



The effect of social media on the development of eco-literacy among students

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Abstract

The rapid growth of social media has transformed the way students' access, share, and exchange information related to environmental issues. This study explores the effect of social media on the development of eco-literacy among students, focusing on how digital platforms contribute to environmental awareness, knowledge, attitudes, and sustainable practices. Social media platforms provide students with opportunities to engage with environmental campaigns, educational content, scientific discussions, and sustainability initiatives, which can enhance their understanding of ecological challenges. The study examines the role of social media in promoting environmental responsibility and encouraging students to adopt eco-friendly behaviour in their daily lives. It also considers the challenges associated with online misinformation, passive engagement, and limited critical evaluation of environmental content. The findings suggest that social media can serve as an effective educational tool for developing eco-literacy when used strategically with reliable and informative environmental resources. The study highlights the importance of integrating social media-based learning approaches into educational systems to strengthen students' environmental knowledge and encourage sustainable decision-making.

Keywords: Eco-literacy, Environment, Social media, Higher Education Institution

Introduction

Eco-literacy includes environmentally sustainable practices together with the understanding, competencies, capabilities, and mindsets necessary for making those decisions. Social media significantly contributes to fostering environmental consciousness, information accessibility, beneficial peer impact, and outdoor activities. Eco-literacy promotes sustainability by focusing on system comprehension, evidence assessment, and proactive measures to tackle fundamental issues (Prasad and Balraj, 2011) [20]. Sustainability education may empower individuals and communities with the expertise and abilities required to tackle environmental issues, such as natural calamities and inadequate resource management (Amjad *et al.*, 2026) [3]. Social media disseminates information, facilitates community engagement, and fosters inquiry and critical teaching methods. Individuals articulate opinions and intentions via comments and shares, and communal dialogue can uncover values, norms, and compassion (Alsulimani and Sharma, 2019) [1]. Engaging in public dialogue necessitates comprehension of both one's own and others' viewpoints, which subsequently calls for contemplation of the topics and substance of the discussion.

The deterioration of the environment, alterations in climate, loss of biodiversity, contamination, scarcity of water,

deforestation, and excessive consumption of natural resources is the major concerns for people of all nations (Sarkar *et al.*, 2018; Dey and Sarkar, 2021; Das *et al.*, 2022) [24, 8, 7]. They have rendered environmental education a crucial component of modern education. Learners necessitate more than merely the capacity to memorise scientific information regarding ecosystems. They require the understanding, principles, competencies, mindsets, and drive necessary to comprehend environmental interdependence and engage in the establishment of sustainable communities. UNESCO's paradigm for Education for Sustainable Development underscores the necessity for learners to make enlightened choices and engage in responsible actions that uphold environmental integrity, social equity, and economic sustainability. Education should consequently cultivate information pertaining to sustainability alongside skills for reflection, engagement, decision-making, and accountable action.

The expansion of social media has profoundly transformed how individuals obtain and generate information. Students are progressively utilising online platforms like YouTube, Facebook, Twitter, Pinterest, and WhatsApp for educational resources. Social media enables a novel framework for decentralised information access and holds promise as an

educational resource in both formal and informal contexts. Diverse attributes of social media render it beneficial for environmental education. Social media facilitates peer engagement and feedback, allowing learners to develop comprehension through dialogue and negotiation, collaboratively build knowledge, gather information, evaluate and organise resources, and produce artefacts in reaction to knowledge creation. Interacting with social media aids learners in forming and building cognitive frameworks of the physical world and promotes the sharing of information and collaborative efforts for environmentally beneficial actions. As the worldwide conversation on ecology evolves, youth are progressively participating in social media discussions about climate change, pollution, and sustainability.

Eco-literacy: definitions and dimensions

Eco-literacy refers to comprehending the nature of interaction within natural systems and connects to socio-ecological systems at the plant, animal, and human levels (Saltan and Divarci, 2017) ^[23]. Eco-literacy fundamentally encompasses the understanding, abilities, dispositions, and drive required to engage in responsible behaviours towards the ecosystem in which individuals reside. This framework emphasises four aspects: systems thinking, evaluation of evidence, action proficiency, and results of ecological literacy (Ha *et al.*, 2022) ^[10]. Systems thinking fosters comprehension of intricacy, interconnectedness, and dynamism. Assessment of evidence pertains to the pursuit, analysis, and dissemination of information to understand issues and validate policy. Action competence revolves around proactively asserting one's citizenship rights. The results of ecological literacy encompass recognition of environmental challenges and eco-centric frameworks, collective accountability for ecological health, sustainable practices, propensity to advocate, civic participation, and young engagement in environmental matters. Eco-literacy is one of several literacy concepts aimed at empowering individuals to address through action, advocacy, or engagement- environmental issues that differ on local, national, and global scales, influenced by varying knowledge, priorities, and values. Such involvement may manifest through several channels-either individually or in collaboration with different entities; directly via gradual or radical modifications of daily habits; and/or indirectly by fostering collective efforts to tackle wider systemic issues.

Social media: features and educational potentials

Social media encompasses diverse electronic platforms where users engage in content sharing and interpersonal interaction, creating a broad definition beyond specific sites like Facebook or Twitter (Pandey, 2025) ^[17]. Educationally, social media fosters collaborative construction of knowledge among peers; promotes feedback and scaffolding from diverse sources including educators and experts; and supports authentic tasks grounded in real-world contexts and audiences (Salmon *et al.*, 2015; Verma and Grover, 2021) ^[22, 26]. These features combine to offer potential for ecological learning. Barriers for young audiences impede engagement with pressing ecological

challenges, yet social media affords access to credible information, collective sense-making within communities, and opportunities for critical discursive practices. Broadening information access to include diverse sources beyond formal curricula remains essential (Ozdemir and Alkabbanie, 2017) ^[16]. Information curation practices potentially enhance competence in evaluating credibility, reducing susceptibility to mis- or disinformation (Balraj Baboo and Yi Lim, 2015) ^[4].

Mechanisms linking social media to eco-literacy

The capacity to think, act, and promote sustainability at the individual and social levels is improved by eco-literacy. Achieving sustainability is aided by the ability to apply systems-thinking, evidence-appraisal, and action-competence skills. Through comprehensive, timely, and reliable information, social media can increase limited involvement in ecological challenges like climate change and biodiversity depletion. Additionally, according to Saltan and Divarci (2017) ^[23], these platforms have the ability to reroute information to other communities that hold different ecologically aligned values. Social media may give students access to a multitude of information about ecological issues, and these platforms have the capacity to introduce and broaden their understanding of environmental issues, thereby aiding in the development of their ecological literacy. The fact that educational institutions no longer have the exclusive right to acquire information is emphasised by many educational players.

• Information access and curatorial practices

Many students engage in distributed curating on social media sites by sharing, commenting on, or annotating content about subjects that interest them. Such involvement often functions with different levels of authority, to be actively investigated and curated collaboratively, while still permitting anonymous discourse. According to the literature, curatorial practices are the main way that young people use social media to acquire essential skills for interacting with the current hyper-mediated information environment. These skills include identifying reliable sources, evaluating the accuracy of information and its applicability to urgent issues, producing trustworthy annotations, and analysing the viewpoints of curated communities (Mihailidis and Cohen, 2013; Caldevilla-Dominguez *et al.*, 2021) ^[13, 5]. Numerous sources of ecological data and significant attention to annotation are indicated by empirical research. Curatorial techniques serve as a gateway to the broader conversation about constructivist education at the nexus of ecological action and information literacy (Perras, 2019) ^[19]. Young people encounter challenges when navigating the modern information system because the majority of information and opinions come from varied individuals rather than official sources. Some educators have referred to information literacy as a "framing" issue within larger ecological discourses due to concerns about dealing with false information and navigating a digitally mediated environment (Pasipamire, 2025) ^[18]. As young people go closer to later schooling, processes of curation and collaborative sense-making become ever more important.

• **Community formation and collective sense-making**

The creation of community and interactions among peers might affect students' sense of belonging across a wide demographic and facilitate the joint formulation of concepts associated with eco-literacy (Wendt, 2013) ^[27]. The creation of social media communities could alter students' participation and engagement in environmental conversations and activities, hence shaping their eco-literacy growth. The extent of text-centric peer engagement, shaped by different initiatives and instructional guidance, stands as a key indicator of community establishment; assessable discourse practices linked to eco-literacy within these interactions can reveal shared comprehension as students communicate, deliberate, and elaborate on their responses to ecological occurrences.

The capabilities of social media cultivate a communal atmosphere, boosting the chances of participation and engagement, resulting in enriched dialogue that goes beyond traditional educational settings (Rhodes, 2024) ^[21]. When students identify with a community, they take on more responsibility for sharing insights and fostering collective comprehension, while a change in identity towards a broader audience sets new expectations for participation, discourse excellence, and ownership that motivate them to tackle larger ecological challenges. Within this paradigm, community participation and allegiance can foster active involvement in ecological understanding through broadened social learning. Furthermore, platforms including integrated crowdsourcing, live feedback, and avenues for curatorial contributions promote additional engagement and heightened ownership.

• **Discursive methodologies and critical education theory**

Critical pedagogy underscores the principles of empowerment, critique, and social equity. In discussions pertaining to ecology, these priorities correspond with efforts to condemn climate injustice and confront the existing norms within various socio-ecological frameworks (Song, 2017) ^[25]. In the realm of students' development of ecological viewpoints on social media, critical pedagogical principles are evident in four unique aspects that constitute a separate facet of eco-literacy: the calibre of argumentation, the depth of inquiry, the existence of counter-narratives, and civic participation regarding a broader spectrum of ecological concerns (Liberona, 2026) ^[12]. Argumentation encompasses the essence and efficacy of assertions, justifications, and support ratios in students' contributions, whereas questioning relates to the existence and profundity of enquiries aimed at fellow students. Considering the significance of allure, lucidity, and justification in persuasion, these factors influence the potency and complexity of reasoning. Evaluating the sufficiency of the arguments relies on the prior knowledge and experience of fellow interlocutors, hence the quality of discourse contributes to mutual recognition.

• **Factors influencing motivation and engagement**

Access to varied ecological knowledge, peer engagement, dialogue, and curation are the most significant aspects connecting social media utilisation to eco-literacy in students.

Theorists examining the relationship between social media and social capital assert that it primarily concerns the types of information students may access, the peers they can associate with, and the nature of discussions they may participate in (Alalwan, 2022) ^[2]. In addition to these factors, motivation and involvement represent a significant aspect as well. Examinations of the processes that facilitate engagement with social media are intricately linked to motivational theories (Mishra *et al.*, 2024) ^[14]. Social media possesses inherent and external incentive capabilities for enhancing ecological literacy competencies, which are examined below. The duration dedicated to ecological subjects is intricately linked to scale scores, suggesting that curricular decisions, particularly regarding reinforcement circumstances, are essential components of instructional design. Investigating the motivations behind learners' engagement with social media platforms and identifying the elements that captivate student interest provides valuable insights for using social media into educational methodologies.

Empirical evidence on eco-literacy development

Ecological literacy denotes the ability to cultivate a connection with nature via comprehension of the interrelations among humans, other life forms, and the ecosystem (Saltan and Divarci, 2017) ^[23]. Eco-literacy encompasses four domains of comprehension: systems thinking, evaluation of evidence quality, action proficiency, and ecological literacy results (Amjad *et al.*, 2026) ^[3]. Systems thinking encompasses the comprehension of intricacies, interrelations, and the temporal aspects of ecosystems. Assessing the calibre of evidence reflects the gap between the evidence, the model, and its credibility. Action competence refers to the capacity to impact one's environment significantly. Ultimately, the results of ecological literacy pertain to comprehending thresholds, hazards, and the scientific approach. The cultivation of ecological literacy via social media can be analysed in diverse contexts and viewpoints, including classroom settings and educator training; these approaches can be categorised into environmental sustainability, cognitive frameworks, serious gaming, informal education, and curriculum as well as instructional development.

Empirical evidence regarding the advancement of eco-literacy via social media is limited. Certain research indicates the advancement of ecological literacy within educational environments, notwithstanding the utilisation of diverse platforms such as Facebook, Twitter, and WhatsApp (Murti *et al.*, 2025) ^[15]. Metrics differ, although numerous research suggest improvements in certain areas and the relative originality of the ecological subjects explored. Typically, greater attention is required to formulate environmentally-related concepts in additional unexamined applications following the research, and efforts to refine a more comprehensive post-analysis are recognised. Social media contemplation involves educational institutions and educators, incorporating practices across various platforms, including we-media applications (such as blogs and microblogs) and network meta-platforms (like Facebook), which compile concise text, images, hashtags, links, videos, and other media formats (Fiedler *et al.*, 2021) ^[9].

Numerous cross-sectional investigations analyse the correlation between social media utilisation and the enhancement of ecological literacy in students (Jillani *et al.*, 2025) ^[11]. The findings indicate varying levels of ecological literacy among users of different social media platforms and reinforce the notion that these platforms may have unique impacts on education. A study indicates that enhanced ecological literacy in students utilising blogs is linked to their ability to find, evaluate, and utilise data; their systems-thinking capabilities; and their comprehension of ecological crises as interrelated social, economic, and political issues. In a subsequent study, heightened involvement with social media (Facebook, Twitter, Instagram) and various digital platforms (e.g., YouTube, blogs) among students is associated with a sophisticated understanding of environmental concerns, methodical investigation of data, and the capacity to contemplate personal responsibility. However, studies indicate that a younger age constrains elevated ecological literacy, particularly in relation to the intricacies or interrelations of environmental issues and the broader dimensions of ecology, an observation consistent with pedagogical methods employed (Saltan and Divarci, 2017) ^[23].

Longitudinal viewpoints and educational pathways in environmental literacy underscore the necessity of incorporating social media, blogs, and personal learning settings to bridge formal and informal education. Cultivating environmental literacy necessitates comprehending ecological principles, promoting critical environmental consciousness, and creating social media platforms for communal learning. Studies highlight the importance of evaluating environmental literacy across different demographics and developing educational programs to enhance ecological understanding and competencies across time (Saltan and Divarci, 2017) ^[23]. Environmental education seeks to cultivate an environmentally conscious generation by developing ecologically informed individuals who can adapt to social-ecological transformations. The intricacy of environmental challenges indicates that social networking platforms may serve as effective venues for environmental education, fostering diversity, engagement, and involvement. Research conducted in Denmark indicated that online education facilitated cultural exchange among students about environmental health matters, resulting in favourable educational results. These virtual engagements can cultivate shared zones of proximal development, improving comprehension of intricate environmental issues such as climate change. Such methodologies include alternative strategies, encompassing sustainable and organic farming techniques, as feasible alternatives for extensive education and ecological initiatives (Chetty, 2015) ^[6].

Despite a plethora of research examining the development of eco-literacy in social media contexts, there exists a scarcity of comparative studies that systematically differentiate among diverse platforms or networks. These investigations reveal significant disparities in user characteristics, behaviours, and motivations, suggesting that different online environments may elicit unique interactions with environmental and sustainability issues. In a longitudinal investigation monitoring high school

students' growth over three years on Facebook and Weibo, an analysis of user interactions with posts revealed significant differences in engagement styles and community involvement (Saltan and Divarci, 2017) ^[23]. Users of the aforementioned site have an increased tendency to provide feedback and exchange information, as well as a greater likelihood of distributing and reposting content related to environmental matters. Participants' comments and conversations suggested that the primary motivation for engagement on Weibo was the exchange of knowledge, coupled with a notable focus on recycling, a practice strongly promoted by the Chinese government (Riendeau, 2019). These factors positioned Weibo as a more effective medium for advancing eco-literacy and environmental sustainability.

Analytical assessments of interaction with ecology-centered content across several platforms clarify this relationship. A research investigation sought to assess the influence of various social media platforms on the ecological information accessible by pre-service educators and the resulting effects on their environmental consciousness and eco-literacy development. A singular platform was selected as the primary choice, while two others with significantly diminished usage were recognised as supplementary options. Despite analogous tendencies regarding ecological content consumption, assessments of the ecology-related material were statistically comparable across the three platforms. Nonetheless, distinctive patterns emerged regarding the importance of the examined ecological sectors, the enjoyment derived from engaging with ecological content, the regularity of sharing and reposting, and the anticipated future engagement with ecological information. Evidence of eco-literacy advancement corroborated the diverse impacts of several platforms such as Facebook, Instagram, and Twitter, delineating the distinctive characteristics of various social media environments. Taking into account the distinctive traits and idiosyncrasies of contemporary social media platforms that earlier research has neglected, there is an opportunity to improve the comparative assessment of platform influence through systematic investigation of diverse technologies and broader domains.

Implications of social media for pedagogy and policy

Social media offers distinctive avenues for improving ecological education; however, it also presents significant pedagogical and policy dilemmas. Methodical and tactical instructional design can foster interaction with social media and enhance the skills required to exploit its possibilities. Comprehending the functionality of social media platforms, influencing feature and algorithm design, and utilising social media for educational purposes are vital skills for both students and educators. The spectrum of educational roles required—collaborator and co-learner, design architect, co-creator of knowledge, engagement facilitator, and critical ally—mirrors the teacher abilities outlined in scholarly literature. A cost-effective strategy for professional growth emphasises teamwork, joint creation of educational activities, and engagement with pertinent insights from social media platforms in the realm of education.

A pedagogical framework that advocates for the utilisation of social media as a medium for environmental education is crucial for fostering eco-literacy among learners. It is essential to implement governance frameworks and protocols for the educational use of social media, alongside developing universally applicable digital literacy benchmarks that encompass eco-literacy. The prevailing emphasis of digital literacy programs is predominantly confined to the proficient management of information. Financial and institutional backing is essential for the development of resources and educational content that encourages safe, critical, and constructive engagement with social media.

The advancement of eco-literacy can be enhanced by collaboration between the educational community and social media platforms to promote ecological education. These collaborations should align with the goals of the educational framework while catering to the needs of the private sector. The collaboration of resources, information, and knowledge from both entities can promote groundbreaking projects that enhance the role of social media as a holistic educational instrument. Hierarchical configurations enhance the potential for cooperative endeavours between scholarly institutions and the platforms.

Institutional backing can aid educators in engaging in social media-facilitated ecological education. Implementing a comprehensive institutional approach at the policy level provides a unified framework for advancing educational innovation using social media capabilities. Formulating digital literacy frameworks, influenced by the extensive impact of social media on students' education and welfare, can provide direction for integrating social media into pedagogy while accommodating local efforts. Distributing resources like software, connection, and technical assistance can enable a greater number of educators to explore social media-facilitated ecological learning and address the related pedagogical issues efficiently.

Social media has unique opportunities for enhancing environmental education, although it also poses considerable educational and policy challenges. Systematic and strategic educational design can promote engagement with social media and improve the competencies necessary to leverage its potential. Understanding the operation of social media platforms, shaping feature and algorithm development, and using social media for educational objectives are essential competencies for students and educators alike. The range of educational functions needed collaborator and co-learner, design architect, co-creator of knowledge, engagement facilitator, and critical ally reflects the competencies of educators described in academic research. An economical approach to professional development highlights collaboration, co-creation of learning initiatives, and interaction with relevant information from social media in the educational sector.

Institutional support can also assist educators in participating in ecological education using social media. Establishing a holistic institutional strategy at the policy level offers a cohesive structure for promoting educational innovation through social media functionalities. Developing digital

literacy frameworks, shaped by the significant effects of social media on students' learning and well-being, can offer guidance for incorporating social media into teaching practices while supporting local initiatives. Allocating resources such as software, connectivity, and technical support can empower a larger cohort of educators to investigate social media-enhanced ecological education and effectively tackle associated pedagogical challenges.

Role of teachers and professionals

The incorporation of social media into educational methodologies necessitates that educators augment their understanding and instructional techniques for effective social media use (Amjad *et al.*, 2026) ^[3]. When educators transparently communicate their choices and activities, their interactions become apparent, enabling fellow teachers to witness and contemplate their methodologies as contributors to their educational advancement. Digital platforms like social media unite educators inside networks that promote professional growth via transparent peer interaction. Educators get knowledge on the ecological and environmental initiatives of others using social media, as colleagues update them on recent advancements and resources (Leslie Forbes, 2017). Ongoing focus on the media and communication behaviours of youth will facilitate the incorporation of social media into the classroom, hence improving eco-literacy.

An educational framework that emphasises social media not just as a backdrop for learning, but as a platform for socially dispersed cognition and collaborative learning can enhance involvement with ecological matters via social media. The formulation of curricula and initiatives that enhance educators' professional growth amplifies their ability to foster young individuals' eco-literacy proficiently. Studies indicate that collaborative efforts that resonate with students' principles and beliefs are crucial for effecting change. Collaborative media initiatives that focus on common viewpoints arising from media important in the lives of youth might provide educators with possibilities to enhance student involvement with these methodologies. Platforms like Twitter enable debate, disagreement, and the dissemination of counter-narratives, therefore honouring students' aspirations to express divergent viewpoints (Echo Sirotkin, 2019).

Challenges and Limitations

The desire for knowledge is a common trait, and Suthendra aims to utilise Instagram to informally explore subjects of interest while using the platform's features for yoga and health (Echo Sirotkin, 2019). The organization of information and the preservation of posts are streamlined via Instagram, aiding educators in managing time constraints and encouraging pupils to participate formally in reading activities.

- **Misinformation, echo chambers, and digital distractions**

Social media platforms, being progressively integral to students' existence, provide avenues for education on environmental concerns and promoting ecological initiatives.

Nevertheless, significant reliance on sites like Instagram, TikTok, and Twitter poses threats of encountering misinformation, diverting focus from environmental issues, fostering civic apathy, and diminishing mental frameworks about systemic circumstances. Three primary avenues of influence include information accessibility and curatorial methodologies that determine the sources, credibility, and thematic presentation of inputs; the establishment of communities and collaborative interpretation that influence norms, interaction quality, and peer involvement; and discursive methodologies that promote argumentation, inquiry, counter-narratives, and civic engagement. Although prospects for the advancement of eco-literacy are plentiful, the associated risks are heightened. Sources of knowledge frequently exhibit tenuous links to formal schooling, the reliability of contributions remains uncertain, and curation methods tend to prioritise worse quality data. Fifth, false information spreads across diverse content domains, sources lacking substantial histories continue to be influential, echo chambers bolster specific narratives, and other perspectives are not consistently pursued. Social media provides unparalleled access to a variety of content, yet notable deficiencies persist in the range of specific subjects and the level of interaction (Wang *et al.*, 2024).

• Equity, access, and digital divide

The influence of social media on the advancement of eco-literacy in students occurs via multiple channels that provide access to ecological knowledge, encourage cooperative understanding, and nurture critical discussions. Digital and tangible communities unite students and educators who possess ecological interests and consider themselves eco-educators or eco-warriors. These inclusive standards motivate students to participate in environmental issues regardless of their background, expertise, or previous involvement. Curation and annotation facilitate learners in optimising knowledge intake, enhancing comprehension, and indicating significance to their society. Utilising authentic sources enhances meta-judgment abilities and fosters knowledge construction, whilst engagement provides feedback that sharpens credibility evaluation and encourages additional exploration. Discursive activities at the macro level that include inquiry, civic-minded counter-narratives, and widespread involvement in contentious matters promote communal understanding of ecological challenges. Instructional frameworks aimed at fostering information literacy, collaborative sense-making, and critical public pedagogy via social media directly tackle these aspects and enhance students' eco-literacy (Riendeau, 2019).

Conclusion

In examining the implications of social media on eco-literacy, it is essential to acknowledge the significance of learner autonomy. Eco-literacy, as a body of knowledge, provides an opportunity to address the crises endangering the sustainability of socio-nature complex systems. Such a reaction depends not only on the ability to perceive informational cues from the environment, but also, importantly, on the motivation to

implement change and the capability to achieve it. Social media platforms have revolutionised the dissemination of knowledge across society, significantly affecting the development of new insights among learners. In structured educational settings, social media provides participation opportunities that can involve students in ecological exploration, peer discussions, and the joint creation of knowledge outside the prescribed curriculum. Engagement in such matters is crucial, as the pressing issues posed by the Anthropocene necessitate enhanced abilities in systems analysis, evidence evaluation, and practical action. Focus on emerging pedagogical approaches in these settings is essential, as students engage in the collaborative interpretation of socio-ecological events; whether alone or in groups, they navigate the opportunities presented by these platforms, deliberating on the norms, ethics, and practices linked to various expressions of eco-literacy. The growing focus on this educational environment presents avenues for additional investigation into the mechanisms of eco-literacy cultivation within social media settings, as well as a clearer comprehension of how educational policies might facilitate the more effective strategic utilisation of these platforms.

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