Research on communication strategies for ecological civilization awareness among Chinese university students under the influence of new media

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Abstract. Given the current ecological crisis, there is a universal desire to achieve a higher level of sustainable development and create a harmonious society. Ecological civilization has emerged as a new form of human civilization that is an inevitable consequence of industrial civilization. It takes various forms in different countries, ethnic groups, and regions. China's distinctive approach and model of ecological civilization have the potential to influence the global direction of ecological civilization. Young university students, as future successors and builders, play a critical role in the progress of human civilization. This paper analyzes survey data and interview materials from 403 college students to uncover the reasons behind the insufficient implementation of ecological actions. Additionally, the paper proposes optimization strategies for ecological content dissemination based on the SIPS model, which align with the information dissemination mechanism of the new media era and the characteristics of audience behavior, and evaluates their effectiveness. The research aims to provide valuable insights for enhancing the ecological civilization awareness and practical actions of university students and contribute to the promotion of global ecological civilization and sustainable development.

Keywords: New media, Ecological Civilization, University Students, Communication Strategies, SIPS Model.

1   Introduction

Amidst a global ecological crisis, humanity faces the concept of ecological civilization, a progressive ideal transcending industrial society, garnering significant attention. Originating from 18th-century critiques of industrial society's environmental impact, ecological consciousness surged in Western societies during the 1960s-70s with the environmental movement. Rachel Carson's seminal 1962 work, "Silent Spring," highlighted the dire repercussions of human activity and urged a shift from conquering to coexisting with nature.[1]

1.1   Literature Review

In the late 1970s to the 1990s, green ecology emerged as a dominant ideology, underpinning environmental communication theory and practice. Backes (1995) established it as a research field in the 'Journal of Communication,' encompassing environmental news, issue awareness, attitudes, and mechanisms of social conflict.[2] Cox (2013) delved into the role of environmental communication in shaping public discourse and promoting social change, emphasizing the importance of effective communication and public engagement in environmental issues.[3] Saleh M (2017) pointed out that the media and environmental non-profit organizations play a very similar role in publicizing and educating the public about environmental issues and conducting research on environmental and sustainable development issues.[4] Han R (2020) mentioned that compared to traditional media, social media primarily influences pro-environmental behavior through the enhancement of interpersonal communication.[5] Scholars suggest that activating social media communication can promote environmental conservation behavior in light of the mutual influence between social media and interpersonal communication.

Ecological civilization dissemination is a unique ecological discourse system in China. Since President Xi Jinping introduced the ecological civilization concept in 2007, China has adopted it as a strategic, millennia-spanning vision for sustainable development, establishing a distinct ecological discourse system.[6] This dissemination activity is influenced by China's traditional concept of harmony between humans and nature and emphasizes environmental protection and sustainability.[7] Shen (2017) believes that ecological civilization dissemination involves three roles: education, communication, and supervision. The media plays a key role in enhancing public environmental awareness, constructing an information sharing platform, and monitoring environmental changes.[8] In the new era, advancements in new media technologies have transformed information consumption and dissemination. Li's study (2019) indicates a post-2000 shift in China's ecological civilization research, aligning with national policies and pivoting towards new media's impact.[9] Wu (2019) proposes that ecological civilization dissemination should not only promote the implementation of national policies and popularize education, but also establish a communication system suitable for the national conditions to enhance China's ecological image globally.[10] Huang (2021) emphasizes the critical role of integrated media in promoting ecological civilization, enhancing public consciousness, policy, and production, thus improving communication efficacy and fulfilling informational needs.[11]

Western environmental communication has evolved from theoretical frameworks to practical applications, concentrating on environmental journalism, public awareness, and conflict resolution mechanisms. In contrast, China's ecological civilization communication aligns closely with state policies, stressing the creation of a communication system tailored to national specifics, advancing public education, and bolstering the international image. With new media technology advancements, the research emphasis has transitioned towards leveraging these innovations to heighten environmental consciousness and influence behavioral change. Current research inadequately explores strategic assessments of information dissemination mechanisms

and audience behavioral patterns in the new media context. Studies on cognitive and perceptual differences across demographics concerning ecological civilization, and the factors shaping their behaviors, are limited. Additionally, academic investigations into ecological civilization education primarily examine the role of disseminators like educators and administrators, often overlooking the pivotal student perspective necessary for tailoring to their unique characteristics and preferences.

1.2   Research Purpose

From the early 21st century to the present, the process of global environmental governance and sustainable development has been continuously advancing. However, some people still lack environmental awareness, and the process of ecological civilization communication still has significant blind spots [12]. College students, as societal pillars, exhibit a limited grasp of ecological civilization, insufficient action, hindered information flow, and weak environmental awareness. [13-14]. This study aims at elucidate the factors underlying college students' limited engagement in ecological practices and to propose optimized new media communication strategies that resonate with contemporary youth and the zeitgeist. Following this introduction, the rest of the article is organized as follows. First, this study's research methods are outlined, followed by the details of analysis and results. Second, communication strategies with practical implications for the results will be provided and tested in practice. The article ends by pointing out major limitations of the study and direction for relevant future research.

2   Methods

This study aims at explore the dissemination strategies of ecological civilization awareness among Chinese university students in the new media environment. In order to gain a deeper understanding of this phenomenon and propose effective communication strategies, this study adopts an interpretive research philosophy, focusing on understanding individual college students' cognition and attitudes towards the concept of ecological civilization, as well as how they construct and disseminate this awareness under the influence of new media. Qualitative research methods are employed to collect data through open-ended questionnaires and semi-structured interviews, with the goal of discovering and summarizing issues from participants' responses, and subsequently analyzing the data to reveal underlying patterns and strategies. The research design emphasizes understanding and exploration, using the content analysis and thematic analysis to interpret key concepts and patterns in the data.

Convenience sampling is used for sample selection, with the target population being Chinese university students.   Data collection is conducted in August 2023 and lasted for one month, through an online crowdsourcing platform in mainland China, which provides functions equivalent to Amazon Mechanical Turk, [15] recruited 430 participants. The survey questionnaire consisted of three parts: an introduction, personal basic information, and main content. To ensure the authenticity of the survey

data, a small-scale online pretest and offline interviews were conducted after the initial survey was developed. The collected questionnaires were analyzed, and any unreasonable items were removed. Strict adherence to research ethics is maintained throughout the research process to ensure the privacy and information security of participants. The research process is delineated in Figure 1.
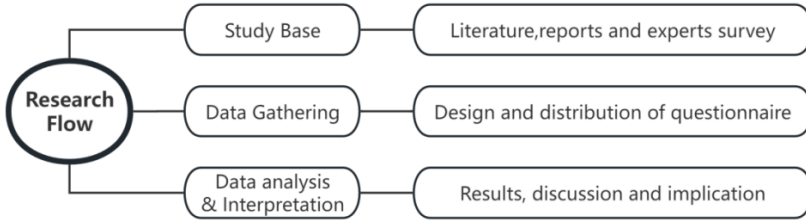
Fig. 1. Research flowchart

3   Analysis and Results

Subsequent to a validation process, a total of 403 participants constituted the final sample, which featured a gender distribution of 51.61% male and 48.39% female, with undergraduates constituting the majority at 55.08%. The data reflects the characteristics of ecological communication among Chinese college students as follows.

New Media Communication

The statistical analysis reveals that, among Chinese university students, new media channels are the predominant source for accessing ecological information, constituting 72.7% of the total, compared to official and traditional non-official media outlets. Furthermore, the primary engagement with ecological topics among surveyed students is through social media, by expressing opinions and creating content. Traditional media offer limited forms and channels, whereas new media's flexible diverse and shared platforms broaden information dissemination and deepen its reach.[16] New media platforms facilitate interactive communication, enabling individuals to voice opinions on ecological issues, thereby enhancing engagement and spurring action.

Current Hot Topics

The survey reveals that college students prioritize issues aligning with personal interests, such as economic, quality of life, health, safety, and happiness—with 67.49% focusing on green economy and sustainable investment, followed by ecological and smart cities. Participants exhibit limited concern for distant natural disasters, focusing primarily on local environmental threats. New media mitigates class and information disparities, rapidly propelling public opinion and creating group effects, enabling topics to rapidly gain attention. Algorithm-driven platforms amplify controversial, emotive, interactive content, reaching wider audiences. For instance, the giant panda,

emblematic of China, is a prominent keyword in conservation discourse with a 38.48% interest rate, resonating with social identity.

Facing Ecological Problems Can Easily Generate Negative Emotions

Over 60% of Chinese college students feel anxious about ecological crises, with 81.79% tense about their severity. Disappointment (55.59%) and aversion (40.26%) arises from handling and causes, respectively, while 52.72% feel fatigue due to the long-term nature of the problem. Most reactions are transient, not affecting daily life, yet 10.92% suffer lasting negative emotions. Negative emotions, represented by anxiety and anger, drive some students to engage in ecological actions. However, another group of students remains inactive due to feelings of powerlessness and despair.

Positive Attitude Towards Ecological Education

Students value ecological education but seek enhanced quality, interesting content, diverse channels, and personalized learning experiences. Some participants suggested that educators should innovate and cater to youth preferences over rigid, mandatory approaches.

Factors of Motivation and Obstacles

Based on the data results, the motivation and obstacles for Chinese university students to engage in ecological actions can be summarized as shown in Table 1. Based on these factors, this paper provides four suggestions combined with the SIPS model (Sympathize-Identify-Participate-Share&Spread Model).

Table 1. Factors of Motivation and Obstacles

Motivation	Obstacles
①A high awareness of the importance of environmental issues and a belief that they are related to personal development. ②A perception of the school and society's emphasis on ecological civilization. ③A sense of responsibility and obligation to participate in relevant actions. ④A willingness to learn more knowledge and share opinions. ⑤A cautious attitude towards media reports but higher satisfaction with government actions. ⑥A clear understanding of sustainable development but a lack of implementation.	①Lack of specific action plans and guidance on capabilities ②Lack of role models and visibility in the surroundings ③Ecological education methods lack interest and do not adapt to the preferences of young people ④Lack of channels for participation and support resources ⑤Low requirements for mandatory enforcement, easy to generate inertia ⑥Individual values are biased towards material enjoyment.

4   Discussion and Implications

The SIPS model was proposed by Dentsu Inc. in 2011 and can reflect the information dissemination mechanism and audience behavior characteristics in the new media environment.[17] The SIPS model outlines four strategies: Sympathize (initial information contact incites user interest and identification), Identify (validates beneficial information and cultivates trust), Participate (fosters active engagement and fortifies connections), and Share & Spread (expands the dissemination of experiences and promotes word-of-mouth). This model accentuates the audience's active participation and interactivity, remedying the shortcomings of conventional linear communication models. This study, informed by the SIPS model, proposes four ecological civilization communication strategies among college students, summarized in the mind map in Figure 2. The degree of acceptance of communication strategies by the audience can be used to evaluate the effectiveness of the strategies.[18] To test the proposed communication strategies, this study surveyed 384 Chinese college students using the Likert scale. Results showed high endorsement levels by the participants, affirming the strategies' reliability (Data results can be found in Appendix Table 2).
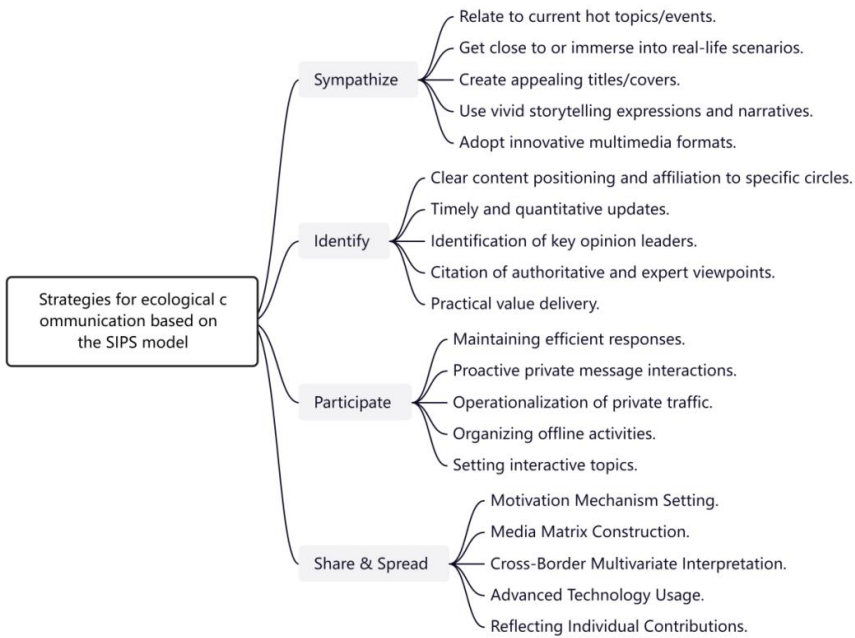

Fig. 2. Mind map 4-1 Ecological communication strategies under the SIPS model

Sympathize

As the initial stage of the SIPS model, attracting users' attention and arousing emotional resonance is crucial. Content related to current hot topics and events is more appealing. The implicit characteristics of hot public opinion information can trigger users' empathy, which is an important factor in triggering the spread of public opinion

information.[19] Furthermore, real-world immersion through relatable topics rapidly reducing psychological distance, stimulating active user engagement by generating a sense of identification and ecological crisis awareness. In the new media era, content is a critical node for information transmission and value shaping. Ecological communication thrives through visual conveyance, textual articulation, and innovative multimedia presentations. Engaging titles and cover content are essential to capture the immediate attention. Platforms like Instagram, YouTube, and TikTok, which prioritizes visual content, vividly illustrate ecological issues—such as damaged landscapes and polluted rivers—thereby igniting emotional resonance and concern for such matters. Moreover, fresh, vibrant, and original language styles are the correct approach to mediated expression, with storytelling and narrative engagingly conveying values through contextualized, humanized accounts.[20] This not only makes ecological knowledge accessible but also weaves narratives that evoke cultural empathy, creating works that are informative, aesthetically pleasing, artistic, and philosophical.[21] Lastly, innovative multimedia forms that combine text, images, and videos cater to the diverse interests of college students, offering a rich tapestry of visual and auditory content.

Identify

Following initial Sympathize, users seek information to solidify and deepen their attitudes, making value affirmation and trust generation crucial. Based on the communication attribute of social media chain, the radiation of the influence of new media content has a strong circle characteristic.[22] University students' online interactions create distinct informational ecosystems. Ecological content creation must identify with these student spheres.[23] Feedback from this study's participants indicates that the "Generation Z" media evolution offers fresh opportunities for ecological communication. All organizations, including governments, universities, and businesses, should focus on crafting media images that appeal to students, prioritizing content quality, creativity, and value to maintain their interest and support for ecological initiatives. Media publishers can enhance students' identification with and trust in ecological efforts through regular content updates, thereby solidifying media presence and loyalty. Leveraging key opinion leaders and authoritative expert perspectives can amplify outreach and convey the practical benefits of ecological civilization, ensuring students perceive the tangible value and personal gains from engaging with ecological topics.

Participate

In the new media era, the creation, dissemination, and reception of information has dramatically changed, fostering immediate interaction between communicators and audiences. College students are no longer passive, one-way recipients of information. [24] They engage with content creators on media platforms through direct communication, such as commenting and private messaging. Content creators can encourage further interaction by responding promptly, initiating private conversations, and setting interactive agendas. This prompts followers to participate in discussions, express

their views on ecological issues, and even create and share original and derivative content, facilitating secondary dissemination. Positive feedback during participation enhances their identification and enthusiasm, strengthening emotional ties with students. Beyond individual interactions, managing private group traffic on media platforms amplifies the collective impact on ecological civilization engagement. Organizing offline events reinforces both online and offline dynamics, providing action plans and skill guidance, along with ecological role models and opportunities for engagement, thus spurring actual ecological involvement.

Share & Spread

User-generated recommendations and feedback influence the behavior of others through extended channels of communication and sharing, reaching a wider audience through secondary dissemination. Following Maslow's hierarchy of needs, tangible material rewards, such as small gifts given for rewarded sharing and participation, as well as intangible personal contributions and recognition of intrinsic value, respectively fulfill the needs of deficiency and growth, motivating college students to participate in ecological activities and share their experiences. [25] The burgeoning of new media channels diversifies exposure to ecological content, engaging a broader audience. This interdisciplinary nexus of ecology intersects with diverse cultures, fostering a synergy that propels innovative engagement and affinity for ecological ideologies. Enhanced messaging resonance deepens penetration of mainstream ecological thought. Customized sub-channels within a new media matrix address college students' preferences and optimize content dissemination through platform-specific strategies, broadening the sharing scope. The expansion of new media technologies facilitates the multifaceted curation and dissemination of ecological data. Utilizing advanced analytics and AI, these tools are pivotal in sentiment analysis and forecasting. Additionally, immersive technologies like VR and VI diversify students' ecological engagement, promoting content sharing.

5   Conclusion

This research examines ecological civilization awareness and engagement among 403 Chinese university students within the new media landscape, utilizing surveys and interviews. Results indicate that new media serves as a primary source of ecological information, with a trend towards personalized, interactive dissemination centered on topical issues and practical relevance. Analysis of survey data reveals factors influencing student participation and barriers encountered. From these findings, the study proposes the SIPS model (Sympathize-Identify-Participate-Share&Spread Model). As a strategic framework for communicating ecological civilization in the new media context. Empirical validation suggests these strategies are effective to a degree, underscoring that aligning content with students' interests and media habits enhances resonance and engagement. This research offers foundational insights for strategy development in ecological civilization communication, meriting further investigation to bolster ecological involvement among university students and the broader society.

This study acknowledges certain limitations that suggest directions for future research. The initial survey's limited random sample may not adequately represent a broader population. Constraints on the author's resources and energy could affect the selection and persuasiveness of the sample and interviewees. Future research should consider a more systematic sampling across various universities and regions to gain a comprehensive understanding of the ecological cognition and its influencing factors among Chinese university students, which would aid in devising targeted strategies. Moreover, an in-depth examination of the motivations and barriers to the student engagement in ecological initiatives is warranted, with potential for cross-cultural studies to contrast these dynamics with students from other nations, thereby elucidating ecological value transmission across diverse cultural contexts.

The study employed the SIPS model from Japan's Dentsu Inc. to propose strategies for communicating ecological civilization to university students in the new media landscape. However, the application of this theoretical framework was limited to the latter stages of the research and was not thoroughly integrated into the initial stages, leaving the model's theoretical potential underexplored. With the evolving landscape of media communication research, future studies could investigate the impact of media in varied contexts on the dissemination of ecological civilization awareness, concepts, and education. Additionally, it is imperative to empirically test strategies to confirm their effectiveness in different scenarios. For instance, implementing the SIPS strategy in a specific university and monitoring its impact, while refining the approach based on feedback. Research could also broaden to include other demographics, such as schoolchildren and rural and urban residents, to study ecological communication strategies across groups and conduct longitudinal studies to assess the long-term effects of these strategies and their contributions to the advancement of ecological civilization.

The construction of ecological civilization necessitates the collaborative participation of all societal sectors and actors to ensure its principles resonate deeply and foster sustainable development. This research predominantly examines college students, suggesting future studies should investigate how different societal actors contribute to the propagation and establishment of ecological civilization. For instance, at the governmental level, a guiding framework for entities could be established, alongside clearer policies and directives for ecological communication. Investment in ecological dissemination, including financial and technical support, is crucial, as is the creation of an evaluation mechanism to oversee and enhance these efforts.[26] Universities could augment ecological education and facilitate practical experiences at the social level, while businesses might engage in campus ecological initiatives and leverage shared resources for communication. The media should amplify ecological coverage to shape public discourse. Additionally, the potential for school-corporate co-construction mechanisms warrants exploration, assessing how corporate resources could aid in campus ecological efforts. At the industry level, new media platforms could refine ecological content recommendations and dissemination, with ecological institutions innovating products and services. Non-profit organizations could drive community-based ecological communication. The application of emerging technolo-

gies like AR/VR and artificial intelligence to create compelling ecological communication tools also offers a promising avenue for exploration.

Appendix

Table 2. Test data results of ecological communication strategies under the SIPS model

		Identity (average)	Cronbach α	Commonality (Common Cause Variance)
Sympathize	Relate to current hot topics/events.	3.65		0.666
	Get close to or immerse into real-life scenarios.	3.6		0.626
	Create appealing titles/covers.	3.62	0.888	0.676
	Use vivid storytelling expressions and narratives.	3.67		0.714
	Adopt innovative multimedia formats.	3.74		0.658
Identify	Clear content positioning and affiliation to specific circles.	3.41		0.714
	Timely and quantitative updates.	3.47		0.698
	Identification of key opinion leaders.	3.51	0.908	0.727
	Citation of authoritative and expert viewpoints.	3.43		0.714
	Practical value delivery.	3.42		0.735
Participate	Maintaining efficient responses	3.42		0.714
	Proactive private message interactions	3.41		0.711
	Operationalization of private traffic	3.42	0.911	0.750
	Organizing offline activities	3.44		0.713
	Setting interactive topics	3.52		0.742
	Motivation Mechanism Setting	3.43		0.722
Share	Media Matrix Construction	3.44		0.724
	Cross-Border Multivariate Interpretation	3.48	0.902	0.753
	Advanced Technology Usage	3.53		0.694
	Reflecting Individual Contributions	3.43		0.728
Total		3.502 *	0.927 *	
KMO			0.933	
Bartlett		Approximate chi square		4718.428
		df		190
		p		0.000

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