

Significance, Plight and Strategy of Eco-Civilization Cultivation in Colleges and Universities for the New Era

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Abstract:

Colleges and universities undertake the important tasks of talent fostering, scientific research, cultural inheritance and innovation, and service for the society. In the new era ahead, eco-civilization cultivation is a requisite for colleges and universities to promote eco-civilization construction and to create a harmonious campus. By building an indicator system for evaluating satisfaction with eco-civilization cultivation services in colleges and universities, which comprises 4 primary indicators (understanding of eco-civilization, satisfaction with textbooks, satisfaction with teachers, and satisfaction with eco-education activities) and 16 secondary indicators, this study has singled out 6 universities in Fuzhou as the research subjects, and harnessed grey relational analysis to dig into the difficulties faced by colleges and universities in promoting eco-civilization cultivation and the underlying causes. In response to the government's realistic concerns over eco-civilization construction and the pressing need to achieve sustainable socioeconomic development, colleges and universities must effect a fundamental shift in the goals of eco-civilization cultivation, innovate both the education carriers and the collaborative promotion model, and bolster the revival and expansion of eco-civilization cultivation in colleges and universities with a fresh approach.

Keywords: *Eco-civilization cultivation, Plight, Grey relational analysis, Strategy.*

I. INTRODUCTION

COVID-19 has been rampaging through the world since 2020, causing extensive damage to the lives and health of people across the globe. Although its pathogenesis and origin are still being studied and traced, it is beyond doubt closely related to the abnormal human contact with wild animals and the predatory, excessive exploitation of our nature. Attaching great importance to eco-civilization construction, the Chinese government has put forward a string of new concepts, new ideas and new strategies in recent

years in addition to its drive to constantly enrich and polish up its unique philosophy of eco-civilization. As a pivotal platform for implementing China's strategies of "rejuvenating the country through science and education" and "achieving sustainable development", colleges and universities enjoy inherent advantages and play an indispensable role in eco-civilization construction. Moreover, young college students with active mindset and strong receptivity are the foremost force undergirding eco-civilization construction, and they should hold high the banner of constructing socialist eco-civilization with Chinese characteristics [1].

II. VALUE AND SIGNIFICANCE OF PROMOTING ECO-CIVILIZATION CULTIVATION IN COLLEGES AND UNIVERSITIES IN THE NEW ERA

2.1 It's a Requisite for Colleges and Universities to Promote Eco-Civilization Construction and to Create a Harmonious Campus

By strengthening eco-civilization cultivation, colleges and universities can help teachers and students improve their ecological awareness, ecological attitude and understanding of ecological legislations, thereby eradicating disharmonious factors on the campus, achieving the harmonious coexistence between man and nature and between students on campus [2], setting a stellar example of eco-civilization construction for the whole society, and contributing to the dissemination and popularization of green technology, green knowledge and green culture in the whole society.

2.2 It's the Endogenous Demand of College Students in Seeking All-round Development

Eco-civilization cultivation is the endogenous demand of college students in seeking all-round development. The time at college is not only a golden period for young students to grow their bodies and to acquire professional knowledge, but also a critical period for them to develop a proper outlook on the world, life and values. By cultivating college students into high-quality talents with both deep expertise and strong awareness of eco-civilization, we can guide them to become the fresh troops spreading and practicing eco-civilization. This is of great and far-reaching significance for ensuring the smooth progress of the national cause of eco-civilization construction and the accomplishment of the corresponding goals.

2.3 It Provides a Solid Basis for Comprehensive Regional Governance

Cultivating and improving citizens' eco-civilization awareness is not only a fundamental task of socialist eco-civilization cultivation, but also the key to improving regional governance capabilities. Placing emphasis on citizens' perception, understanding and thinking of ecological issues, eco-civilization cultivation attempts to help citizens build their political identity and then establish a high degree of consciousness of and confidence in their ecological citizenship. This is conducive to transforming the advantages of regional eco-civilization system into the comprehensive strength in eco-civilization construction [3], which would in turn help constantly beef up the efficiency of regional governance.

III. DIFFICULTIES FACED BY COLLEGES AND UNIVERSITIES IN PROMOTING ECO-EDUCATION: A SURVEY SAMPLE CONSISTING OF 6 COLLEGES AND UNIVERSITIES IN FUJIAN PROVINCE, CHINA

3.1 Questionnaire Design

Through literature review and the analysis of realistic situations in colleges and universities, this study first identified the test indicators for initial screening and then qualitatively disaggregated these indicators into four dimensions: understanding of eco-civilization, satisfaction with textbooks, satisfaction with teachers, and satisfaction with eco-education activities). Specifically, students' perception of the connotations of eco-civilization and the connections between eco-civilization and the country/individual falls under the dimension of "understanding of eco-civilization" to evaluate students' understanding of the connotations, significance and role of eco-civilization; student's perception of the difficulty level, logical structure, case application and language style of textbooks for eco-civilization cultivation falls under the dimension of "satisfaction with textbooks" to evaluate students' feelings about and satisfaction with the textbooks; Students' satisfaction with teachers' teaching attitude, expertise and interaction with students as well as the practicality and enlightenment of the course falls under the dimension of "satisfaction with teachers" to evaluate students' acceptance of teachers and their teaching styles; students' satisfaction with the participation, experience, and frequency of eco-civilization cultivation activities falls under the dimension of "satisfaction with eco-education activities" to evaluate students' satisfaction with the eco-civilization practical activities and the associated after-school activities organized by the school. In order to quantify the survey results, students were asked to answer each question through a five-point scale (from high to low: 5, 4, 3, 2, 1). The details are shown in TABLE I.

3.2 Selection of Survey Subjects and Implementation of the Survey

Adopting the snowball sampling method and upholding the principle of voluntary and anonymous response, we distributed paper questionnaires to college students from 6 colleges and universities in Fuzhou (Minjiang University, Fujian Medical University, Fujian Normal University, Minjiang Teachers College, Fujian Vocational College of Bioengineering, and Fuzhou Polytechnic), and collected a total of 1,265 valid questionnaires.

3.3 Grey Relational Analysis

In view of the grey characteristics of college students' satisfaction evaluation, we used the grey system evaluation model to obtain the correlation coefficient between the secondary indicator sequence and the corresponding ideal value, thereby smoothing the way for our inquiry into the difficulties faced by colleges and universities in promoting eco-education and the underlying causes.

In the process of system development, if the trends of the two factors are consistent (suggesting high degree of synchronous change), it can be concluded that there is a high correlation between the two;

otherwise, the correlation is low. Grey relational analysis method is a method to measure the degree of correlation between factors according to the degree of similarity or dissimilarity of the development trend between factors (i.e., "grey correlation degree"). The basic steps are as follows [4]:

1. Identify the reference sequence (X_0) that reflects the behavioral characteristics of the system and the comparison sequence (X_i) that affects the behavior of the system.

$$\begin{aligned} X_i &= (x_i(1), x_i(2), \dots, x_i(n)) \quad (i = 1, 2, 3, \dots, m) \\ X_0 &= (x_0(1), x_0(2), \dots, x_0(n)) \end{aligned} \quad (1)$$

2. Assign a value to the scale domains in the questionnaire to obtain the raw data and ideal values of the secondary indicators for evaluating students satisfaction with the eco-civilization cultivation services in colleges and universities, i.e. $V = \{\text{very satisfied, relatively satisfied, generally satisfied, relatively dissatisfied, very dissatisfied}\} = \{5, 4, 3, 2, 1\}$; normalize the reference and comparison sequences to obtain the normalized value $X'_i(q)$ of each indicator, as shown in Equation 2, where $x_i(q)$ represents respondents' average degree of satisfaction with each indicator, and $x_0(q)$ represents the ideal value of each indicator.

$$X'_i(q) = x_i(q) / x_0(q) \quad (i = 1, 2, 3, \dots, m; \quad q = 1, 2, 3, \dots, n) \quad (2)$$

3. Calculation of absolute difference: calculate the difference sequence, the minimum difference and the maximum difference, and then calculate the absolute difference $\Delta_{0i}(q)$ between the comparison sequence X'_i and the reference sequence X'_0 for the corresponding indicator. It's expressed as:

$$\Delta_{0i}(q) = |x'_i(q) - x'_0(q)| \quad (i = 1, 2, 3, \dots, m; \quad q = 1, 2, 3, \dots, n) \quad (3)$$

4. Calculate the grey relational coefficient between the reference sequence and the comparison sequence. It's expressed as:

$$\delta_{0i}(q) = \frac{\Delta(\min) + \rho\Delta(\max)}{\Delta_{0i}(q) + \rho\Delta(\max)} \quad (4)$$

Where $\Delta(\min)$ 、 $\Delta(\max)$ represent the maximum and minimum values respectively of the absolute differences, and ρ represent the distinguishing coefficient ($0 < \rho < 1$). The value range of correlation coefficient $\delta_{0i}(q)$ is (0, 1).

3.4 Results of Empirical Analysis

In this study, distinguishing coefficient of $\rho=0.1$ was used to calculate the correlation coefficient between each secondary indicator and the corresponding ideal value. The calculation results are shown in TABLE I.

TABLE I. Correlation coefficient of secondary indicators for evaluating students' satisfaction with eco-civilization cultivation services in colleges and universities

Primary Indicator	Secondary Indicator	Value	Ideal Value	Normalized Value	Absolute Difference	Correlation Coefficient	Key Indicator
Understanding of eco-civilization	School's overall emphasis on eco-civilization cultivation	2.956	5	0.591	0.409	0.436	Yes
	Personal understanding of the connotations of eco-civilization	2.975	5	0.595	0.405	0.439	Yes
	Personal understanding of the connections between eco-civilization and socialist modernization with Chinese characteristics	4.135	5	0.827	0.173	0.916	
	Personal understanding of the connections between ecological and environmental issues and individuals	4.226	5	0.845	0.155	1.000	
	Perception of the	2.90	5	0.580	0.420	0.425	Yes

Satisfaction with textbooks	difficulty level of textbooks	2					
	Acceptance of the logical structure of textbooks	3.050	5	0.610	0.390	0.455	Yes
	Suitability of cases cited by textbooks	3.042	5	0.608	0.392	0.453	Yes
	Comprehension of the language style of textbooks	3.056	5	0.611	0.389	0.456	Yes
Satisfaction with teachers	Satisfaction with teachers' teaching attitude	4.143	5	0.829	0.171	0.923	
	Satisfaction with teachers' expertise	4.135	5	0.827	0.173	0.916	
	Satisfaction of teacher-student interaction	4.095	5	0.819	0.181	0.883	
	Satisfaction with teachers' combination of theory and practice	3.006	5	0.601	0.399	0.446	Yes
	Inspiration for students	3.176	5	0.635	0.365	0.483	Yes
Satisfaction with ecological education activities	Satisfaction with the participation in after-school practical activities	4.186	5	0.837	0.163	0.961	
	Satisfaction with the experience of after-school practical activities	3.549	5	0.710	0.290	0.592	
	Satisfaction with the frequency of related activities	3.774	5	0.755	0.245	0.685	

Empirical analysis reveals that the prevalence of diversified values dominated by utilitarianism and individualism has led to the dilemma of "big investment yet weak effects" when it comes to the content, methods and paths of eco-civilization cultivation in colleges and universities.

Under the dimension of "Understanding of eco-civilization", despite the slightly higher correlation coefficients for "Personal understanding of the connections between eco-civilization and socialist modernization with Chinese characteristics" and "Personal understanding of the connections between ecological and environmental issues and individuals", there is a yawning gap between the coefficient of other indicators and the corresponding ideal value, laying bare the following facts:

First, colleges and universities are generally weak in their awareness of eco-civilization cultivation. When drawing up a strategy to achieve the leapfrog development of eco-civilization cultivation, colleges and universities are more inclined to choose the lower-cost institutional reform to improve service quality. In pushing for the reform, they are often confronted with the shortage of supporting resources, which greatly limits the capacity of school's education management department to adopt alternative strategies. As a result, eco-civilization cultivation is constantly marginalized and the associated efforts often turn out mere window dressing that won't solve the problem.

Second, students lag behind seriously in the awareness of eco-civilization. As a group deeply exposed to new media such as the Internet, college students do have some knowledge of eco-civilization, yet their knowledge is mainly focused on the connections between ecological and environmental issues and individuals. Instead of a systematic, comprehensive and in-depth understanding, they only have some perceptual knowledge of the connotations of eco-civilization. Their limited understanding does have an impact on their behavioral patterns, i.e., their pro-ecological behaviors lag behind their eco-civilization awareness. In these days, food waste, water waste, electricity waste and excessive consumption are still commonly seen on campus, suggesting that the national strategy of promoting eco-civilization has failed to influence the behaviors of college students.

The correlation coefficient is relatively low for all secondary indicators under the dimension of "Satisfaction with textbooks", and the same holds true for secondary indicators such as "Satisfaction with teachers' combination of theory and practice" and "Inspiration for students" under the dimension of "Satisfaction with teachers", a reflection of the problematic curriculum system and subject setting for eco-civilization cultivation in colleges and universities [5].

First, there is a general lack of the special ecological education textbooks for college students in non-environmental majors. As a result, non-environmental students will inevitably bump into professional barriers when attending eco-civilization cultivation. Some colleges and universities use self-edited textbooks for ecological education, yet the editors' limited knowledge of environmental science and humanistic science often leads to one-sided textbooks with poor quality.

Second, there are very few teachers who can implement comprehensive and systematic eco-civilization cultivation. Even in colleges and universities that perform relatively well in eco-civilization cultivation, most of the teachers engaged in eco-civilization cultivation are transferred from related disciplines such as environmental science, philosophy or ethics. There are hardly any teachers with strong background in both humanistic and social sciences and natural sciences. On top of that, teachers generally lack the actual teaching cases and the related hands-on experience, and hence they are prone to over-rely on the textbooks in lecturing.

Third, in regard to curriculum design for eco-civilization cultivation, in addition to the professional courses for environmental majors, most colleges and universities have not included eco-civilization cultivation into public compulsory courses. Only a handful of comprehensive universities and universities with strong connections with eco-civilization (by offering agriculture, forestry and water resource programs) put special emphasis on including open classes or activities related to eco-civilization into the second classroom activities, which students are highly satisfied with and have also become the main front of eco-civilization cultivation in colleges and universities [6].

IV. STRATEGIES FOR ADVANCING ECO-CIVILIZATION CULTIVATION IN COLLEGES AND UNIVERSITIES IN THE NEW ERA

Eco-civilization cultivation is not only a new breed of ideological and political education for college students, but also an arduous task in the new era that entails comprehensive consideration and systematic advancement. Colleges and universities may, taking into account their own realities, invite the participation of multiple stakeholders and try to build a "four-in-one" eco-civilization cultivation framework as shown in Fig1.

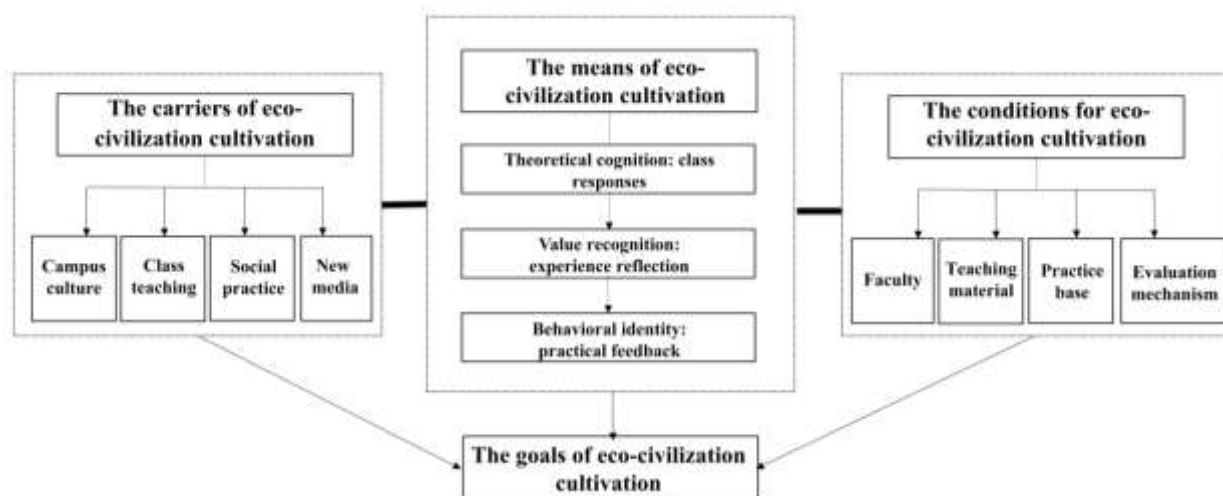


Fig 1: "Four-in-one" eco-civilization cultivation framework design for colleges and universities

4.1 Crystalize the Goals of Eco-civilization Cultivation

According to the own characteristics of the school, the education management department of colleges and universities should polish up the organizational structure of its eco-civilization cultivation system, flesh out the relevant rules and regulations, bolster the modernization, accuracy and organization of eco-civilization cultivation, and ensure the effective implementation of eco-civilization cultivation. Focusing on the education of morality, intelligence, physique, aesthetics and labor skills, the department should crystalize the goals of eco-civilization cultivation (i.e., to enhance the eco-civilization literacy of college students), draw up the relevant knowledge and capability requirements and the corresponding quality standards, and integrate the same into the routine work of other functional departments of the college/university [7]. The educational activities carried out by the administrative departments of the college/university should also be assessed under this system in order to bolster the effectiveness of eco-education activities.

4.2 Enrich the Carriers of Eco-civilization Cultivation

The carriers of eco-civilization cultivation in colleges and universities comprise of classroom teaching, campus culture, emerging media and social practice. First, we should expand the values for eco-civilization in carrying out moral education in colleges and universities, strengthen the education of attitude towards, knowledge of and values for eco-civilization under existing public courses such as the ideological and political theory course, and promote innovations such as thematic inquiry-based education and teaching in the sphere of eco-civilization cultivation, in addition to including courses related to ecology and natural sciences into elective or compulsory courses. We should push for the systematic study of eco-civilization among college students and foster a distinctive model of eco-civilization cultivation.

Second, we should give full play to the positive influence of situational factors on eco-civilization cultivation and attach good importance to the cultivation of a flexible cultural environment; strengthen the promotion of eco-civilization and build an enabling atmosphere both at home and on campus; and vigorously expand the breadth of Second Classroom to promote various forms of eco-civilization social practice activities which, hosted by student associations, would feature hands-on learning, distinct themes and strong interaction, thereby increasing students' subjective participation and improving the effectiveness of eco-civilization cultivation.

4.3 Innovate the Means of Eco-civilization Cultivation

In parallel with the carrier innovation of eco-civilization cultivation, a progressive approach to the eco-civilization cultivation in colleges and universities should be devised to best align the educational methods with educational goals. Specifically, we should enrich the eco-civilization theory based classroom teaching methods to ensure the steady cognition of eco-civilization theory in college students; enrich the eco-civilization value underlain experiential education methods to guide college students to adhere to value consciousness in learning and accepting the principles of eco-civilization, and eventually to transform

these principles into sustainable behaviors; and enrich the eco-civilization behavior underpinned practical feedback methods to incorporate the theoretical eco-civilization principles into the study and life patterns of college students, to transform these principles into content-rich materials and practical activities that can be easily perceived by college students, and eventually to translate the eco-civilization theory into down-to-earth practices.

4.4 Improve the Conditions for Eco-civilization Cultivation

In regard to the educational process, eco-civilization cultivation entails a team of accomplished teachers, a complete set of textbooks, a group of stable practice bases, and a set of scientific evaluation mechanisms. First, giving adequate play to the school's strengths in humanities and natural subjects, colleges and universities should organize the study and training of eco-civilization cultivation to get teachers clued up on the importance, status quo and situational factors of eco-civilization cultivation, to build a team of teachers with relatively strong theoretical backgrounds in ecological cognition education, and to gradually accumulate school-specific textbooks on such footing, thereby providing intellectual support for a series of eco-civilization construction practices. Second, in carrying out the labor education, colleges and universities may establish extensive partnerships with off-campus institutions such as regional ecological parks, ecological enterprises and ecological and environmental protection bases in a bid to build a stable lineup of off-campus practice bases and to forge an all-encompassing eco-civilization cultivation environment that extends from the classroom to the outside world. Lastly, taking into account the regular patterns, organizational structure and difficulty level of eco-civilization teaching and the learning ability of college students, colleges and universities should actively promote the integration of eco-civilization cultivation for college students into the credit system, award system and research review system, encourage students to take an active part in ecological education activities and manage their own behaviors, turn external institutions into internal self-awareness, and help students comprehend the intrinsic connections between ecological and environmental protection and the social ecosystem, thereby enhancing the quality of ecological education in colleges and universities [8].

V. CONCLUSION

Exemplifying the eco-civilization value orientation of the harmonious coexistence of all beings, eco-civilization cultivation in colleges and universities is not only a requisite for colleges and universities to promote eco-civilization construction and to create a harmonious campus, but also the endogenous demand of college students in seeking all-round development. It also provides a solid basis for comprehensive regional governance. Through extensive initial screening and meticulous selection of indicators, this study has built an indicator system for evaluating students' satisfaction with eco-civilization cultivation services in colleges and universities, which comprises 4 primary indicators (understanding of eco-civilization, satisfaction with textbooks, satisfaction with teachers, and satisfaction with ecological education activities) and 16 secondary indicators. It also harnessed grey relational analysis to dig into the difficulties faced by colleges and universities in promoting eco-education and the underlying causes.

Empirical analysis shows that the value norms underlain by simple bans have constituted an important part of the eco-civilization cultivation in colleges and universities in these days. Although these norms can help students develop a relatively abstract consciousness of ecological protection, resource conservation and social responsibility, the specific ecological knowledge about the evolution, structure and functions of ecosystems or the impact of human activities on ecosystem diversity is barely mentioned in the textbooks for eco-civilization cultivation, thus preventing teachers from giving substantive guidance to the behaviors of students and leading to the generally weak awareness of eco-civilization among students. Presently, classes and themed activities extended from the "exam-centric education model" are the main approaches to eco-civilization cultivation. However, the static instillation of ecological knowledge and the formalistic interactions of ecological topics are inadequate to arouse students' awareness of eco-civilization. Today, schools have become the only reliable implementation path for regional eco-civilization cultivation, yet the excessive shortcomings of colleges and universities in teaching management system design, curriculum system design, subject setting and teacher training have led to the increasing marginalization of eco-civilization cultivation, and the associated efforts often turn out mere window dressing.

To conclude, under the new economic normal characterized by "speed reduction, quality improvement and efficiency improvement", it won't be easy to complete the transition of economic growth driven by massive investment and intensive labor input that rely heavily on the consumption of material resources and the maintenance of high savings rate to a new model undergirded by human capital, technology innovation, and industrial structure upgrade. Contradictions and conflicts between "economic development" and "ecological protection" occur from time to time. Colleges and universities may, taking into account their own realities, invite the participation of multiple stakeholders and try to build a "four-in-one" eco-civilization cultivation framework — i.e., crystalize the goals of eco-civilization cultivation, enrich the carriers of eco-civilization cultivation, innovate the means of eco-civilization cultivation, and improve the conditions for eco-civilization cultivation — thereby injecting "green gene" into the whole society, improving the quality and efficiency of eco-civilization cultivation, enhancing the public self-awareness to take part in ecological governance, stimulating the enthusiasm of the general public to participate in ecological construction, and eventually allowing all people to share the fruits of ecological construction.

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