

Integrating SDGs into Chinese Higher Education: Practices and Insights

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Abstract: *This study systematically examines the integration of Sustainable Development Goals (SDGs) in Chinese higher education, with the primary objective of identifying prevalent implementation models, key drivers, and persistent challenges. Through a systematic literature review of publications from 2020 to 2024, the research analyzes institutional practices across curriculum design, research alignment, and campus operations. Findings reveal three dominant integration approaches: curriculum innovation through embedded pedagogical methods, research prioritization aligned with national strategies such as clean energy, and campus operationalization as "living laboratories." While strong policy directives and international rankings serve as significant drivers, implementation faces challenges including disciplinary barriers, resource disparities, and inadequate assessment mechanisms. The study concludes by highlighting a distinctive "Chinese model" of SDG integration characterized by tight policy-institution alignment, offering practical insights for enhancing sustainability strategies in higher education systems.*

Keywords: Sustainable Development Goals (SDGs); Chinese Universities; Curriculum; Green Campus; Teaching and Learning

1. Introduction

1.1 Background

The 2030 Agenda for Sustainable Development, with its 17 Sustainable Development Goals (SDGs), has established a comprehensive global framework for addressing humanity's most pressing challenges (United Nations General Assembly, 2015). Higher education institutions (HEIs) globally are recognized as critical actors in this endeavor, tasked with generating knowledge, fostering critical thinking, and cultivating future leaders capable of driving sustainable transformations (Chankseliani & McCowan, 2023). The integration of SDGs into the core functions of universities—teaching, research, and operations—has thus become a significant indicator of institutional relevance and responsibility in the 21st century (UNESCO & International Association of Universities, 2023).

The 17 SDGs constitute an integrated and indivisible agenda, encompassing a wide range of thematic areas from poverty eradication (Goal 1) and zero hunger (Goal 2) to quality education (Goal 4), climate action (Goal 13), and partnerships for the goals (Goal 17), collectively aiming to balance the three dimensions of sustainable development: economic, social, and environmental (United Nations, 2015). The complete list of goals, as formally adopted by the United Nations, is systematically presented in Table 1.

Table 1: The 17 Sustainable Development Goals (SDGs)

SDG Number	Goal Title	Key Focus Areas
1	No Poverty	Eradicating extreme poverty, ensuring social protection systems.
2	Zero Hunger	Ending hunger, achieving food security, promoting sustainable agriculture.
3	Good Health and Well-being	Ensuring healthy lives and promoting well-being for all ages.
4	Quality Education	Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities.
5	Gender Equality	Achieving gender equality and empowering all women and girls.
6	Clean Water and Sanitation	Ensuring availability and sustainable management of water and sanitation.
7	Affordable and Clean Energy	Ensuring access to affordable, reliable, sustainable, and modern energy.
8	Decent Work and Economic Growth	Promoting sustained, inclusive, and sustainable economic growth and employment.
9	Industry, Innovation and Infrastructure	Building resilient infrastructure, promoting inclusive and sustainable industrialization.
10	Reduced Inequalities	Reducing inequality within and among countries.
11	Sustainable Cities and Communities	Making cities inclusive, safe, resilient, and sustainable.
12	Responsible Consumption and Production	Ensuring sustainable consumption and production patterns.
13	Climate Action	Taking urgent action to combat climate change and its impacts.
14	Life Below Water	Conserving and sustainably using the oceans, seas, and marine resources.
15	Life on Land	Protecting, restoring, and promoting sustainable use of terrestrial ecosystems.
16	Peace, Justice and Strong Institutions	Promoting peaceful and inclusive societies, providing access to justice.
17	Partnerships for the Goals	Strengthening implementation means and revitalizing the Global Partnership.

The Chinese context provides a particularly compelling case for examining this integration. The national strategic frameworks of "Ecological Civilization" and the "Dual Carbon" goals (peaking carbon emissions before 2030 and achieving carbon neutrality before 2060) have created a powerful, top-down impetus for sustainable development across all sectors (State Council, 2021). This national agenda is deeply intertwined with the development of higher education. Initiatives such as the "Double First-Class" construction explicitly encourage universities to enhance their social service capabilities and contribute to national strategic needs (Ministry of Education et al., 2017). Consequently, Chinese universities are operating within a unique policy environment that strongly incentivizes the alignment of their activities with sustainability principles, making them fertile ground for investigating the practical realization of the SDGs in higher education (Li & Wang, 2024). Early evidence suggests a surge in activities, from green campus initiatives to the development of sustainability-focused curricula, indicating a proactive response to these dual drivers of global agenda and national policy.

1.2 Research Problem

Despite the conducive policy environment and visible activity, a significant gap exists in the systematic understanding of how SDG integration is actually unfolding within Chinese universities. Existing literature often focuses on macro-level policy analysis or showcases isolated success stories, leaving a fragmented picture of the overall landscape (Wang & Wang, 2023). There is a lack of a synthesized analysis that systematically identifies the predominant

modes of integration, critically examines the drivers beyond policy mandate, and investigates the pervasive challenges that hinder deeper, more systemic implementation.

Key unanswered questions include: How is SDG integration prioritized across different university functions? What are the tangible outcomes of these initiatives beyond symbolic commitment? What disparities exist between leading institutions and the broader higher education sector? And crucially, how do universities navigate the potential tensions between global SDG targets and localized national priorities? Addressing these questions is essential to move beyond anecdotal evidence and develop a nuanced understanding of the realities of SDG integration in one of the world's largest higher education systems.

1.3 Research Questions

- RQ1: What are the predominant models and specific practices of SDG integration currently employed in Chinese universities, particularly in the domains of curriculum design, research prioritization, and campus operations?
- RQ2: What are the key drivers that influence the adoption and implementation of SDG-related initiatives in Chinese higher education? These drivers primarily encompass policy mandates, institutional leadership decisions, and internationalization strategies.
- RQ3: What are the major challenges and barriers that hinder the deep and systemic integration of SDGs in Chinese universities? These obstacles are primarily manifested in resource constraints, difficulties in interdisciplinary collaboration, and limitations in impact assessment mechanisms.
- RQ4: Based on the identified practices, drivers, and challenges, what evidence-based recommendations can be proposed for universities and policymakers to enhance the effectiveness and sustainability of SDG integration strategies?

1.4 Significance of the Study

The findings of this research are expected to hold significance for both theory and practice. Theoretically, it will contribute to the growing body of literature on Education for Sustainable Development (ESD) by providing an empirical case study from the Chinese context, potentially revealing new insights into the interplay between global norms and national policy in shaping university behavior. It seeks to test and potentially refine existing models of SDG integration in non-Western contexts.

Practically, the study offers valuable insights for university leaders, administrators, and faculty in China and similar contexts. By delineating effective practices and highlighting common pitfalls, it can serve as a guide for strategic planning and resource allocation. For policymakers, the analysis of drivers and challenges can inform the design of more supportive and effective policy instruments. Finally, for the international community, understanding the Chinese experience can foster cross-cultural learning and collaboration in the global pursuit of the SDGs.

2. Literature Review

2.1 Theoretical Foundations of ESD and SDG Integration

Education for Sustainable Development (ESD) provides the primary theoretical framework for integrating Sustainable Development Goals (SDGs) in higher education. UNESCO (2023) defines ESD as a transformative approach that empowers learners to make informed decisions and take responsible actions for environmental integrity, economic viability, and a just society. This approach emphasizes developing sustainability competencies, including systems thinking,

anticipatory reflection, and collaborative problem-solving, which align directly with the interdisciplinary nature of the SDGs (Kioupi & Voulvoulis, 2023).

The "whole-institution approach" has emerged as a dominant theoretical model, suggesting that effective SDG integration requires simultaneous transformation across curriculum, research, campus operations, and community engagement (Leal Filho et al., 2023). This comprehensive framework recognizes that universities must align their educational mission with their operational practices to create authentic learning environments for sustainability.

2.2 Global Trends in Higher Education SDG Implementation

Globally, universities are implementing diverse strategies for SDG integration. The Times Higher Education (THE) Impact Rankings have significantly influenced institutional approaches, encouraging systematic mapping of SDGs against university activities (THE, 2024). Leading institutions now regularly assess their research output, educational programs, and operational policies against specific SDG targets.

Curriculum innovation represents a major focus area. Universities are moving beyond creating standalone sustainability courses to embedding SDGs across disciplines through interdisciplinary modules and problem-based learning (Li et al., 2024). Simultaneously, the "campus as a living lab" approach has gained prominence, using university infrastructure as testbeds for sustainability solutions in energy management, waste reduction, and carbon neutrality initiatives (Abad & Zhang, 2024).

2.3 The Chinese Policy Context and Institutional Responses

China's distinct policy environment creates unique conditions for SDG integration in higher education. The national "Ecological Civilization" and "Dual Carbon" goals provide a strong strategic directive that aligns with multiple SDGs, particularly those addressing climate action, sustainable cities, and responsible consumption (State Council, 2021). The "Double First-Class" initiative further reinforces this alignment by linking institutional development with national strategic priorities, including sustainability (Ministry of Education, 2017).

In response, Chinese universities have developed characteristic implementation patterns. The "Green University" concept has evolved into a comprehensive framework addressing campus ecology, resource conservation, and sustainability education (Ding & Li, 2023). Research shows increasing publication output in SDG-related fields, particularly renewable energy and environmental engineering, indicating growing academic engagement with sustainability challenges (Zhang & Liu, 2024).

2.4 Research Gaps and Theoretical Framework

Despite growing literature, significant gaps remain in understanding SDG integration in Chinese higher education. First, most studies focus on individual case examples rather than developing systematic typologies of implementation models (Zhou & Yang, 2024). Second, research often emphasizes policy drivers while underrepresenting other factors like institutional leadership and international collaboration. Third, there is limited critical analysis of implementation challenges, particularly regarding interdisciplinary barriers and impact measurement (Liu, 2024).

This study addresses these gaps by examining both the practices and challenges of SDG integration through the theoretical lens of the whole-institution approach. The analysis

specifically investigates how global frameworks are adapted within China's distinctive policy context and institutional environment.

3. Research Methodology

3.1 Research Design

This study adopts a qualitative research design, specifically utilizing a systematic literature review methodology to investigate the integration of Sustainable Development Goals (SDGs) in Chinese higher education. This approach is selected for its efficacy in synthesizing existing knowledge, identifying research trends, and delineating conceptual frameworks within a defined field (Snyder, 2019). The design is structured to provide a comprehensive analysis of peer-reviewed literature, policy documents, and institutional reports published between 2020 and 2024, ensuring the inclusion of the most current developments and policy directions.

3.2 Data Collection Methods

Data collection was conducted through a systematic search of major academic databases, including Scopus, Web of Science, and CNKI (China National Knowledge Infrastructure). The search strategy employed a combination of keywords related to "Sustainable Development Goals," "higher education," "universities," "China," and "integration." The initial search yielded over 200 potential sources, which were subsequently screened based on predefined inclusion and exclusion criteria.

Inclusion criteria focused on: (1) literature explicitly discussing SDG integration activities within Chinese universities; (2) articles published in English or Chinese between 2020-2024; and (3) sources providing empirical or conceptual insights into practices, drivers, or challenges. Exclusion criteria removed editorials, simple news reports, and studies not specifically focused on the Chinese context. This process resulted in a final corpus of 38 peer-reviewed journal articles, 5 key policy documents from the Chinese Ministry of Education and State Council, and 10 institutional reports from leading Chinese universities, which formed the basis for the thematic analysis.

3.3 Data Analysis

The data analysis followed a thematic analysis approach, as outlined by Braun and Clarke (2006). The process involved a systematic coding of the collected literature to identify recurring themes and patterns. The analysis proceeded in three primary phases. First, an initial coding process was conducted to identify basic concepts and ideas related to SDG implementation. Second, these initial codes were grouped into potential themes, such as "curricular integration models," "operational challenges," and "policy drivers." Finally, the themes were reviewed and refined to ensure they formed a coherent pattern relative to the coded extracts and the entire dataset. This iterative process allowed for the identification of core practices, drivers, and challenges, which are presented and discussed in the subsequent chapter. The rigorous and transparent methodology employed ensures the reliability and validity of the findings, providing a solid foundation for understanding the current state of SDG integration in Chinese higher education.

4. Findings and Discussion

4.1 Integration Models and Practices of SDGs in Chinese Universities

4.1.1 Curricular Integration and Pedagogical Innovation

Chinese universities have developed systematic approaches to integrate SDGs into curriculum design. Leading institutions such as Tsinghua University and Zhejiang University have established mandatory sustainability literacy courses for all undergraduates, focusing on interdisciplinary understanding of SDG interlinkages (Li & Wang, 2024). These courses employ case-based learning methodologies centered on China's "Ecological Civilization" construction, enabling students to analyze sustainability challenges within local contexts. Furthermore, disciplinary programs have incorporated SDG-aligned content through specialized modules - for instance, engineering curricula now include sustainable design principles while business schools emphasize social entrepreneurship and circular economy models (Zhang et al., 2023).

The pedagogical approaches show significant innovation through project-based learning initiatives. At Fudan University, students participate in "SDG Innovation Labs" where they collaborate with local communities to develop solutions for urban sustainability challenges, particularly addressing SDG 11 (Sustainable Cities) and SDG 12 (Responsible Consumption). Similarly, Beijing Normal University has implemented service-learning programs that connect academic learning with community engagement, fostering both conceptual understanding and practical implementation skills (Chen & Liu, 2024).

4.1.2 Research Integration and Knowledge Production

Research activities demonstrate strong alignment with national strategic priorities, particularly SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action). Analysis of research output from 2020-2024 indicates a 150% increase in SDG-related publications, with concentrated efforts in renewable energy technologies, carbon capture methodologies, and sustainable urban planning (Wang & Zhou, 2024). This research focus reflects the influence of China's "Dual Carbon" goals and demonstrates how national policy directives shape academic research agendas.

Interdisciplinary research centers have emerged as key organizational structures for SDG implementation. For example, Tongji University's "Institute of Sustainable Development" brings together researchers from engineering, social sciences, and design disciplines to address urban sustainability challenges. These centers facilitate knowledge co-production with government agencies and industry partners, ensuring research relevance and practical impact (Gao & Li, 2023). However, the research integration remains predominantly focused on technological solutions, with relatively less emphasis on the social dimensions of sustainable development.

4.1.3 Campus Operations as Living Laboratories

Chinese universities are increasingly utilizing their campuses as experimental sites for sustainability innovations. Shanghai Jiao Tong University's "Green Campus Initiative" has implemented comprehensive energy monitoring systems that reduce energy consumption by 25% while serving as research infrastructure for engineering students (Deng & Wang, 2024). Similarly, Huazhong University of Science and Technology has transformed its campus into a testbed for smart grid technologies, integrating renewable energy sources and energy storage systems.

Sustainable campus management extends beyond infrastructure to include behavioral interventions. Multiple universities have implemented "green passport" programs that track and incentivize sustainable behaviors among students and staff. These programs integrate educational components with operational management, creating synergistic learning opportunities while reducing environmental impacts (Liu & Yang, 2023). The physical campus thus becomes both the subject and object of sustainability education, embodying the "whole-institution" approach advocated in ESD literature.

4.2 Driving Mechanisms for SDG Integration

4.2.1 Policy Drivers and Institutional Response

National policies serve as the primary driver for SDG integration in Chinese higher education. The "Double First-Class" construction policy explicitly links institutional funding and evaluation with contributions to national strategic priorities, including sustainability goals (Ministry of Education, 2023). This has prompted universities to establish dedicated sustainability offices and incorporate SDG indicators into institutional development plans. The policy framework creates a top-down impetus that ensures institutional commitment and resource allocation for SDG initiatives.

At the institutional level, university leadership has played a crucial mediating role in translating national policies into concrete actions. Presidents and vice-presidents increasingly champion sustainability initiatives, with many institutions appointing senior administrators specifically responsible for sustainable development. This high-level commitment facilitates cross-departmental coordination and ensures that SDG integration receives adequate attention and resources (Wei & Zhang, 2024).

4.2.2 Internationalization and Global Engagement

International university rankings, particularly the Times Higher Education Impact Rankings, have created competitive incentives for SDG integration. Chinese universities are increasingly strategic in documenting and reporting their SDG contributions to enhance international visibility and reputation (THE, 2024). This has led to improved monitoring and evaluation systems, though it also risks encouraging "ranking-driven" rather than "impact-driven" approaches.

Participation in global networks such as the International Sustainable Campus Network (ISCN) and regional initiatives like the ASEAN University Network provides platforms for exchanging best practices. Chinese universities actively learn from international peers while also contributing their experiences, particularly regarding large-scale implementation and policy alignment (Xu & Li, 2023). This two-way knowledge exchange enriches both Chinese and global approaches to SDG integration in higher education.

4.3 Challenges in SDG Implementation

4.3.1 Structural and Resource Constraints

Despite progress, significant challenges persist in achieving deep and systemic SDG integration. The disciplinary organization of universities creates barriers to interdisciplinary collaboration essential for addressing complex sustainability challenges. Traditional departmental structures and promotion criteria often discourage faculty from engaging in cross-disciplinary SDG initiatives (Zhou & Wang, 2024). Additionally, limited funding for sustainability initiatives constrains the scaling of successful pilot projects, with many programs relying on soft funding rather than institutional budgets.

Resource allocation patterns reveal persistent inequalities between well-resourced "Double First-Class" universities and regional institutions. Leading universities benefit from substantial government funding and international partnerships, while less prestigious institutions struggle to implement basic sustainability measures (Feng & Chen, 2024). This creates a two-tier system that threatens to widen existing educational inequalities while limiting the overall national impact of SDG integration efforts.

4.3.2 Measurement and Evaluation Challenges

Universities face difficulties in assessing the actual impact of their SDG initiatives. Current evaluation systems prioritize quantifiable outputs such as publications and patents over more meaningful but harder-to-measure outcomes like behavioral change or community impact (Hu & Deng, 2024). The absence of standardized impact assessment methodologies makes it difficult to compare effectiveness across institutions or track progress over time.

Furthermore, there is tension between comprehensive SDG integration and selective reporting for ranking purposes. Some institutions focus their efforts on a few "high-scoring" SDGs rather than pursuing balanced integration across all goals (THE, 2024). This strategic behavior potentially undermines the holistic spirit of the 2030 Agenda while creating distorted incentives for institutional practice.

4.4 Discussion: Towards a Chinese Model of SDG Integration

The findings reveal a distinctive Chinese approach to SDG integration characterized by strong policy alignment, systematic institutional response, and emphasis on technological solutions. This model differs from Western approaches in its tighter coupling between national priorities and institutional actions, enabled by China's centralized governance structure. The policy-driven approach facilitates rapid implementation at scale but may limit bottom-up innovation and local adaptation.

The integration patterns reflect China's development stage and political context, with greater emphasis on environmental SDGs aligned with "Ecological Civilization" than on social dimensions like reduced inequalities. This selective emphasis illustrates how global frameworks are adapted to local priorities through processes of "Vernacularization" where universal goals are interpreted through specific national lenses (Liu & Wei, 2024).

The challenges identified—particularly regarding interdisciplinary collaboration, equitable resource distribution, and impact assessment—highlight areas requiring further attention. Addressing these challenges will be crucial for moving from symbolic adoption to transformative integration that advances both China's national sustainable development goals and the global 2030 Agenda.

5. Recommendations

5.1 For University Administrators

University leaders should develop comprehensive SDG integration strategies that move beyond symbolic adoption toward transformative institutional change. Specifically, institutions should establish clear governance structures for sustainability initiatives, such as appointing chief sustainability officers and creating interdisciplinary committees with representatives from all academic units (Wei & Zhang, 2024). Resource allocation must be aligned with strategic priorities, with dedicated funding for curriculum development, interdisciplinary research centers, and campus sustainability projects. Promotion and tenure criteria should be revised to

recognize and reward interdisciplinary collaboration and community-engaged research that addresses SDG challenges, moving beyond traditional publication metrics to acknowledge broader impact (Gao et al., 2023).

5.2 For Academic Staff

Faculty should actively develop and implement innovative pedagogical approaches that foster sustainability competencies through experiential and problem-based learning. This includes creating opportunities for students to engage with real-world sustainability challenges through community partnerships and campus projects (Huang & Zhao, 2024). Departments should establish regular interdisciplinary forums where faculty from different disciplines can identify shared research interests and develop collaborative proposals addressing complex sustainability issues. Additionally, academic staff should leverage their professional networks to establish international research collaborations that bring global perspectives to local sustainability challenges, while also documenting and publishing their innovative teaching practices to contribute to the broader knowledge base on Education for Sustainable Development (Li & Chen, 2023).

5.3 For Policymakers

Government agencies should develop more nuanced funding mechanisms that support both comprehensive SDG integration and targeted excellence. The "Double First-Class" evaluation criteria should incorporate qualitative indicators of SDG contribution alongside traditional research metrics, giving weight to community impact and interdisciplinary collaboration (Ministry of Education, 2023). Policy frameworks should specifically address regional disparities through targeted funding programs that enable less-resourced institutions to develop their capacity for SDG integration. National research funding agencies should create dedicated programs for interdisciplinary sustainability research that require collaboration between natural sciences, social sciences, and humanities, with explicit links to specific SDG targets and indicators (Zhou & Liu, 2024).

Limitations

This study is subject to several constraints that warrant consideration. Primarily, its reliance on published literature and institutional reports may inadvertently prioritize formal, documented initiatives, potentially overlooking informal or emergent practices related to SDG integration (Feng & Yang, 2024; Kioupi et al., 2023). Furthermore, the analytical focus on leading Chinese universities might overrepresent successful cases, limiting the generalizability of findings across the broader, more diverse landscape of higher education institutions (Deng & Wang, 2023; Larrán Jorge et al., 2022).

Future Research

To address these limitations and advance the field, several avenues for future inquiry are proposed. Methodologically, mixed-methods approaches incorporating surveys, interviews, and ethnographic observation are recommended to capture a more comprehensive spectrum of SDG-related activities (Feng & Yang, 2024; Leal Filho et al., 2023). Empirically, research should expand to include regional and teaching-focused institutions to better understand contextual variations (Deng & Wang, 2023; Bautista-Puig et al., 2022). The adoption of longitudinal designs is crucial to track the evolution of SDG integration and assess its long-term impacts on institutional culture and community development. Comparative international studies could illuminate how different national contexts shape implementation strategies (Xu & Ma, 2024; Vaughter, 2022). Finally, there is a pressing need to develop and validate robust, multi-dimensional assessment frameworks capable of measuring the transformative, rather

than merely quantitative, impacts of university contributions to the SDGs (Zhang & Huang, 2024; Bhowmik et al., 2023).

6. Conclusion

The integration of Sustainable Development Goals in Chinese higher education represents a significant opportunity to align academic missions with pressing societal needs. The distinctive Chinese approach—characterized by strong policy alignment, systematic institutional response, and emphasis on technological solutions—has generated considerable momentum while facing persistent challenges. By addressing these challenges through the recommendations outlined above, Chinese universities can deepen their contributions to both national sustainable development priorities and the global 2030 Agenda. Ultimately, the success of SDG integration will be measured not by the number of sustainability initiatives undertaken, but by the ability of higher education institutions to foster the knowledge, skills, and values needed to create a more just, prosperous, and sustainable future.

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Conflict of Interest

The authors hereby declare that no known competing financial interests or personal relationships exist that could have influenced the work reported in this paper.

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