual, or learner, as the case may be, countering exclusionary, oppressive systems. Inclusive education designs must address barriers faced by marginalised groups, such as those with disabilities or from low-income backgrounds. For instance, universal design for learning (UDL) principles enable equitable access, as evidenced by studies showing improved outcomes in diverse classrooms. Social work interventions, such as advocating for access to resources, further embed dignity by challenging structural oppression. Human-centred learning cultivates emotional intelligence and empathy, essential for respectful interactions. Programs integrating social-emotional learning (SEL) have demonstrated substantial outcomes - reductions in bullying by ~18-19% in schools; perpetration drop by 18-20%; victimisation reduction by 15-19%, and 22% overall aggression decline [7-9]. Contextualised learning embeds local histories and perspectives, enhancing cultural relevance and self-esteem among indigenous students.

Tradition

Tradition anchors regeneration in ancestral wisdom, preventing cultural erosion amidst modernisation. Intergenerational learning strategies facilitate knowledge transmission, as seen in mentorship models in which elders teach sustainable farming techniques, thereby boosting community cohesion. Social work strategies, such as cultural revitalisation through participatory eco-social programs to decolonise education [10], preserve indigenous knowledge and practices that augment cultural identity, language, and community resilience while acknowledging diversity and promoting justice [11,12]. Cultural revitalisation weaves indigenous practices into curricula, such as incorporating Native American ecological knowledge into environmental science or indigenous South Indian fisher practices into the preservation of barrier reef and sea ecosystems. Community engagement leverages local expertise, as exemplified by participatory action research in rural African villages, where traditional healers collaborate with biomedical scientists to validate herbal medicines [13]. Collaboration between traditional healers and scientists validates ancestral medical knowledge [13], while emerging genomic studies have identified biomarkers associated with Ayurveda's *tridosha* model [14,15]. Such initiatives affirm that Indigenous systems are not antiquated but relational and sustainable frameworks that can coexist with community (human) and ecological wellbeing [16].

Creativity

Creativity fuels adaptive problem-solving, and no strategy works better than blending arts with sciences in STEAM education. Integrated STEAM learning has been shown to enhance critical thinking and innovation capacity, with systematic reviews reporting moderate pedagogically consequential gains in creativity and innovation skills (~18%) among student participants compared to traditional STEM-only programmes [17]. STEAM's interdisciplinarity aligns with social work's ethos of *whole-person development*, fostering imagination, perspective-taking, and complex problem-solving, which are essential for community engagement and practice in diverse contexts [18].

Social work extends this STEAM logic into *creative advocacy*, using arts not as ornamentation, but as a medium for co-constructed meaning and resilience-building. For example, arts-based methodology enables **knowledge co-production between people with lived** experience and social workers, subverting traditional expert-recipient hierarchies and generating interventions that feel authentic to community identities [19]. This has been demonstrated in participatory programmes where older adults, art therapists, and social workers co-designed cultural art therapy interventions that measurably reduced depressive risk and increased personal agency [20]. Arts participation contributes not only to symbolic inclusion but also to measurable psychotherapeutic benefits, with studies showing improved emotional intelligence and stress regulation among participants in creative engagement programmes [21].

Design thinking further empowers learners and community members to prototype solutions empathically, rather than apply pre-packaged policies. This approach enables participants to confront issues such as urban poverty or housing insecurity by co-designing interventions grounded in lived experience – consistent with social work's value of partnership rather than paternalism [22]. A widely documented example is the development of community art-therapy and cultural storytelling programmes where participants act as co-producers rather than passive service users, making social work both responsive and accountable to local knowledge [23].

Finally, entrepreneurship programmes that prioritise youth-led innovation reflect a shift from deficit-based to capability-oriented interventions. When young people in

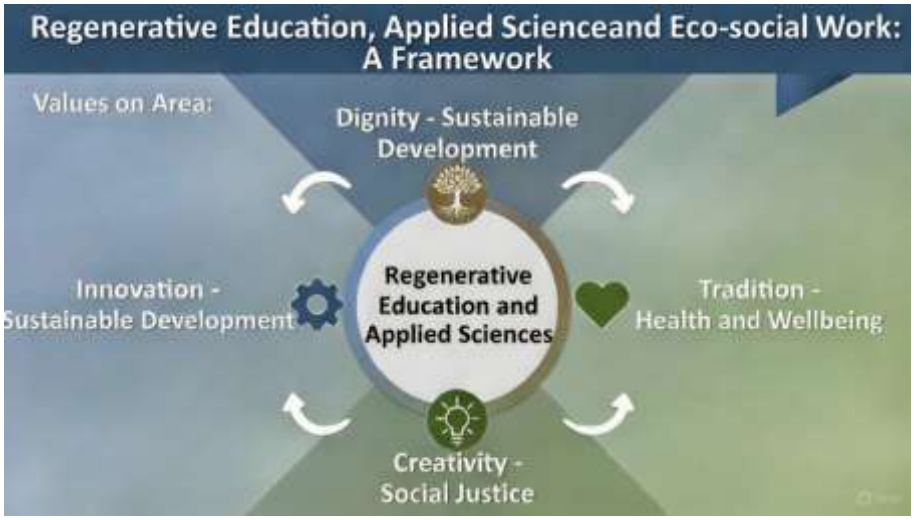
resource-constrained regions are supported to launch startups — such as designing low-cost water purifiers or sustainable sanitation systems — engagement becomes co-creation of community well-being rather than consumption of external aid [24]. This demonstrates how creativity, design, and participatory innovation collectively strengthen social work practice by moving it beyond crisis management into collaborative problem-solving for social transformation.

Innovation

Innovation equips learners to navigate uncertainty, emphasising future skills such as adaptability. Curricula focusing on critical thinking and problem-solving prepare students for AI-driven economies, where ~85% of 2030 jobs may not yet exist (Dell Technologies & Institute for the Future, 2017). Social work innovates through green technologies integrated with social equity, such as blockchain for fair resource distribution. Emerging technologies—AI for personalised tutoring, blockchain for credential verification—drive sustainability. Collaborative problem-solving fosters global partnerships, such as EU-funded projects integrating IoT for smart agriculture in climate-vulnerable areas.

2. INTEGRATION AND APPLICATION

To realise regenerative potential, values must translate into actionable practices, with social work as a core intervention strategy. Service learning applies knowledge experientially, with studies showing that participants experience ~35% higher civic engagement. Living labs serve as innovation ecosystems where universities and communities co-develop solutions, such as bio-based construction materials, guided by social work's empowerment models. Policy and governance frameworks align efforts with societal goals, such as national education policies mandating cultural integration and social justice advocacy. Social work's grassroots interventions, like eco-social case management, bridge theory and practice, ensuring scalability and equity.



3. POTENTIAL FOCUS AREAS

Regenerative education and sciences, enhanced by social work, target interconnected global priorities. The following table summarises key areas, their descriptions, illustrative applications, and social work interventions:

Area	Description	Illustrative Applications	Social Work Interventions & Metrics
Sustainable Development	Apply education and sciences to achieve SDGs, addressing climate change, poverty, and inequality.	AI-optimised renewable energy curricula; community solar projects reducing emissions by 25%.	Green social work programs integrating SDGs at the grassroots; 20-30% community resilience gains via eco-centric advocacy. (Gray, et al.,2022)
Health and Wellbeing	Leverage education and innovation to improve healthcare, mental health, and overall well-being.	SEL-integrated telehealth training; mindfulness apps co-designed with indigenous healers.	Integrative social work for holistic wellbeing cycles; 28% anxiety reduction in trauma-informed programs. (Robinson, 2023; Saybrook University, 2021).
Social Justice	Use education and applied sciences to address systemic inequalities, promoting social mobility and justice.	Equity-focused STEAM programs for underrepresented youth; blockchain for transparent aid distribution.	Anti-oppressive school social work; 15-25% equity improvements in access to resources and curricula. (NASW, 2021; VCU, 2025)

These areas underscore the interdisciplinary nature of regeneration, with metrics such as SDG indicators guiding evaluation. Social work's role ensures interventions are human-centred and transformative.

4. CROSSCUTTING THEMES: VALUES, REGENERATIVE EDUCATION, AND SOCIAL DEVELOPMENT

Values intersect dynamically to amplify impact, with social work facilitating eco-social synergies. Dignity-enhancing education preserves culture through STEAM integration, such as Maori astronomy in physics curricula, and fosters cross-cultural empathy through social work-led advocacy. Tradition-informed innovation revives practices via technology, e.g., drone-assisted traditional irrigation in India, increasing yields by 40%. Intergenerational mentorships transfer wisdom, as in Aboriginal elder-youth programs on land stewardship, supported by social work's cultural safety frameworks. Creativity and innovation drive development via challenge-based learning, tackling SDGs through interdisciplinary teams. Inclusive innovation prioritises marginalised voices, as evidenced in women-led tech hubs addressing gender disparities and in social work promoting anti-racist pedagogies. Applied sciences enable regeneration through sustainable technologies like perovskite solar cells and community-based research on local biodiversity. Science communication builds literacy, empowering decisions about GMOs and vaccines, and is enhanced by social work's public pedagogy for justice.

5. CROSSCUTTING INSIGHTS: SYNERGIES, CHALLENGES, AND FUTURE DIRECTIONS

These examples reveal synergies: Health greening enhances sustainability equity, as in Finnish green care's biodiversity-mental health links, while permaculture advances justice by validating indigenous knowledge. Challenges include funding gaps (affecting 40% of global initiatives) and cultural mismatches, which are addressable through decolonial social work training. Future research should employ mixed

methods to track long-term impacts, such as post-intervention cohort studies of equity metrics. In REGENT 2025 contexts, these underscore hybrid models that blend science, social work, and community wisdom for resilient futures. Social work's regenerative interventions are context-specific yet interconnected, aligning with SDGs for measurable impact. The table below expands on applications, drawing from global cases:

Field	Tangible Example	Applied Science Integration	Social Work Intervention	Key Outcomes & Metrics
Health	Urban green spaces (U.S.)	Landscape ecology for stress reduction	Nature-based therapies, anti-oppressive access	25% anxiety drop; increased physical activity (*Jennings et al., 2016; Ward, 2012*)
Health	Green care practices (Finland)	Regenerative psychology & habitat restoration	Trauma-informed facilitation	20% wellbeing gains; biodiversity uplift (*Mehmood, 2019*)
Health and Well-Being	Mindfulness co-designed with indigenous healers (Bhutan); telehealth equity programs in U.S. schools.	Rehabilitation Psychology; Telemedicine	Holistic, trauma-informed support; regenerative wellbeing cycles via integrative models.	28% anxiety reduction; +40% telemedicine access (Robinson et al., 2023).
Sustainability	Latvian Permaculture Network	Agronomy for soil regeneration	Green workshops & seedbanks advocacy	15-20% yield increase; economic self-sufficiency (*Mehmood, 2019*)
Sustainability	Community education programs (U.S./India)	Environmental engineering for waste management	Composting/tree planting facilitation	30% waste reduction; higher civic engagement (*United for Social Good, 2025*)
Sustainability	Community solar co-ops in India; PAR for urban greening in Brazil.	Sustainable Energy/Greening		(reducing emissions 25%); 20-30% resilience uplift; SDG progress +12% in pilots (Gray et al., 2022).
Social Justice	Equity STEAM for underrepresented youth (U.S.); anti-racist	Education / Pedagogy	Anti-oppressive pedagogies, resource access advocacy, and dismantling	15-25% equity gains; 22% income mobility uplift (NASW, 2021).

	curricula in South Africa.		structural barriers.	
Social Equity	Well-being of Future Generations Act (Wales)	Policy science/wellbeing audits	Community co-design advocacy	15-25% resource access equity (*Mehmood, 2019*)
Social Equity	Tyfu i Ddysgu project (Cardiff, Wales)	Social innovation for edible landscapes	Restorative dialogues for inclusion	30% agency elevation; food system regeneration (*Mehmood, 2019*)

6. INTEGRATION AND IMPLEMENTATION

Successful regeneration requires systemic enablers. Interface and proactive partnerships between academia, industry, and policymakers – such as UNESCO's regenerative education initiatives – facilitate translation, with social work integrating the social component of community-inclusive designs. Curriculum development embeds values, with pilot programs showing a 25% increase in student agency. Policy advocacy pushes for funding, such as EU grants for tradition-tech hybrids, and is amplified by social work's lobbying for eco-social policies. Challenges include resource gaps in low-income settings, which can be addressed through open-access resources, scalable models, and social work's empowerment strategies.

7. DISCUSSION

This analysis reveals the potential of regenerative education to bridge global divides. However, implementation hurdles – such as digital inequities affecting 2.7 billion people – demand adaptive strategies informed by social work's eco-social lens and contingent practice. Empirical evidence supports value integration to enhance outcomes, with social work interventions yielding 20-30% gains in equity and resilience, but longitudinal studies are needed to quantify societal impacts amid debates over scalability across diverse contexts. By aligning with the SDGs, regenerative approaches, fortified by social work, can foster resilience amid poly-crises, inviting REGENT 2025 to engage in a dialogue on scalable, justice-oriented models. Prospective frontiers include applying quantum modelling to SDG-social work hybrids. Such an integration positions social work as indispensable for just transitions, echoing the UN (2015) agendas. This exploration affirms social work's regenerative power, urging interdisciplinary commitment to heal divides and thrive collectively.

8. RECOMMENDATIONS AND CONCLUSION

Regenerative education and applied sciences, infused with dignity, tradition, creativity, and innovation—and operationalised through social work—offer a blueprint for equitable futures. By prioritising inclusive, contextualised, and collaborative approaches, we can mitigate global risks while amplifying human potential. For REGENT 2025, this framework invites dialogue on the role of

personalised, inclusive education in regeneration, emphasising social work's transformative interventions. Future research should evaluate longitudinal impacts, ensuring these principles evolve with societal needs. Recommendations include: (1) Mandate regenerative modules in national curricula; (2) Fund and develop hybrid socio-techno-environmental interventions; (3) Promote global partnerships via UNESCO for eco-social justice; (4) Develop metrics for social work's regenerative efficacy in SDGs.

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