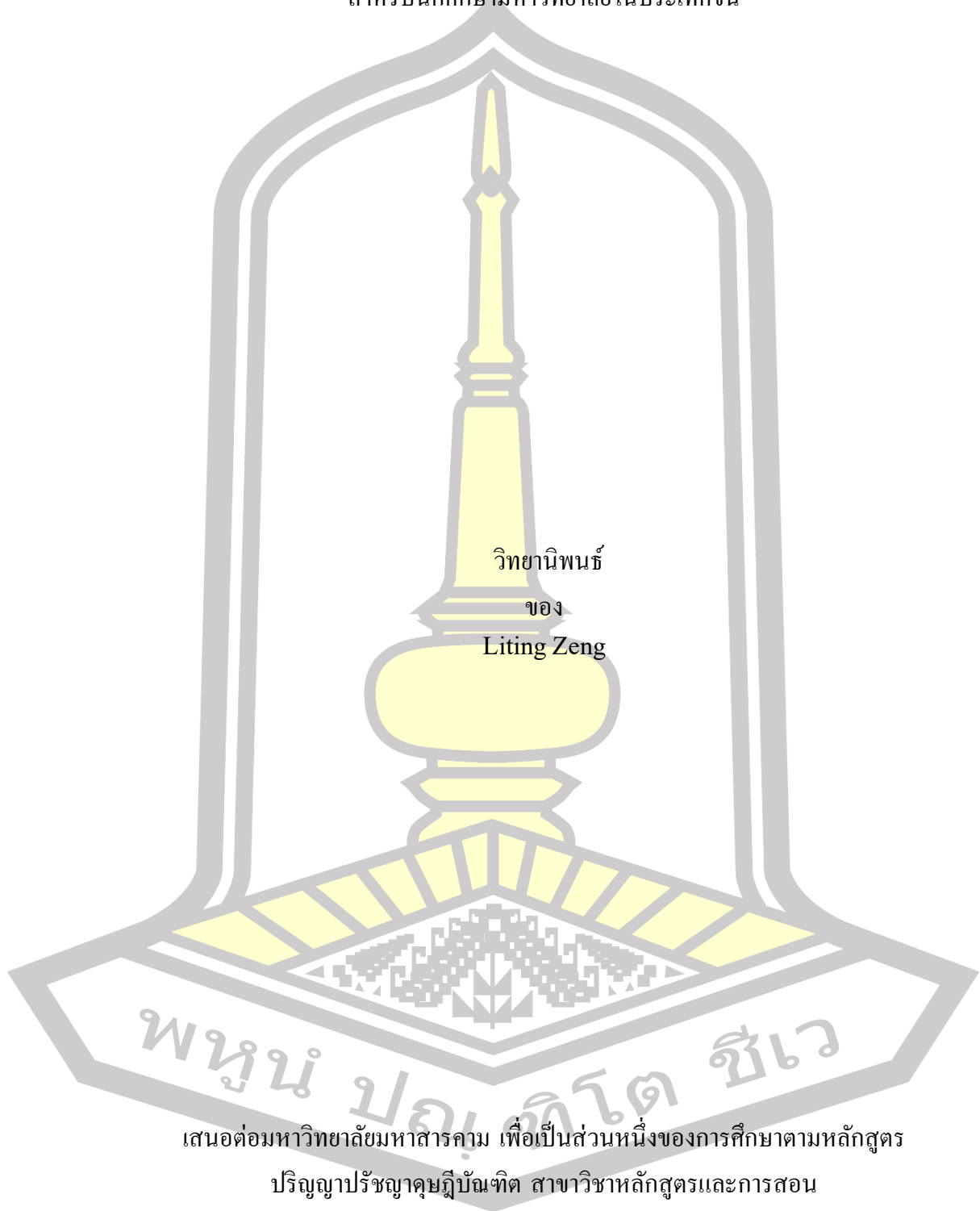Developing a Sustainable Hospitality Education Program to Enhance Critical
Thinking for University Students in China

Liting Zeng

A Thesis Submitted in Partial Fulfillment of Requirements for
degree of Doctor of Philosophy in Curriculum and Instruction
September 2024

การพัฒนาโปรแกรมการศึกษาด้านการบริการอย่างยั่งยืนเพื่อส่งเสริมการคิดอย่างมีวิจารณญาณ
สำหรับนักศึกษามหาวิทยาลัยในประเทศจีน

วิทยานิพนธ์
ของ
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for Doctor of Philosophy (Curriculum and Instruction)

September 2024

The examining committee has unanimously approved this Thesis, submitted by Ms. Liting Zeng , as a partial fulfillment of the requirements for the Doctor of Philosophy Curriculum and Instruction at Mahasarakham University

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ABSTRACT

This study addresses the pressing need to integrate sustainability and critical thinking into hospitality education in China, given the rapid expansion of the industry and the growing demand for professionals who are not only well-versed in traditional management practices but also capable of innovative and responsible decision-making. The research aims to develop and implement a Sustainable Hospitality Education (SHE) program designed to enhance critical thinking skills among university students in China, thereby equipping them to meet the challenges of the modern hospitality industry.

The study is structured around three key research questions: 1)What is the current state of Sustainable Hospitality Education in China? 2)What components of a Sustainable Hospitality Education program can enhance critical thinking for Beijing Hospitality Institute students in China? 3)How effective is the implementation of the developed Sustainable Hospitality Education program in enhancing Beijing Hospitality Institute students' critical thinking skills? Correspondingly, the research objectives are: 1)To evaluate the present status of Sustainable Hospitality Education in China. 2)To design a Sustainable Hospitality Education program aimed at enhancing critical thinking skills among Beijing Hospitality Institute students in China. 3)To execute and assess the implementation of the developed Sustainable Hospitality Education program for Beijing Hospitality Institute students in China.

The research was conducted in three phases: Phase I Basic Information Study. This phase evaluated the current status of Sustainable Hospitality Education in China through a systematic literature review, a questionnaire survey administered to 314 university students to assess their perspectives on SHE, and semi-structured interviews with 16 hospitality teachers to explore their perceptions. The data collected provided a theoretical framework and insights into students' understanding of sustainability and the importance they place on these issues in their daily lives; Phase II: Program Development. Building on the findings from Phase I, a draft framework for the SHE program was developed with the aim of enhancing critical thinking skills. This draft was evaluated by 7 field experts using content analysis and statistical methods,

such as mean and standard deviation, to refine and optimize the program based on expert feedback; Phase III: Program Implementation. In the final phase, the developed SHE program was implemented among 36 junior students enrolled in the International Course in Hotel Management at Beijing Hospitality Institute. The impact of the program on students' critical thinking skills was assessed using the California Critical Thinking Disposition Inventory in a quasi-experimental design, with a dependent sample T-test used to evaluate the results.

The implementation of the SHE program led to significant improvements in students' critical thinking skills, particularly in areas such as truth-seeking, systematicity, and critical thinking self-confidence. The mean scores in these areas showed substantial increases from pre-test to post-test, with statistical significance ($p < .05$ for critical thinking self-confidence and $p < .01$ for truth-seeking and systematicity). These findings suggest that the SHE program effectively promotes a systematic approach to problem-solving and a strong commitment to truth-seeking, while also enhancing students' confidence in their critical thinking abilities. However, other dimensions such as open-mindedness, analyticity, inquisitiveness, and maturity of judgment, although showing positive trends, did not reach statistical significance. This indicates potential areas for further development as the program continues to evolve. Feedback from students and educators emphasizes the need for a more practical and industry-aligned curriculum, with a focus on real-world applications and interdisciplinary approaches. This study contributes to the growing body of literature on sustainability education, particularly within the hospitality industry, by providing empirical evidence of the positive relationship between SHE programs and the enhancement of critical thinking skills. The results highlight the importance of integrating sustainability into university curricula, not only to foster critical thinking but also to prepare students for leadership roles in promoting sustainable practices.

In conclusion, the SHE program has proven to be an effective educational intervention, significantly enhancing both the sustainability knowledge and critical thinking skills of university students. The study provides actionable insights for educators and policymakers in the hospitality sector, underscoring the need for ongoing faculty development and the integration of sustainability across the curriculum. The program's success suggests that it could serve as a model for similar initiatives in other educational contexts, ultimately contributing to the development of a sustainable and critically thinking workforce in the hospitality industry and beyond.
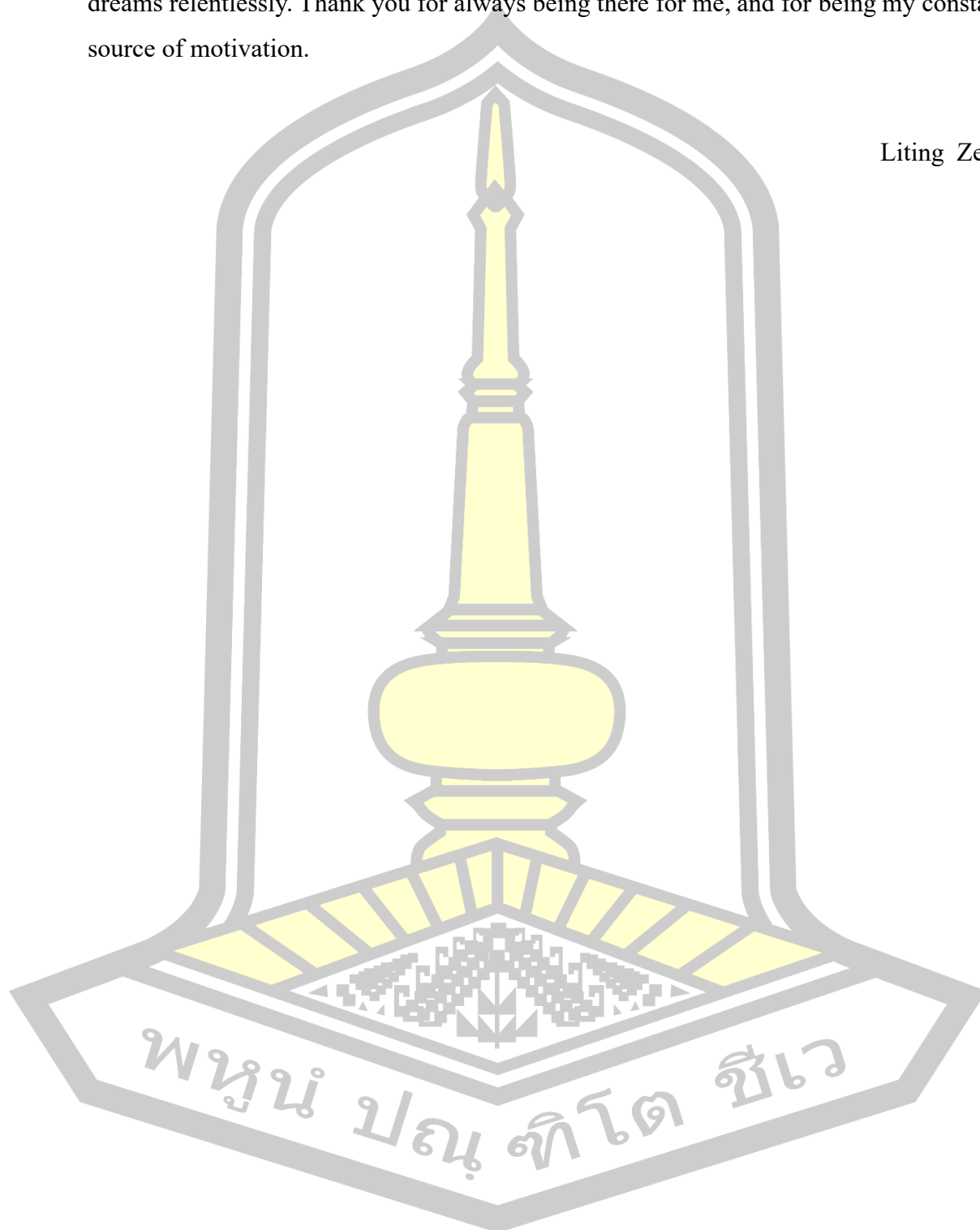
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perseverance, and your quiet encouragement has given me the strength to pursue my dreams relentlessly. Thank you for always being there for me, and for being my constant source of motivation.

Liting Zeng

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CHAPTER 1

INTRODUCTION

1.1 Background

The concept of sustainability, developed in the early 1970s, arose from a myriad of scientific, economic, sociological, and environmental issues, aiming to foster a more responsible approach to development (Aber et al., 2009; Hardy, Beeton, & Pearson, 2002). The Brundtland Report (World Commission on Environment and Development, 1987) defined sustainable development as meeting current needs without compromising the ability of future generations, thus shaping the dominant discourse on sustainability. Recent decades have seen less sustainable patterns of production and consumption across various industries, intensifying the challenges faced by humanity in economic, political, social, and environmental domains (Albareda-Tiana et al., 2020; Harvey et al., 2022; Zamora-Polo & Sanchez-Martin,2019). Harvey et al. (2022) highlighted sustainability and climate change as critical elements of the Anthropocene crisis. As a result, working towards the three pillars of sustainable development (economic, social, and environmental) has become an urgent need for the international community (United Nations, 2022). The 17 Sustainable Development Goals (SDGs)set by the United Nations in 2015 (UNDP, 2021) underscore the necessity to balance social, economic, and environmental sustainability for a prosperous future. Dale and Newman (2005)argue that the inherent vagueness of sustainability offers an advantage by enabling diverse stakeholders to unite towards a common goal, gaining significant attention in higher education.

Higher Education Institutions (HEIs) play a crucial role in addressing global sustainability challenges and are key stakeholders in this endeavor (SDSN, 2017). HEIs significantly contribute to society's efforts to achieve SDGs through a variety of means, including research, campus practices, teaching, learning, and leadership (Aleixo et al., 2018; Findler et al., 2019; Rezapouraghdam and Akhshik, 2021). These institutions are responsible for raising awareness among future professionals and equipping them with the necessary skills and competencies to respond to sustainability challenges (García-Feijoo et al., 2020). HEIs are seen as catalysts or change agents in

sustainable development (SD) (Franco et al., 2019; Žalėnienė and Pereira, 2021). The United Nations underscored the importance of education in sustainability through the initiative "Decade of Education for Sustainable Development DESD 2005–2014" (UNESCO, 2005b). The DESD aimed to integrate concepts, beliefs, and applications of SD into all aspects of education, recognizing the profound economic, environmental, and social implications. The efforts of HEIs are pivotal in changing people's behavior to ensure environmental integrity, economic viability, and a sustainable future for present and future generations (UNESCO, 2005a). The DESD, 2014 reaffirmed the responsibility of HEIs in supporting the achievement of socio-economic, cultural, environmental, and educational goals. There is considerable literature on HEIs' approaches to integrating SD into teaching and learning (Felgendreher and Löfgren, 2017). However, the progress of HEIs in implementing sustainability has its unique challenges (Velazquez et al., 2005).

SHE has become an increasingly important area of academic research, yet it lacks a comprehensive definition in existing literature, despite its frequent use （Deale and Barber, 2012; Millar and Park, 2013; Deale, 2013; Boley et al., 2014; Liu et al., 2017; Berjozkina and Melanthiou, 2021）. This absence highlights the need for a clearer understanding of what constitutes SHE. Piramanayagam et al. define SHE as a "hospitality education institution that enables stakeholders to acquire knowledge, skills, attitude, and values that shape their behavior toward sustainable developmentthrough teaching, research, stewardship, partnership and outreach", (Piramanayagam et al., 2023）. In the context of sustainability in education, two main areas are discussed: Education for Sustainable Development (ESD) and Environmental Education (EE). ESD is associated with the formal commitment of Higher Education Institutions (HEIs) to become more sustainable through initiatives like sustainable campuses and procurement. In contrast, EE is focused on integrating sustainability into the curriculum (Boley, 2011; Figueiró and Raufflet, 2015; Kohl et al., 2022; Thürer et al., 2018; Wu and Shen, 2016). The hospitality field, covering subjects from foodservice to resorts and conventions, necessitates a comprehensive approach to sustainability (Deale et al., 2009). Elkington's (2004) "Triple Bottom Line" concept, emphasizing economic, environmental, and societal gains, is particularly relevant to

the hospitality industry, a major contributor to the global economy (WTTC, 2011). The industry faces the need for environmentally friendly and socially responsible practices. However, knowledge is scarce about HEIs' achievements in pursuing sustainable development in hospitality and tourism education (Liu et al., 2017). The hospitality industry requires leaders capable of addressing future environmental and social challenges. As the next generation of students will be the "change agents" in this field, equipping them to confront sustainability's complexities is essential for the long-term viability and success of the hospitality sector (Wade, 1999). Lan criticized the excessive emphasis on 'professional' development in hospitality higher education to the neglect of personal development, advocated for transcending the boundaries of 'knowledge', 'skills', and 'attitudes', and called for contemplation of the original meaning of hospitality（Tran, 2022). With the industry's global significance and the growing emphasis on sustainability, it is crucial to prepare future leaders and professionals with a strong foundation in sustainable values.

The rapid growth of China's hospitality industry, coupled with the increasing importance of sustainable development, provides a critical backdrop for this research. However, the advancement of sustainable hospitality education in China remains in its early stages, and several key issues hinder its effectiveness. One of the most pressing concerns is the dominance of traditional hospitality management curricula, which primarily focus on operational and managerial knowledge, with insufficient integration of sustainability principles. This disconnects between classroom learning and the evolving demands of the hospitality industry leaves students ill-prepared to address real-world sustainability challenges (Cheung et al., 2024)). Moreover, the cultivation of critical thinking skills among Chinese hospitality students is notably lacking. Many students rely heavily on rote learning and teacher-led instruction, which stifles their ability to engage in deep analysis or independent problem-solving. This educational approach limits students' capacity for innovation and diminishes their competitiveness in the workforce, where the ability to think critically and adapt to complex sustainability issues is increasingly valued (Jiang et al., 2023). Research shows that Chinese students, including those in hospitality programs, often face difficulties in developing critical thinking skills due to the emphasis on memorization and teacher-centered instruction. Additionally, the closed and compartmentalized structure of

hospitality education in China further exacerbates these challenges. Students often have a narrow knowledge base, limited professional skills, and few opportunities for interdisciplinary collaboration or engagement with the hospitality industry. This insular educational experience hampers their ability to apply sustainability concepts effectively in practice, thereby limiting their contribution to the industry's long-term sustainable development goals.

Given these challenges, this research seeks to address the critical gap by developing a Sustainable Hospitality Education program that enhances critical thinking among university students in China. By integrating sustainability principles into hospitality curricula and fostering students' ability to think critically and innovatively, the study aims to bridge the gap between academic training and industry needs, ultimately contributing to the development of a more sustainable hospitality sector in China.

1.2 Research Questions

1) What is the current state of Sustainable Hospitality Education in China?
2) What components of a Sustainable Hospitality Education program can enhance critical thinking for Beijing Hospitality Institute students in China?
3) How effective is the implementation of the developed Sustainable Hospitality Education program in enhancing Beijing Hospitality Institute students' critical thinking skills?

1.3 Research Objectives

1) To evaluate the present status of Sustainable Hospitality Education in China.
2) To design a Sustainable Hospitality Education program aimed at enhancing critical thinking skills among Beijing Hospitality Institute students in China.
3) To execute and assess the implementation of the developed Sustainable Hospitality Education program for Beijing Hospitality Institute students in China.

1.4 The Importance of Research

1) Critical thinking is a high-level thinking ability, which is of great significance for college students' future careers in the hospitality industry and sustainable development.

2) Improving the critical thinking ability of college students plays an important role in promoting the sustainable development of the hospitality industry.

3) The cultivation of critical thinking ability for college students is of great significance to the improvement and innovation of hospitality education in China.

4) Improving the critical thinking ability of college students is of great significance to their future employment and sustainable development in the hospitality industry.

1.5 Research and Development Methods (R&D)

This research is dedicated to advancing higher education in the hospitality sector, specifically focusing on the development of a sustainable hospitality education program aimed at enriching critical thinking among university students in China. This research will use research and development methods to design the thesis. The program development procedures are as follows: 1) To explore current situations of sustainable hospitality education in China. 2) To develop a SHE Program and promote the critical thinking of sustainable performance for university students in China. 3) To study SHE to enhance students' sustainable performance and enhance students' critical thinking of sustainability in hospitality. 4) Curriculum evaluation and follow-up.

Phase I: Basic Information Study (R1): In this initial phase, theories, concepts, principles, and components influencing critical thinking in SHE are examined. The focus is on gathering foundational knowledge that will serve as a guideline for program development. This phase employs documentary research and survey research methodologies to collect relevant data.

Phase II: Program Development (D1): Utilizing the data obtained from Phase 1, this phase involves designing and developing the program. A draft program framework is created based on the collected data. The quality of the program construction is assessed through expert evaluation. Additionally, this phase involves identifying instruments for data collection in the subsequent phase.

Phase III: Implementing Program (R2): This phase refers to the implementation of the developed program among the target group of the research, which includes university students in China enrolled in hospitality programs. The effectiveness of the

program in enhancing critical thinking is evaluated through pre-test and post-test methods. The results of these tests are used to measure the improvement in students' critical thinking abilities and to make any necessary adjustments to the program.

1.6 Scope of the Research

Phase I Basic information study

1. Population and sampling

   1. 1 Population

     1. 1. 1 3188 University students from Beijing Hospitality Institute, China.

     1. 1. 2 78 teachers who teach hospitality from Beijing Hospitality

     Institute, China.

   1. 2 Sample

     1.2.1 314 Hospitality students were selected by purposive and convenient

     Sampling from Beijing Hospitality Institute, China.

     1.2.2 16 Hospitality teachers were selected by purposive sampling from

     Beijing Hospitality Institute, China

2. Variables

   2. 1 Questionnaire of University Students' Perspectives on SHE

     Independent variable: Student characteristics, cognition, attitude,

     preference towards SHE.

     Dependent variable: Student perceptions of SHE.

   2. 2 Semi-structured Interviews with Hospitality Teachers

     Independent variable: Teachers' understanding of Sustainability and SHE,

     barriers to implementing SHE, strategies to overcome barriers, strategies

     to enhance Critical Thinking.

Dependent variable: Perceptions of SHE integration, effectiveness of strategies in enhancing Critical Thinking.

3. Duration

This phase of research lasted 6 weeks to study basic information.

Phase II Developing program

1. Participant

The target participants used in evaluating the SHE programs framework are 7 experts selected by selective sampling, including one hospitality education expert, one hospitality industry expert, one Sustainability expert, and two program and instruction experts.

2. Variables

2.1 Independent Variables

The independent variables include program content, teaching methods, learning resources, and program design.

2.2 Dependent Variable

The dependent variable is a SHE programs framework.

3. Duration

This phase of research lasted 4 weeks to develop the program.

Phase III Implementing the program

1. Population and sample

1. 1 Population

39 Junior students in the international track in Hotel Management from

Beijing Hospitality Institute, China.

1. 2 Sample

The sample for this phase is 36 Junior students in the International

track in Hotel Management selected by purposive and convenient

sampling from Beijing Hospitality Institute, China.

2. Variables

2.1 Independent Variable

The independent variable is the developed Sustainable Hospitality

Education Program.

2.2 Dependent Variable

The dependent variable is critical thinking, measured by the Critical

Thinking Disposition Inventory (CTDI-CV), which includes dimensions

such as truth-seeking, open-mindedness, analyticity, systematicity,

self-confidence, inquisitiveness, and cognitive maturity.

3. Duration

This phase of the research lasted a total of 11 weeks. Undertaking

participant recruitment and eligibility screening lasted 1 week, the

implementation of the program spanned 8 weeks, and the data analysis

phase took an additional 2 weeks. The program implementation required a

total of 4 hours per week over these 8 weeks, amounting to 32 hours in total.

1.7 Expected Outcomes

1) Provide a comprehensive evaluation of the current state of Sustainable
   Hospitality Education in China, thereby raising awareness and understanding of
   its significance among university faculty and administrators.

2) Identify and implement key components of a Sustainable Hospitality Education program that broaden the scope of sustainability in hospitality education at Chinese universities, enhancing students' engagement and understanding of sustainable practices in the hospitality industry.

3) Demonstrate the effectiveness of the designed Sustainable Hospitality Education program in fostering critical thinking skills among Beijing Hospitality Institute students, preparing them for future challenges and opportunities in the hospitality sector.

1.8 Definition

The Triple Bottom Line

The Triple Bottom Line (TBL) is a framework that broadens a business's focus beyond the traditional financial bottom line to include social and environmental considerations. Incorporating the TBL into a sustainable hospitality education program aims to equip students with a comprehensive understanding of how to manage hospitality businesses in a way that is economically viable, socially responsible, and environmentally friendly. This approach is crucial for developing critical thinking, as it encourages students to consider the interconnected impacts of business decisions. It includes Economic Sustainability, Social Sustainability, and Environmental Sustainability.

Sustainable Hospitality Education

Sustainable Hospitality Education (SHE) is a comprehensive pedagogical strategy within hospitality institutions aimed at fostering a sustainable development mindset among students and other stakeholders. SHE integrates the three core pillars of sustainable development: environmental protection, economic viability, and social equity. Its primary goal is to equip learners with the skills and knowledge to make decisions that meet current needs without jeopardizing future generations' ability to meet theirs. A key component of SHE is the cultivation of critical thinking, as it empowers students to evaluate complex sustainability challenges in hospitality and formulate balanced, forward-thinking solutions.

Critical Thinking

Critical thinking is a cognitive process characterized by the purposeful and self-reflective application of reasoning to form judgments. It involves actively

analyzing, synthesizing, and evaluating information to reach well-substantiated conclusions. In this study, critical thinking is applied as a key outcome variable to assess the effectiveness of the Sustainable Hospitality Education Program. The study considers the following dimensions of critical thinking as variables: truth-seeking, open-mindedness, analyticity, systematicity, self-confidence, inquisitiveness, and cognitive maturity. The measurement of critical thinking in this study is operationalized through the Utilization of standardized tests such as the Critical Thinking Disposition Inventory (CTDI-CV). In the context of hospitality education, critical thinking is essential for decision-making and problem-solving, by honing these skills, students are better prepared to navigate the intricate issues that arise in sustainable hospitality management.

Hilda Taba Model

The Hilda Taba Model is a progressive teaching strategy focused on curriculum or program development. This approach, with its emphasis on inductive development and flexibility, is particularly suited to addressing the complex and dynamic nature of sustainable hospitality education. This research would involve several key steps: 1) Diagnosis of Needs; 2) Formulating Learning Objectives; 3) Selecting Content; 4) Organizing Content; 5) Choosing Learning Experiences; 6) Organizing Learning Experiences; 7) Evaluating and Assessing.

Sustainable Hospitality Education Program

The Sustainable Hospitality Education Program is an educational initiative that integrates sustainability principles into the hospitality curriculum. It is designed to cultivate systematic thinking and critical competencies among Chinese university students, specifically in the context of sustainable hospitality. This study applies the program to enhance students' understanding of sustainability in the hospitality industry by developing structured classroom activities that align with the principles of the Hilda Taba Model. Furthermore, the SHE Program fosters students' abilities in critical analysis, problem-solving, and decision-making. The effectiveness of the program is assessed through quantitative methods to evaluate its impact on student learning outcomes.

SHE Program Development

SHE Program Development refers to the structured creation and enhancement of educational frameworks aimed at cultivating critical thinking and sustainability expertise in hospitality students. This development process involves integrating sustainability principles, critical thinking methodologies, and industry-specific knowledge to create a dynamic curriculum. The ultimate objective is to prepare students to confront sustainability challenges in the hospitality sector with analytical rigor and innovative solutions, ensuring that they can contribute to the industry's sustainable future.

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

In this study, to develop the Sustainable Hospitality Education Program to improve critical thinking competence, the relevant literature was studied according to the following main issues:

2.1. Sustainable Education

    2.1.1 Developing Sustainable Education in Universities

    2.1.2 Barriers to Sustainable Development in Universities

    2.1.3 Solutions for Sustainable Development in Universities

    2.1.4 Sustainable Education in China

    2.1.5 Summarize

2.2. Sustainable Hospitality Education

    2.2.1 SHE and Perspectives

    2.2.2 Sustainability and Curriculum

    2.2.3 Implications of Sustainability Education

    2.2.4 Sustainability and Learning

    2.2.5 Students' Sustainability Perception and Literacy

    2.2.6 Summarize

2.3. Critical thinking

    2.3.1 The Definitions of Critical Thinking

    2.3.2 The Measure of Critical Thinking

    2.3.3 Critical Thinking Skills Play an Important Role in SHE

2.3.4 Summarize

2.4. Developing Programs

2.4.1 Leonard Nadler's Critical Event Model

2.4.2 Ralph Tyler's Program Development Model

2.4.3 Conklin's Model

2.4.4 Hilda Taba Model

2.4.5 Summarize

2.5. Sustainable Hospitality Education Program

2.5.1 Method of Delivery of Sustainability Modules in Hospitality

2.5.2 Topics of Sustainable Hospitality Education

2.5.3 Teaching Technique

2.5.4 Assessment Strategies

2.5.5 Summarize

2.6. Conclusion

2.7. Related Research

2.7.1 Domestic Research

2.7.2 International Research

CONCEPTUAL FRAMEWORK

2.1.Sustainable Education

2.1.1 Developing Sustainable Education in Universities

Universities are pivotal in achieving sustainable human development. The Rio+20 United Nations Conference highlighted the role of education in sustainable development, emphasizing quality, innovation, and lifelong learning. As the United Nations Educational, Scientific and Cultural Organization (UNESCO) defines, education is a deliberate process of passing accumulated knowledge, attitudes,

and skills from one generation to the next (UNESCO, 2013). Higher education embodies continuous inheritance and innovation, including in ecological civilization. Since the 1990s, green university construction movements committed to environmentally sustainable development have emerged around the world. Since the 21st century, based on the construction of green universities, sustainable universities (Sustainable Universities), which are committed to realizing the sustainable development of people and the earth, have rapidly emerged. (Zhong Zhou & Yuan Wei, 2022).

Universities' Practices in Sustainable Education Reflect Their Response to Global Sustainability Challenges. For instance, Furman University in the USA incorporates courses on "humans and the natural environment" in general education across different majors, enhancing students' awareness of sustainability（http: //www. furman. edu/sustain）. The University of Toronto in Canada has launched four flagship sustainability programs including divestment from fossil fuel investments and a Climate Positive Plan, furthering the integration of sustainable development concepts into the academic sphere（https: //sustainability. utoronto. ca/）. These practices not only promote environmental stewardship and sustainability but also deepen students' understanding and engagement with sustainability issues.

In the book *UNESCO and Sustainable Development* published in 2005, the authors explore the significance of education and learning in sustainable development from a strategic perspective. The book highlights the importance of ESD and discusses how education can promote sustainable development in social, economic, and environmental aspects. And summarize the key issues of Education for Sustainable Development (ESD) over the past decade (UNESCO, 2015).

Table 1. Decade of Education for Sustainable Development

Socio-cultural perspectives	Environmental perspectives	Economic perspectives

• Human rights • Peace and human security • Gender equality • Cultural diversity and intercultural understanding • Health • HIV/AIDS • Governance	• Natural resources (water, energy, agriculture, biodiversity) • Climate change • Rural development • Sustainable urbanization • Disaster prevention and mitigation	• Poverty reduction • Corporate responsibility and accountability • Market economy

Biltagy (2015) calls for curriculum changes in higher education institutions, advocating for innovative strategies to promote sustainable consumption, align research with sustainability needs, and enable students to develop relevant knowledge, values, and skills. To define the process of education for sustainable development, some important issues should be identified, such as:

1) What are the learning values and curricula that should be formulated?
2) How can assessment methods support the learning process?
3) What are the required educational planning and resourcing systems?
4) What are the suitable approaches of learning needed for decent and sustainable work?
5) What is the role of international support in achieving sustainability in education?
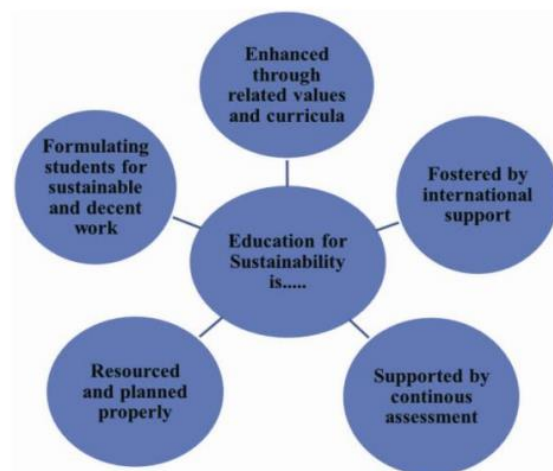
Figure 1. Education for Sustainability

Education can only promote sustainable development through curriculum education and teaching, innovative curriculum models, and striving to explore effective educational methods and teaching strategies. This is the main way to enhance the effect of value education (Tian, 2020).

2.1.2 Barriers to Sustainable Development in Universities

The 2030 Agenda for Sustainable Development, adopted by the United Nations in 2015, aims to address global challenges such as poverty, inequality, climate change, environmental degradation, and the need for peace and justice. Central to this agenda are the 17 Sustainable Development Goals (SDGs), which offer a comprehensive blueprint for global sustainable development efforts, targeting a more equitable, just, and environmentally sustainable world by 2030. However, at the midpoint of the 2030 Agenda, all of the SDGs are seriously off track. The world is off track, but that is all the more reason to double down on the SDGs (Sachs, J. et al., 2023).

Education for sustainable development, a paradigm shift in educational theory, prioritizes the integration of learners' varied needs and strengths. It strives for a community-oriented approach to a sustainable future. This approach marks a significant departure from conventional educational methods, presenting unique challenges in its implementation and teaching. Education for sustainable development may be a new educational theory and practice practice paradigm, which is different from existing educational paradigms (Huckle & Sterling, 2002). Tian (2013) stated that the practical value of sustainable development education is reflected in meeting the educational needs of the educated for sustainable development, but merely meeting the needs of the educated does not produce practical value. There are also the knowledge, abilities, interests, will, etc. of the educated. The impact of limiting Component. Compared with traditional education, sustainable education not only pays attention to the fairness and justice of intra-generational and inter-generational rights but also breaks through the sovereignty fetters of traditional politics and strives to establish a community of shared future for mankind based on the integrity of the ecosystem and the sustainability of generations, demonstrating that the understanding

and practice of the attributes and laws of education in promoting sustainable development have reached a high level (Tian, 2020).

By exploring how higher education institutions can move from understanding sustainability to action, Granados-Sánchez et al. (2023) identified and overcome the most urgent barriers to sustainable development in universities:

1) Difficulties in acquiring integrative thinking, transdisciplinary learning, and interdisciplinary cooperation in universities.

2) Sustainable development is felt as an 'add-on' to education, not a built-in aspect of HE.

3) Lack of vision and prioritization of sustainable development at the leadership level of HE.

4) Lack of a common understanding of ESD in HE.

5) Lack of coordination and vision to change sustainability policies and education at the government level.

2.1.3 Solutions for Sustainable Development in Universities

To address the significant challenge of integrating sustainable development into university curricula, scholars have conducted extensive theoretical and practical research. Cortese and Hattan (2010) suggest an integrated approach in formal education to implement sustainable education effectively. The practical value of education for sustainable development is reflected in the satisfaction of the educational needs for sustainable development of the educated. However, only the needs of the educated cannot produce practical value. There are also constraints on the educators' knowledge, ability, interest, will, etc. influence of Components.

Granados-Sánchezet al. (2023) found the solutions considered as priorities on which work should start are:

1) Developing an institutional understanding, vision, and mission on sustainable development in HEIs, taking into account faculty, students, and external parties, and engaging in open dialogues with all of them.

2) Changing the incentive system and quality indicators for encouraging and promoting multidisciplinary work, interdisciplinary teaching, theses, and program

3) Building a culture of sustainability by involving and engaging the local community, universities, families, schools, and other stakeholders in sustainability issues and programs. Including active learning courses and action research with local community programs that take students out of the classroom.

4) Involving internal stakeholders in such a way that leads to ownership, empowerment, participation, and willingness to contribute to and be responsible for change. Communicating and sharing more information (for example through team-building, coffee breaks, awareness-raising of ESD issues, and so on).

5) Monitoring the design and implementation of sustainable development contents in curricula, offering awareness-raising and/or training programs on sustainable development for all university academic and administrative staff.

2.1.4 Sustainable Education in China

In aligning with the United Nations' sustainable development concept, China is strategically incorporating this principle into its higher education system, thereby facilitating the nation's shift towards sustainable nation-building and high-quality developmental transformation. The United Nations defines sustainability as a shared worldview in which individuals should strive to meet their own needs while ensuring the ability of future generations to meet their needs. (Doctory et al., 2008). Low-carbon economic development is an important part of China's green development. At the 75th United Nations General Assembly, China proposed the goal of carbon peaking before 2030 and carbon neutrality before 2060. It announced at the Climate Ambition Summit that China would actively submit its independently determined contributions. China's higher education is at a critical stage from connotative development to high-quality development. How higher education maintains sustainable development, national strategy of high-quality services, and economic and

social development is an important issue worthy of exploration and research (Li, 2023).

2.1.5 Summarize

This section has critically explored the pivotal role of universities in advancing sustainable human development, highlighting their responses to global sustainability challenges. The discourse traces the evolution of green university initiatives from the early 1990s, emphasizing the significant contributions of higher education institutions in fostering a sustainable future through education. The Rio+20 United Nations Conference and UNESCO's definitions underscore the importance of quality, innovation, and lifelong learning in shaping educational responses to sustainability. Notable practices from institutions like Furman University and the University of Toronto illustrate the integration of sustainability into curricula, enhancing student engagement and awareness.

Moreover, the literature underscores the necessity of addressing educational and structural challenges to effectively incorporate sustainable development goals (SDGs) into university programs. Challenges such as integrating transdisciplinary learning and overcoming institutional inertia are discussed, alongside strategic solutions like modifying curricula to support sustainable development and actively involving stakeholders in sustainability initiatives.

This comprehensive approach to sustainable education not only aligns with global strategies but also addresses specific barriers and solutions, illustrating a dynamic interplay between policy, practice, and pedagogical innovation in higher education's pursuit of sustainability.

2.2. Sustainable Hospitality Education

As a major contributor to the global economy and employment, the hospitality and tourism industry plays a crucial role in achieving the United Nations Sustainable Development Goals, despite facing significant sustainability challenges due to its diversity and complexity. Hospitality and tourism are the largest industries in the world (Berjozkina & Melanthiou, 2021; Deale & Barber, 2012), The tourism industry is a significant contributor to the global economy and a major employer around the world, accounting for 10. 3% of the Gross Domestic Product (GDP), creating 333

million jobs globally in 2019 (WTTC, 2022). It is a highly inclusive and diverse industry that helps strengthen social structures and enrich communities, provides an important source of employment for young workers and women, and impacts the achievement of the United Nations Sustainable Development Goals. The industry spans multiple sub-sectors including accommodation, food services, meetings, events, attractions, and transportation. Future leaders need to be able to address and manage environmental and social challenges now and into the future (Deale & Barber, 2012; Millar & Park, 2013)

By combining two review techniques: a systematic review and a bibliometric analysis of peer-reviewed scientific articles published in journals indexed in Scopus, Piramanayagam et et al. (2023) found that SHE is an emerging field consisting of five themes. Thematic issues that emerged included SHE and perspectives, sustainability, and curriculum, implications of sustainability education, sustainability and learning and sustainability, and students' perception and literacy.

2.2.1 SHE and Perspectives

The academic consensus acknowledges the necessity and importance of incorporating sustainability education into hospitality. However, approaches to this integration, the structure of course content, and focal areas of program development are subjects of varied perspectives. This diversity reflects the complexity and evolving nature of embedding sustainability in hospitality education. Incorporating sustainability in higher education, particularly in hospitality and tourism, aims to develop talents capable of innovating effective solutions for modern injustices while maintaining stakeholder harmony. This approach necessitates curriculum updates in tertiary institutions to mirror recent trends and issues, a critical factor in enhancing teaching quality assurance (Barber et al., 2014). Learning objectives must reflect the sustainability philosophies and goals set by the United Nations World Tourism Organization (UNWTO), thus broadening students' global industry understanding. The focus on environmental conservation within sustainability topics, guided by the Triple Bottom Line framework, addresses the significant impacts of environmental issues in tourism, influenced by natural and cultural resources (Chen & Jeong, 2009). The multifaceted nature of sustainability in hospitality and tourism education allows for the integration of related topics across various courses, addressing issues like food ethics,

tourism value chain, and sustainable entrepreneurship (Daniel et al., 2017; Lans, Blok, & Wesselink, 2014).

2.2.2 Sustainability and Curriculum

In the realm of sustainable education, educators' perspectives, particularly in hospitality, reveal a curriculum-centric focus. Zhang &Tavitiyaman (2022) conducted an online survey to assess the importance and performance of sustainability courses in hospitality and tourism education in Hong Kong, targeting industry practitioners and undergraduate students. Their study revealed that while sustainability is deemed important in this field, it is not central in actual courses and programs. Employing the Importance-Performance Analysis (IPA)model, the research highlighted divergent perceptions of sustainability issues (economic, social, and environmental) between practitioners and students, emphasizing the need for comprehensive integration of sustainability in education. Zizka, L. (2022) discovered that in higher education institutions (HEIs), larger institutions with multiple programs, disciplines, and resources have a clear advantage in offering courses related to sustainability. Additionally, schools with a diverse range of programs are more inclined to promote their sustainability initiatives and community engagement actions on their official websites. However, the availability of sustainability courses in their undergraduate programs appears relatively limited. This does not imply that they do not integrate sustainability concepts into other courses or programs, but this integration is not presented on their websites.

However, sustainability often lacks a central position within these programs, indicating the necessity for more comprehensive and integrated educational strategies. This suggests an academic shift towards embedding sustainability more deeply within the curriculum to ensure a holistic approach to sustainable education. Deale et al. (2009) surveyed 151 educators in the International Council on Hotel, Restaurant, and Institutional Education to examine sustainability education within hospitality curricula. The study's results revealed that while sustainability topics are included in hospitality courses, they are not a central focus in the sampled courses and programs. This finding suggests that sustainability concepts are not heavily emphasized in hospitality education, raising important implications for the development and integration of sustainability in this field. Sezen-Gultekin & Argon

(2022) selected participants through purposive criterion sampling who were teachers and data came from semi-structured interviews at Sakarya University Institute of Educational Sciences in Turkey, revealing teachers' metaphorical perspectives and identifying barriers and facilitators to educational sustainability

2.2.3 Implications of Sustainability Education

In the context of sustainable education within the hospitality industry, the research highlights the critical focus of industry managers on the economic dimensions of sustainability. These studies underscore the depth of concern among professionals regarding evolving consumer trends, the demand for sustainable practices, and the challenges posed by inconsistent legislation. According to Barber et al. (2011), industry professionals are highly concerned about SE. The key issues, according to hospitality managers, are changing consumer behaviors and demands and inconsistent legislation. It is hardly surprising that the industry is very keen to incorporate the economic aspect of sustainability in ESD. Ali et al. (2017) examined the application of sustainability in hospitality education through in-depth interviews with 11 hospitality industry managers in Northern California. They found a diversity of perspectives regarding the definition and practice of sustainability, emphasizing the need for comprehensive integration of sustainability concepts in hospitality education and enhancing students' ability to apply these concepts in their professional lives.

2.2.4 Sustainability and Learning

Incorporating innovative teaching strategies and practical sustainability activities, underpinned by creativity theory and the Triple Bottom Line framework, significantly enhances critical thinking and the application of sustainability concepts in hospitality education. Liu et al. (2017) utilized a pedagogical co-competition strategy and creative thinking assessments within the creativity theory framework to evaluate the impact of learning environments on sustainability education. They found that this approach encourages critical thinking in students. In a similar vein, Tavitiyaman and Zhang (2022), guided by the Triple Bottom Line (TBL) framework, explored the essential sustainability topics for classroom instruction. Their research indicates that stakeholders favor classroom learning of sustainability issues and recommend practical activities like internships and field trips in the hospitality curriculum to apply sustainability concepts effectively.

2.2.5 Students' Sustainability Perception and Literacy

Due to the diversity of the industry, complex systems, and interactions between different stakeholders, significant challenges are posed to sustainable development (Liu et al., 2017; Berjozkina & Melanthiou, 2021). There are numerous studies on perceptions, perspectives, and attitudes, with samples including stakeholder groups such as students, teachers, and hospitality industry managers. Qualitative research mainly uses interviews, semi-structured interviews, and focus group discussions, while quantitative research mainly uses questionnaires. Some studies focus on conducting in-depth research on a specific type of stakeholder group (Millar& Park, 2013; Chawla& Manhas, 2015; Aliet al.,2017; Sezen-Gültekin& Argon, 2022), while others compare two or three types (Deale& Barber, 2012).

There is a significant gap in students' understanding and interest in sustainability. Educational research and curriculum development, especially within sustainability hospitality education, align with students' expectations and prepare them for future challenges in both their careers and global sustainability. Chawla and Manhas (2015) used a structured questionnaire that combined open-ended and closed-ended questions to assess respondents' overall understanding of the sustainable development agenda, the importance they attach to such issues in their daily lives, and the importance of sustainable development in teaching programs. curriculum and its impact), explore hospitality university students' perspectives on sustainability education. Zizka, L. (2017) based on a quantitative study of 203 first-year students at a hospitality management school in Switzerland revealed gaps between perceived knowledge, importance, and desire to learn about ECSRS within the hospitality management program, arguing that based on students responses, there is a clear need and expectation that courses on ECSRS will be taught during their academic program to better prepare them for their future ambitions as well as the future of the planet.

2.2.6 Summarize

Sustainable Hospitality Education (SHE) significantly contributes to the global economy and employment, playing a vital role in achieving the United Nations Sustainable Development Goals. As the hospitality and tourism industry represents a major segment of the global economic structure, it is crucial in fostering sustainable practices amidst its diversity and complexity. The research underscores the

industry's inclusive nature, providing substantial employment opportunities and contributing to socio-economic development.

Recent scholarly reviews have identified five thematic areas within SHE, focusing on the integration of sustainability in education curricula, and the implications of these educational strategies on learning and student perceptions. The academic consensus supports the necessity of incorporating sustainability education into hospitality, aiming to develop future leaders capable of addressing environmental and social challenges. Such integration involves updating curricula to reflect modern sustainability requirements and enhancing students' comprehensive understanding of the industry's impact on global sustainability issues.

Challenges persist in embedding sustainability deeply within hospitality programs, with studies indicating a gap between the importance of sustainability and its actual centrality in curricula. This necessitates a shift towards more integrated and comprehensive educational strategies, ensuring that sustainability becomes a core component of educational outcomes in hospitality. The research also highlights the critical role of educators and industry professionals in shaping these educational frameworks, suggesting that active engagement and innovative teaching strategies are essential for effectively imparting sustainability concepts to students.

Overall, SHE is emerging as a crucial field that not only addresses immediate industry needs but also aligns with broader global sustainability goals, preparing students to contribute effectively to the sustainable development of the hospitality sector.

2.3. Critical thinking

Critical thinking, a multifaceted skill, involves an individual's capacity to evaluate, analyze, and synthesize information and opinions, fostering rational judgment and questioning. In Sustainable Hospitality Education (SHE), the significance of critical thinking is profound. Given the complexities of sustainability – which intertwines ecological, economic, and social dimensions – critical thinking enables students to navigate these complexities effectively. It aids them in understanding the intricate balance required in hospitality management to meet current needs without compromising future resources. In SHE, critical thinking is not just a skill but a necessary tool for innovation, problem-solving, and responsible decision-

making, crucial for addressing the dynamic challenges in sustainable hospitality practices.

   2.3.1 The Definitions of Critical Thinking

   Critical thinking, as defined by various scholars, encapsulates diverse aspects of rational and reflective cognition. Ennis (1962) emphasizes its role in reasoned decision-making. Willingham (2007) focuses on the importance of open-mindedness and evidence-backed reasoning. Paul and Elder (2008) view it as a process of thought improvement, while Siegel (2009) underlines its foundation in rationality and open-mindedness. Chui (2009) highlights its critical examination nature in specific contexts, and Boltanski (2013) links it to societal goals. Lastly, Howard et al. (2015) described it as a metacognitive process that questions assumptions. Each perspective contributes to a comprehensive understanding of critical thinking as a complex, multifaceted cognitive skill essential in various disciplines, including education.

   The connotation of critical thinking includes logical reasoning, problem discovery and solution, judgment and evaluation, etc. Logical reasoning means that students can use scientific thinking methods to conduct reasonable reasoning and analysis. This requires students to have rigorous logical thinking and analytical skills and to be able to comprehensively examine problems from multiple perspectives. Problem discovery and solving means that students can take the initiative to ask questions and use critical thinking to analyze and solve problems. Students need to have keen observation skills and the ability to think independently and be able to discern the authenticity and reliability of information, as well as discover deficiencies and contradictions. Judgment and evaluation refer to students' ability to make objective, accurate, and evidence-based evaluations of information, ideas, and theories. This requires students to have solid professional knowledge and extensive information literacy and be able to judge its rationality and feasibility.

Table 2 Defined in Critical Thinking

Name	Year	Research	Mention
Ennis	1962	A concept of critical thinking	Defines critical thinking as involving reasonable and reflective thinking which focuses on deciding what to believe or do.

Name	Year	Research	Mention
Willingham	2007	Critical thinking: Why is it so hard to teach?	Views critical thinking as seeing both sides of an issue and not being satisfied with a settled perspective. It is 'open to new evidence that disconfirms your ideas, reasoning dispassionately, demanding that claims be backed by evidence, deducing and inferring conclusions from available facts, solving problems'.
Paul & Elder	2008	Critical Thinking: Concepts and Tools	See critical thinking as the art of 'analyzing and evaluating a thought with a view of improving it'.
Siegel	2009	Open-mindedness, Critical Thinking, and Indoctrination: Homage to William Hare	Critical thinking embodies rationality on the basis of open-mindedness.
Chui	2009	Facilitating Asian students' critical thinking in online discussions	Critical thinking involves critical examination of a statement by examining 'its assumptions, the accuracy of supportive evidence and the logical reasoning advanced in reaching conclusions, with sensitivity to situated contexts'. It is a process of continuous progressive thinking.
Boltanski	2013	New Spirits of Capitalism? Crises, Justifications, and Dynamics	Critical thinking is a skill that may have implications for the attainment of social goals.
Howard et al.	2015	Teaching critical thinking skills: ability, motivation, intervention, and the Pygmalion Effect	As a higher-order thinking habit that questions assumptions, critical thinking is described as 'thinking about thinking', thus a process of metacognition.

2.3.2 The Measure of Critical Thinking

Critical thinking skills involve the capacity to effectively evaluate and judge the subject under scrutiny, based on techniques and strategies of examination, inspection, and decision-making. The Delphi Reportidentifies the cognitive skills at the heart of critical thinking as elucidation, analysis, evaluation, inference, explanation, and self-regulation(Facione, 1990). Many scholars recognize and further elaborate on these components of critical thinking. Wang, W. (2004) for instance, highlights key aspects like problem identification, information gathering, data analysis, evidence evaluation, distinguishing between facts, personal claims, logical judgments, drawing general rules, articulating inferences clearly, and maintaining an open mind without letting personal beliefs hinder understanding. Several tools have

been developed to measure these critical thinking skills, like the Watson-Glaser Critical Thinking Appraisal (WGCTA), California Critical Thinking Skills Test (CCTST), Collegiate Learning Assessment (CLA), California Critical Thinking Disposition Inventory (CCTDI) et al. These tools are instrumental in evaluating and fostering critical thinking abilities in educational contexts.

Table 3 Measures of Critical Thinking

Tool	Developed by	Dimensions
Watson-Glaser Critical Thinking Appraisal (WGCTA)	Watson & Glaser	1. Inference 2. Recognition of assumptions 3. Deduction 4. Interpretation 5. Evaluation of Arguments
Collegiate Learning Assessment (CLA)	Ennis & Millman	1. Inductive reasoning 2. Deductive reasoning 3. Identification of assumptions 4. Evaluation of arguments 5. Credibility of sources
California Critical Thinking Disposition Inventory (CCTDI)	Peter & Noreen	1. Truth-seeking 2. Open-mindedness 3. Analyticity 4. Systematicity 5. Critical thinking self-confidence 6. Inquisitiveness 7. Maturity of judgment
California Critical Thinking Skills Test (CCTST)	California Academic Press	1. Analysis 2. Evaluation 3. Inference 4. Deductive reasoning

2.3.3 Critical Thinking Skills Play an Important Role in SHE

Critical thinking skills can also cultivate students' critical attitudes and humanistic concerns. Students can promote sustainable development in the hospitality industry through the application of critical thinking, focusing on social and environmental sustainability. Incorporating sustainability into hospitality education emphasizes practical application through diverse methods like case studies, guest lectures, individual programs, and reflective internships, enabling students to explore sustainability's impact on local and global scales. Such experiences are pivotal for

understanding sustainable practices within hospitality operations, fostering analytical and critical thinking, and preparing students as future sustainability advocates in their careers. This educational approach, underpinned by research (Goh et al., 2017; Phi & Waldesten, 2021; Berjozkina & Melanthiou, 2021), also aims to influence students' professional trajectories and commitment to sustainable.

2.3.4 Summarize

This study selected the Chinese Version of Critical Thinking Disposition Inventory (CTDI-CV), which was translated and revised by Meici Peng et al. The CTD-CV contains 70 items, retaining the seven aspects of critical thinking measured by the CCTDI. Each trait contains 10 items, with 30 positive items and 40 negative items. The content validity (CVI) of the CTDI-CV is 0.89, and the Cronbach's a value is 0.90. The main reasons for choosing CTDI-CV are: (1) The vocabulary used in the questionnaire was adopted through focus group discussions to ensure that students can understand the meaning; (2) 16 of the items have contextual descriptions or the wording takes into account the Chinese cultural value of humility, so that students can better grasp the key points measured by each item; (3) CTDI-CV simplifies the calculation and scoring procedure of CCTDI, but the score is equal to CCTDI, and it is highly operational.

Critical thinking is a crucial component of Sustainable Hospitality Education (SHE), where it serves as a vital skill for students navigating the multidimensional challenges of sustainability in the hospitality industry. This cognitive ability enhances students' capacity to analyze, evaluate, and synthesize complex information pertaining to the ecological, economic, and social aspects of sustainability. The importance of critical thinking in SHE is underscored by its role in fostering rational judgment, promoting innovative problem-solving, and facilitating responsible decision-making in hospitality management.

Scholars have defined critical thinking as involving various cognitive processes such as reasoned decision-making, open-mindedness, and evidence-based reasoning. These definitions collectively highlight the skill's fundamental role in improving thought processes and contributing to effective educational outcomes. Critical thinking in the context of SHE not only aids in understanding the intricate balance required to meet current hospitality needs without compromising future

resources but also prepares students to address and manage environmental and social challenges effectively.

Furthermore, the methodologies to measure critical thinking, such as CTDI-CV, are instrumental in assessing and developing these skills within educational settings. These tools help educators identify critical thinking capabilities and guide the integration of targeted educational strategies to enhance these skills among hospitality students, ultimately preparing them for future roles as leaders in sustainable hospitality practices.

2.4. Developing Programs

2.4.1 Leonard Nadler's Critical Event Model

Leonard Nadler's Critical Events Model is a significant concept in the field of training. Introduced in the 1960s, Nadler's model serves as a tool for assessing training needs and planning career development strategies. The core of this model is identifying and analyzing specific events or experiences that have a decisive impact on a career. It is often used in training and development contexts to enhance the effectiveness of learning by focusing on these pivotal experiences. It's a tool for reflection and learning, helping individuals understand how these events shaped their skills, knowledge, and professional attitudes. Key elements of Nadler's Critical Events Model include:

Event Identification: The model emphasizes identifying key events that have significantly impacted an individual's career growth and development. These could include important job experiences, challenges, successes, or failures.

Analysis and Reflection: The Critical Events Model encourages in-depth analysis and reflection on these events to understand their impact on an individual's skills, knowledge, attitudes, and behaviors.

Personal Development: Through the analysis of critical events, individuals can identify their strengths and developmental needs, leading to the creation of effective career development plans and training strategies.

Organizational Development: At an organizational level, Nadler's model can guide employee development and training programs, especially in identifying training needs for key roles or positions within the organization.

Continuous Learning and Adaptation: The model emphasizes the need for individuals and organizations to adapt to new challenges in a constantly changing work environment, promoting continuous learning and improvement through the identification and reflection on critical events.

Source: Nadler, L. & Nadler, Z., (1940) *Designing Training Programs: The Critical Events Model*, Gulf Publishing Co. Houston, Texas.
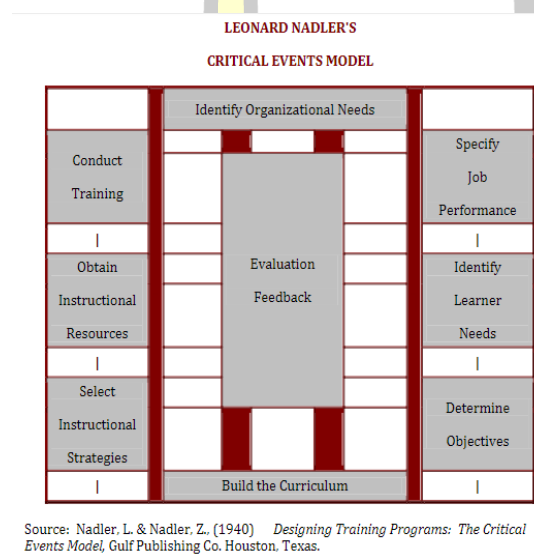
Figure 2. Leonard Nadler's Critical Events Model

2.4.2 Ralph Tyler's Program Development Model

Ralph Tyler's (1949) program development model, often referred to as Tyler's Rationale, is a foundational concept in educational theory. This model is represented as a linear progression from objectives to evaluation, emphasizing systematic planning and assessment in educational program development. It encompasses four basic components:

1）Defining Objectives: Determining the educational objectives or goals of the program.

2）Selecting Learning Experiences: Identifying educational experiences that will achieve these objectives.

3）Organizing Learning Experiences: Systematically organizing these experiences to have a cumulative effect.

4）Evaluating the Program: Assessing the program and revising objectives based on evaluation results.

2.4.3 Conklin's Model

Conklin's (1997) model, often referred to in educational contexts, emphasizes three main elements:

Cognitive Strategies: This involves the mental processes used for learning, understanding, and problem-solving. These strategies are key to how learners process and retain information.

Metacognitive Strategies: This aspect focuses on self-awareness and regulation of one's cognitive processes. It includes planning, monitoring, and evaluating one's own learning.

Social/Affective Strategies: These strategies are concerned with the social and emotional aspects of learning, including interaction with others and emotional responses to learning tasks.
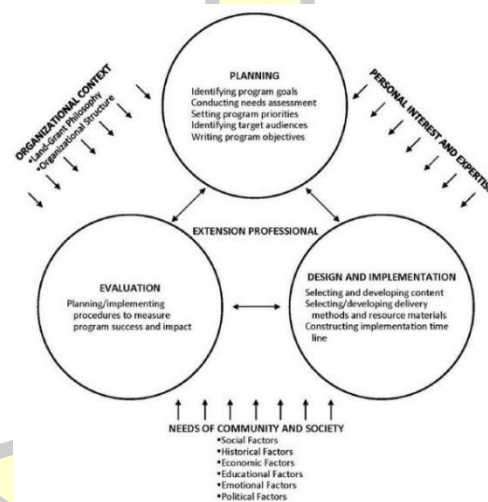
Figure 3. A Basic Program Development Model

Source: Conklin, N. (1997). *University Extension*. Columbus, OH: The Ohio State University.

2.4.4 Hilda Taba Model

The Taba Model, developed by Hilda Taba, is a bottom-up approach to curriculum development. It suggests that curriculum development should start at the classroom level and teachers should be the primary agents in developing curricula. This model emphasizes the active role of teachers in shaping the curriculum based on

their first-hand experience with student needs and classroom dynamics. It involves the following key steps:

1) Diagnosing needs: Identifying the needs and interests of learners.
2) Formulating objectives: Establishing clear curriculum goals based on diagnostic findings.
3) Selecting content: Choosing appropriate educational content.
4) Organizing content: Deciding how to arrange and sequence the content.
5) Choosing learning experiences: Designing learning activities that align with curriculum objectives.
6) Organizing learning experiences: Ensuring that the sequence of learning activities is logical.
7) Determining evaluation methods:Selecting appropriate methods to assess learning outcomes.

2.4.5 Summarize

In the process of reviewing various program development methodologies, multiple models were considered, each offering distinct approaches and focal points in the context of program development. Leonard Nadler's Critical Events Model emphasizes the analysis of pivotal professional experiences to inform training and career development. Ralph Tyler's Program Development Model, established in 1949, provides a linear and systematic framework from setting objectives to evaluation, focusing on educational programs. Conklin's Model introduces cognitive, metacognitive, and social/affective strategies, highlighting the psychological and social dimensions of learning.

After a comprehensive evaluation of these models, the Hilda Taba Model was selected for its distinct bottom-up approach to curriculum development. This model uniquely positions teachers as the central figures in curriculum design, advocating for development initiatives to originate from the classroom level. It stresses the importance of understanding student needs and classroom dynamics firsthand, which is crucial for creating responsive and effective educational programs. The Taba Model's structured yet flexible steps−from diagnosing needs to determining evaluation methods−provide a practical framework that empowers educators to craft curricula

that are both tailored to student requirements and aligned with educational goals. This model was chosen because it not only accommodates the insights of educators who interact directly with students but also supports the dynamic adaptation of educational content and methodologies in response to evolving learning environments and objectives.

2.5.Sustainable Hospitality Education Program

Integration across courses is critical, given the interdisciplinary nature of hospitality education (Jurowski & Liburd, 2001). Deale et al (2009) find that SE in the hospitality context is a highly under-explored area of research and is still in its infancy, although there is strong interest in sustainability, it is not a common component of many hospitality management courses. Boley（2011）agrees that sustainability is finding its place within mainstream curricula in hospitality management courses, rather than being just an interesting alternative. Chawla and Manhas（2015）Call for consideration of innovative approaches to integrating sustainability with traditional hospitality management curricula.

2.5.1 Method of Delivery of Sustainability Modules in Hospitality

The delivery of sustainability modules in education can vary widely, including as stand-alone subjects, integrated within multiple modules, offered as optional courses, or as an overarching concept across the curriculum, reflecting a diverse approach to embedding sustainability in academic programs.

Table 4. Method of Delivery of Sustainability Modules

Author	Year	Mention
Deale&Barber	2012	1. As a stand-alone subject 2. Integrated within multiple modules 3. As a module, but also discussed within others. 4. Optional course, based on students' choice 5. Over-arching concept, the entire curriculum is based on this principle

Author	Year	Mention
Gaurav Chawla	2015	1. Sustainability taught as a stand-alone module 2. Integrated into other modules 3. Taught as a stand-alone module, but also integrated into other courses 4. Taught as an entire course/discipline
Zizka, L.	2017	1. one courses 2. embedded in all courses 3. one elective 4. one program 5. one degree 6. externally

2.5.2 Topics of Sustainable Hospitality Education

Hospitality faculty address a broad spectrum of sustainability topics in their teaching, encompassing environmental, economic, social, and cultural dimensions. This includes sustainable business models, environmental management, waste and resource management, cultural preservation, responsible leadership, and consumer behavior towards sustainability. Boley (2011) advocated an integrated approach in embedding sustainability within all aspects of hospitality education and further noted that this is the "ethical" thing for curriculum developers to do.

Table 5.Sustainability Topics Taught by Hospitality Faculty

Author	Year	Research	Mention
Jurowski & Liburd	2001	A multi-cultural and multi-disciplinary approach to integrating the principles of sustainable development into human resource management curricula in hospitality and tourism	1. environmental sustainability 2. sustainable tourism design and construction 3. waste management 4. economic sustainability 5. cultural preservation and sustainability

Author	Year	Research	Mention
Deale et al.	2009	A descriptive study of sustainability education in the hospitality curriculum	1. Environmental management practices in hotels, Resorts, &Foodservice operations 2. Sustainable tourism design &Construction 3. Waste management 4. Economic sustainability 5. Energy production, Products, &Conservation 6. Cultural preservation & sustainability 7. Social sustainability 8. Water supply, Treatment, &Conservation 9. Natural resource management & conservation 10. Sustainability indicators 11. Environmental impact analysis 12. Environmental law 13. Ecological footprinting 14. Life cycle assessment 15. Environmental auditing
Deale & Barber	2012	How Important Is Sustainability Education toHospitality Programs?	1. Creating sustainable business models 2. Training and education about sustainability 3. Changing consumer behavior and attitudes related to sustainability 4. Purchasing principles related to sustainability 5. Understanding consumer demand related to sustainability
Chawla	2015	Sustainability in Hospitality Education: A Content Analysis of the Curriculumof British Universities	1. Environmentalism 2. Responsible Leadership 3. Regeneration 4. Human/SocialCapital 5. BusinessEthics 6. CorporateGovernance
Zhang &Tavitiya man	2022	Sustainability courses in hospitality and tourism higher education: Perspectives from	Economic 1. Corporate culture issues 2. Sustainable development concepts

Author	Year	Research	Mention
		industry practitioners and students	3. Creating sustainable business models 4. Purchasing principles 5. Pricing policy 6. Food ethics 7. Organic product 8. Training and education 9. Social 10. Understanding consumer demand 11. Consumer behaviors and attitudes 12. Personal ethics and values 13. Legislation and laws 14. Communication systems and consumer privacy 15. Technology 16. Cultural preservation 17. Environmental 18. Environmental policy development 19. Environmental principles 20. Waste management 21. Energy conservation 22. Water conservation 23. Sustainable building 24. Environmental auditing
Tavitiyaman & Zhang	2022	Sustainability Issues and Higher Education in Hospitality and Tourism: Stakeholders' Perspectives	Economic issues 1. Creating sustainable business models 2. Corporate culture issues 3. Sustainable development concepts 4. Pricing policy social issues 5. Legislation and laws 6. Technology 7. Consumer privacy Environmental 8. Energy conservation 9. Environmental auditing 10. Water conservation 11. Sustainable building 12. Waste management 13. Environmental policy development 14. Environmental principles

2.5.3 Teaching Technique

In the realm of traditional education, the emphasis is placed on subject-centered curriculum design and the selection of teaching methodologies that prioritize the structure and comprehensiveness of the knowledge system. Conversely, Sustainable Hospitality Education (SHE) embraces a wide array of teaching techniques that are both diverse and dynamic, fostering interactive and experiential learning. These methods encompass lectures, discussions, case studies, guest lectures, field trips, service-learning programs, and internships, alongside community service programs and experimental learning opportunities. To further enrich students' grasp of sustainability principles and their application within the hospitality sector, the curriculum integrates small-group interactive activities, panel discussions, symposiums, and forums, as well as individual and group programs. Additionally, games or simulations and term papers are employed as pedagogical tools. This multifaceted approach aims to cultivate a deep and nuanced understanding of sustainability among students, preparing them to effectively navigate and contribute to the sustainable evolution of the hospitality industry.

Table 6.Teaching Technique in SHE

Author	Year	Mention
Deale et al.	2009	1. Lecture/discussion 2. case studies 3. guest lecturers 4. field trips 5. Service-learning projects
Deale&Barber	2012	6. Guest Lecturer/Speake Lecture 7. Small-Group Interactive Activities 8. Case Studies 9. Service-learning Activities or Projects 10. Panel/Symposium/Forum 11. Individual Term Paper or Project
Zizka, L.	2017	12. Internships 13. guest speakers 14. community service projects
Tavitiyaman & Zhang	2022	15. Field trip 16. Discussion 17. Lecture 18. Experimental learning 19. Guest lecturer/speaker 20. Case studies 21. Service-learning activities

Author	Year	Mention
		22. Internship 23. Small group interactive activities 24. Group project 25. Group project with a deliverable to a business/organization 26. Game or simulation 27. Panel/symposium/forum 28. Individual term paper or project

2.5.4 Assessment Strategies

In this research, the efficacy of Sustainable Hospitality Education will be assessed by measuring changes in students' environmental attitudes, behaviors, and comprehension of environmental issues in the hospitality management curriculum, utilizing scales that have been validated for reliability and validity. This methodological approach ensures a rigorous evaluation of SHE's impact on fostering environmentally responsible attitudes and behaviors among hospitality students.

Table 7. Assessment Methodological in this Research

Survey Topic	Cronbach's alpha	Statements Assessment	Assessment	Research
Environmental attitudes	α=.84	1. Humans must live in harmony with nature to survive. 2. I am concerned about public health in general. 3. I consider myself in favor of the defense of the environment. 4. Plants and animals have as much right as humans to exist. 5. The balance of nature is very delicate and easily upset. 6. When humans interfere with nature, it often produces disastrous consequences. 7. To maintain a healthy economy, we will have to develop a "steady state" economy where industrial and service	Strongly disagree; Disagree; Agree; Strongly agree	Milfont & Duckitt(2004); Barber et al. (2010)

Survey Topic	Cronbach's alpha	Statements Assessment	Assessment	Research
		8. I am concerned that we will not have enough water to meet our demands. 9. Humans were meant to rule over the rest of nature. 10. Humans are severely abusing the environment. 11. Humans have the right to modify the natural environment to suit their needs.		
Environmental behavior	α=.79	1. I saved water. 2. I picked up litter that was not my own. 3. I purchased refillable products. 4. I walked instead of using the car. 5. I used public transportation instead of the car. 6. I purchased locally produced/grown products. 7. I used my bicycle instead of the car. 8. I purchased biodegradable products. 9. I switched off the heating/air conditioning in unoccupied rooms. 10. I switched off the light whenever leaving a room.	Never; Rarely; Sometimes; Always	Laroche, Bergeron, &Barbaro-Forleo(2001) ; Barber et al. (2010) ; Milfont &Duckitt (2004)
Environmental issues in the hospitality management curriculum	α=.71	1. We need to be aware of these issues. 2. We need to be thoroughly informed. 3. This is essential for the hospitalitycurriculum. 4. Employers will look for this in myeducational background.	Strongly disagree; Disagree; Agree; Strongly agree	Wade (1999)

2.5.5 Summarize

Sustainable Hospitality Education (SHE) is becoming increasingly critical as the hospitality industry navigates its complex role in the global economy and environmental stewardship. Research highlights the industry's significant economic impact, yet also underscores its substantial environmental footprint, driving the need for integrating sustainability into hospitality management curricula. Despite strong interest, sustainability remains underexplored and inconsistently included in many hospitality programs, although it is gradually being recognized as a mainstream component rather than an alternative.

The delivery of sustainability education in hospitality varies widely, ranging from stand-alone subjects to integration across multiple courses, reflecting a diverse academic approach to instilling sustainability principles. Topics covered in SHE are extensive, addressing environmental, economic, social, and cultural dimensions through various educational techniques including case studies, field trips, and service learning, which are aimed at enriching students' understanding and practical application of sustainability.

Current studies advocate for a more pronounced inclusion of sustainability in hospitality education, suggesting that embedding it throughout the curriculum can cultivate an ethical and comprehensive understanding of sustainability issues among future hospitality leaders. This integration aims to prepare students not only to meet the demands of the hospitality industry but also to contribute to the broader sustainable development goals set forth by global initiatives.

2.6.Conclusion

In the context of sustainable development, the advancement of hospitality management education programs is becoming increasingly crucial. This paper aims to enhance the critical thinking skills of Chinese university students by developing sustainable hospitality education programs, ultimately promoting the sustainable development of the hospitality industry in the future. Currently, several issues exist within hospitality education in China. First, traditional programs tend to focus heavily on theoretical knowledge while neglecting the cultivation of students' critical thinking skills. Secondly, there is a general lack of emphasis on the concept of sustainable development in existing hospitality education, which fails to meet the industry's

growing demand for sustainability. Finally, the critical thinking level of Chinese college students remains relatively low, with limited capacity for in-depth analysis and problem-solving, posing challenges for the future development of the hospitality sector. Therefore, the goal of this study is to develop a sustainable hospitality education program specifically aimed at improving the critical thinking abilities of Chinese university students. By enhancing critical thinking, students will be better equipped to understand and address the complex challenges within the hospitality industry, contributing to the long-term sustainability of the field.

2.7. Related Research

2.7.1 Domestic Research

In China, the depth of research on sustainable hospitality education programs remains limited. However, some researchers have started to explore this field and conduct related studies. For instance, one study investigated Chinese college students' attitudes and perceptions toward sustainable hospitality education. The study found that while most students recognized the importance of the field, there was a lack of understanding regarding specific training methods and program designs. Additionally, researchers have begun to study the application of sustainable development concepts in Chinese hospitality education programs. They proposed a program design model centered on sustainable development, which aims to cultivate students' critical thinking skills and awareness of sustainability through the integration of relevant educational content and practical activities.

Despite the growing prominence of sustainable education in hospitality, there remains a noticeable gap in understanding and implementation, particularly within Chinese hospitality universities, where awareness and comprehension appear limited. Piramanayagam et al. (2023) identified this gap through a review of 17 high-quality Scopus journal papers on Sustainable Hospitality Education (SHE), noting a significant lack of empirical research in mainland China. This underscores the critical need for enhanced empirical studies and broader academic engagement in sustainable education within the hospitality sector in China.

2.7.2 International Research

Internationally, numerous researchers have recognized the importance of sustainable hospitality education programs and have conducted relevant studies. For example, a study in the UK explored the design and implementation of sustainable hospitality management education programs aimed at developing students' critical thinking skills and sustainability awareness. The results indicated that the program positively impacted students' cognition and behavior, enhancing their awareness of environmental responsibility and sustainable development.

Similarly, a study in the United States examined sustainable hospitality management education programs for university students. Researchers developed students' critical thinking skills through practical activities and case studies, and they evaluated the program's effectiveness. The findings showed that students experienced significant improvements in their critical thinking abilities and sustainability awareness after participating in the program. Ali et al. (2017) explored the complex relationship between the platform society and sustainable development, discussing how digital platforms, while offering potential benefits for sustainability, also pose significant risks due to their business models and impacts on social and environmental structures.

In summary, both international and Chinese studies have emphasized the importance of sustainable hospitality education programs and provided valuable research insights and suggestions. However, there remain deficiencies in the cultivation of critical thinking among Chinese college students. Therefore, this study should draw lessons from relevant international and domestic research and combine them with the actual context in China to develop a sustainable hospitality education program tailored to Chinese college students. This would enhance their critical thinking skills and advance the sustainable hospitality industry.

CONCEPTUAL FRAMEWORK
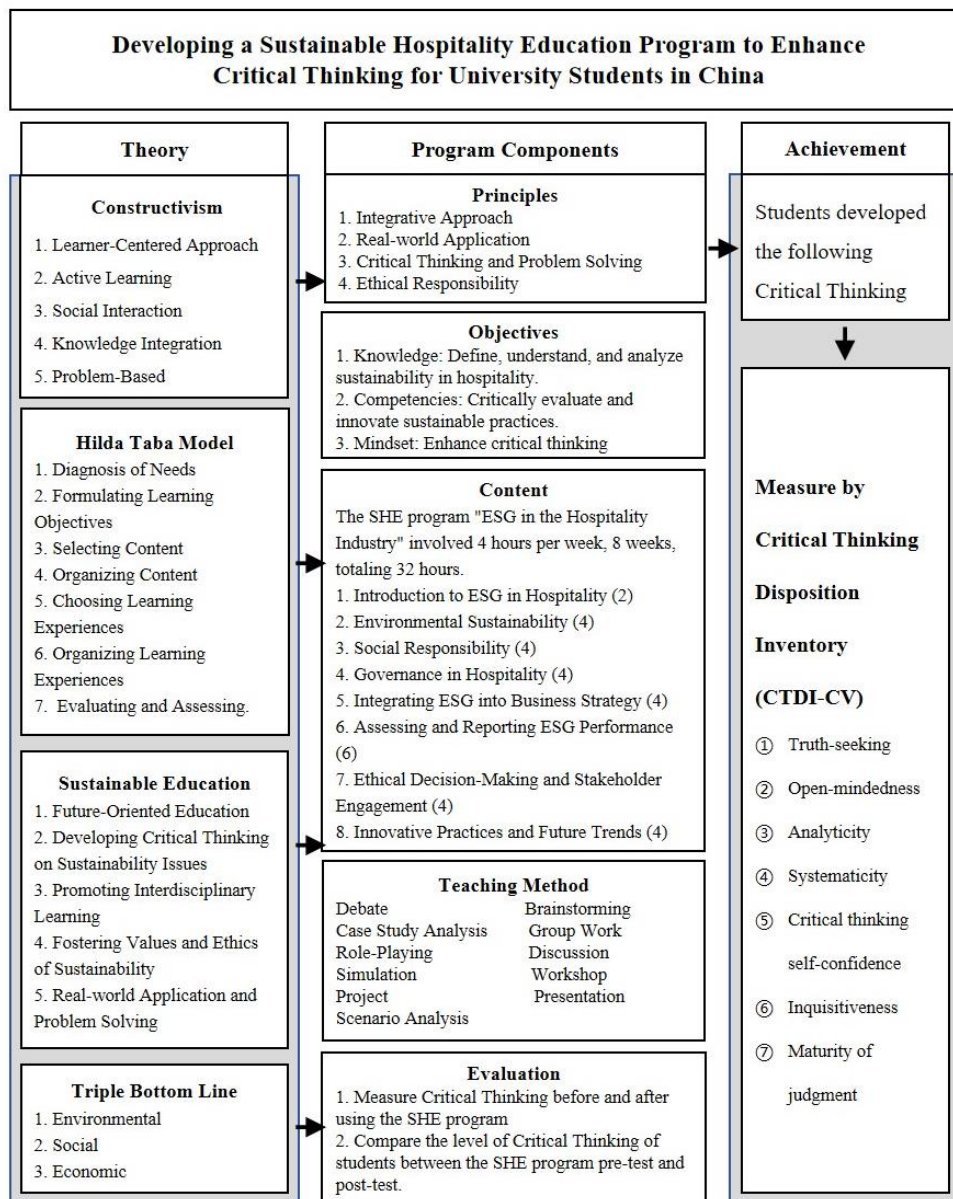
Figure 4. The Conceptual Framework

CHAPTER 3

RESEARCH METHODOLOGY

This research is dedicated to advancing higher education within the realm of hospitality, with the primary goal of integrating sustainable practices and critical thinking into the curriculum for university students in China. It employs the Hilda Taba Model for curriculum development, which emphasizes a bottom-up approach, engaging educators in the curriculum development process. This method ensures that the curriculum is both relevant and effective in meeting the educational needs of students. The process for developing this Sustainable Hospitality Education Program is as follows:

Phase I: Basic Information Study (R1): In this initial phase, theories, concepts, principles, and Components influencing critical thinking in SHE are examined. The focus is on gathering foundational knowledge that will serve as a guideline for program development. This phase employs documentary research and survey research methodologies to collect relevant data.

Phase II: Program Development (D1): Utilizing the data obtained from Phase 1, this phase involves designing and developing the program. A draft program framework is created based on the collected data. The quality of the program construction is assessed through expert evaluation. Additionally, this phase involves identifying instruments for data collection in the subsequent phase.

Phase III: Implementing Program (R2): This phase refers to the implementation of the developed program among the target group of the research, which includes university students in China enrolled in hospitality programs. The effectiveness of the program in enhancing critical thinking is evaluated through pre-test and post-test methods. The results of these tests are used to measure the improvement in students' critical thinking abilities and to make any necessary adjustments to the program.

3.1 RESEARCH FRAMEWORK

This research will introduce and apply research methods such as questionnaires, in-depth interviews, and teaching experiments in detail to scientifically and

comprehensively explore the impact of developing sustainable hospitality education courses on the improvement of the critical thinking ability of Chinese college students. Through in-depth research and analysis, it aims to provide targeted improvement suggestions for the education and training of Chinese college students and make due contributions to the sustainable development of the hospitality education field.
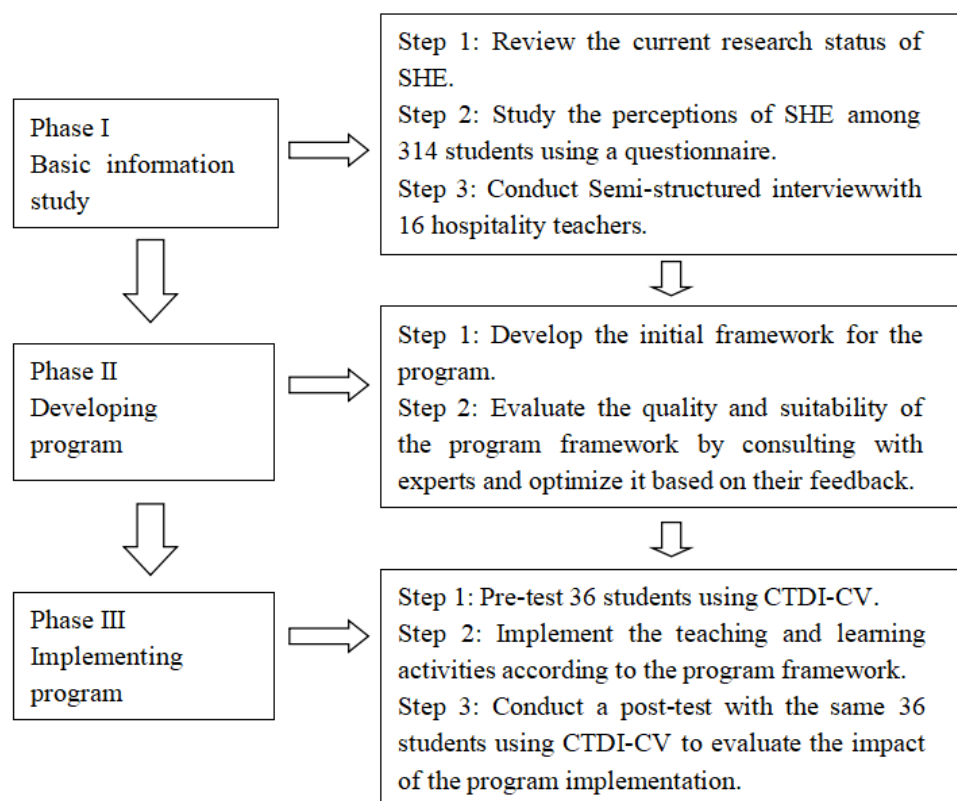
Figure 5 Research Process

This chapter will introduce and apply research methods such as questionnaires, in-depth interviews, and teaching experiments in detail to scientifically and comprehensively explore and develop a sustainable hospitality education program to enhance the critical thinking ability of Chinese university students.

Table 8 Research Phases

Research phase	Objective	Method/Instrument	Data Source - Sampling	Data Analysis	Expectation
Phase I	To evaluate the present status of SHE in China	Learn from relevant research	Articles	Systematic Literature Review	Theoretical framework

Research phase	Objective	Method/ Instrument	Data Source - Sampling	Data Analysis	Expectation
Basic information study		Questionnaire of university students' perspectives on SHE	Students answer the Questionnaire (314 students)	mean, standard deviation	Assess students' overall understanding of sustainability, the importance they attach to such issues in their daily lives
		Semi-structured interview for hospitality teachers	interviewing (16 hospitality teachers)	Content Analysis	Explore teachers' perceptions of SHE
Phase II Developing program	To develop a SHE program aimed at enhancing critical thinking skills among Beijing Hospitality Institute students in China	Using the information obtained from the Phase I study to draft a program framework to promote critical thinking for university students in China.	Data from a study of Phase I	Content Analysis	The first draft of the SHE program framework
	To evaluate the effectiveness of the developed Sustainable Hospitality Education program.	Evaluating the quality and suitability of the program framework	7 experts	Mean, standard deviation	Optimize the SHE program based on experts' feedback
Phase III Implementing program	To execute and assess the implementation of the developed SHE program for Beijing Hospitality Institute students in China.	Critical Thinking Disposition Inventory (CTDI-CV)	36 Junior students in the international track in Hotel Management were selected by purposive and convenient sampling from Beijing Hospitality Institute, China.	Quasi-Experimental design; Dependent sample t-test	Evaluate the impact of the program implementation.

Phase I Basic Information Study

This phase is dedicated to uncovering the existing state and perspectives regarding Sustainable Hospitality Education in China, utilizing a blend of research methods to engage multiple stakeholders and sources.

Step 1 Literature Review

Previous research on sustainable hospitality education has provided valuable insights. Berjozkina & Melanthiou (2021) reviewed publicly available data related to 11 higher education institutions (HEIs) and 14 tourism-related BA programs, focusing on contributions to education and the current situation in Cyprus. Their analysis provided a detailed examination of the specific context of Cyprus and highlighted the practical implications of tourism education programs in local HEIs. Chen et al. (2022) conducted a systematic literature review of 32 articles from 2000 to 2022, focusing on teaching and learning methods, key points, knowledge, and cognitive skills, and supporting structures in sustainable hospitality education. They employed a rigorous systematic literature review methodology and provided comprehensive coverage of teaching and learning methods. Santos et al. (2023) reviewed 113 articles from 1996 to 2021, identifying trends, influence, authors, research areas, and future research directions. This study's extensive sample size provides a broad overview of the field, and the detailed bibliometric analysis highlights research trends and key contributors. However, the study lacks focus on specific educational practices and outcomes, primarily offering quantitative analysis without deep qualitative insights.

A juxtaposition of these literature reviews (Appendix: A Structured Comparison of Related Literature Reviews), reveals several methodological and scopal gaps, including limited geographical scope and generalizability, small sample sizes, methodological rigidity, insufficient qualitative insights, and a focus on specific aspects. To address these gaps and build on the strengths of previous research, the proposed systematic literature review on sustainable hospitality education will integrate and expand upon these dimensions.

1. Data Collection and Filtering

In the pursuit of a rigorous and systematic literature review, our investigation commenced with an exhaustive search of prominent educational databases in June 2024，including Scopus, the Science Citation Index, the Social Science Citation Index, Education Research Complete, Web of Science (WOS), and ScienceDirect (Hwang and Tsai, 2011；Hsu et al., 2012). The search employed a specific query, "Sustainab* AND Hospitality AND Education", targeting keywords within abstracts, which yielded an initial 159 results. The search criteria were then narrowed to include only articles with full texts available in "scholarly (peer-reviewed) journals." Non-English articles were excluded, resulting in a subset of 39 articles. Each abstract was subjected to a thorough review to exclude studies with weak relevance to the research objectives or those that were not empirical. Furthermore, to ensure a focused examination of hospitality education rather than the broader application of sustainability concepts within the hospitality industry, studies not directly related to education were also excluded, reducing the sample to 33 articles. To enhance the comprehensiveness of the literature review, a snowballing technique was utilized, involving the examination of the reference lists of the identified articles for additional relevant works. This approach identified and included an additional 6 articles, culminating in a final sample of 39 papers for the systematic review.
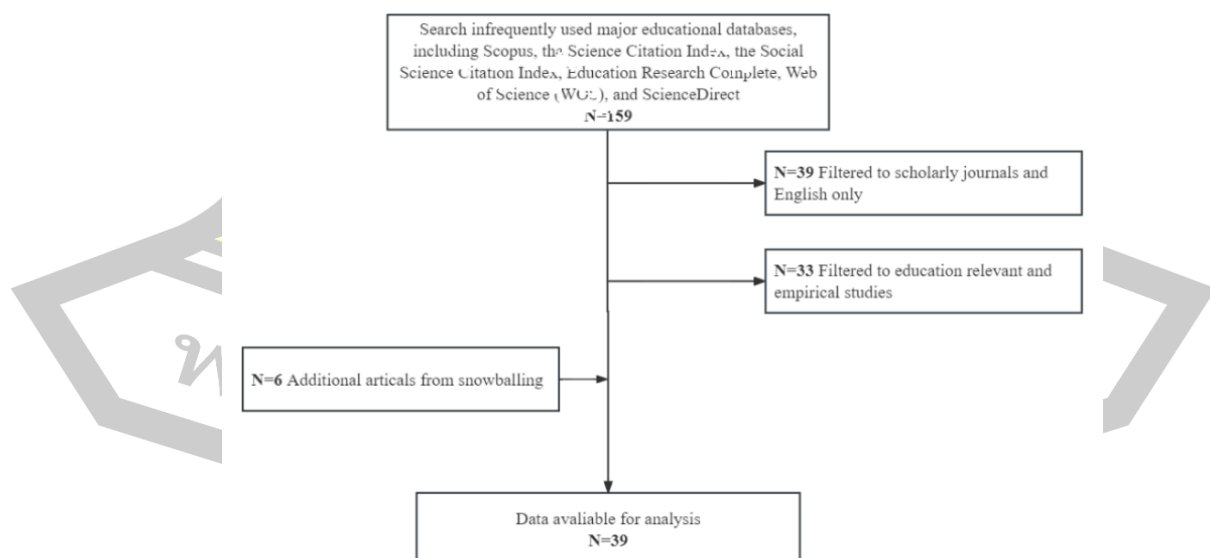
Figure 6. The Data Collection and Filtering Process

2. Coding Scheme

This coding system provides a systematic approach to examining the literature on sustainable hospitality education. Following the screening, we reviewed each paper and recorded the following details: authors, public year, journal, level of education, sample, country/region, research methods, study length, sample size, delivery, and subject domain. Any disagreements were discussed in person until the researchers reached a consensus. By ensuring that every pertinent aspect is consistently and thoroughly analyzed, we aim to gain a deeper understanding of sustainable hospitality education in scientific literature, identifying key trends and insights from the reviewed studies. The categories and codes utilized in this analysis are described in the coding system that follows:

(1) Level of Education Codes

Based on Hwang and Tsai (2011), we categorized participants by their education level: Elementary Education (EE), Secondary Education (SE), Higher Education (HE), Other (O).

(2) Delivery Code

Drawing upon the scholarly work of Zizka, L. (2017), this paper systematically classifies the modalities of sustainability module delivery within the hospitality education sector. For a comprehensive literature review analysis, the following coded categories are proposed: Embedded Across Curriculum (EAC), Elective Course (EC), Stand-alone Program (SP), Integrated Degree (ID), External Delivery (ED), Other (O).

(3) Subject Domain Codes

Drawing inspiration from the subject domain in hospitality established by Thio (2005), we delineate our subject domain as follows: Social Domain (SD), Private Domain (PD), Commercial Domain (CD), and Cross-Domain Issues (CDI).

(4) Research Method Codes

Following the research of Gay et al. (2009), we categorized studies based on their research methods:Quantitative (QT), Qualitative (QL), and Mixed Methods (MM).

3. Bibliometric Analysis

Bibliometric analysis is an important aspect of the study evaluation process, especially in scientific and practical disciplines. It entails a quantitative analysis of

textual articles to discover patterns and trends in scholarly communication (Ellegaard & Wallin, 2015, p. 1809). For this study on SHE, bibliometric analysis will be used to carefully assess various parts of the literature, improving our understanding of the discipline and identifying crucial areas for future research. One unique characteristic of this study is the extensive bibliometric analysis used to provide a thorough and multifaceted overview of the area. Its goal is to uncover critical trends, notable authors and institutions, and emerging research fields, all of which will help to enhance sustainable hospitality education.

Step 2 Questionnaire of Students᾽ Perceptions

To assess university students' perspectives on Sustainable Hospitality Education (SHE), a structured questionnaire was administered to 314 students. The questionnaire aimed to evaluate students' overall understanding of sustainability and the importance they place on these issues in their daily lives. Data collected from the responses were analyzed using statistical measures, including mean and standard deviation, to quantify students' awareness and attitudes towards SHE. This analysis provided a comprehensive overview of students' perceptions and the significance they attribute to sustainability-related topics.

1. Population and Sampling
1.1 Population

The target population for this study comprises both students and faculty members of the Beijing Hospitality Institute in China. Specifically, it includes 3,188 undergraduate students specializing in Hospitality and 78 faculty members who teach courses related to this field. Established in May 2008 and accredited by the Ministry of Education, BHI holds a distinctive position within China's Hospitality education landscape, being one of the few undergraduate institutions in the capital with a specialized focus on this industry. Notably, BHI's Hospitality Management program has been recognized by the Ministry of Education as a "National First-Class Undergraduate Program," further solidifying its reputation as a leader in the field. Additionally, BHI's "Educational Culture System" has been recognized by the China Tourism Association as a model for "Chinese Service" in tourism product innovation, earning the institution the prestigious title of the "Whampoa Military Academy" of the hospitality industry.

The researcher, with 18 years of professional experience in Hospitality education and previous academic and industry background in Hospitality, holds an in-depth understanding of the field. This expertise, combined with the researcher's current role as a teaching supervisor and faculty member at BHI, facilitated smooth access to the target population during the sample collection process. The strong professional relationships and institutional support from both students and faculty members ensured the successful implementation of the study. Given BHI's prominent role in shaping Hospitality education in China, it serves as a representative and relevant case for examining sustainable educational practices within the Hospitality sector.

1.2 Sampling

A stratified random sampling approach was employed to select more than 298 students from the pool of 3188, aiming to reflect the broader student body's diversity accurately. This sample size is determined based on statistical principles to ensure that, with a 95% confidence level, the real value lies within ±5% of the measured value. This sampling design is pivotal in enhancing the representativeness of the sample, thereby ensuring that the findings can be generalized to the entire student population with a high degree of confidence.

To ensure that the data collected from the survey effectively represents the entire population of 3,188 undergraduate students at the Beijing Hospitality Institute, an accurate calculation of the required sample size is imperative. This calculation is based on a predetermined statistical confidence level, margin of error, and the estimated proportion of the attribute present in the population. The formula for sample size calculation is:

$$n = \frac{Z^2 \times p \times (1-p)}{e^2}$$

Where N represents the required sample size, Z corresponds to the Z-score associated with the desired confidence level (set at 95% for this study, hence Z = 1.96), p is the estimated proportion of the attribute in the population (0.5 is used here to maximize the sample size requirement), and e is the acceptable margin of error (set at 5%, i.e., 0.05).

Given the large size of the population, the finite population correction coefficient is applied to adjust the sample size:

$$n_{\mathrm{adj}} = \frac{n}{1+\frac{(n-1)}{N}}$$

Where N is the total population size, which in this study is 3,188. Applying the above formula, the preliminary calculated sample size is:

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384.16$$

Rounding up, we obtain 385. Applying the finite population correction:

$$n_{\mathrm{adj}} = \frac{385}{1+\frac{(385-1)}{3188}} = 298$$

Therefore, to achieve statistical significance and accuracy, this study needs to sample at least 298 students from the pool of 3,188 undergraduate students.

2. Sampling Designs

This study employs purposive and convenient sampling to select a representative sample of more than 298 students from the total population of 3188 Hospitality students at the Beijing Hospitality Institute. Purposive sampling allows researchers to select participants who are specifically knowledgeable about or experienced with the research topic, ensuring the data collected is highly relevant and insightful. Convenient sampling, on the other hand, is advantageous due to its practicality and cost-effectiveness. Additionally, leveraging technology can streamline the sampling process, reducing the time and complexity involved.

3. Instrument

Structured questionnaires (See Appendix: Questionnaire of University Students' Perspectives) were distributed to students at participating universities. The questionnaires included a mix of open- and closed-ended questions. List questions and Likert rating-type questions were included to obtain numerical data. A total of 17 questions covering a range of issues were asked. The questions include students' characteristics, cognition, attitude, preference towards SHE. These aspects are pivotal in understanding the landscape of SHE among university students in China.

3.1 Validity

The questionnaire's alignment with the sustainability curricula in hospitality management, as per Chawla and Manhas (2015), ensures its content validity. This alignment confirms the instrument's capacity to accurately measure students' perceptions and attitudes toward sustainability, mirroring the actual educational aims and content. The Index of Content Validity (IOC) further assesses its scientific robustness and applicability, involving expert evaluation for enhanced content relevance.

3.2 Reliability

Reliability is substantiated through Cronbach's alpha, reflecting a 95% confidence level and indicating a high internal consistency among items. This consistency affirms the instrument's ability to reliably capture the intended constructs across various data collection instances. A pilot test with 30 participants supplements the reliability assessment, ensuring the questionnaire's practical validity and its efficacy in measuring Sustainable Hospitality Education perspectives accurately.

3.3 Evaluation

To ensure the validity and reliability of the "Questionnaire of University Students' Perspectives," the researcher utilized the Expert Evaluation Form detailed in the Appendix. Esteemed experts were invited to review the questionnaire, which is designed to assess students' perspectives on Sustainable Hospitality Education (SHE). The evaluation used a scoring system where a +1 indicated that the question met the objectives, 0 indicated uncertainty, and -1 indicated that the question did not meet the objectives. Each question was evaluated by seven experts, and the Inter-Observer Consensus (IOC) score was computed for each item. As a result, Items 1 to 8, 10, 11, 12, 13, 14, 15, and 16 received IOC scores indicating they met the objectives and were deemed valid. Item 9, with an IOC score of 0.57, was identified as needing revision due to lower consensus among experts.Expert Suggestions:
Addition of a Discriminative Question: To differentiate between students majoring in Hospitality Management and those in other fields, a new question will be added to the first section of the questionnaire.

Revision of Understanding Question: Question 4, originally "Do you understand the concept of Sustainable Hospitality Education?" will be revised to

"Have you heard of the concept of Sustainable Hospitality Education?" to better capture students' prior exposure to the concept.

New Question on Learning Willingness: A new question, "Are you willing to learn about hospitality sustainable education-related information?" will be included to assess students' openness to learning more about SHE.

Adjustment of Interest Question: Question 4 in the second section will be modified from "What are the main topics of Sustainable Hospitality Education that you have been exposed to?" to "What aspects of Sustainable Hospitality Education interest you?" to better gauge students' interests.

Modification of Learning Channels Question: Question 5, originally "Through which channels do you learn about Sustainable Hospitality Education?" will be revised to "Which channels can help you learn about sustainable hospitality education?" Additionally, the options "Parents or relatives" and "Classmates or friends" will be combined into "Relatives and friends with industry background."

Question Consolidation: Question 10, "In your opinion, how important is sustainable hospitality education for future work?" and Question 11, "In your opinion, is sustainable development important to enterprises?" are considered redundant. The questionnaire will retain only one of these questions to avoid repetition.

Language and Formality Adjustments: The language throughout the questionnaire will be adjusted to use informal pronouns ("you" instead of "you") to create a more approachable tone for students.

This comprehensive evaluation and subsequent revisions aim to enhance the clarity, relevance, and effectiveness of the questionnaire. The expert feedback has guided targeted improvements, ensuring that the questionnaire accurately captures students' perspectives on SHE and aligns with the research objectives before its final distribution.

3.4 Pre-Test

The pre-testing phase involved administering the "Questionnaire of University Students' Perspectives" to a sample of 32 university students before its full-scale distribution. This preliminary phase aimed to identify and address any issues related to the clarity, relevance, and effectiveness of the questions. By analyzing the participants' responses, the researcher assessed whether the questionnaire effectively captured the

intended data and whether the questions were easily understood. Feedback from these pre-test participants provided valuable insights, leading to necessary revisions and improvements. This process ensured that the final version of the questionnaire was valid, reliable, and well-suited for a broader distribution within the study population.

4. Measurement

Questionnaires allow for the efficient collection of data from a broad sample of university students, offering quantifiable insights into their perspectives on SHE. This method ensures a wide-reaching analysis of student attitudes and knowledge.

The Participant Recruitment Process will follow these 4 steps:

1) Identification: Establish inclusion and exclusion criteria based on research aims, targeting BHI students for surveys and faculty involved in sustainable hospitality education for interviews.
2) Outreach: Utilize BHI's communication channels (bulletins, emails, social media) by the Student Affairs Department to engage interested participants.
3) Screening: Verify eligibility through campus ID verification, excluding students majoring in non-hospitality management
4) Consent: Disseminate comprehensive study information and secure informed consent from participants.

5. Data Collection

The data collection process for the Questionnaire of Students' Perceptions involved a structured and systematic approach, ensuring comprehensive data gathering and analysis. The process began with one week dedicated to designing the questionnaire, focusing on formulating questions that accurately capture students' understanding and attitudes toward Sustainable Hospitality Education (SHE). Following this, another week was allocated for expert evaluation, including the Index of Item-Objective Congruence (IOC) and pre-testing to refine the questionnaire based on expert feedback and pilot responses. Subsequently, the finalized questionnaire was distributed to 314 students over one week, during which participants provided their responses. The data collection phase culminated with an additional week devoted to compiling and organizing the collected data, ensuring its accuracy and completeness. This meticulous process facilitated the effective assessment of students' perceptions

and the statistical analysis of their responses, employing measures such as mean and standard deviation to derive meaningful insights.

6. Data Analysis

In this study, data analysis for questionnaires utilized SPSS to perform descriptive and inferential statistics, applying basic statistical functions such as descriptive statistics, means, and standard deviations. Initially, all primary datasets were meticulously coded and organized into Excel spreadsheets for preliminary analysis. These datasets were then imported into SPSS, where descriptive and inferential statistical analyses were conducted, including the use of means and standard deviations to understand the data's central tendencies and variability. Furthermore, inferential techniques assessed significant correlations between variables. Additionally, qualitative data from open-ended questions underwent codification and quantitative analysis, allowing for a comprehensive examination of both quantitative and qualitative aspects of the data. This integrated approach ensured a thorough exploration of the research questions, blending statistical rigor with deep qualitative insights.

Step 3 Semi-structured Interview for Hospitality Teachers

The study involves conducting semi-structured interviews with 16 hospitality teachers. Through these interviews, qualitative data will be collected and analyzed using content analysis. This approach will provide a comprehensive understanding of educators' perceptions and experiences, offering valuable insights into the integration and effectiveness of sustainable practices in hospitality education. The semi-structured interview guide comprises a series of carefully formulated questions aimed at eliciting in-depth insights into the dynamics of SHE. Specifically, the interviews seek to understand educators' definitions of 'sustainability' or 'SHE,' identify courses or modules that currently incorporate SHE content, and uncover the barriers encountered in implementing SHE within their teaching. Furthermore, the guide explores recommended strategies to overcome these barriers, the role of critical thinking in enhancing student learning and engagement in SHE, and potential methods to foster critical thinking skills during SHE implementation.

Adopts a mixed-methods approach, integrating qualitative and quantitative analyses to examine the current landscape of Sustainable Hospitality Education (SHE) in China.

Phase 1 of the research through an enhanced approach to data collection and analysis, ensuring a comprehensive understanding of the landscape.

1. Population and Sampling
1.1 Population

The target population for this study comprises both students and faculty members of the Beijing Hospitality Institute (BHI) in China. Specifically, it includes 3,188 undergraduate students specializing in Hospitality and 78 faculty members who teach courses related to this field. Established in May 2008 and accredited by the Ministry of Education, BHI occupies a distinctive position within the landscape of Hospitality education in China. It is one of only undergraduate institutions in capital with a dedicated focus on Hospitality. BHI's "Educational Culture System" has been recognized and endorsed by the China Tourism Association as an exemplary model of "Chinese Service" in tourism product innovation. This recognition has earned BHI the prestigious title of the "Whampoa Military Academy" of the hospitality industry. The demographic characteristics of BHI's students and faculty are central to the research question, highlighting the importance of their perspectives in understanding and advancing sustainable educational practices within Hospitality education.

1.2 Sampling

For the faculty component, purposive sampling was utilized to select several instructors involved in or knowledgeable about Sustainable Hospitality Education (SHE) for semi-structured interviews. This method facilitates an in-depth exploration of faculty perceptions regarding the integration of SHE into current teaching programs and identifies perceived barriers and facilitators to SHE implementation. Additionally, organizing a lecture on Sustainable Hospitality Education was chosen through purposive sampling, prioritizing students with a keen interest in the subject matter. This selective approach aims to garner detailed insights into student demands and feedback on sustainable education courses, further enriching the study's data pool.

Based on the recommendations by experts such as Patton (2015), the ideal number of participants in qualitative research typically ranges from 15 to 30 for a homogeneous group. Considering the total number of hospitality faculty at the

Institute is 78, the lower threshold is sufficient to achieve saturation while ensuring manageability and depth of the engagement in the interviews.

For this study, purposive sampling will be used to select participants who are directly involved in teaching hospitality-related subjects or who have substantial experience in hospitality education. This method allows for the selection of individuals who can provide the most pertinent and profound insights into the phenomena being studied.

Given the homogeneous nature of the group and the depth required to understand their perspectives on hospitality education, a sample size of approximately 20% of the population is proposed. This equates to approximately 16 faculty members, which aligns with the guidelines for achieving data saturation in a qualitative study within a specialized domain of study.

2. Sampling Designs
The sampling design for interviewing teachers about their perceptions of SHE barriers and facilitators utilized purposive sampling. This approach involved selecting seven educators with expertise or involvement in SHE, ensuring that the individuals chosen could provide rich, relevant insights into the research question. Purposive sampling is recognized for its relevance, flexibility, and efficiency in data collection, allowing for the selection of information-rich cases that directly contribute to understanding the research topic. This method is particularly effective in qualitative studies where in-depth exploration is required, making it ideal for investigating complex educational phenomena within resource-constrained settings.

3. Instrument
This semi-structured interview intricately combines educational and statistical methodologies to explore educators' perspectives on SHE's facilitators and barriers. This instrument, through its demographic information section and a series of open-ended questions, aims to elicit rich qualitative data that provide insights into the dynamics of sustainability in hospitality education. It's crafted to allow respondents to share subjective experiences and perceptions, thereby enriching the understanding of how sustainability is integrated into curricula and identifying strategies to enhance SHE's effectiveness and relevance in both academic and professional realms.

3.1 Validity

The instrument's adaptation from Gozde Sezen-Gultekin and Turkan Argon's work ensures its content validity for studying Sustainable Hospitality Education (SHE). It incorporates both demographic and 6 open-ended questions aimed at understanding SHE's barriers and facilitators, aligning with the curriculum's sustainability aspects and capturing varied perspectives on sustainability.

3.2 Reliability

To establish the reliability of the instrument, the interview questions were rigorously reviewed by five experts with expertise in language teaching, hospitality, and education. The review focused on ensuring linguistic, scientific, and structural validity. Experts evaluated the interview questions using a detailed Expert Evaluation Form, which assessed the following criteria:

1) Content Relevance: Whether the questions comprehensively cover key areas of the research topic and are closely related to the research objectives.
2) Clarity of Expression: Whether the questions are clearly and accurately expressed, and whether any terms or concepts may lead to misunderstanding.
3) Structure and Logic: Whether the structure of the question outline is logically clear, well-organized, and whether the questions are arranged in an appropriate logical order.
4) Cultural Appropriateness: Whether the outline considers cultural differences and contextual appropriateness, and whether any content needs localization.

Each criterion was rated on a 5-point scale, from 1 (strongly disagree) to 5 (strongly agree). The expert evaluations confirmed the appropriateness and relevance of the questions, ensuring their reliability through a consensus among the experts. This process validated the instrument's capacity to effectively measure the intended constructs and maintain academic rigor.

4. Measurement

Following a comprehensive review of the literature and an assessment of the current landscape in sustainable education, 16 educators with significant involvement in this field were identified for participation. With the obtained consent from these

participants and adherence to ethical standards, in-depth, semi-structured interviews were conducted. These sessions took place in quiet, designated areas within the university, such as meeting rooms or unused classrooms, ensuring a conducive environment for thoughtful reflection and discussion.

5. Data Collection

The data collection process for the Semi-structured interview for hospitality teachers involves a methodical approach starting with participant recruitment and screening, followed by the administration of surveys and semi-structured interviews to gather both quantitative and qualitative data. This is complemented by rigorous examination and follow-up to ensure data integrity and address any uncertainties, embodying a comprehensive strategy to assess the instrument's effectiveness and gather insights into the study's focus area. 1 week to initiate participant recruitment and conduct eligibility screening. 2 weeks to carry out semi-structured interviews with participants, employing a systematic approach to gather in-depth qualitative data. Undertake a comprehensive examination of collected data. Conduct any necessary follow-up to clarify ambiguities or gather additional information, adhering to rigorous analytical standards.

6. Data Analysis

The data collection process for the Contextual Study involves a methodical approach starting with participant recruitment and screening, followed by the administration of surveys and semi-structured interviews to gather both quantitative and qualitative data. This is complemented by rigorous examination and follow-up to ensure data integrity and address any uncertainties, embodying a comprehensive strategy to assess the instrument's effectiveness and gather insights into the study's focus area.1 week to initiate participant recruitment and conduct eligibility screening. 2 weeks to carry out semi-structured interviews with participants, employing a systematic approach to gather in-depth qualitative data. Undertake a comprehensive examination of collected data. Conduct any necessary follow-up to clarify ambiguities or gather additional information, adhering to rigorous analytical standards.

6.1 Index of Objective Congruence Analysis

The Index of Objective Congruence (IOC) is a statistical measure designed to evaluate the degree of alignment between the educational objectives of BHI and the expectations of domain experts.

The IOC is computed as follows:

$$IOC = \frac{\sum R}{N}$$

IOC— Index of Objective Congruence

$\sum R$—Sum of Expert Scores

N—Number of Experts

Where:

- Sum of Expert Scores is the total of all ratings given by experts on specific objectives.
- N represents the number of experts who participated in the evaluation.

This formula offers a direct measure of consensus among experts regarding the program's alignment with its intended outcomes.

6.2 Basic Statistical Analysis

In addition to the IOC, basic statistical measures will be employed to further analyze the data collected through the study. These measures include:

6.2.1 Mean (Average Value of the Sample)

The mean score for each item assessed will be calculated to provide a central point of the data distribution. This average score represents the typical opinion of experts concerning the educational program's objectives.

$$\bar{X} = \frac{\sum X}{n}$$

$\bar{X}$—The average value of the sample

$\sum \bar{X}$—The sum of the average value of the samples

n—Number of samples

To encapsulate the overall expert opinion across multiple parameters, the sum of the mean scores for all assessed items will be determined. This aggregated measure helps in understanding the collective viewpoint of experts on the program's objectives.

6.2.2 Standard Deviation

The standard deviation will be used to assess the variability or dispersion of expert opinions around the mean. It highlights how much individual opinions differ from the average expert opinion.

$$S.D = \sqrt{\frac{\sum (X_i - \overline{X})^2}{n-1}}$$

S.D--Standard deviation

X—Each data of the sample

$\bar{X}$—The average value of the sample

n—Number of samples

A smaller standard deviation suggests a strong consensus among experts, whereas a larger standard deviation indicates a broader range of opinions.

Phase II Developing program

This phase focuses on the creation and refinement of a Sustainable Hospitality Education (SHE) program designed to enhance critical thinking among university students in China. Drawing from the foundational insights gathered in Phase 1, this phase proceeds as follows:

Step 1 SHE Program Development

Leveraging the data and findings from Phase I, a preliminary SHE programs framework will be drafted. This framework aims to systematically integrate sustainability concepts within hospitality education, with a particular focus on

fostering critical thinking skills among students. The development process will involve synthesizing the qualitative and quantitative data collected previously to outline the core components, learning outcomes, and teaching strategies of the SHE program. Content analysis will be employed to ensure the program aligns with the identified needs, gaps, and facilitators of SHE as understood from the perspectives of students and educators.
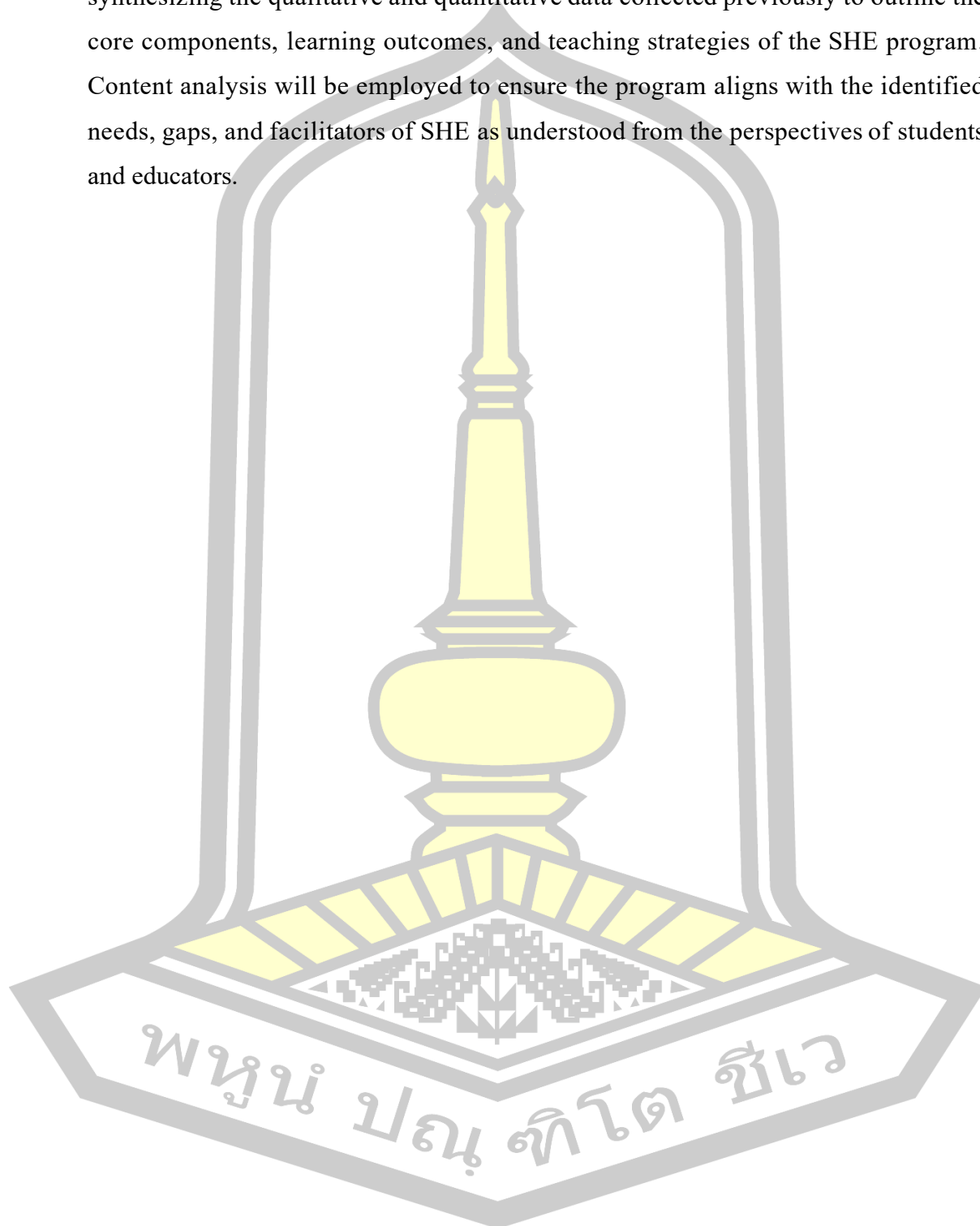
Table 9. Theories, Principles, and Application Components Applied during Program Development

Theory/Model	Principle	Component	Application
Constructivism	Active learning	Interactive discussions	Facilitate debates on sustainability topics
Critical Thinking	Reflective thinking process	Critical thinking exercises	Engage students in evaluating sustainability case studies
Sustainable Education Theory	Holistic understanding of sustainability	Interdisciplinary modules	Develop courses that cover economic, environmental, and social aspects of sustainability
The Triple Bottom Line	Sustainability in three parts: economic, environmental, social	Case studies on sustainable practices	Incorporate analysis of real-world businesses' sustainability efforts
Hilda Taba Model	Program development from general to specific	Program design activities	Design a program that integrates critical thinking into SHE
Adult Learning Theory	Learner-centered approach	Experiential learning programs	Create programs that allow students to explore sustainability issues personally
Bloom's Taxonomy	Hierarchical learning	Critical thinking exercises	Develop assignments that require analysis and evaluation
Social Learning	Observational learning	Peer learning activities	Implement group programs on sustainable practices

Step 2 Program Evaluation

The initial draft of the SHE program framework will undergo a rigorous evaluation process involving a panel of 7 experts in the fields of hospitality education and sustainable development. This panel includes a diverse mix of professionals: 2 experts specializing in hospitality education, 2 experts from the hospitality industry, 1 expert in sustainability, and 2 experts in program and instruction design. This selection aims to encompass a broad spectrum of insights and expertise, ensuring that the program is assessed from multiple relevant perspectives. These experts will assess the program's quality, relevance, and potential effectiveness in promoting critical thinking. The evaluation will be based on a set of criteria developed from Phase 1 insights, focusing on the program's comprehensiveness, pedagogical soundness, and alignment

with sustainability education goals. Mean and standard deviation calculations will be used to quantify the experts' feedback, facilitating the identification of areas for improvement.

The outcome of Phase II is the production of a refined SHE program framework, incorporating expert feedback to enhance its quality and suitability for implementation. This phase aims to ensure that the developed program is both theoretically grounded and practically viable, capable of effectively integrating sustainability and critical thinking into hospitality education in China. The modified SHE program framework will serve as a blueprint for the subsequent phase of piloting and further evaluation within the university context.

Phase III Implementing Program

This phase is dedicated to the implementation of the Sustainable Hospitality Education program and the assessment of its impact on university students' critical thinking skills. Employing the CTDI-CV as the main instrument, this phase aims to quantify changes in students' critical thinking dispositions resulting from their participation in the SHE program.

1. Population and Sampling

The refined SHE program, developed in Phase II, will be introduced to a cohort of hospitality students. The program will be integrated into the existing curriculum at the Beijing Hospitality Institute, China, aiming to infuse critical thinking and sustainability concepts into students' learning experiences. The program will include various pedagogical strategies such as case studies, program-based learning, and reflective practices designed to engage students actively and promote deeper understanding and application of sustainability in the hospitality sector. The Hospitality major at BHI encompasses several disciplines, including Hotel Management, Human Resources Management, Financial Management, Marketing, Health Services and Management, and Finance. For this phase of the study, we selected the hospitality major as it is the most representative and influential discipline within BHI. Established at the inception of the institute, the Hospitality program was designated as a National First-Class Construction Pilot Unit by the Chinese Ministry of Education in 2021, underscoring its significant impact on the industry. Furthermore, since 2020, the program has offered an international track. It refers to a specialized

pathway or set of courses designed with an international focus, the purpose of offering an international track is to prepare students for a globalized job market, providing them with the skills and knowledge needed to navigate and succeed in an international setting.

This study focuses on junior students enrolled in the international track of the Hospitality Management program at BHI. There are 39 students in total in this cohort, and 36 were selected to participate in the educational experiment using purposive and convenient sampling methods. The rationale for selecting this sample size is based on achieving a high level of statistical confidence. Specifically, a sample size of 36 students ensures a 95% confidence level that the true population parameter is within ±5% of the measured value (Cochran, 1977). This sample size is sufficient to provide reliable and valid results for the research study, allowing for generalization of the findings to the larger population of students within the program.

2. Sampling Designs

The sampling design for the implementation phase involves purposive and convenient sampling of 36 Junior students in the international track in hospitality major from the Beijing Hospitality Institute, chosen for their potential to provide meaningful insights into the SHE program's impact on critical thinking. This design facilitates a targeted approach to selecting participants who are most likely to experience the intended outcomes of the SHE program, enabling an effective examination through a quasi-experimental design. The use of the CTDI-CV and a dependent sample t-test allows for a precise measurement of changes in students' critical thinking dispositions. However, the selection method may limit the generalizability of the findings across a broader student population, as it does not randomly sample from the entire population of hospitality students.

3. Instrument

A group of 36 Junior students in the international track in Hospitality major will be selected to participate in the program through purposive and convenient sampling methods. These students will undergo a pre-test and post-test evaluation using the CTDI-CV to measure their critical thinking disposition before and after the implementation of the SHE program. The CTDI-CV, a standardized tool designed to assess the inclination of individuals to engage in critical thinking, will provide

valuable insights into the effectiveness of the SHE program in enhancing critical thinking skills.

Table 10. Quasi-experimental

Group	Pre-test	Treatment	Post-test
Experiment	01	X	02

4. Construction and Quality of Instrument

In this study, the construction and quality of the instrument were assessed using the CTDI-CV, a well-established scale for evaluating critical thinking dispositions. The rigorous development and widespread academic acceptance of the CTDI-CV support its validity and reliability in measuring critical thinking dispositions. To determine the suitability of this instrument for assessing critical thinking abilities among Chinese university students in the SHE program, seven experts were consulted. The experts completed an evaluation form (see Appendix: Expert Evaluation Form for Assessing the Validity of the Critical Thinking Adaptability Test Tools), and an Item-Objective Congruence (IOC) analysis was conducted based on their feedback. The results indicated a high level of usability and appropriateness, meeting the study's requirements. Its application within a quasi-experimental design framework enables a robust evaluation of the SHE program's impact on students' critical thinking skills, providing a solid methodological foundation for assessing the program's effectiveness.

5. Measurement and Data Collection

At this stage, the principles of destination and convenience sampling will be followed. The participant recruitment process includes three links of "Solicitation - Registration - Review" to select 36 Junior students in the international track in hospitality from BHI. With the consent of the BHI Student Affairs Department, students who can complete the program implementation will be awarded the BHI SHE Certificate. This program will ensure a systematic, ethically responsible approach to collecting meaningful data, respecting the contributions of participants, and adhering to academic standards for education and statistical research.

Table 11. Implementation Timeline

Step	Duration	Activities
1	1 weeks	Undertaking participant recruitment and eligibility screening.
2	8 weeks	Implement the program as per the designed framework and methodologies.Data Analysis and Follow-Up
3	2 weeks	Review collected data and conduct any necessary follow-up actions to ensure comprehensive understanding and accuracy of findings.

During research, engagement and motivation levels among students and faculty regarding SHE initiatives may fluctuate. To maintain high engagement levels, we will:

1) Leverage university channels for disseminating information about sustainable hospitality education, highlighting its significance for the industry's future.
2) Offer program certification to incentivize participation, alongside organizing a recognition ceremony for contributors.
3) Engage industry experts in program activities to enrich the learning experience and pique student interest.
4) Incorporate incentives during lectures and program activities to foster a vibrant and interactive learning environment.

6. Data Analysis

A quasi-experimental design will be employed to compare the pre-test and post-test scores of the CCTDI. The dependent sample t-test will be used to analyze the data, allowing for the determination of statistically significant differences in students' critical thinking dispositions as a result of their participation in the SHE program. This analysis will provide empirical evidence regarding the impact of the SHE program on fostering critical thinking abilities among hospitality students. The findings will contribute to the ongoing development and refinement of SHE programs, ensuring they are effectively tailored to meet the educational needs of students in the field of hospitality and promote the integration of sustainability and critical thinking into

higher education.To analyze the collected data, the following statistical methods were applied:

6.1 Index of Objective Congruence Analysis

The Index of Objective Congruence (IOC) is a statistical measure designed to evaluate the degree of alignment between the educational objectives of BHI and the expectations of domain experts. The IOC is computed as follows:

$$IOC = \frac{\sum R}{N}$$

IOC— Index of Objective Congruence

$\sum R$—Sum of Expert Scores

N—Number of Experts

- Sum of Expert Scores is the total of all ratings given by experts on specific objectives.
- N represents the number of experts who participated in the evaluation.

This formula offers a direct measure of consensus among experts regarding the program's alignment with its intended outcomes.

6.2 Basic Statistical Analysis

6.2.1 Mean and Standard Deviation

Initially, the mean (average) and standard deviation (S.D.) were calculated for the CTDI-CV scores both pre- and post-implementation of the SHE program. These descriptive statistics provide a summary of the central tendency and dispersion of the scores, offering insights into the overall critical thinking disposition of the students before and after the intervention.

$$\bar{X} = \frac{\sum X}{n}$$

$$S.D = \sqrt{\frac{\sum (X_i - \overline{X})^2}{n-1}}$$

6.2.2 Dependent Sample T-test

To evaluate the effectiveness of the SHE program, a dependent sample t-test was conducted. This statistical test is used to compare the means of two related groups to determine if there is a statistically significant difference between them. In this context, the pre-and post-SHE program CTDI-CV scores of the same students were compared.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s^2}{n}}}$$

The mean and standard deviation provides an initial overview of the data, indicating the general disposition towards critical thinking among the BHI students before and after the SHE program. The dependent sample t-test further allows for a rigorous assessment of the program's impact.

A statistically significant difference in the CTDI-CV scores post-SHE program implementation would suggest that the program has effectively enhanced the critical thinking skills of the participants. Conversely, a lack of significant difference would indicate that the program's impact on critical thinking disposition is minimal or requires further investigation.
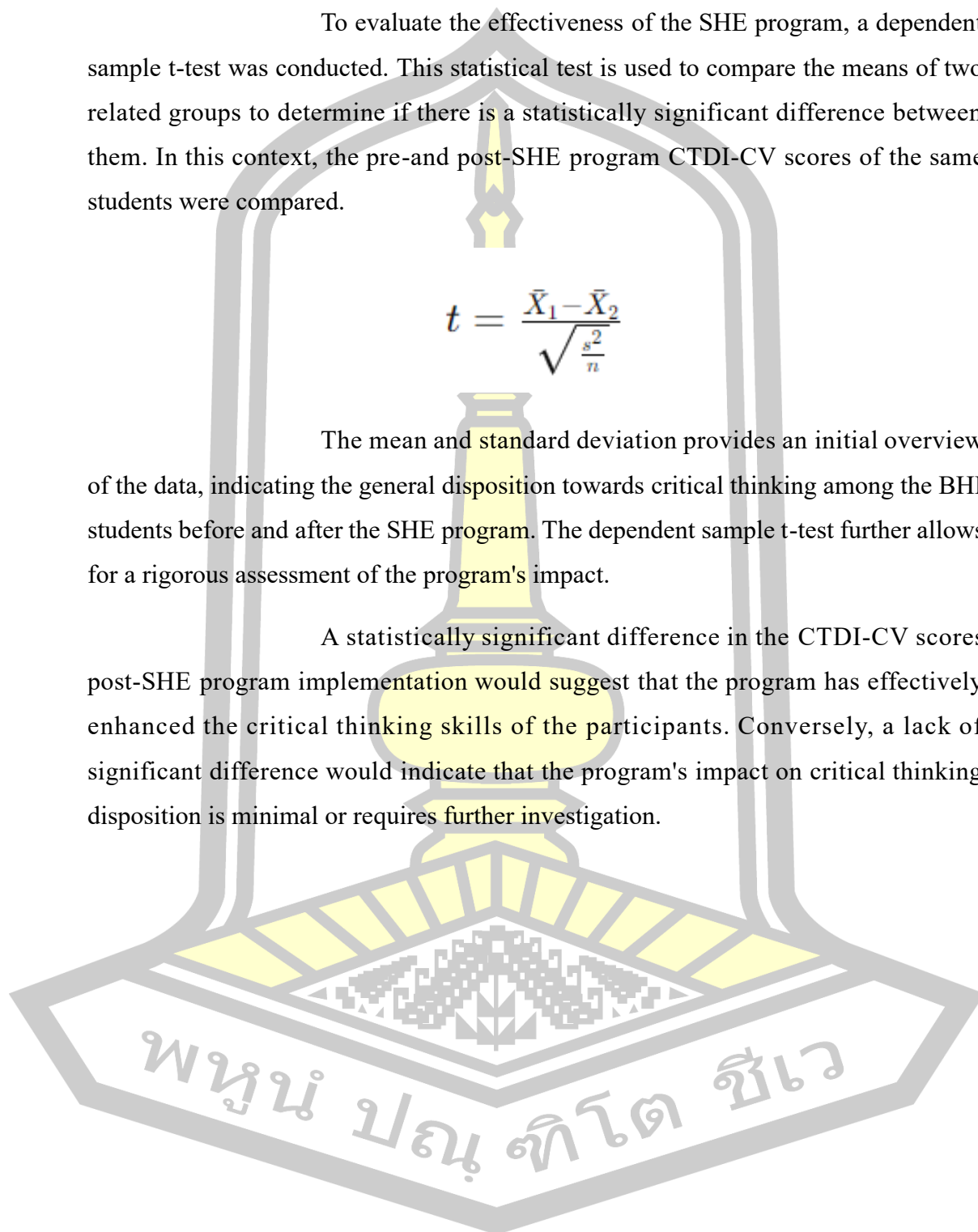
CHAPTER 4

DATA ANALYSIS RESULTS

4.1   What is the current state of Sustainable Hospitality Education in China?

To gain a comprehensive understanding of the current state of Sustainable Hospitality Education (SHE) in China, it is essential to explore the topic from multiple angles. This section will be organized around three key aspects. First, we will conduct a detailed review of the existing research on SHE, highlighting the key trends, insights, and gaps in the literature. Second, we will examine the perceptions of university students, focusing on their awareness, attitudes, and engagement with sustainable practices in hospitality education. Finally, we will analyze the perspectives of teachers, considering their experiences, challenges, and strategies in implementing SHE. Together, these three perspectives will offer a well-rounded view of the current landscape of SHE in China, providing a foundation for future development in the field.

4.1.1 Review the Current Research Status of SHE

The review will encompass a broader geographical and temporal scope, ensuring greater generalizability and relevance. It will combine systematic literature review and bibliometric analysis to provide both qualitative and quantitative insights, offering a detailed analysis of teaching and learning methods, curriculum design, and practical applications in sustainable hospitality education. This approach will provide a more holistic understanding of sustainable hospitality education by integrating diverse methodologies and expanding the scope. The review will offer actionable insights for educators and policymakers to improve sustainable hospitality education programs, identify gaps, and suggest future research directions to advance the field.

Previous research on sustainable hospitality education has provided valuable insights. Berjozkina & Melanthiou (2021) reviewed publicly available data related to 11 higher education institutions (HEIs) and 14 tourism-related BA programs, focusing on contributions to education and the current situation in Cyprus. Their analysis provided a detailed examination of the specific context of Cyprus and highlighted the practical implications of tourism education programs in local HEIs. Chen et al. (2022)

conducted a systematic literature review of 32 articles from 2000 to 2022, focusing on teaching and learning methods, key points, knowledge, and cognitive skills, and supporting structures in sustainable hospitality education. They employed a rigorous systematic literature review methodology and provided comprehensive coverage of teaching and learning methods. Santos et al. (2023) reviewed 113 articles from 1996 to 2021, identifying trends, influence, authors, research areas, and future research directions. This study's extensive sample size provides a broad overview of the field, and the detailed bibliometric analysis highlights research trends and key contributors. However, the study lacks focus on specific educational practices and outcomes, primarily offering quantitative analysis without deep qualitative insights. A juxtaposition of these literature reviews (Appendix: A Structured Comparison of Related Literature Reviews), reveals several methodological and scopal gaps, including limited geographical scope and generalizability, small sample sizes, methodological rigidity, insufficient qualitative insights, and a focus on specific aspects. To address these gaps and build on the strengths of previous research, the proposed systematic literature review on sustainable hospitality education will integrate and expand upon these dimensions.

4.1.1.1 Global Growth, Thematic, and Emergent Trends in SHE Research

1) Development Patterns Over Time

The overall trend shows a steady increase in the number of publications over the past two decades, indicating growing academic and practical interest in sustainable hospitality education. Recent years have seen a broader range of topics being explored, including detailed analyses of teaching methodologies, curriculum design, and the impact of sustainability practices on hospitality education outcomes. The analysis also suggests a widening geographic distribution of research efforts, with contributions from various countries and institutions, reflecting the global importance of sustainability in hospitality education. The volume and focus of publications in sustainable hospitality education have shown notable trends and milestones over the past two decades, as evidenced by the publication dates of 39 key articles in the field.
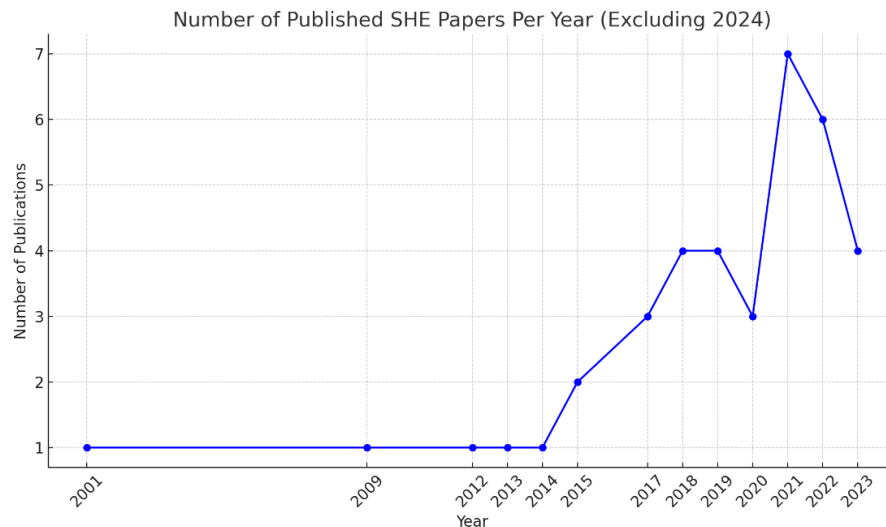
Figure 7. Number of Published SHE Papers per Year

2）Journal Identification

A total of 39 journals have contributed to SHE research, amongst which the top 4 are depicted in Table 13. They stand out as top SHE journals due to their interdisciplinary scope, academic rigor, relevance to current issues, global reach, and supportive scholarly communities. These factors collectively contribute to their prominence and effectiveness in publishing research in the field of Sustainable Hospitality Education. Sustainability stands out with 8 articles, reflecting its focus on sustainable practices across various disciplines. Hospitality & Tourism Education and Hospitality, Leisure, Sport & Tourism Education follow, with 6 and 4 articles respectively, highlighting their specialized focus on education within the hospitality sector. Teaching in Travel & Tourism contributes 3 articles, emphasizing pedagogical approaches within the tourism industry.

Table 12. Top Contributing Journals in SHE

Journal Name	No. of Articles	JCR	SJR 2023
Sustainability	8	Q 1	0.67
Hospitality & Tourism Education	6	Q 2	0.6
Hospitality, Leisure, Sport & Tourism Education	4	Q 1	1.05
Teaching in Travel & Tourism	3	Q 2	0.46

Note: JCR = Journal Citation Reports; SJR = Scientific Journal Rankings.
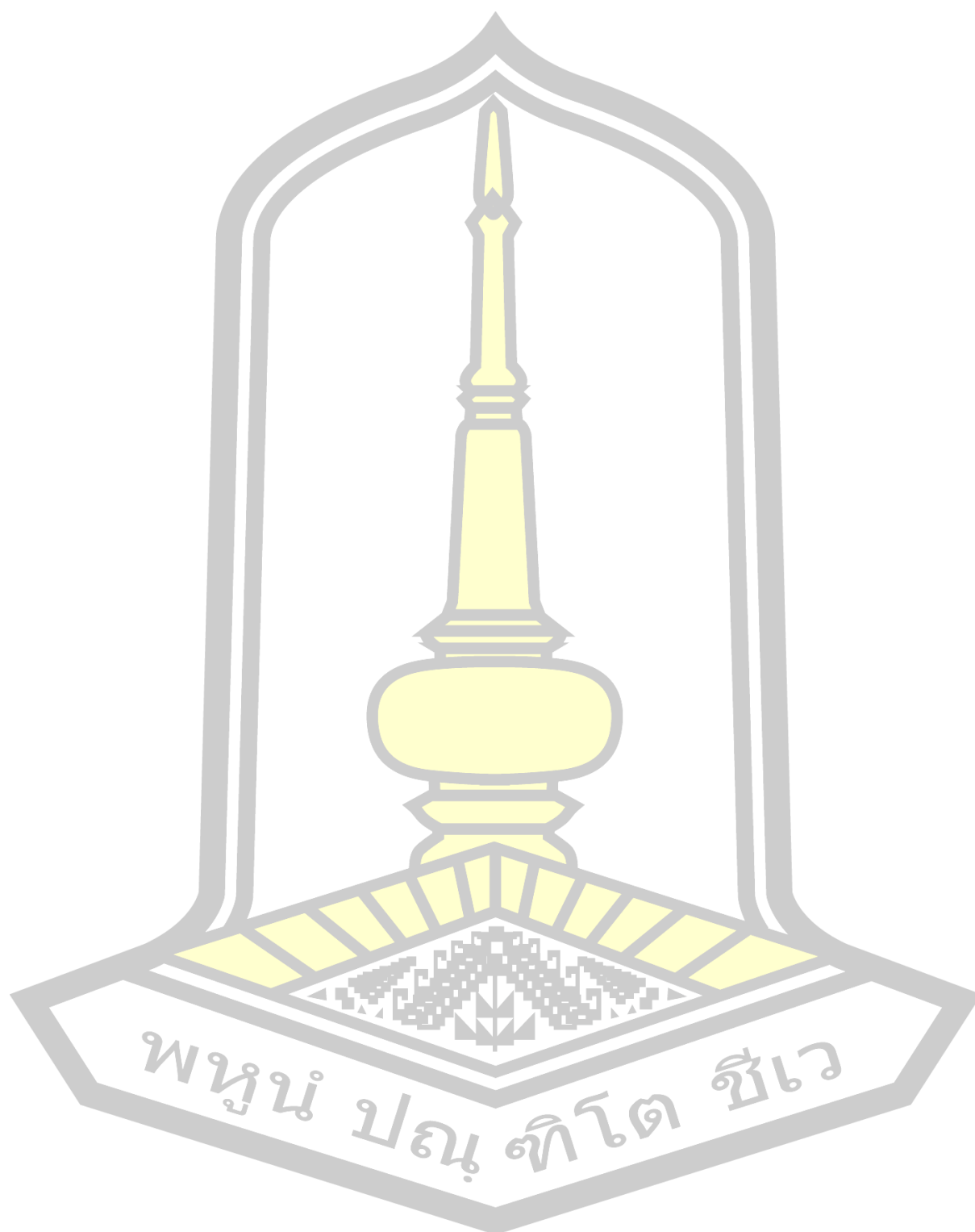
3）Geographic Distribution

The research shows that SHE is a worldwide relevant topic, with major contributions from China, Turkey, and several other countries, as well as six global studies. It is important to clarify that in this study, the terms "country" and "region" relate to the locations where SHE practices are applied, not the authors' home countries or regions. This diversified geographical distribution of research highlights the widespread acknowledgment of the value of sustainability in hospitality education. The top contributing countries/regions are making significant contributions to the discipline through research.
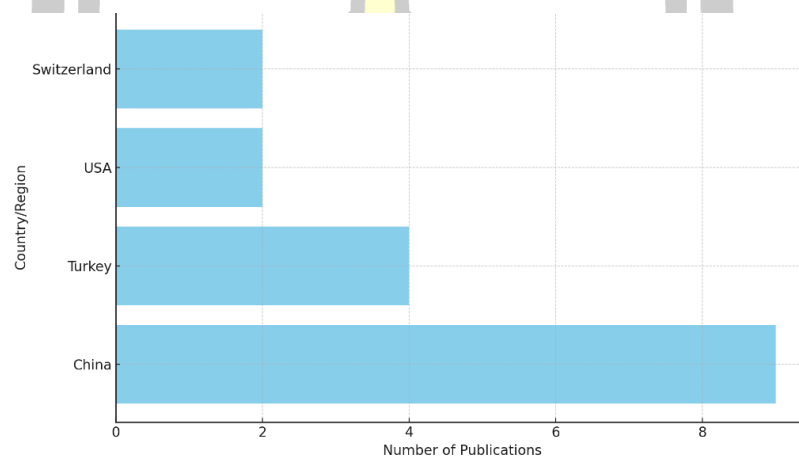
Figure 8. Top Contributing Country/Region in SHE

4）Keywords

Upon meticulous examination of the keywords extracted from 39 studies, we have delineated the thematic and emergent trends within the discourse on SHE. The visual representation of these keywords, as depicted in the word cloud (Figure 8), accentuates the most recurrent terms that are intrinsically linked to sustainability and educational practices within the hospitality and tourism sectors. The prominence of each term in the word cloud is directly proportional to its frequency of occurrence in our data set. The thematic areas within SHE are undergoing a dynamic evolution, with scholarly inquiry progressively embracing an interdisciplinary methodology. This approach amalgamates insights from the realms of education, management, environmental sciences, and a multitude of other disciplines. In the wake of globalization, there is a marked trend of collaborative research endeavors among

scholars hailing from diverse geographical regions, united in their pursuit to enhance sustainable practices in hospitality education.

Our analysis indicates that the research is bifurcated between theoretical inquiry and practical application. There is a discernible emphasis on not only the exploration of conceptual frameworks but also the cultivation of students' operational competencies and problem-solving acumen. This dual focus underscores the importance of equipping the next generation with the skills necessary to navigate the complexities of the hospitality industry. Furthermore, with the exponential progression of technological advancements, the seamless integration of modern technology into educational curricula has emerged as a salient research priority. This underscores the need for innovative pedagogical strategies that harness the power of technology to foster a more interactive, efficient, and sustainable learning environment.

Figure 9. Word Cloud of Keywords inSHE Research

The evolution of SHE research can be categorized into three main phases: Early Focus, Middle Period, and Recent Trends:

Early Focus (2001-2010): Early research primarily concentrated on the fundamental knowledge and teaching methods of hospitality management education, exploring ways to introduce sustainability concepts.

Middle Period (2011-2020): The research focus gradually shifted towards practical application and skills development, highlighting the importance of soft skills and vocational competencies. With the promotion of global sustainable development

goals, studies began to focus on Education for Sustainable Development (ESD) and global perspectives.

Recent Trends (2021-Present): Recent research has placed greater emphasis on technological integration and innovative teaching methods to promote sustainable education. Studies on gender equality and diversity in hospitality education have also increased, reflecting growing societal attention to these issues.

The bibliometric analysis of SHE researches over the past two decades reveals a clear and sustained increase in the number of publications. This growth trajectory underscores the escalating academic and practical interest in integrating sustainability into hospitality education. The widening geographic distribution of research efforts further indicates the global relevance of SHE. Contributions from diverse countries and institutions reflect the universal importance of sustainability in hospitality education and underscore the collaborative nature of research in this field. The geographic analysis reveals a diverse distribution of SHE research, with significant contributions from China, Turkey, and several other countries, as well as six global studies. This distribution illustrates the widespread recognition of the importance of sustainability in hospitality education across different regions. The research is not confined to the authors' home countries but rather focuses on the locations where SHE practices are applied, demonstrating the global applicability and relevance of the findings. The international scope of SHE research highlights the collaborative efforts of scholars worldwide, united in their pursuit of enhancing sustainable practices in hospitality education. This diversity in research origins underscores the universal appeal and necessity of integrating sustainability into hospitality education curricula. The keyword analysis, depicted in the word cloud, showcases the thematic and emergent trends within SHE research. The most recurrent terms, prominently featured, include "sustainability", "education", "hospitality", "tourism", "management", "curriculum", and "technology". These keywords reflect the central themes and focus areas within the field. The research reveals a dual emphasis on theoretical inquiry and practical application. There is a notable focus on exploring conceptual frameworks alongside the cultivation of operational competencies and problem-solving skills among students. This dual focus underscores the importance of preparing the next

generation with the necessary skills to navigate the complexities of the hospitality industry.

In conclusion, the bibliometric analysis of SHE research highlights significant development patterns, influential journals, diverse geographic contributions, and key thematic trends. These insights provide a comprehensive understanding of the evolution and current state of SHE research, offering valuable guidance for future studies and practical applications in sustainable hospitality education.

4.1.1.2 Diverse Methodological Approaches in SHE Research

1）Research Methods

The review of research methods employed in studies on SHE reveals a diverse and comprehensive approach, encompassing mixed methods (MM), qualitative research (QL), and quantitative research (QT). Mixed methods research, which combines qualitative and quantitative techniques, is frequently utilized to provide a holistic understanding of SHE complexities. Examples include questionnaires paired with interviews (Kiryakova-Dineva et al., 2019), qualitative research combined with case studies (Koblianidze & Sachaleli, 2023), and online surveys alongside focus group sessions (Karakiraz et al., 2021). Qualitative research methods, such as interviews (Millar & Park, 2013; Ali et al., 2017), phenomenological approaches (Sezen-gültekin & Argon, 2022), and case studies (Lo, 2022; Zvereva, 2019; Lampoltshammer et al., 2023), are pivotal in exploring and understanding the intricate experiences and perspectives within SHE. These methods offer in-depth descriptions and interpretations, enriching the understanding of complex social and cultural phenomena. Quantitative research methods, including surveys (Zizka, 2017; Mínguez et al., 2021; Akinci et al., 2018), questionnaires (Chawla & Manhas, 2015; Fuchs, 2022; Akinci et al., 2018), and experimental research (Chen et al., 2021; Chou et al., 2019; Zhang et al., 2020), employ statistical, mathematical, or computational techniques to analyze data, emphasizing objectivity and reproducibility. The use of diverse research methods indicates a multidimensional exploration of SHE, with mixed methods providing comprehensive insights, qualitative research offering depth and richness, and quantitative research supplying empirical support. This multidisciplinary and international collaboration trend enhances the global and diverse

development of SHE research, suggesting that future studies should continue integrating various methods to advance the field.
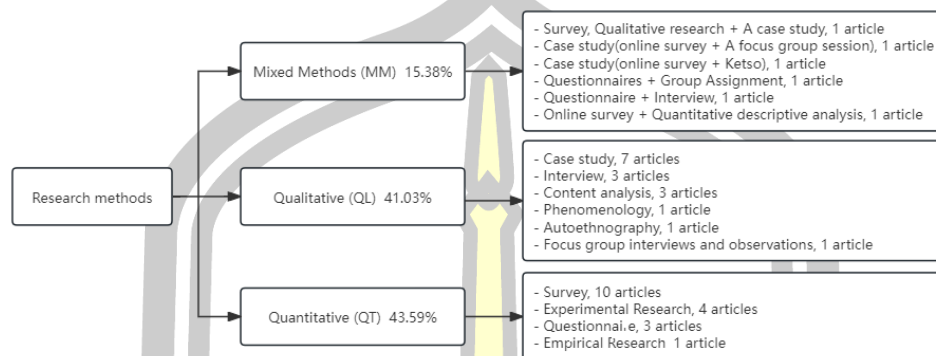

Figure 10 Distribution of Research Methods in SHE Research

2）Level of Education

The diverse methodological approaches and international reach of SHE research highlight its comprehensive and inclusive nature, engaging a wide spectrum of participants from various educational and professional backgrounds. The emphasis on Higher Education (HE) indicates a strong focus on university-level programs and students, with significant contributions from various countries and regions. The inclusion of Secondary Education (SE) and Other (O) categories highlights the interdisciplinary and inclusive nature of SHE research, involving a wide range of participants from different educational and professional backgrounds.

A majority of the SHE studies focus on Higher Education (HE), primarily involving college and university students. For instance, studies conducted by Akdeniz University (Turkey) and Georgian Technical University (Georgia) reflect significant international engagement, with sample sizes of 524 and 675 students respectively. Other notable studies include a Romanian study with 998 participants and a Chinese study with 646 students. Learners in SHE research span various countries, including India, Thailand, Fiji, the UK, the USA, Sweden, and multiple regions in China, indicating a wide geographical distribution of SHE research. Some studies also involve collaboration between students, educators, and industry professionals. For example, one study included 998 participants, comprising 50 teachers and 948 students, demonstrating the involvement of middle and high school students in SHE

research. Additionally, several studies feature participants categorized as Other (O), which include educators, industry professionals, and individuals from non-specified education levels.

3） Sample Size

The sample size data have been meticulously organized into quintiles, reflecting the methodological diversity inherent in SHE research. The data were categorized into five groups based on sample size: less than 50, 50-100, 101-150, 151-200, and greater than 200. This stratification elucidates the breadth and depth of scholarly inquiry within the field, as delineated in Figure 6. The group "Greater than 200," comprising 13 studies, dominates the distribution, signifying an emerging preference for expansive research designs that are likely to yield comprehensive insights into sustainable practices within the hospitality industry. The "Less than 50" group includes 12 studies, suggesting a prevalence of exploratory or niche-focused research endeavors typically initiating new lines of investigation or delving into specialized areas of the hospitality sector.

The distribution of sample sizes not only accentuates the eclectic methodologies employed in SHE research but also underscores the field's evolving academic landscape. The juxtaposition of smaller-scale, targeted studies with larger-scale, ambitious projects reflect a field that is both dynamic and responsive to the multifaceted nature of sustainability in hospitality education. In the realm of SHE, 5 sample size analysis takes on a distinct dimension as the units of analysis are not individuals but courses or educational programs. The categorization of these programs based on their scope and prestige provides a nuanced perspective on the research landscape within SHE, showcasing a range from single courses to international cohorts of top programs. This breadth underscores the dynamic and multifaceted nature of SHE, accommodating various scales of educational initiatives and their approaches to sustainability.
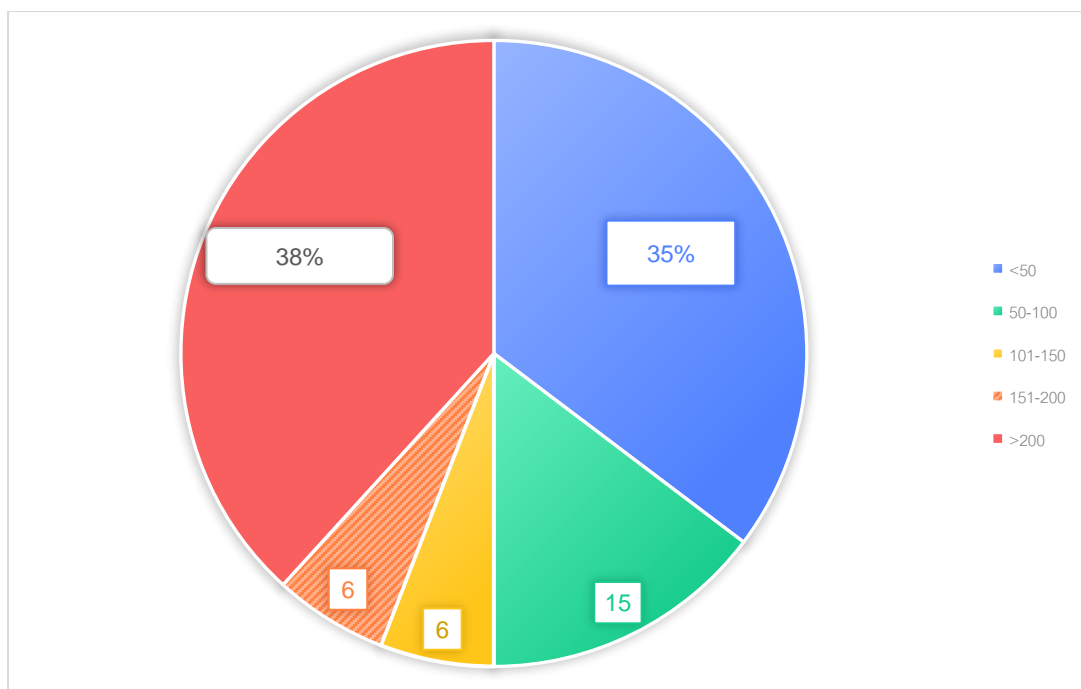
Figure 11 Distribution of Sample Size in SHE Research

4）Research Length

The analysis of research lengths in SHE studies demonstrates a strategic selection of methodologies tailored to specific research objectives. Among the 23 reviewed studies, short-term studies (<1 month) constitute 17.4% (4 studies) and are predominantly quantitative, highlighting a preference for controlled research designs that capture immediate data points and trends. Medium-term studies (1–6 months) account for 43.5% (10 studies) and exhibit the highest methodological diversity, incorporating mixed methods, qualitative, and quantitative approaches. This flexibility allows for thorough data collection and preliminary analysis, suitable for comprehensive evaluations. Long-term studies (6–12 months) represent 26.1% (6 studies), balanced among qualitative, mixed methods, and quantitative approaches, enabling more extensive data collection and deeper analysis. Extended studies (>1 year) make up 17.4% (4 studies) and are predominantly qualitative, emphasizing prolonged observation and data gathering to understand sustainable practices in hospitality education over time.

Figure 12 Distribution of Research Length in SHE Research

The methodological analysis of SHE research highlights a diverse and comprehensive approach, encompassing varied research methods, educational levels, sample sizes, 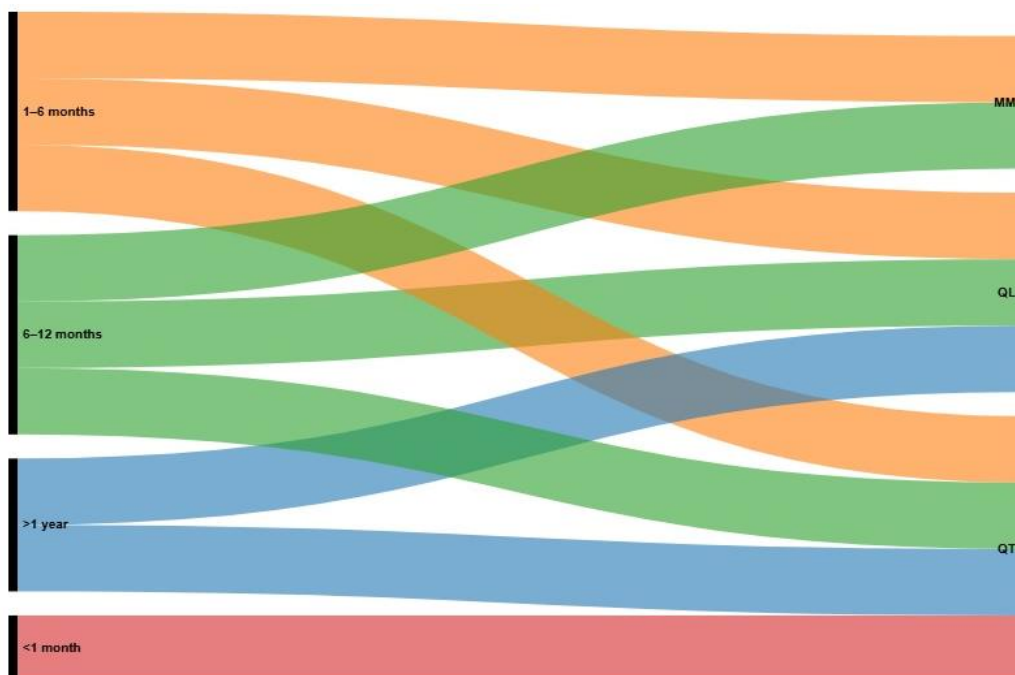and research lengths. This diversity underscores the field's complexity and the multifaceted nature of sustainability in hospitality education, providing a robust foundation for future research and practical applications.

The methodological landscape in SHE research reflects a multidimensional exploration of the field. Mixed methods offer comprehensive insights, qualitative research provides depth and richness, and quantitative research supplies empirical evidence. This multidisciplinary and international collaboration enhances the global development of SHE research, suggesting that future studies should continue integrating various methods to advance the field.

The focus on different educational levels in SHE research underscores its comprehensive and inclusive nature, engaging participants from diverse educational and professional backgrounds. The emphasis on higher education highlights the importance of integrating sustainability into university curricula to prepare future hospitality professionals. Some studies involve middle and high school students, educators, and industry professionals, indicating a wide range of participants. The broad geographical distribution of SHE research, with participants from countries

including India, Thailand, Fiji, the UK, the USA, Sweden, and multiple regions in China, underscores the global relevance and applicability of SHE practices.

The analysis of sample sizes in SHE research reveals methodological diversity, emphasizing the field's evolving academic landscape. The juxtaposition of smaller-scale, targeted studies with larger-scale, ambitious projects reflects a dynamic and responsive field, accommodating various scales of educational initiatives and their approaches to sustainability.

4.1.1.3 Educational Implementation and Focus Domain

1）Delivery

In the examined research sample, 17 papers explicitly outline the delivery modes for sustainability modules within the field of hospitality education. Based on the designed Delivery Code data provided for SHE research articles, the analysis reveals the distribution of delivery modes. Seven Embedded Across Curriculum (EAC) articles emphasize a transformative approach to hospitality education that prioritizes sustainability. These articles advocate for the integration of creative problem-solving, technological proficiency, interdisciplinary collaboration, and global awareness into the educational framework. Four Stand-alone Program (SP) articles present stand-alone programs that comprehensively address sustainability within hospitality education. Three External Delivery (ED) articles demonstrate the use of external delivery modes, such as online platforms and workshops, to extend sustainability education beyond traditional academic frameworks. There are three Single Course (SC) instances where sustainability is delivered through a focused, single course dedicated to the subject.
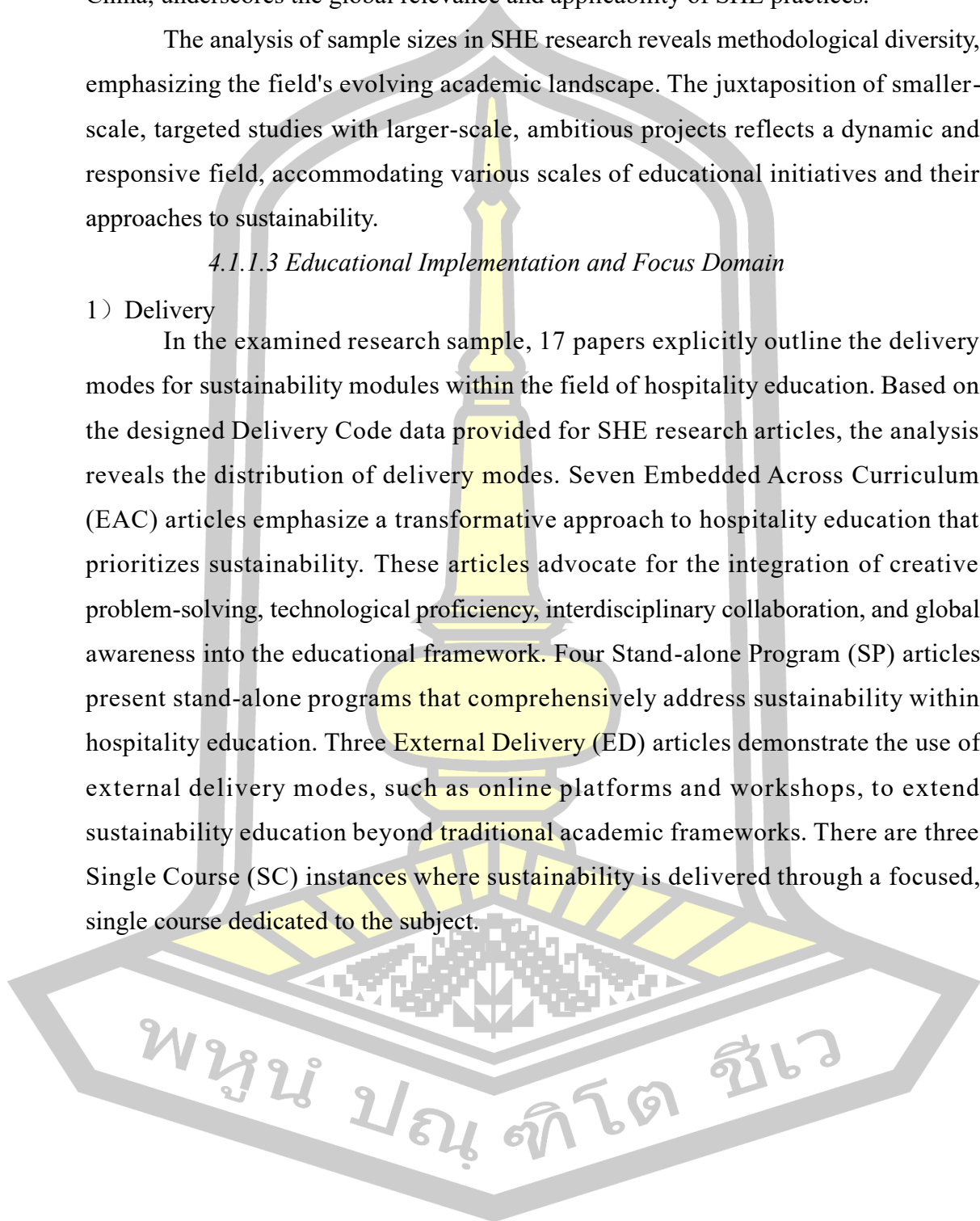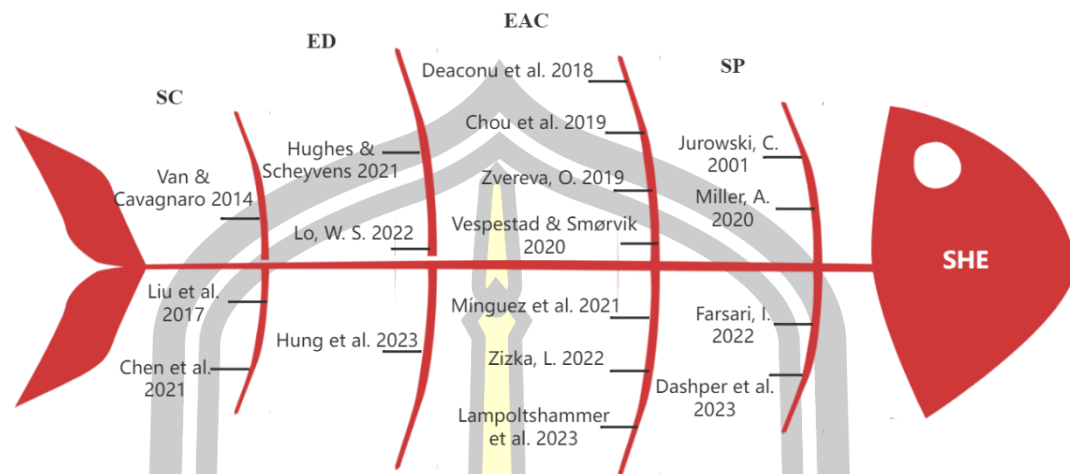
Figure 13 Distribution of Delivery Modes in SHE Research

2）Subject Domain

　　　　Our comprehensive analysis reveals a pronounced emphasis on Cross-Domain Issues (CDI) within the realm of Sustainable Hospitality Education research. This domain, which delves into the multifaceted nature of policy adherence, technological convergence, and their collective influence across the hospitality sectors, stands out as the most thoroughly explored, featuring a robust corpus of 32 scholarly articles. These contributions underscore the paramount importance of grasping and navigating the intricate dynamics between regulatory structures and technological evolutions within the hospitality industry.Moving to the Commercial Domain (CD), which encapsulates the operational, marketing, and human resource facets of business, this domain emerges as the second most prominent, with a modest yet significant presence of 6 articles. The focus here is on the economically driven dimensions of the hospitality industry, championing the pursuit of efficient management practices and pioneering marketing strategies aimed at bolstering business efficacy.In contrast, the Social Domain is represented by a solitary article, indicating a stark underrepresentation in the current body of literature. This domain, which could potentially explore the societal impacts and community engagement aspects of hospitality education, is conspicuously absent from the broader discourse.Furthermore, the Private Domain is notably absent in the current sample, suggesting a significant gap in the literature concerning the private aspects of hospitality education, such as personal development,

individual learning experiences, and the role of private initiatives in shaping the industry.

The analysis of delivery modes in SHE reveals several important trends and implications for the field. The diversity in delivery modes indicates an evolving and dynamic approach to integrating sustainability into hospitality education, each with its distinct advantages and challenges. The prevalence of the EAC approach underscores its effectiveness in providing holistic and continuous exposure to sustainability principles. By embedding sustainability across various courses, this method ensures that students consistently engage with and apply sustainability concepts throughout their education. This integration promotes a deeper understanding and commitment to sustainability, preparing students to address complex environmental and social challenges in their future careers. However, the success of this approach depends heavily on the faculty's ability to cohesively incorporate sustainability into diverse subjects, which may require significant curricular redesign and faculty training. The stand-alone programs highlight their role in offering concentrated and specialized knowledge. These programs are particularly beneficial for students who seek to gain expertise in sustainability without the need to overhaul entire curriculums. Stand-alone programs can act as intensive courses that provide detailed, focused education on sustainability topics. Despite their depth, these programs may lack integrative experience, potentially limiting students' ability to see the interconnectedness of sustainability with other aspects of hospitality. The use of external delivery modes demonstrates the potential of online platforms and workshops to extend the reach of sustainability education. These methods offer flexibility and accessibility, making it possible for a broader and more diverse audience to engage with sustainability content. This is particularly important in an increasingly digital and global educational environment. However, the effectiveness of these modes depends on the quality of online content and the ability to engage students remotely, which can vary widely. The single-course delivery reflects an approach that provides a dedicated focus on sustainability within a specific course. This method allows for an in-depth exploration of sustainability issues and may serve as an important introduction or supplement to broader sustainability education initiatives.

The subject domain analysis reveals a clear focus on Cross-Domain Issues (CDI) within SHE research, which highlights the field's response to the complex and interconnected nature of sustainability challenges. This domain encompasses critical areas such as policy adherence, technological convergence, and interdisciplinary collaboration, all of which are essential for developing comprehensive sustainability strategies in hospitality. The focus on CDI reflects an understanding that addressing sustainability in hospitality requires a broad and integrative approach, considering various regulatory, technological, and operational factors. The extensive exploration of CDI indicates its foundational role in shaping sustainable practices and policies within the industry. Commercial Domain (CD) highlights the importance of operational, marketing, and human resource aspects of sustainability. This focus underscores the need for efficient management practices and innovative strategies to promote sustainability within the commercial operations of hospitality businesses. Addressing sustainability from a commercial perspective ensures that economic viability and environmental responsibility are balanced, which is crucial for the long-term success of sustainability initiatives. The Social Domain, which could explore the societal impacts and community engagement aspects of hospitality education, remains largely unexplored. This gap indicates an opportunity to investigate personal development, individual learning experiences, and the role of private initiatives in promoting sustainability in hospitality education.

4.1.1.4 Summarize

The systematic literature review and bibliometric analysis presented in this paper have illuminated the evolving landscape of SHE. There has been a notable increase in publication volume over the past decades, signaling heightened academic and practical interest in incorporating sustainability into hospitality education. SHE research has a global presence, with contributions from a diverse array of countries, reflecting its universal relevance and the collaborative nature of the field. Keyword analysis identifies central themes such as sustainability, education, hospitality, and technology, which underscore both theoretical exploration and practical application in SHE research. Methodologically, the field is characterized by a diverse array of approaches, including mixed methods, qualitative, and quantitative research, covering various educational levels and sample sizes. This diversity highlights the complexity

of SHE and underscores the importance of interdisciplinary and international collaboration. Educational implementation and focus domain analysis reveal key delivery modes and thematic domains. Delivery modes such as embedded curriculum, standalone programs, online platforms, and single-course modules each present unique benefits and challenges in promoting sustainability education within hospitality. Thematic domain analysis underscores the importance of addressing cross-domain issues, including policy adherence, technological convergence, and commercial operations. This review offers a holistic perspective on the trajectory and current state of SHE research. It provides a solid foundation for future scholarly work and practical initiatives, guiding the development of sustainable hospitality education towards a more resilient and impactful future.

This study has several limitations that should be acknowledged. Firstly, the systematic literature review method has inherent constraints. The selection of databases and search terms might have excluded some relevant studies, potentially introducing bias into the included literature. Additionally, the subjective nature of screening and selecting studies can introduce human error and bias, despite efforts to follow a rigorous and transparent process. Furthermore, this research primarily focuses on the application of sustainable hospitality education within the academic context. As a result, it does not extensively cover the training and professional development initiatives within the hospitality industry itself. Lastly, the diverse methodologies and sample sizes across the included studies pose challenges in drawing consistent and generalizable conclusions. Variations in research design, sample characteristics, and educational levels can result in heterogeneous findings, complicating the synthesis of results.

As we take stock of the progress in SHE, the horizon is ripe with opportunities for transformative growth and innovation. The imperative for the field is to refine curricula through the lens of local contexts, aligning educational strategies with the environmental particularities and societal norms of each region. It is essential that faculty training keeps pace with these adaptations, instilling in educators the competencies to champion sustainable practices within their pedagogy. The nuanced integration of teaching strategies, as underscored by Chano et al. (2023), must be

attuned to the mosaic of educators' convictions, societal mores, and the resource landscape, ensuring that the implementation is both contextually appropriate and effective. Interdisciplinary collaboration stands as a cornerstone for the future of SHE, cultivating a well-rounded comprehension of sustainability and honing the problem-solving acumen of students. Dedicated programs must delve into the intricacies of sustainability within the hospitality sector, utilizing case studies to bridge theory with tangible, real-world applications. Furthermore, research endeavors should keenly examine the confluence of technological advancements and educational modalities, assessing their enduring influence on students' grasp of sustainability concepts and their capacity to enact ecologically sound behaviors. By addressing these gaps, SHE can pave the way for a robust, future-ready hospitality workforce that embraces sustainable practices and innovation. With a concerted effort, SHE will not only enhance professional preparedness but also drive the industry toward a sustainable future.

4.1.2 Perceptions of University Students

This study offers an in-depth exploration of the perceptions held by university students concerning SHE, with a concentrated lens on the Beijing Hospitality Institute. Undertaken in the year 2024, the study utilized a meticulously crafted and validated questionnaire. This instrument underwent a stringent process of expert appraisal and pre-testing to ascertain its reliability and validity, thereby ensuring a robust foundation for data collection. The overarching aim of this research endeavor was to ascertain the level of awareness, the spectrum of attitudes, the range of preferences, and the educational aspirations of students about SHE.

This comprehensive understanding is pivotal for the advancement of educational strategies that are both sustainable and responsive to the needs of the hospitality industry. The questionnaire, disseminated in an electronic format, was strategically channeled through the student management department, capitalizing on their established institutional networks. To enhance accessibility and encourage participation, a digital poster was designed, prominently featuring a QR code that provided direct access to the online survey. This initiative significantly amplified the questionnaire's visibility among the targeted student cohort. Furthermore, a carefully

composed invitational text message was disseminated by the faculty members of the student management department, targeting the WeChat groups of each Hospitality-related class. This strategic communication approach was pivotal in eliciting a high degree of student engagement, indicative of the proactive collaboration between the academic community and the research team. The response to the survey was remarkably enthusiastic. Within 1week post-distribution, a total of 314 valid questionnaires were collected, surpassing the initial projection of 298 valid responses. Upon reaching this threshold, the data collection was deliberately halted to ensure the sample's robustness and representativeness. The subsequent sections of this chapter provide an exhaustive analysis of the data, elucidating the descriptive findings, analytical outcomes, and the pivotal insights and trends gleaned from this study.

The meticulous execution of data collection and analysis, bolstered by a rigorous methodological scaffold, paves the way for a detailed exposition of the research findings. The ensuing discourse will delve into the intricate perspectives of university students on SHE, providing a nuanced comprehension of their cognitive frameworks, attitudinal inclinations, preferential leanings, and educational yearnings in the realm of sustainable hospitality education.

4.1.2.1 Participant Demographics

Beijing Hospitality Institute established in May 2008, is a four-year undergraduate institution approved by the Ministry of Education, with nationally recognized academic qualifications and a planned enrollment. Over the past decade, BHI has adhered to its core educational philosophy of "internationalization and application-oriented learning," responding to the talent needs of the hospitality industry. The institute blends the advanced educational models of world-renowned hospitality management schools with the unique characteristics of China's national conditions, continuously exploring and refining an application-oriented talent cultivation model. Guided by its motto, "Learning for Practical Application," BHI emphasizes the integration of theory with practice, ensuring that students are well-prepared for real-world challenges. Through over a decade of development, BHI has become a leading model in domestic undergraduate hospitality management education. This is reflected in its curriculum, which aligns with industry needs, the development

of self-authored textbooks, a faculty that integrates practical experience with theoretical knowledge, and a distinctive campus culture. These elements collectively form the "BHI Model" for cultivating hotel management professionals in China. Recognized as the "Whampoa Military Academy" for Chinese hospitality management education, BHI has earned high praise from education authorities, industry professionals, and parents alike. The institute has established a specialized academic framework with hospitality at its core, offering six key majors: Hotel Management, Human Resources Management, Marketing, Financial Management, Health Services and Management, and Finance. These programs are designed to meet the diverse talent demands of the broader service industry, attracting students from across the country.

In the survey, the Participant Demographics were characterized by a clear majority of female respondents, accounting for 61.78% of the participants. In contrast, the proportion of male respondents was 38.22%. This gender distribution indicates a higher level of engagement or interest from female participants in the topic of sustainable hospitality education. In the realm of hospitality education in China, a consistent trend has been observed where the enrollment of female students has historically surpassed that of their male counterparts. This gender distribution not only reflects the prevalent trend in educational choices but also suggests a heightened level of engagement or interest from female students in the subject matter of SHE.
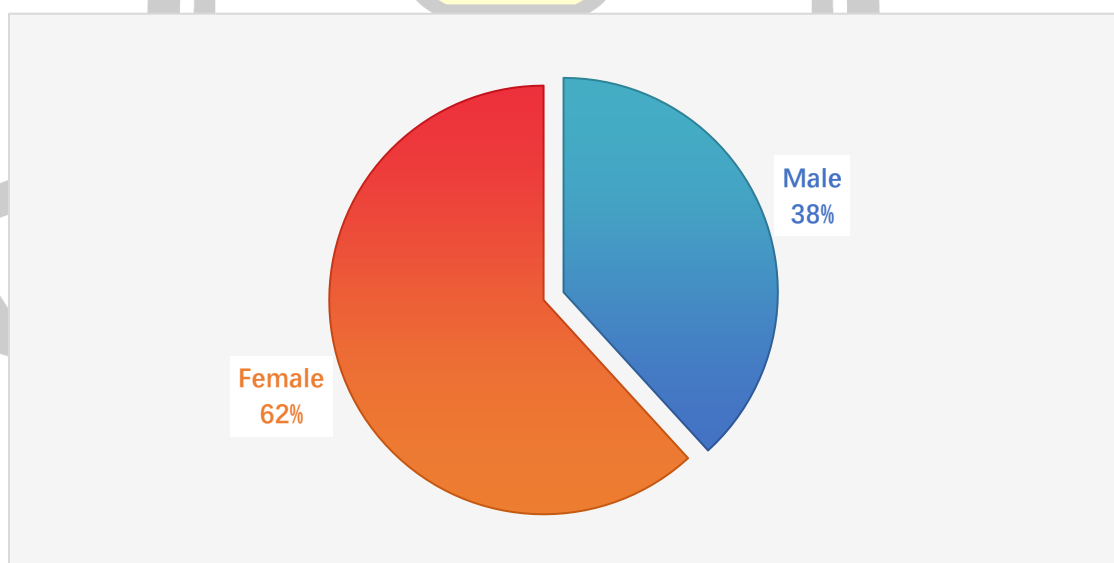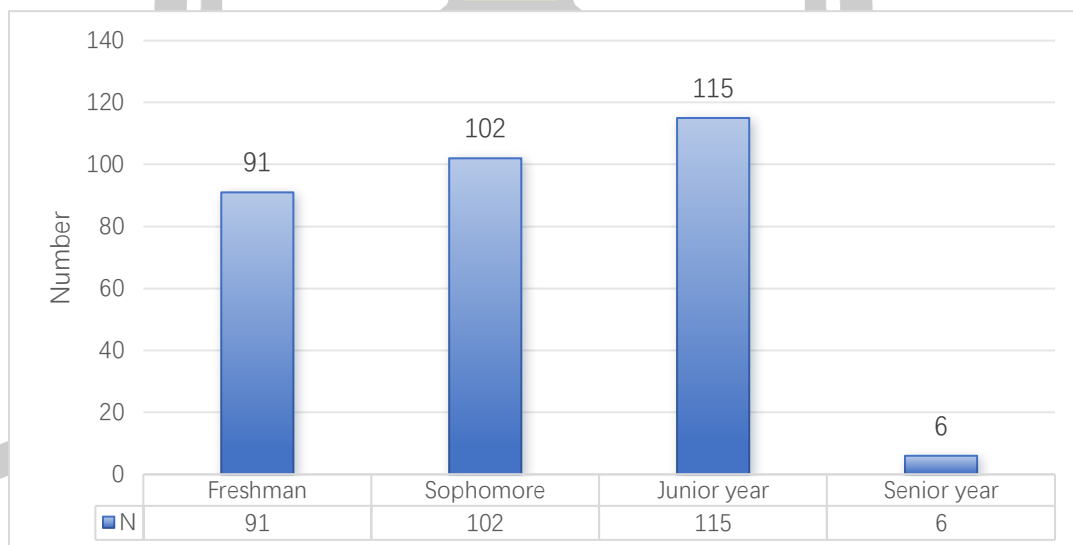

Figure 14 .Gender Distribution of Participants

The grade level distribution of survey participants showcases substantial involvement from Freshman (91 participants) and Sophomore (102 participants) classes. The Junior year has the highest participation with 115 respondents, indicating a keen interest among students at this stage of their academic journey. However, it is essential to note that the Senior year has comparatively lower participation with only 6 respondents. This could be attributed to the fact that the survey was conducted during the graduation season for Senior students, a time when they are typically occupied with a myriad of graduation-related activities. The demands of finalizing their academic programs, preparing for graduation ceremonies, and transitioning to post-graduation endeavors might have influenced their lower involvement in the survey. Despite this, the overall distribution of responses across different academic levels indicates the survey's extensive reach and the importance placed on SHE by students at various stages of their education. It also underscores the need to consider the timing of research initiatives to maximize participation from all student cohorts.

Figure 15. Grade Level Distribution of Participants

4.1.2.2 SHE Awareness

1) Awareness of SHE

The survey data indicates a varied level of familiarity with the concept of Sustainable Hospitality Education among the respondents. A total of 21 participants (6.69%) indicated that they were not familiar with the concept (Category 1.0), while

17 participants (5.41%) showed a minimal level of awareness (Category 2.0). The majority of respondents, 113 individuals (35.99%), demonstrated a moderate understanding of SHE, falling under Category 3.0. A significant proportion, 94 participants (29.94%), showed a high level of familiarity, categorized as 4.0, and the most knowledgeable group consisted of 69 participants (21.97%) who were very familiar with SHE, corresponding to Category 5.0. This distribution suggests a positive trend in awareness, with a substantial portion of the respondents having at least a moderate understanding of SHE. However, there is still a notable minority that is either unaware or minimally aware of the concept, indicating a potential area for targeted educational interventions to enhance overall awareness.

2) Willingness to Learn SHE

In terms of the willingness to learn about SHE, the survey results reveal a strong interest among the participants. A total of 21 participants (6.69%) indicated no interest in learning more (Category 1.0), and 20 participants (6.37%) showed a low level of interest (Category 2.0). The majority, 106 participants (33.76%), expressed a moderate willingness to learn, categorized under 3.0. A considerable group, 98 participants (31.21%), showed a high level of interest, falling into Category 4.0, and the most enthusiastic group included 69 participants (21.97%) who were very willing to learn more about SHE, aligning with Category 5.0. The high percentage of participants expressing a willingness to learn, particularly those in the higher categories, underscores a proactive attitude towards education in sustainability within the hospitality industry. This willingness is a crucial factor in the success of any educational initiative, as it indicates a readiness to engage with new concepts and ideas.

The analysis of the survey data on awareness and willingness to learn about SHE among the participants shows a generally positive attitude. While there is a clear need for further education to increase awareness among those who are currently unaware or minimally aware, the overall trend is encouraging. The strong willingness to learn, especially among a significant proportion of the respondents, suggests that there is a fertile ground for the introduction and expansion of SHE programs. Educational institutions and industry professionals can leverage this interest to

develop targeted educational materials and initiatives that cater to the diverse levels of familiarity and eagerness to learn within the student population.
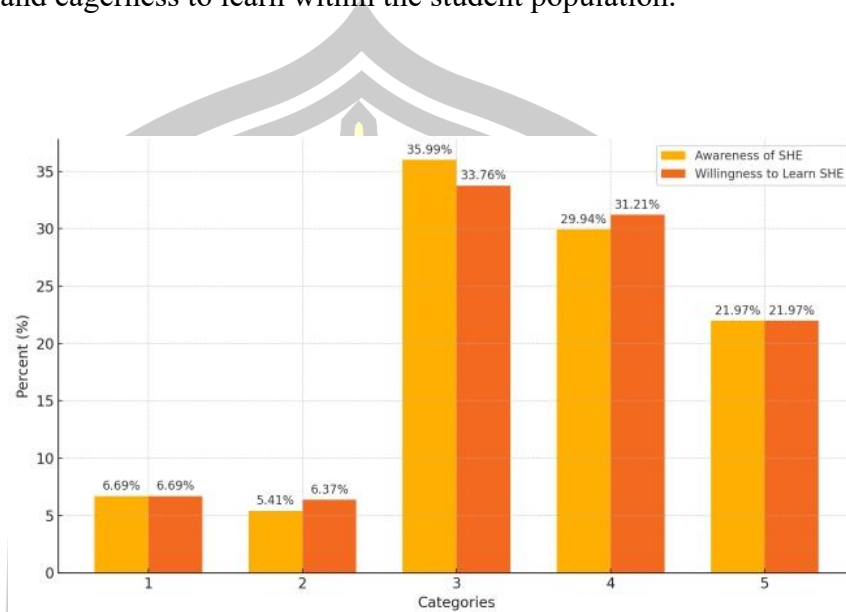

Figure 16. Awareness and Willingness of SHE

The high levels of both awareness and willingness suggest that educational initiatives for SHE could be effective, as there is a strong base of individuals who are already aware of and willing to engage with the content. The moderate awareness and willingness categories highlight a group that could be further targeted with specific strategies to increase their engagement and understanding of SHE. Although a smaller segment, the low awareness and willingness categories indicate a need for more outreach and introductory programs to bring these individuals up to speed on the importance of SHE.

The data indicates a generally positive outlook for the implementation and expansion of SHE programs. With more than half of the respondents showing high awareness and willingness to learn about SHE, there is a solid foundation to build upon. However, efforts should also be made to engage those with moderate and low levels of awareness and willingness to ensure comprehensive education and adoption of sustainable practices in the hospitality sector.

3) Areas of Interest

The distribution of interest across these three aspects indicates a balanced yet differentiated focus among the respondents. The economic aspect of sustainable hospitality education has garnered a high level of interest, with a score of 0.857. The social aspect receives a moderate level of interest, scoring 0.662. The environmental aspect holds a score of 0.627, reflecting a strong interest from the respondents. The insights from this analysis can inform the curriculum development in educational institutions, guiding them to create programs that cater to these interests. There could be a particular emphasis on modules that explore the economic benefits of sustainability, alongside courses that address social and environmental responsibilities. This comprehensive approach can prepare students to contribute effectively to the sustainable development of the hospitality industry.
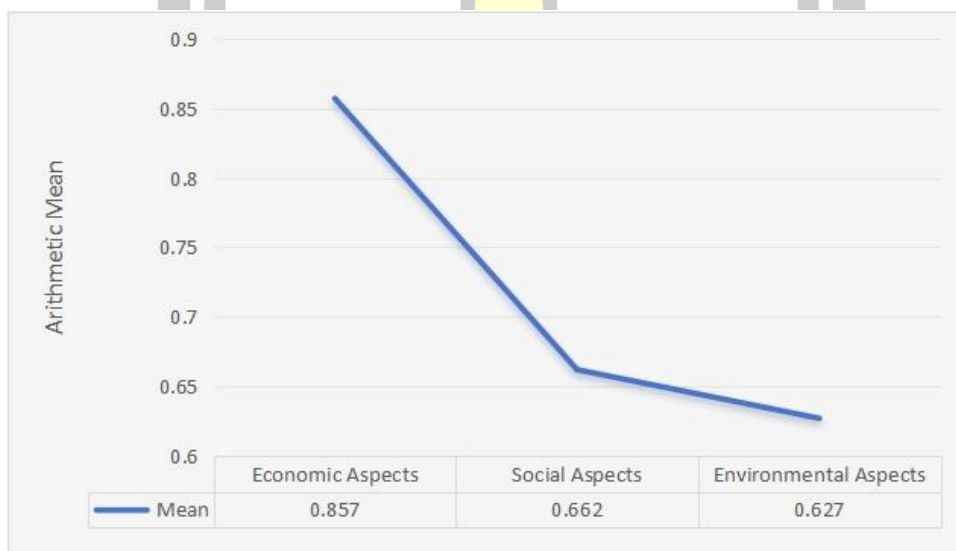

Figure 17 Distribution of Interest of SHE

4) Learning Channels

This analysis examines the various channels through which students can learn about sustainable hospitality education. The data was collected using a multiple-choice question format, where respondents could select more than one option. With a frequency of 226, professional teachers are the most cited channel for learning about sustainable hospitality education. This indicates the significant role that educators play in disseminating knowledge on sustainability within the hospitality sector. News media is the second most frequently mentioned channel, with 194 responses. This

highlights the importance of media in raising awareness and providing information on sustainable practices in the hospitality industry.

The analysis reveals that traditional educational channels, such as professional teachers, remain the most influential in imparting knowledge about sustainable hospitality education. However, the substantial role of news media and industry activities underscores the need for a multi-faceted approach to education that includes both formal and informal learning environments. Additionally, the influence of personal networks and professional development opportunities through training and certification programs highlights the diverse ways in which students can access and engage with sustainability education.
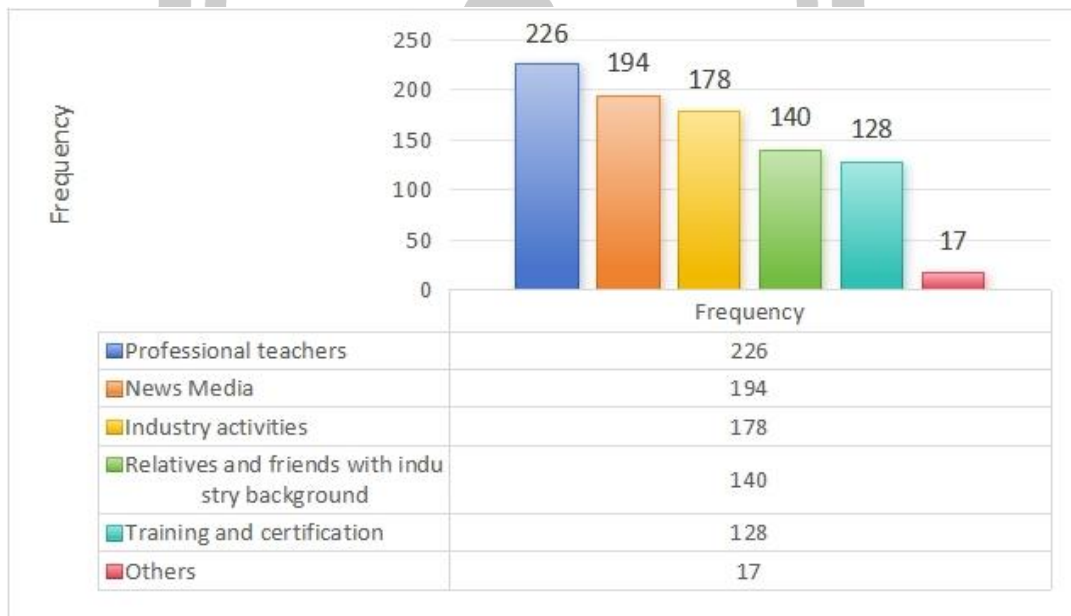

Figure 18 Distribution of Learning Channels

5) Related to SDGs

This analysis examines the alignment of SHE content with the United Nations Sustainable Development Goals (SDGs) based on student responses. The data was collected using a multiple-choice question format, allowing respondents to select multiple SDGs they believe are aligned with the SHE content they have encountered. The Clean Water and Sanitation (SDG 6) goal, with a frequency of 154, is the most frequently aligned with SHE content. This indicates a strong emphasis on the importance of water quality and sanitation practices within the hospitality industry.

The Good Health and Well-being (SDG 3) goal, with 150 responses, highlights the significant focus on health and wellness in sustainable hospitality education, reflecting the industry's commitment to ensuring the well-being of guests and staff. The analysis reveals that SHE content aligns with a broad range of SDGs, indicating a comprehensive approach to sustainability in the hospitality industry. The frequent alignment with goals related to health, clean energy, water, and sanitation suggests that these areas are particularly emphasized in SHE programs. Additionally, the alignment with goals related to education quality, gender equality, and decent work underscores the holistic nature of SHE, addressing both the environmental and social dimensions of sustainability.
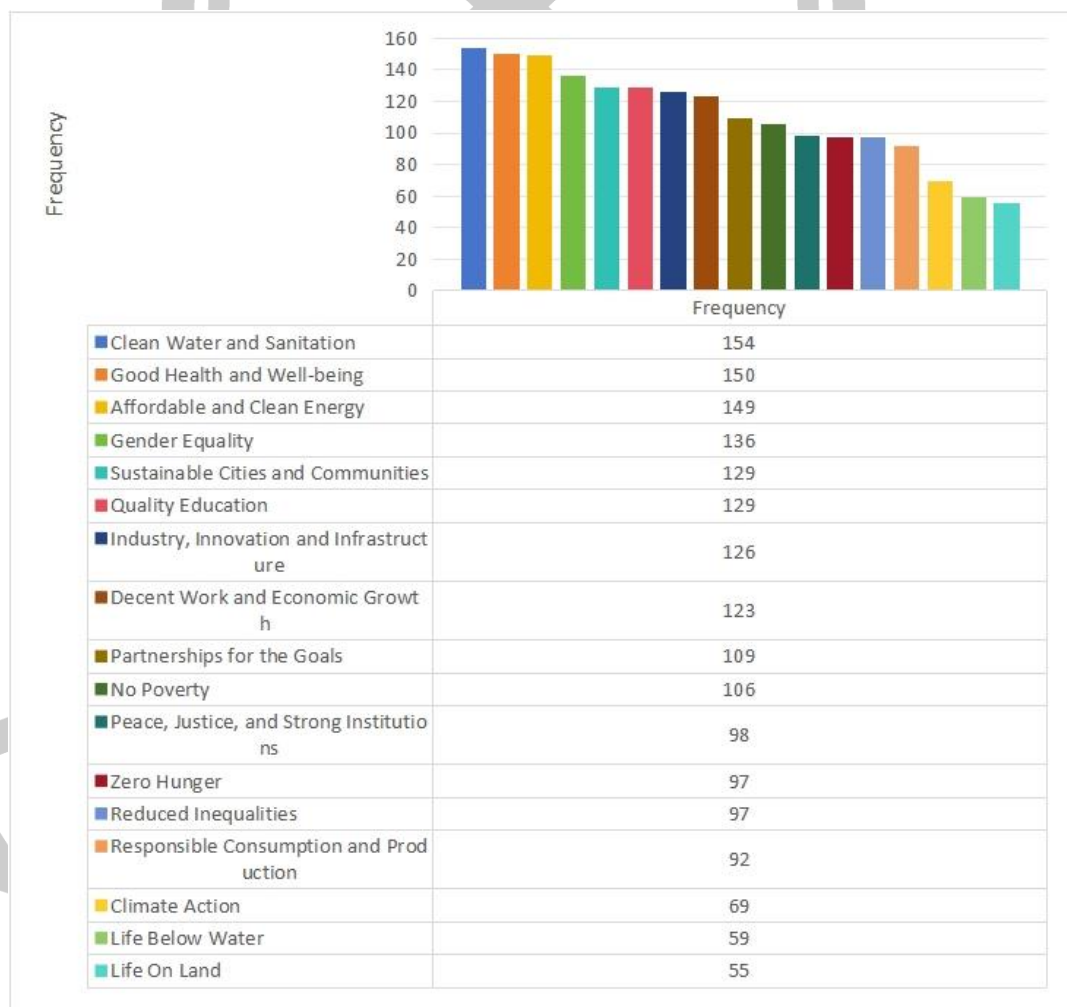
	Frequency
■ Clean Water and Sanitation	154
■ Good Health and Well-being	150
■ Affordable and Clean Energy	149
■ Gender Equality	136
■ Sustainable Cities and Communities	129
■ Quality Education	129
■ Industry, Innovation and Infrastructure	126
■ Decent Work and Economic Growth	123
■ Partnerships for the Goals	109
■ No Poverty	106
■ Peace, Justice, and Strong Institutions	98
■ Zero Hunger	97
■ Reduced Inequalities	97
■ Responsible Consumption and Production	92
■ Climate Action	69
■ Life Below Water	59
■ Life On Land	55

Figure 19 Distribution of Related to SDGs

4.1.2.3 SHE Attitudes Analysis

This analysis investigates student attitudes toward SHE and its perceived importance in various contexts. The data is derived from responses to four single-choice questions, with ratings ranging from 1 (Veryunimportant/pessimistic) to 5 (Very important/optimistic).

1) Impact on Daily Life

The majority of students (88.6%) rated the impact of SHE on daily life as 3 or higher, indicating a generally positive perception. Responses 4 and 5 were the most frequent, suggesting that students recognize the significant impact of SHE on their daily routines.
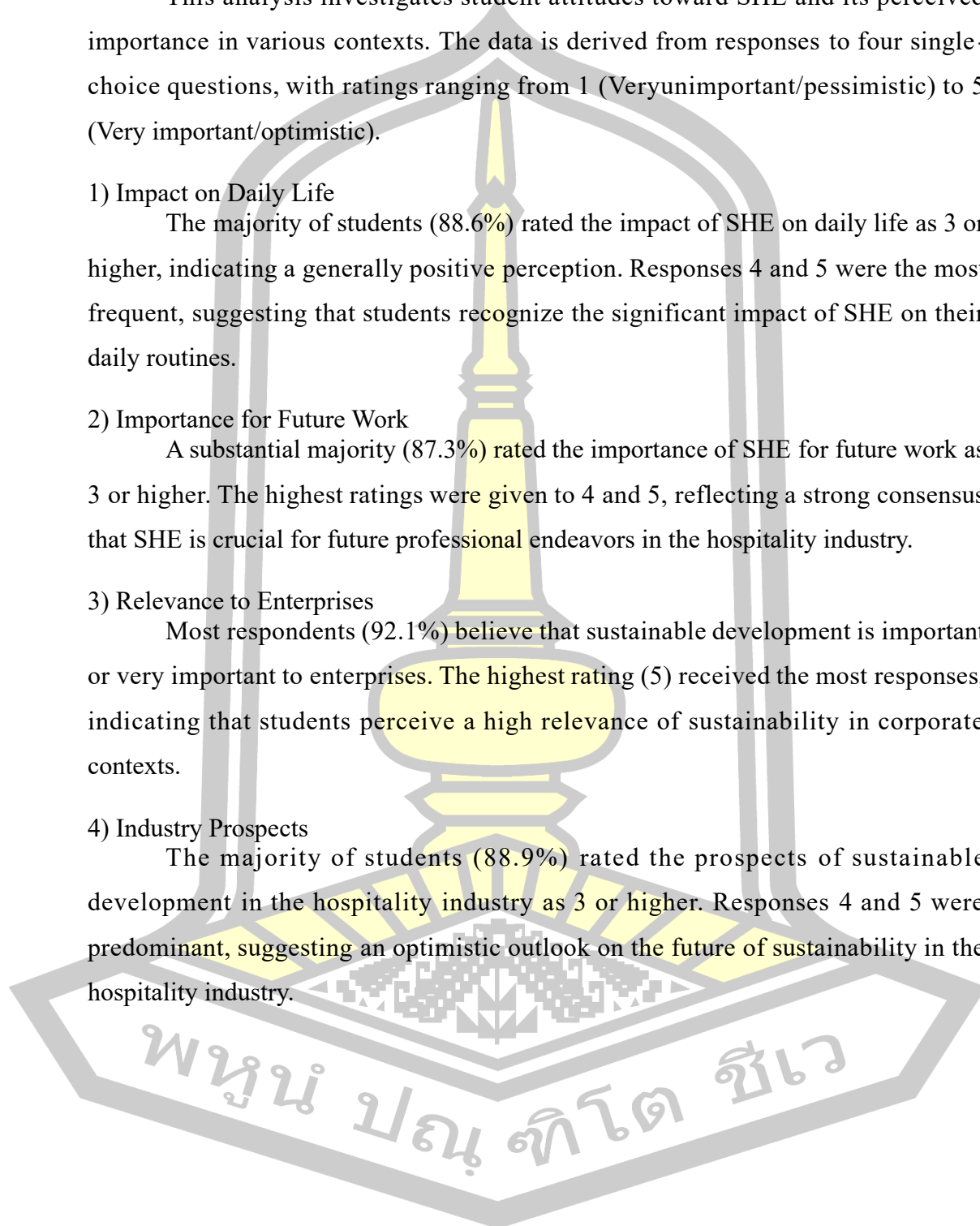
2) Importance for Future Work

A substantial majority (87.3%) rated the importance of SHE for future work as 3 or higher. The highest ratings were given to 4 and 5, reflecting a strong consensus that SHE is crucial for future professional endeavors in the hospitality industry.

3) Relevance to Enterprises

Most respondents (92.1%) believe that sustainable development is important or very important to enterprises. The highest rating (5) received the most responses, indicating that students perceive a high relevance of sustainability in corporate contexts.

4) Industry Prospects

The majority of students (88.9%) rated the prospects of sustainable development in the hospitality industry as 3 or higher. Responses 4 and 5 were predominant, suggesting an optimistic outlook on the future of sustainability in the hospitality industry.
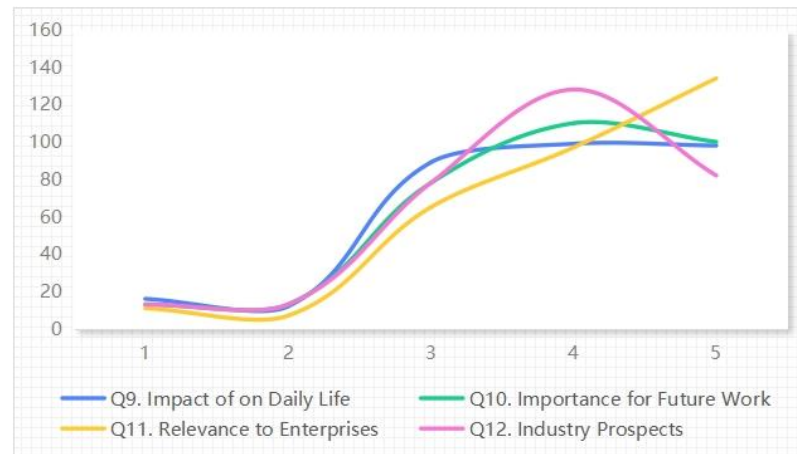
Figure 20 Distribution of SHE Attitudes

Overall, the analysis indicates a positive attitude among students toward SHE and its relevance across various aspects. The high ratings for the impact on daily life, importance for future work, and relevance to enterprises demonstrate a strong belief in the value of SHE. Additionally, the optimistic views on the prospects of sustainable development in the hospitality industry highlight a forward-looking perspective among students, suggesting they are likely to support and engage in sustainable practices throughout their careers.

4.1.2.4 SHE Preference Analysis

1) Preference for Educational Models

This analysis explores student preferences for different educational models in SHE. The data collected represents the mean preferences and the standard deviations for various educational models that could be implemented. Students showed the highest preference for offering elective courses that interested students can choose. The relatively high mean indicates a strong inclination towards flexibility in their learning paths, allowing students to select SHE courses according to their interests. The moderate standard deviation suggests a reasonable level of agreement among students regarding this preference. Designing SHE as a program centered around project themes garnered moderate interest. This indicates that some students see value in a more structured and project-based approach, which can provide practical, hands-on experience. The standard deviation suggests a varied level of interest in this model. The model of setting SHE as a university degree was the least preferred. The low mean suggests that students may not see the necessity of a separate degree in SHE,

possibly preferring integration within existing programs or as elective options. The standard deviation indicates a level of agreement among students on this preference.

Table 13. Preference for Educational Models

Models	Mean	Std. Deviation
As a course module, embedded in other professional courses	0.58	0.494
It is a professional course that every student needs to learn	0.315	0.465
Offer elective courses for interested students to choose	0.675	0.469
Designed as a program, centered around the project theme	0.382	0.487
Set as a university degree	0.309	0.463
Extracurricular development	0.414	0.493

The analysis indicates a clear preference for elective courses and embedded modules within professional courses for SHE. These models offer flexibility and integration with current curricula, aligning with student interests and the importance of interdisciplinary approaches. Models requiring mandatory participation or a separate degree in SHE are less favored, reflecting a desire for more adaptable and less rigid educational structures. The varied preferences underscore the importance of offering multiple pathways for students to engage with sustainable hospitality education, catering to diverse interests and learning styles.

2) Preferences for Teaching Methods

The analysis reveals a strong preference for practical and engaging teaching methods, such as case studies and lectures, in SHE. While traditional and experiential learning methods are favored, there is less enthusiasm for more intensive or solitary methods like internships and personal projects. The variety in preferences underscores the importance of offering diverse teaching methods to cater to different learning styles and interests, ensuring a comprehensive and effective SHE program.
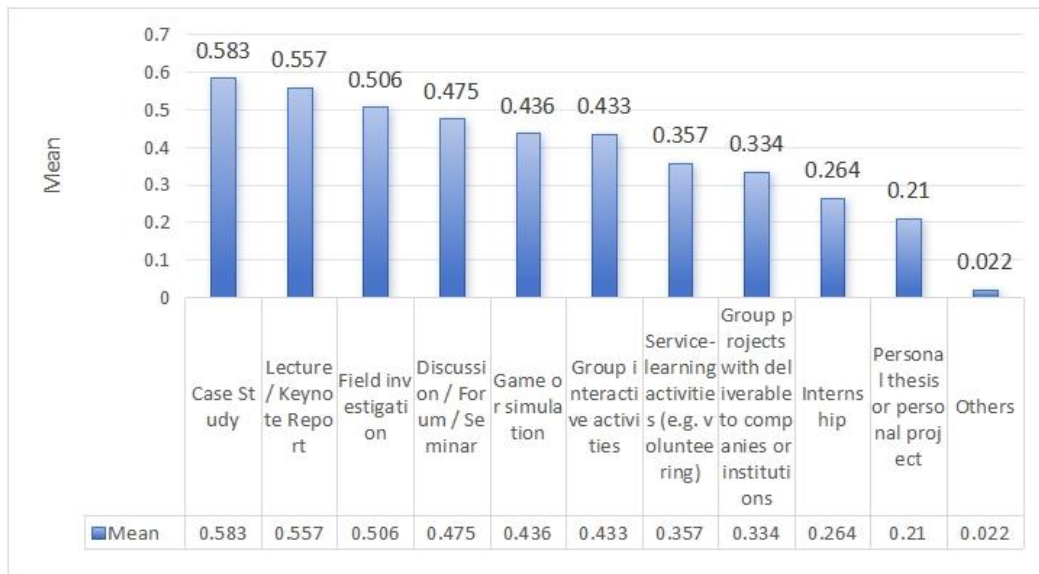
Figure 21. Preferences for Teaching Methods

The ANOVA results offer insights into whether there are statistically significant differences in the mean preferences for various teaching methods across different grades. The analysis indicates that there are no significant differences in preferences for most teaching methods across grades, except for "Personal Thesis or Personal Project," which shows a significant variation. There is a significant decrease in preference from Grade 1 (0.29) to Grade 3 (0.13), and Grade 4 shows the highest preference (0.33). The ANOVA test shows a p-value of 0.041, which is less than 0.05, indicating a statistically significant difference in preferences across grades. This could be due to the small sample size in Grade 4, leading to higher variability in preferences. The preference for internships also shows a trend toward significance, which may warrant further investigation. Educational institutions may consider these preferences when designing curricula, particularly focusing on providing more opportunities for personal projects and internships, which appear to be valued by students across different grades.

Table 14. ANOVA Results of Preferences for Teaching Methods

Items	Grade (Mean ± Standard Deviation)				F	p
	1.0(n=91)	2.0(n=102)	3.0(n=115)	4.0(n=6)		

Case Study	0.58±0.50	0.62±0.49	0.53±0.50	1.00±0.00	2.048	0.107
Lecture / Keynote Report	0.60±0.49	0.56±0.50	0.51±0.50	0.67±0.52	0.670	0.571
Discussion / Forum / Seminar	0.54±0.50	0.45±0.50	0.44±0.50	0.50±0.55	0.722	0.539
Group interactive activities	0.49±0.50	0.43±0.50	0.39±0.49	0.33±0.52	0.816	0.486
Group projects with deliverable to companies or institutions	0.41±0.49	0.34±0.48	0.26±0.44	0.50±0.55	1.910	0.128
Field investigation	0.55±0.50	0.49±0.50	0.49±0.50	0.50±0.55	0.316	0.814
Game or simulation	0.45±0.50	0.39±0.49	0.47±0.50	0.33±0.52	0.549	0.649
Service-learning activities (e.g. volunteering)	0.40±0.49	0.35±0.48	0.32±0.47	0.50±0.55	0.581	0.628
Personal thesis or personal project	0.29±0.45	0.23±0.42	0.13±0.34	0.33±0.52	2.780	0.041*
Internship	0.34±0.48	0.29±0.46	0.18±0.39	0.17±0.41	2.506	0.059
Others	0.04±0.21	0.01±0.10	0.02±0.13	0.00±0.00	0.981	0.402
* $p<0.05$ ** $p<0.01$						

3) Support and Resources

This analysis explores student preferences for various types of support and resources they hope the school will provide in the context of SHE. The data reflects mean preferences for each type of support or resource based on multiple-choice responses. Students exhibit the highest preference for increasing practical programs and internship opportunities （Mean = 0.599）. This underscores a strong desire for hands-on experience and the real-world application of their knowledge in sustainable hospitality. There is a significant preference for research funding and resource support （Mean=0.57）. This suggests that students recognize the importance of financial and material resources in supporting their academic and research activities in SHE. The analysis indicates that students place a high value on practical experience, research support, and expert insights in the context of SHE. Increasing practical programs and internship opportunities, providing research funding and resource support, and adding relevant courses are the top priorities for students. Inviting industry experts for

lectures is also significantly valued, emphasizing the importance of real-world connections and industry knowledge.
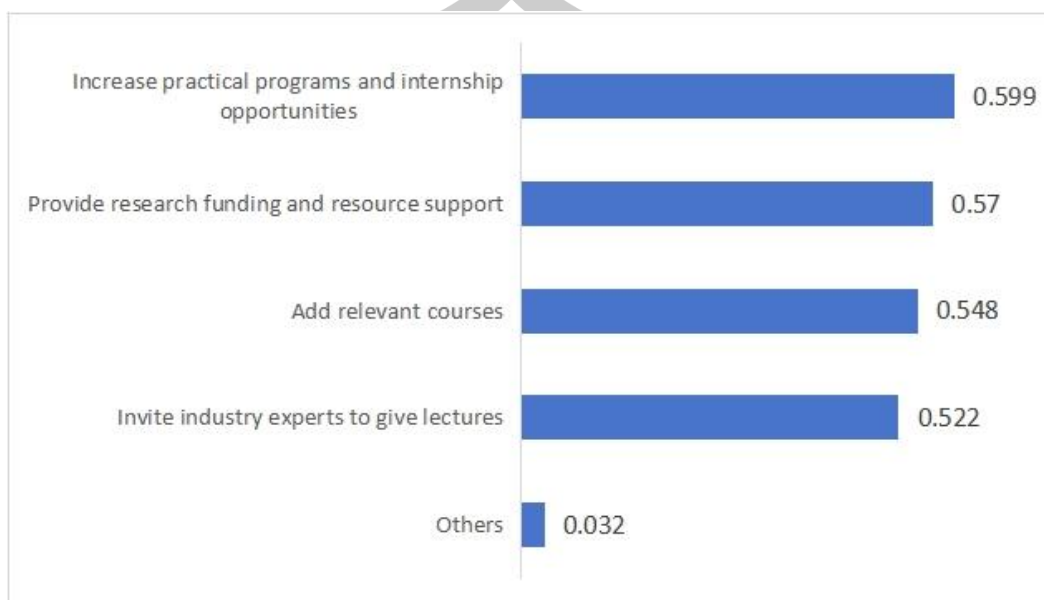

Figure 22 Preferences for Support and Resources

This analysis evaluates the preferences of students regarding the support and resources they hope their school will provide to enhance sustainable hospitality education (SHE). No significant difference across grade levels ($p > 0.05$) on Increase Related Courses, Increase Practical Opportunities, and Invite Industry Experts for Lectures. A significant difference was found across grade levels ($p = 0.005**$, $p < 0.01$). Grade 1 students showed a higher mean, indicating a stronger desire for funding and resource support. The analysis reveals that, while most categories did not show significant differences across grades, there is a notable exception in the desire for research funding and resource support. Specifically, Grade 1 students expressed a significantly higher need for funding and resource support compared to other grades. This suggests that early-stage students may perceive a greater necessity for financial and material resources to engage effectively in SHE. Future research could further explore the underlying reasons for these differences and consider tailored support strategies to meet the specific needs of students at various stages of their academic journey.

Table 15. ANOVA Results of Preferences for Support and Resources

Items	Grade (Mean ± Standard Deviation)				F	p
	1.0(*n*=91)	2.0(*n*=102)	3.0(*n*=115)	4.0(*n*=6)		
Add relevant courses	0.49±0.50	0.57±0.50	0.57±0.50	0.50±0.55	0.527	0.664
Increase practical programs and internship opportunities	0.62±0.49	0.57±0.50	0.63±0.49	0.33±0.52	0.865	0.459
Invite industry experts to give lectures	0.51±0.50	0.53±0.50	0.52±0.50	0.67±0.52	0.206	0.892
Provide research funding and resource support	0.71±0.45	0.56±0.50	0.47±0.50	0.50±0.55	4.332	0.005**

* *p*<0.05 ** *p*<0.01

4) Expectations and Suggestions for SHE

From the responses of 35 students, several valuable suggestions have emerged, primarily categorized into the themes below. The qualitative analysis of student expectations and suggestions for SHE reveals a strong desire for practical experience, focused and relevant curriculum development, career guidance, and enhanced support and resources. Students also show a keen interest in sustainability, innovation, and industry engagement. Encouragement and a positive outlook toward the future of SHE are prevalent, along with a recognition of the importance of institutional and policy support. Incorporating these insights can help in designing a more effective and comprehensive SHE program that aligns with student needs and industry standards.

Practical Experience and Internships

Students emphasize the need for more practical experience and internships. This theme recurs with comments such as "more practice," "a bit more practice," and "open more internship positions." This suggests a strong desire for hands-on learning opportunities that bridge theoretical knowledge with real-world applications.

Curriculum Development

Several students express the need for curriculum development that is more aligned with industry needs. Comments like "add more hospitality-related courses" and "offer fewer unrelated courses for non-hospitality majors" indicate a preference for a more focused and relevant curriculum.

Career Development and Guidance

There is a notable emphasis on career development and guidance. Responses such as "clearer career development guidance" and "appoint industry professionals to teach and provide employment guidance" highlight the need for structured career support and professional mentorship.

Sustainable Practices and Innovation

Students recognize the importance of sustainability and innovation in hospitality education. Phrases like "green and environmental protection," "intelligent, high-tech," and "hope for sustainable development" reflect a keen interest in integrating modern, sustainable practices into the curriculum.

Support and Resources

The need for better support and resources is apparent in suggestions like "provide research funding and resource support" and "seize opportunities." These comments suggest that students feel they need more institutional support to fully engage with their education and future careers.

Positive Outlook and Encouragement

There are several expressions of encouragement and positive outlooks towards the future of SHE. Responses such as "go for it," "strive to achieve as soon as possible," "continue to innovate and develop," and "hope to become better" reflect a supportive and hopeful attitude towards the program's potential.

Open-ended Feedback

The response from 38 students providing their contact information reflects a high level of interest, commitment, and willingness to engage further with the project on Sustainable Hospitality Education. This indicates that the students are not only supportive of the research but are also keen to contribute more deeply, offering the potential for rich, qualitative insights. Their participation will likely enhance the research outcomes, providing valuable perspectives and detailed information that can inform and improve the SHE program.

4.1.3 Perspectives of Teachers

The primary aim of this study is to explore the perceptions of hospitality teachers regarding the barriers and facilitators to Sustainable Hospitality Education (SHE). Given the increasing importance of sustainability in the hospitality industry, understanding the perspectives of educators who play a critical role in shaping future professionals is vital. This research seeks to identify the challenges and opportunities faced by hospitality teachers in integrating SHE into their curricula, thereby providing insights that can inform policy and practice.

Participants were selected based on their involvement in teaching hospitality-related courses and their expressed interest in sustainability education. A total of 16 hospitality teachers from various departments within the hospitality field were chosen to ensure a comprehensive understanding of different perspectives on Sustainable Hospitality Education (SHE). The departments included Finance and Investment, Marketing and Strategy, Food Production, Room Division, Food and Beverage Service, Health and Wellness, Human Resource Management, Foreign Languages, and General Education. The selection process involved sending invitations via email to potential participants who met the criteria. Informed consent was obtained from all participants, and their confidentiality was assured.

Table 16. Distribution of Teacher Participants

Participants	Department	Gender	Title
T1	Finance and Investment	Male	Associate Professor
T2	Finance and Investment	Female	Assistant Professor
T3	Marketing and Strategy	Female	Assistant Professor
T4	Food Production	Female	Senior Lecturer
T5	Food Production	Female	Assistant Professor
T6	Room Division	Male	Lecturer
T7	Room Division	Male	Senior Lecturer
T8	Food and Beverage Service	Female	Senior Lecturer
T9	Food and Beverage Service	Female	Lecturer
T10	Health and Wellness	Female	Assistant Professor
T11	Human Resource Management	Male	Lecturer

Participants	Department	Gender	Title
T12	Human Resource Management	Female	Professor
T13	Foreign Languages	Female	Assistant Professor
T14	General Education	Male	Senior Lecturer
T15	Student Affairs Department	Female	Junior Moral Education Teacher
T16	Academic Affairs Center	Male	-

The interviews were designed as semi-structured to allow for a balance between guided questions and the flexibility to explore topics in depth. The interview guide included key questions such as the participants' understanding of sustainability, their perceptions of the implementation and impact of SHE, observed barriers, and recommended strategies for overcoming these barriers. Interviews were conducted face-to-face, each lasting approximately 60 minutes, in a private setting to ensure comfort and confidentiality. All interviews were audio-recorded with the participant's consent and transcribed verbatim for analysis.

Ethical approval was obtained from the institutional review board of Mahasarakham University. Participants were assured that their responses would remain confidential and that their identities would be anonymized in any published results. They were informed of their right to withdraw from the study at any time without any consequences.

The data were analyzed using thematic analysis. Transcripts were coded and categorized to identify recurring themes and patterns. The use of NVivo software facilitated the organization and analysis of qualitative data, ensuring a systematic approach to identifying key insights from the interviews. Each transcript was read multiple times to ensure thorough understanding and accurate coding. Emerging themes were discussed among the research team to ensure the reliability and validity of the findings.

4.1.3.1 Understanding of Sustainability/SHE

The teachers' diverse interpretations of sustainability reflect the term's richness and complexity. By embracing this diversity in educational strategies,

hospitality programs can better prepare students to engage with sustainability holistically and practically. The concept of sustainability elicited a range of interpretations and reflections from hospitality teachers, highlighting its multifaceted nature within the context of the hospitality industry.

Teachers articulated that sustainability is a broad and richly connotative term, encompassing various aspects such as "Green Hotel", "Eco-friendly Practices", "Low Carbon", "Energy Conservation", and "Corporate Social Responsibility". These keywords were among the most frequently mentioned by the teachers, underscoring the environmental and ethical dimensions of sustainability. This perspective reflects a comprehensive understanding that aligns with contemporary discussions in both academia and industry. One teacher described sustainability as a "positive development state, meaning a balance of income and expenditure, allowing for healthy and stable growth" (T2). This interpretation emphasizes the economic aspect of sustainability, suggesting that sustainable practices should lead to financial viability and long-term operational stability for businesses. This view aligns with the idea that sustainability is not only about environmental stewardship but also about maintaining economic health.One teacher highlighted that sustainability is a goal pursued by "every business, as well as governments and society" (T12). This reflects the recognition that sustainability extends beyond individual entities to encompass broader societal and governmental efforts. It underscores the collective responsibility and aspirational nature of sustainable development, indicating a holistic view that integrates various stakeholders' efforts towards achieving sustainability.In contrast, one teacher expressed skepticism, stating that "sustainability is just a slogan, and it is not easy to achieve" (T14). This critical viewpoint highlights the perceived gap between the idealistic goals of sustainability and the practical challenges of implementing these principles. It suggests a sense of disillusionment or frustration with the difficulties encountered in actualizing sustainable practices within the constraints of the industry.

The diverse interpretations of sustainability among the teachers indicate the complexity of the concept and its various dimensions—environmental, economic, and social. These varying perspectives can inform how sustainability is taught in hospitality education, emphasizing the need for a multidisciplinary approach that

covers the wide-ranging implications of sustainable practices. Incorporating these insights into the curriculum can help students develop a nuanced understanding of sustainability, preparing them to address the multifaceted challenges they will face in the industry. Furthermore, addressing the skepticism and practical challenges noted by some teachers can help create more realistic and actionable strategies for integrating sustainability into hospitality practices. This might involve practical case studies, industry partnerships, and experiential learning opportunities that bridge the gap between theoretical ideals and real-world applications.

4.1.3.2 Current Integration and Perceptions

The teachers' perceptions of the implementation and impact of the Sustainable Hospitality Education program at BHI reveal a variety of insights into how sustainability is integrated into the curriculum and its effects on both students and the broader educational environment.

Teachers from different departments shared their views on how sustainability concepts are incorporated into their courses. A teacher from the Food and Beverage Service department mentioned, "My courses include content on using organic ingredients and avoiding waste, which is related to sustainability. Students are very interested in this type of content and participate actively, which positively impacts their future careers" (T8). This highlights the practical application of sustainability principles in course content and their direct relevance to students' learning experiences.Conversely, a teacher from the Human Resource Management department noted, "In our classes, we emphasize fairness and labor protection, such as the protection of disabled workers and relevant labor contract policies. However, students often feel that this content is distant from them and not very interesting. They are more concerned about issues closely related to their own experiences, such as internship conditions" (T12). This response indicates that while sustainability-related topics are included, their immediate relevance to students' interests and experiences may affect engagement levels.A teacher from the Finance and Investment department discussed how sustainability is integrated into financial evaluations, stating, "When assessing hotel value, we incorporate sustainability-related content, such as analyzing whether a business is in a positive development state through operational ratio

analysis. This topic is quite advanced and involves many specialized terms and background information, which lower-year students might find difficult to understand, whereas higher-year students might be more capable of grasping it" (T1). This comment underscores the challenge of tailoring complex sustainability topics to the appropriate educational level.Additionally, a teacher from the Room Division department highlighted practical challenges, saying, "The consumption of guest amenities in hotels is a significant cost and a key focus of environmental protection. For instance, whether to change bed linens daily or proactively provide single-use amenities like toothbrushes and combs. Government regulations in cities like Beijing now require hotels not to proactively offer these amenities, which sometimes conflicts with customer expectations" (T6). This reflects the real-world challenges that students will face, balancing regulatory requirements with customer satisfaction.Teachers from the Food Production department also shared practical examples of sustainability in their courses. One mentioned, "In teaching, we also instruct students on waste sorting and sustainable food storage practices. The penalties for non-compliance with waste sorting regulations in the hospitality industry are very high" (T4). This example illustrates how regulatory compliance and practical sustainability measures are taught to students.The Marketing and Strategy department provided insights into the broader impact of sustainability, with one teacher noting, "Sustainable marketing is now popular in the hospitality industry. Promoting a company's sustainability efforts can enhance its image as a socially responsible and trustworthy business. Activities like participating in charity events and Earth Hour are examples of this" (T3). This perspective highlights how sustainability can be a strategic tool for brand positioning and corporate social responsibility.

Overall, the teachers' perceptions reveal both the successes and challenges of implementing SHE at BHI. The integration of sustainability into various aspects of the curriculum, from practical applications in food and beverage management to complex financial analyses, demonstrates a comprehensive approach to sustainability education. However, the varying levels of student engagement and the practical challenges faced by educators highlight areas for further improvement and support. Addressing these issues through targeted strategies, such as contextualizing

content to students' experiences and enhancing practical learning opportunities, can further strengthen the impact of SHE programs.

4.1.3.3 Barriers to Implementation

Many teachers noted that one of the biggest barriers to implementing sustainability education is the limitation of resources. BHI faces numerous barriers in implementing sustainability education. These barriers stem from limitations in resources and institutional structures, as well as challenges related to faculty and students. To address these issues, the institution needs to adopt comprehensive measures in areas such as resource allocation, textbook development, teacher training, curriculum design, and industry collaboration to promote the full implementation of sustainability education.

1)Resource Limitations

Many sustainability projects require additional financial support, such as purchasing eco-friendly materials, organizing field trips, and conducting related laboratory activities. However, BHI has limited budgets in these areas, making it difficult to provide sufficient financial support. One teacher mentioned, "I have considered trying to innovate and reform sustainability-related teaching, but the school does not provide funding or time support. The last time I applied for internal research funding, the school did not approve it."(T5). Teachers widely reported that the course schedule is tight, making it challenging to add sustainability content to existing courses. For courses with fixed teaching plans, it is very difficult to comprehensively cover sustainability topics within the limited time available. Another teacher stated, "There are already many courses, and both teachers and students are very busy, so there is no time to add sustainability-related content."(T10).

2)Insufficient Teacher Training

Many teachers themselves have limited professional knowledge in the field of sustainability. Due to a lack of systematic training and learning opportunities, teachers feel inadequate when teaching sustainability content. One teacher said, "Now public companies need to write ESG reports, and I want to know how to do it, but there is no time to attend related training."(T2); Teachers generally reported that the professional training opportunities provided by the school are limited, especially in the area of sustainability education. This makes it difficult for teachers to be competent in teaching sustainability content. Another teacher added, "It's not possible to pay for learning this new content out of my pocket."(T6).

3)Insufficient Student Interest and Understanding

Teachers found that many students are not interested in sustainability topics, believing that it is not closely related to their future career development. As a result, student participation in the classroom is low, affecting teaching effectiveness. One teacher pointed out, "Good students might be interested in this content, but average students probably won't be interested or be able to learn it."(T15). Due to a lack of relevant background knowledge and social experience, many students have a limited understanding of sustainability, making it difficult to fully recognize its importance and practical application. Another teacher noted, "Freshmen don't even fully understand the hospitality industry. Talking about sustainability would confuse them, and they definitely wouldn't understand."(T14).

4)Lack of Industry Support

Limited Industry Support: Teachers reported that the hospitality industry does not place a high priority on sustainability practices, and some companies are not actively participating in and supporting the school's sustainability education projects. This results in a lack of practical opportunities and career guidance for students. One teacher admitted, "The hospitality industry often has one set of practices for internal operations and another set for inspections. There is always a gap between ideals and reality. Don't be too idealistic."(T7).

5)Rigidity of the Curriculum System

Many teachers pointed out that the current curriculum system is too rigid and lacks flexibility, making it difficult to incorporate sustainability content. Particularly in compulsory courses, adding new sustainability content requires cumbersome approval processes, leading to poor flexibility in course adjustments. One teacher stated, "The Chinese Ministry of Education requires choosing majors from the professional directory list for declaration and establishment, so it is impossible to establish asustainability-related hospitality major in China."(T16). Some teachers mentioned that sustainability content needs interdisciplinary integration, while the existing course design is often independent, lacking interdisciplinary integration and collaboration.

6)Lack of Teaching Materials and Resources

Many teachers mentioned that there is currently a lack of textbooks specifically designed for hospitality management that adequately cover sustainability practices in detail, making it difficult to meet teaching needs. Teachers believe that there is a lack of cases and activities that can be used to demonstrate and explain sustainability practices in actual teaching, making it difficult for students to understand and master sustainability knowledge. One teacher remarked, "How can teachers teach students if they haven't fully understood it themselves?"(T13).

4.1.3.4 Strategies to Overcome Barriers

The analysis of the interviews with hospitality management teachers revealed several key strategies that could help overcome the barriers to implementing sustainability education.

1)Securing Funding and Resources

Allocating dedicated funds for sustainability initiatives is crucial. This can be achieved by applying for grants, seeking industry sponsorships, and increasing budget allocations for sustainability-related projects. One teacher suggested, "We need dedicated funding to support sustainability projects and activities, such as eco-friendly materials and field trips."(T7). Developing partnerships with other institutions and industry stakeholders to share resources, such as teaching materials, case studies, and best practices, can alleviate some of the resource constraints. Another teacher mentioned, "Collaboration with other institutions and industry partners can provide access to valuable resources and materials."(T11).

2)Enhancing Teacher Training and Development

Organizing regular training sessions and workshops focused on sustainability can equip teachers with the necessary knowledge and skills. This includes inviting experts from the industry and academia to share insights and practical applications. One teacher emphasized, "It's essential to have regular professional development opportunities to keep teachers updated on the latest sustainability practices."(T3). Providing incentives for teachers to pursue further education and training in sustainability, such as tuition reimbursement or professional development credits, can motivate them to enhance their expertise. A teacher remarked, "Incentives like tuition reimbursement for sustainability courses can encourage teachers to invest in their professional growth."(T14). Encouraging teachers to participate in industry-related

activities and events can keep them updated on the latest trends and developments. This was highlighted by a teacher's comment, "Hope the school can schedule teachers to participate in industry-related activities. Only by staying in touch with industry frontiers can we understand development trends and update teaching content."(T1).

3)Increasing Student Engagement and Awareness

Incorporating interactive teaching methods, such as project-based learning, case studies, and real-world problem-solving, can make sustainability education more engaging and relevant for students. One teacher suggested, "Using project-based learning and real-world case studies can make sustainability concepts more tangible and interesting for students."(T13). Organizing sustainability-themed events, workshops, and competitions can raise awareness and spark interest among students. This can also include integrating sustainability topics into student organizations and extracurricular activities. Another teacher mentioned, "Sustainability-themed events and workshops can inspire students and make them more interested in learning about sustainability."(T15). Offering students the chance to earn certifications related to ESG standards can enhance their employability. One teacher noted, "There are now ESG certifications available. If students can learn and obtain the corresponding certificate during university, it will be helpful for their employment."(T2).

4)Strengthening Industry Partnerships and Support

Establishing strong partnerships with the hospitality industry to gain support for sustainability initiatives can provide practical opportunities for students and ensure that the curriculum aligns with industry needs. One teacher emphasized, "Collaborating with the industry can provide practical learning opportunities and ensure that our curriculum is relevant to industry demands."(T7). Creating industry advisory boards to provide feedback and guidance on sustainability education can help ensure that the program meets industry standards and expectations. Another teacher noted, "An industry advisory board can offer valuable insights and ensure our sustainability education aligns with industry practices."(T12).

5)Integrating Sustainability into the Curriculum

Conducting a comprehensive review of the existing curriculum to identify opportunities for integrating sustainability concepts across various courses can ensure that sustainability is embedded in the education framework. One teacher stated, "A

thorough curriculum review can help identify where sustainability concepts can be naturally integrated into existing courses."(T10). Promoting interdisciplinary teaching and collaboration between different departments can enrich the curriculum and provide a holistic view of sustainability. Another teacher noted, "Encouraging interdisciplinary collaboration can enhance students' understanding of how sustainability applies to various aspects of hospitality management."(T15). Ensuring that curriculum changes are introduced gradually and strategically can maintain educational stability and quality. One teacher pointed out, "Teaching reform should be gradual. We can try on a small scale first, and then promote it more widely after success. We cannot be too hasty. We must ensure stable teaching order and excellent teaching quality."(T16).

6) Institutional Support and Policy

Implementing dedicated support programs for sustainability education can help promote teaching reforms and innovations. One teacher suggested, "Sustainable hospitality education is very important, but it is still in the exploratory stage at BHI. We hope to have special support programs to support teaching reforms."(T9). Gaining the support of the institution's administration for sustainability initiatives is essential. This includes integrating sustainability goals into the institution's strategic plans and policies.

4.1.3.5 Critical Thinking and SHE

The analysis of interview data from hospitality management teachers reveals that students with high levels of critical thinking exhibit deeper understanding and higher engagement in SHE is learning and activities. However, the limitations of the existing education system and the shortcomings of teachers in teaching critical thinking present significant challenges.

1)The Role of Critical Thinking in Promoting Learning

Most teachers believe that students with high levels of critical thinking can achieve a deeper understanding of the concepts and principles of SHE. These students not only acquire superficial knowledge but also apply this knowledge to solve practical problems. For example, one teacher mentioned, "Students with critical thinking skills can better connect classroom theories with real-life environmental protection practices, which is crucial for them to understand and internalize SHE knowledge."(T8);

Students with high levels of critical thinking demonstrate stronger problem-solving abilities when facing SHE-related issues. They excel at analyzing complex environmental problems and proposing innovative solutions. A teacher shared, "When we discussed food waste management, those students with critical thinking always came up with novel and feasible solutions, which was very impressive."(T5).

2)The Impact of Critical Thinking on Participation

Students with strong critical thinking skills tend to actively participate in classroom discussions and extracurricular activities. They frequently ask questions, interact with classmates and teachers, and show a strong interest in SHE topics. One teacher said, "Students with high levels of critical thinking can always lead the class discussions, and their questions often trigger in-depth thinking among their peers."(T10); Critical thinking also stimulates students' creative thinking, enabling them to generate innovative ideas and unique insights in SHE learning. For example, a teacher mentioned, "In a project, several students proposed the idea of using waste to create art, which not only demonstrated their creativity but also enhanced their understanding of environmental protection, exceeding my expectations."(T3)

3)Challenges in the Cultivation of Critical Thinking

Some teachers pointed out that the existing education system and curriculum design limit the cultivation of critical thinking. The course content is relatively fixed, the exam pressure is high, and students tend to focus on memorization rather than critical thinking training. One teacher remarked, "Our education system places more emphasis on test scores, which leaves students with less time and space to develop their critical thinking skills." (T13); Another teacher added, "Hospitality education often emphasizes practical skills and operational knowledge rather than analytical and critical thinking, which may limit students' ability to critically evaluate complex problems and develop innovative solutions."(T16); Furthermore, hotel managers in the industry may emphasize procedures and standards, potentially hindering employees' independent thinking and creativity. As a result, students returning from internships might feel that following management directives is a safer approach. Current hospitality courses may not provide enough opportunities for students to be exposed to diverse perspectives and interdisciplinary content, which are essential for cultivating critical thinking.

Some teachers also mentioned that their deficiencies in teaching critical thinking methods affect their ability to effectively cultivate students' critical thinking in the classroom. One teacher admitted, "I always hear about critical thinking, but to be honest, I don't know much about it." (T1); Another said, "Teachers need more training and resources to improve their ability to teach critical thinking so they can better guide students." (T15); Some teachers are concerned that when students raise critical views, they might mistakenly be seen as challenging authority, and not all teachers may encourage students to question assumptions and explore alternative viewpoints.

4.1.3.6 Enhancing Critical Thinking

Through the reform of educational methods, the improvement of teachers' professional development, the encouragement of students' independent learning, and the optimization of evaluation and feedback mechanisms, students' critical thinking can be enhanced to better support SHE. These strategies not only improve students' understanding and participation but also promote their innovation and problem-solving abilities.

1). Reform of Educational Methods

Method A. Project-Based Learning

Most teachers believe that project-based learning is an effective way to enhance students' critical thinking. This method allows students to apply their knowledge to real projects, cultivating critical thinking in the process of solving practical problems. Teachers mentioned, "Through project-based learning, students can apply SHE knowledge in real situations, which not only improves their understanding but also promotes their critical thinking development" (T6). Another teacher added, "Using real hospitality industry cases involving sustainability challenges can effectively mobilize students' participation" (T11).

Method B. Case Analysis

Case analysis is also regarded as an effective method. By analyzing specific SHE cases, students can learn to critically evaluate problems and propose reasonable solutions. One teacher shared, "By analyzing a hot case, students can see SHE

problems in real life and learn how to analyze and solve problems from multiple perspectives" (T3).

Method C. Real-World Problem Solving

Several teachers suggested inviting industry professionals who are leading in sustainable development practices to share their experiences and insights. This approach helps teachers and students understand the current status and trends in sustainable development. One teacher proposed organizing role-play activities where students act as various stakeholders to express their views and collaboratively find solutions to real-world problems.

Method D. Interdisciplinary Integration

Some teachers mentioned that interdisciplinary teaching can provide diverse perspectives and promote the development of students' critical thinking. Combining SHE content with other subjects helps students gain a comprehensive understanding of problems. Teachers noted, "Engineers, designers, and other professionals can be invited to participate in interdisciplinary teaching, enabling students to think about SHE problems from multiple perspectives, which is very beneficial to the cultivation of their critical thinking" (T9).

2). Improvement of Teacher Professional Development

Many teachers believe that improving teachers' professional abilities is key to enhancing students' critical thinking. Through regular training and seminars, teachers can learn and master new teaching methods and strategies. Teachers emphasized the need for continuous learning and knowledge updates to better guide students in cultivating critical thinking. Providing rich teaching resources, such as case libraries and online learning platforms, can further support teachers. One teacher stated, "If the school can provide some mature curriculum frameworks or toolkits, the teaching of critical thinking can be carried out more smoothly" (T4).

3). Motivation for Students' Independent Learning

Arousing students' interest in SHE is crucial for enhancing critical thinking. Interesting and interactive teaching activities can improve students' participation and motivation. A teacher mentioned, "When students have a strong interest in SHE, they will be more proactive in thinking and exploring problems, which is conducive to the cultivation of critical thinking" (T10). Another teacher suggested "organizing visits to

environmentally friendly hotels or sustainable tourist attractions to provide students with first-hand experience of green practices, which will definitely engage their interest" (T7).

Encouraging students to engage in independent research, such as designing and implementing their own projects, can improve their critical thinking abilities. One teacher shared, "College students are already adults. They can conduct in-depth exploration according to their interests and pace, which not only enhances their critical thinking but also improves their independent learning abilities" (T9). Another teacher believes that "encouraging students to lead sustainable development programs in schools or communities can cultivate their sense of ownership and responsibility" (T12).

4). Optimization of Evaluation and Feedback Mechanisms

Using diverse evaluation methods, such as project reports and case analysis, can comprehensively assess students' critical thinking abilities. A teacher remarked, "We need to change the traditional examination methods and use diverse evaluation approaches to better understand and promote the development of students' critical thinking" (T5).Timely and constructive feedback is essential for cultivating students' critical thinking. Regular feedback helps students identify problems and improve their learning methods. A teacher pointed out, "Teachers' comments in class are very important. Timely feedback can help students reflect and continuously improve, guiding their critical thinking development" (T8).

4.2 What components of a SHE program can enhance critical thinking for Beijing Hospitality Institute students in China?

To effectively address how a Sustainable Hospitality Education program can enhance critical thinking skills for students at Beijing Hospitality Institute, two fundamental components must be examined. First, Program Development will be explored, focusing on the key design elements and pedagogical strategies that can successfully promote critical thinking within the context of hospitality education. This analysis will include a review of curriculum design, instructional methods, and the integration of sustainability principles to support the development of these essential skills. Second, we will delve into Program Evaluation, assessing the effectiveness of

the developed SHE program through an analysis of student outcomes and feedback. By combining these two perspectives, we aim to offer a comprehensive understanding of how a well-designed SHE program can foster critical thinking and better prepare students for the challenges of the hospitality industry. Given the multifaceted nature of SHE and the complexities inherent in the hospitality industry, a phased and strategic approach to the development of an SHE program is warranted.
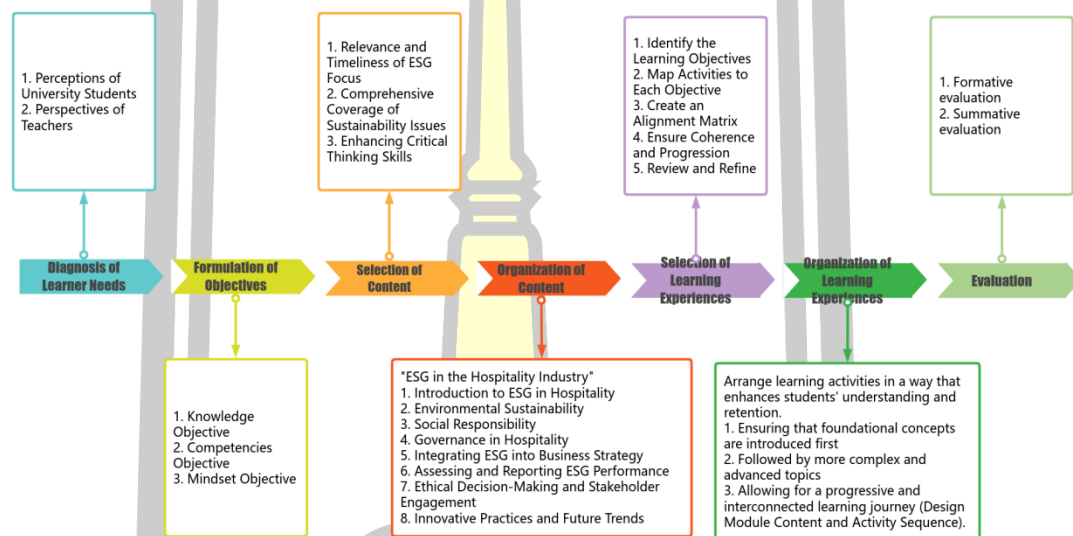
4.2.1 Program Development

Following the Hilda Taba Model's seven-step approach, we will develop a Sustainable Hospitality Education program designed to enhance students' critical thinking. This table would help stakeholders, including educators and administrators, understand the program development process at a glance.

Table 17. The Development Process for a SHE Program

No.	Step	Measure	Specific Content
1	Diagnosis of Learner Needs	Assessment	Conduct surveys and interviews to understand students' current knowledge, attitudes, and practices regarding sustainability in the hospitality industry.
		Objectives	Identify the learning gaps and the specific critical thinking skills that need to be developed.

No.	Step	Measure	Specific Content
2	Formulation of Objectives	Educational Outcomes	Define clear, measurable objectives that focus on sustainability knowledge and critical thinking in the context of hospitality.
		Alignment	Ensure objectives align with industry needs and academic standards.
3	Selection of Content	Curriculum Content	Select content that covers essential sustainability topics such as environmental management, social responsibility, and economic viability within the hospitality industry.
		Critical Thinking Content	Include scenarios, case studies, and dilemmas that require critical analysis and decision-making.
4	Organization of Content	Sequential Learning	Organize content in a logical sequence that allows for the progressive development of understanding and skills.
		Integration	Ensure that sustainability concepts are integrated across various hospitality subjects for a holistic view.
5	Selection of Learning Experiences	Active Learning Strategies	Choose experiences that promote active learning, such as debates, role-plays, and simulations.
		Real-World Applications	Select experiences that connect theoretical knowledge with real-world sustainability issues in the hospitality industry.
6	Organization of Learning Experiences	Curriculum Design	Structure the learning experiences to build upon each other, providing a scaffold for deeper understanding and application of critical thinking.
		Diverse Methods	Use a variety of teaching methods to cater to different learning styles and preferences.

No.	Step	Measure	Specific Content
7	Evaluation	Continuous Assessment	Implement ongoing assessment strategies such as reflective journals, project evaluations, and critical thinking exercises to monitor progress.
		Feedback Loop	Use assessment results to provide constructive feedback and to refine the program continually.

4.2.1.1 Diagnosis of Learner Needs

Through analyzing the perceptions of 314 university students at the Beijing Hospitality Institute. It aimed to gauge the depth of students' understanding of sustainability concepts within the hospitality industry and determine students' attitudes towards sustainability and its integration into their educational curriculum. It also explored the extent to which students are already practicing or considering sustainable practices in their academic and potential professional lives.

The survey revealed a varied level of familiarity with SHE among students. While a significant number had a moderate to high understanding, a minority was either unaware or minimally aware, indicating a need for targeted educational initiatives. There was a strong willingness among students to learn more about SHE, suggesting a positive reception for new educational programs focused on sustainability. Students showed balanced interest across the economic, social, and environmental aspects of SHE, with a slight preference for the economic aspect. Professional teachers and news media were identified as the primary channels through which students currently learn about sustainable practices, highlighting the importance of formal education and media in shaping student knowledge. The survey responses indicated that students see a connection between SHE content and several United Nations Sustainable Development Goals, particularly Clean Water and Sanitation, and Good Health and Well-being. The majority of students recognized the impact of SHE on daily life and its importance for future work, enterprise relevance, and industry prospects, demonstrating a positive attitude toward sustainability. About education preferences, students preferred elective courses and embedded modules within

existing professional courses for SHE, indicating a desire for flexibility and integration with current curricula. Practical and engaging methods like case studies and lectures were favored, with less enthusiasm for solitary methods like internships and personal projects. Students expressed a high preference for increasing practical programs and internship opportunities and providing research funding and resource support. The survey data indicates a general readiness among students to engage with SHE. However, there are clear learning gaps, particularly among those with low awareness of SHE. The strong willingness to learn and the expressed preferences for certain educational models and teaching methods provide valuable guidance for curriculum development. The preference for practical, hands-on learning experiences and the alignment of SHE with SDGs underscore the need for an SHE program that is not only academically rigorous but also practically relevant. The desire for increased support and resources, especially among early-stage students, suggests that institutional backing is crucial for effective learning.

Based on the findings, the SHE program should:

- Design and implement targeted educational interventions aimed at students with limited knowledge of SHE, utilizing focused seminars and workshops to enhance foundational understanding.

- Align the curriculum with the United Nations Sustainable Development Goals (SDGs) to reinforce the real-world applicability and importance of sustainability in the hospitality curriculum.

- Develop an interdisciplinary curriculum that bridges sustainability with core disciplines such as business, environmental science, and cultural studies, offering a comprehensive view of sustainable practices in hospitality.

- Establish partnerships with local hospitality businesses to provide students with internships and field studies that offer hands-on experience with real-world sustainability challenges.

- Create project-based modules that are directly linked to sustainable development goals, fostering teamwork, practical skills, and the application of theoretical knowledge.

- Integrate cutting-edge tools and technologies, including virtual reality and data analytics, to simulate sustainable tourism experiences and assess environmental impacts.

- Organize specialized workshops and seminars that concentrate on enhancing critical thinking, ethical reasoning, and strategic decision-making within a sustainability context.

- Employ a mix of teaching methodologies to accommodate various learning styles, including interactive lectures, case study analyses, role-playing, and collaborative learning projects.

- Invest in faculty development to deepen their knowledge of sustainability and equip them with the pedagogical skills necessary to teach complex sustainability and critical thinking concepts.

- Engage the local community in educational programs to provide students with a contextual understanding of regional sustainability challenges and solutions.

- Provide career guidance services and establish industry connections to facilitate mentorship and internships that prioritize sustainability, preparing students for their professional journey.

- Integrate policy development and advocacy training into the curriculum to prepare students to influence and shape sustainability practices at various organizational and governmental levels.

- Incorporate cultural sensitivity training to ready students for the global hospitality industry, highlighting the diversity of cultural approaches to sustainability.

- Introduce programs that offer students hands-on experience with sustainability audits and certifications, enhancing their professional qualifications and industry credibility.

- Support and encourage student-led initiatives that advocate for sustainability within the campus and community, cultivating leadership and a proactive stance on environmental issues.

- Offer a range of elective courses that provide students with the flexibility to explore various aspects of SHE according to their interests and career aspirations.

- Ensure the provision of ample support and resources for students, particularly in the areas of research and practical experiences, to facilitate a rich and immersive learning environment.

- Implement a robust and ongoing evaluation process for the SHE program to ensure its continuous improvement and alignment with emerging educational and industry standards.

In conclusion, the Diagnosis of Learner Needs has revealed a complex landscape of student awareness, attitudes, and preferences regarding SHE. By addressing these findings, the SHE program can be tailored to effectively enhance students' critical thinking skills and prepare them for sustainable practices in the hospitality industry.

4.2.1.2 Formulation of Objectives

The formulation of clear, measurable objectives is crucial to ensure the success of a Sustainable Hospitality Education program designed to enhance critical thinking among university students in China. The educational outcomes should focus on three key areas: Knowledge, Competencies, and Mindset within the context of sustainability and critical thinking in the hospitality industry.

1）Knowledge Objective

Objective 1: Students will define key concepts and principles of sustainability within the context of the hospitality industry.

Objective 2: Students will understand the environmental, social, and economic impacts of hospitality operations.

Objective 3: Students will analyze case studies of sustainable practices in hospitality to identify best practices and areas for improvement.

2）Competencies Objective

Objective 4: Students will develop the ability to critically evaluate the sustainability practices of various hospitality businesses.

Objective 5: Students will employ problem-solving techniques to propose innovative solutions for enhancing sustainability within the hospitality sector.

Objective 6: Students will demonstrate ethical reasoning by assessing the implications of sustainability decisions on different stakeholders, including employees, customers, and the environment.

Objective 7: Students will acquire skills to conduct sustainability audits and generate sustainability reports for hospitality businesses.

3）Mindset Objective

Objective 8: Students will demonstrate a commitment to integrating sustainability principles in their professional and personal lives.

Objective 9: Students will exhibit a proactive attitude towards continuous learning and improvement in the field of sustainability.

Objective 10: Students will show a willingness to collaborate with others to promote sustainable practices in the hospitality industry.

Objective 11: Students will cultivate a global perspective on sustainability, understanding and respecting diverse cultural approaches to sustainable hospitality practices.

By formulating these clear, measurable objectives and ensuring their alignment with both industry needs and academic standards, the SHE program will be well-positioned to enhance the sustainability knowledge and critical thinking skills of university students in China.

4.2.1.3 Selection of Content

The field of Sustainable Hospitality Education encompasses a wide and expansive range of topics. Given the breadth and complexity of this field, this study strategically narrows its focus to a more specific and manageable theme: ESG (Environmental, Social, and Governance) in the Hospitality Industry. This focused

approach aims to design a program that significantly enhances students' critical thinking abilities. By centering on ESG issues within the hospitality industry, the SHE program will not only bolster students' critical thinking skills but also equip them to become leaders in sustainability. They will be well-prepared to tackle the complex challenges of today's world. This approach ensures that the program is both educationally robust and practically applicable, making it an excellent choice for university students in China.

1) Relevance and Timeliness of ESG Focus

ESG issues are increasingly at the forefront of global business practices. Companies worldwide are recognizing the necessity of addressing environmental sustainability, social responsibility, and governance to remain competitive and responsible. In China, the hospitality industry is experiencing rapid growth, accompanied by a rising awareness of sustainability issues. The government's emphasis on green development and sustainable practices aligns well with the principles of ESG, making this focus particularly timely and relevant for Chinese university students.

2) Comprehensive Coverage of Sustainability Issues

Addressing issues such as resource use, pollution, and climate change is crucial. The hospitality industry, with its significant environmental footprint, provides rich case studies and practical examples.Real-world cases of sustainable practices in hospitality offer students insights into best practices and areas for improvement.Issues such as labor rights, community involvement, and customer well-being are central to the hospitality industry. These aspects provide fertile ground for students to explore social responsibility.Students can learn about the ethical responsibilities of hospitality businesses towards society and the environment, focusing on stakeholder engagement and ethical decision-making.Transparency, ethical behavior, and effective governance are essential for sustainable business operations. The hospitality sector's diverse stakeholders, including employees, customers, and investors, make it an ideal context for studying governance.Through case studies and scenario analysis, students can apply governance principles to real-world situations, enhancing their understanding and skills in this area.

3) Enhancing Critical Thinking Skills

ESG issues often involve complex, interconnected problems that require critical analysis and innovative solutions. Balancing economic performance with environmental sustainability and social responsibility challenges students to think holistically and critically.These methods provide practical contexts for applying critical thinking skills. Students can analyze real-world dilemmas, evaluate alternative solutions, and understand the consequences of different actions.ESG topics naturally involve ethical considerations, requiring students to weigh the impacts of their decisions on various stakeholders. This promotes a deeper understanding of ethical reasoning and responsible leadership.

Focusing on ESG in the hospitality industry allows the SHE program to address critical sustainability issues while enhancing students' critical thinking skills. This approach not only aligns with global and local priorities but also prepares students to become leaders in sustainability. By integrating comprehensive coverage of environmental, social, and governance dimensions with real-world applications, the program offers a robust and practical educational experience that is highly relevant for university students in China.

4.2.1.4 Organization of Content

The content organization process for a Sustainable Hospitality Education program focused on "ESG in the Hospitality Industry" involves several critical steps to ensure a coherent and comprehensive curriculum. Initially, the selection and determination of content are based on the program's educational objectives, emphasizing the most relevant topics within environmental, social, and governance (ESG) dimensions. Following this, the content is sequenced logically, starting from foundational concepts and progressively advancing to complex case studies and practical applications.The curriculum is divided into distinct but interrelated modules, each addressing a specific theme:

Introduction to ESG in Hospitality: Definitions, historical development, and global and regional trends.

Environmental Sustainability: Key issues, best practices, and successful case studies.

Social Responsibility: Concepts, strategies, and exemplary practices.

Governance in Hospitality: Importance, principles, and effective governance practices.

Integrating ESG into Business Strategy: Role in business strategy, tools, and frameworks.

Assessing and Reporting ESG Performance: Measurement methods, reporting standards, and sustainability communication.

Ethical Decision-Making and Stakeholder Engagement: Ethical dilemmas, stakeholder engagement, and communication strategies.

Innovative Practices and Future Trends: Emerging trends, challenges, and innovative practices.

This modular design ensures that each segment can stand alone while also integrating seamlessly with the others, providing a holistic educational experience. Interdisciplinary integration is employed where relevant, incorporating content from environmental science, economics, and sociology to provide multiple perspectives on ESG issues.Appropriate teaching strategies and methods are selected for each module, including lectures, discussions, case analyses, simulations, and project-based learning. Teaching resources such as textbooks, case materials, and multimedia content are arranged to support the delivery of each module effectively.Finally, aligned with the curriculum are the assessment methods designed to evaluate students' comprehension and achievement of the educational objectives. These assessments include quizzes, assignments, project reports, and class participation, ensuring a robust evaluation of both theoretical understanding and practical application.

4.2.1.5 Selection of Learning Experiences

Aligning activities with learning objectives involves ensuring that each learning activity directly supports and facilitates the achievement of specific objectives. Here's a step-by-step approach for the "ESG in the Hospitality Industry" program:

1) Identify the Learning Objectives: Clearly define what students should know, be able to do, and value by the end of the program.

2) Map Activities to Each Objective: Choose learning activities that specifically help achieve each objective. Ensure that every activity is purposefully designed to support a particular goal.

3) Create an Alignment Matrix: Develop a matrix that visualizes how each activity aligns with the learning objectives. This helps in ensuring that all objectives are adequately addressed.

4) Ensure Coherence and Progression: Sequence the activities coherently, ensuring that they build on each other progressively. Start with foundational knowledge and move towards more complex skills and applications.

5) Review and Refine: Continuously review and refine the alignment of activities with objectives based on student feedback and learning outcomes. Adjust the activities as needed to ensure they remain effective and relevant.

Table 18. An Alignment Matrix

Objective	Activity	Teaching Method
Knowledge	Lectures, Case Studies, Group Discussions	Lecture, Discussion
Skills	Debates, Workshops, Projects, Role-Playing	Interactive workshops, Project-based learning, Simulations
Mindset	Reflection Essays, Continuous Learning Assignments, Group Projects, Cross-Cultural Case Studies	Reflective writing, Continuous assignments, Group projects, Comparative analysis

By following these steps, the "ESG in the Hospitality Industry" program can effectively align its learning activities with its objectives, ensuring a cohesive and targeted educational experience.

4.2.1.6 Organization of Learning Experiences

The primary purpose of this step is to arrange learning activities in a way that enhances students' understanding and retention. This includes ensuring that foundational concepts are introduced first, followed by more complex and advanced topics, allowing for a progressive and interconnected learning journey. By organizing

the learning experiences in this structured manner, the "ESG in the Hospitality Industry" program ensures that students progressively build their knowledge and skills. Each module's activities are designed to logically flow from one to the next, reinforcing and expanding upon previous concepts, ultimately fostering a comprehensive and coherent understanding of ESG principles in the hospitality industry.

Table 19. Module Content and Activity Sequence

Module	Content	Activity Sequence
Module 1: Introduction to ESG in Hospitality	Definition, importance, historical development, and trends of ESG in the hospitality industry.	Lecture on basic concepts Reading assignments on historical evolution Discussion on global and regional trends
Module 2: Environmental Sustainability	Key issues such as climate change, resource management, pollution, and best practices.	Case study analysis Group projects on best practices Field trip to sustainable hotels
Module 3: Social Responsibility	Labor rights, community engagement, customer well-being, and ethical practices.	Role-playing Guest lectures from industry experts Project on ethical sourcing
Module 4: Governance in Hospitality	Corporate governance principles, structures, and roles.	Simulated board meetings Case studies of governance practices Debates on transparency and accountability
Module 5: Integrating ESG into Business Strategy	Role of ESG in business strategy, tools, and frameworks.	Workshops on strategy development Guest speaker sessions Group presentations

Module	Content	Activity Sequence
Module 6: Assessing and Reporting ESG Performance	Measuring ESG performance, reporting standards.	Practical workshops on reporting Peer review sessions Guest lectures from auditors
Module 7: Ethical Decision-Making and Stakeholder Engagement	Ethical dilemmas, stakeholder engagement strategies.	Ethical dilemma simulations Panel discussions with stakeholders Writing reflective essays
Module 8: Innovative Practices and Future Trends	Emerging trends, innovations in ESG.	Brainstorming sessions Research projects on emerging trends Presentations on innovative practices

4.2.1.7 Evaluation

Evaluation, the seventh step in Hilda Taba's curriculum development model, is critical for assessing whether the course achieves its intended learning objectives and for providing feedback to improve course design. This step encompasses both formative and summative evaluation methods. Formative evaluation occurs during the implementation of the course, aiming to provide continuous feedback to enhance the teaching and learning process. Summative evaluation, on the other hand, takes place at the end of the course to assess whether students have met the learning objectives.

To ensure a comprehensive and balanced assessment of student performance, the evaluation for the "ESG in the Hospitality Industry" program is divided into several components. Each component addresses different aspects of the learning objectives and skills developed throughout the course. Below is the detailed evaluation structure and the specific weightage assigned to each component:

Table 20. Evaluation for "ESG in the Hospitality Industry"

Evaluation	Description	Proportion
Class Participation and Engagement	Active involvement in class discussions, responsiveness during interactive sessions, and participation in group activities.	10%

Evaluation	Description	Proportion
Quizzes and Short Tests	Regular quizzes and short tests administered after each module to assess comprehension of key concepts and principles.	20%
Group Projects and Presentations	Collaborative projects where students work in groups to analyze case studies, develop ESG strategies, and present their findings.	20%
GroupResearch Paper	An research paper where students explore a specific ESG issue in the hospitality industry, providing in-depth analysis and proposing innovative solutions.	20%
Final Examination	A comprehensive final exam covering all course modules to assess overall knowledge and application of ESG principles in the hospitality industry.	30%

4.2.2 Program Evaluation

4.2.2.1 Define the Purpose of Evaluation

The primary objective of this expert evaluation is to critically assess the SHE program, specifically designed to enhance critical thinking skills among university students in China. The evaluation seeks to gather expert opinions on various aspects of the program, including its structure, content, and pedagogical strategies.

The expert evaluation form (Appendix: Expert Evaluation Form for the Sustainable Hospitality Education Program) includes various sections that experts will rate to assess different aspects of the program. The Expert Evaluation Form for the SHE program assessed several key aspects to ensure the program's effectiveness and relevance. These aspects included the alignment of chapters with learning targets, the engagement and comprehensibility of teaching methods, the appropriateness of the content difficulty level for university students, and the interest and usefulness of the knowledge content. Additionally, the form evaluated the clarity and comprehensibility of language use, the effectiveness of a bilingual teaching approach, and the alignment of the program with learning goals. Finally, the comprehensiveness of chapter content coverage was reviewed to ensure a thorough and complete presentation of the material.

4.2.2.2 Selection and Invitation of Experts

To ensure a comprehensive and balanced evaluation of the SHE program, a panel of seven experts with diverse expertise has been carefully selected (Appendix: Assessment Framework and Roster of Experts for SHE Program Evaluation). The panel includes individuals from the fields of hospitality education, industry practice, sustainability science, and instructional design. The selection process prioritized experts with extensive experience in their respective fields, ensuring that the evaluation encompasses a wide range of perspectives and insights.Expert Panel Composition:

1) Hospitality Educators (2 Experts)

Focus: Assessing the quality of the program, its relevance to hospitality education, and its potential to foster critical thinking among students.

Selected Experts:

Long Yang Xu, Professor and Dean of Academic Affairs, Beijing Hospitality Institute (BHI).

Wei Min Yu, Professor, Vice Dean, and General Manager of the Teaching Hotel at BHI.

2) Industry Practitioners (2 Experts)

Focus: Evaluating the program's industry relevance, practical applicability, and responsiveness to the needs of the hospitality sector.

Selected Experts:

Mingliang Yang, Group Vice President of Shenzhen Huamei Consulting Co., Ltd., General Manager of Beijing Company.

Sen Tian, CEO of Menduner Recruitment Platform, former Vice President of Operations and Opening for Accor Greater China.

3) Sustainability Scholar (1 Expert)

Focus: Ensuring alignment with sustainability goals and evaluating the program's emphasis on environmental responsibility.

Selected Expert:

Jian Li, Researcher at Tsinghua University's Center for Architectural Energy Efficiency, Chief Expert of the China Hotel Engineering Alliance.

4) Instructional Designers (2 Experts)

Focus: Reviewing the pedagogical soundness, curriculum innovation, and optimization of the learning experience within the program.

Selected Experts:

Quanfeng Xie, Associate Professor and Director of the Department of Education at Hunan First Normal University.

Qing Wang, Assistant Professor at the School of Humanities and Social Sciences, Beijing Institute of Technology, Special Deputy Researcher, and Master's Supervisor.

4.2.2.3 Conducting Expert Review

To facilitate a thorough evaluation of the Sustainable Hospitality Education (SHE) program, the selected experts will be provided with a comprehensive set of materials. These materials are designed to offer a clear overview of the program's structure, content, and pedagogical approaches. The review process will include an evaluation of the program's alignment with educational and industry standards, as well as its potential to enhance student's critical thinking and understanding of sustainability in the hospitality industry.

1) Materials Provided for Expert Review

The materials provided for expert review include a detailed program outline, a glossary of 100 "ESG in the Hospitality Industry" Common Vocabulary List, and a selection of assessment questions and teaching materials to illustrate content delivery and learning objectives.

Table 21. Materials Provided for Expert Review

No.	Materials	Details
1	Program Outline	The program outline will detail the course structure, including course descriptions, learning objectives, modules, and key topics covered. It will also include information on teaching methodologies, assessment strategies, and the integration of sustainability concepts throughout the curriculum.(Appendix: "ESG in the Hospitality Industry" Program Outline)
2	100 "ESG in the Hospitality Industry" Common Vocabulary List	A compilation of 100 commonly used terms related to Environmental, Social, and Governance (ESG) issues within the hospitality industry. This glossary is intended to familiarize students with key concepts and terminologies essential for understanding sustainability in the sector. (Appendix : 100 "ESG in the Hospitality Industry" Common Vocabulary List)
3	Selected Question Bank and Teaching Materials	A sample of assessment questions and teaching materials, including lecture slides, case studies, and practical exercises. These samples will provide insight into the content delivery methods and the types of knowledge and skills that students are expected to acquire.

2) Evaluation Criteria

The evaluation criteria focus on assessing the relevance and clarity of learning objectives, the quality and depth of content, the effectiveness of pedagogical approaches, and the practical applicability and industry relevance of the program.The experts will be asked to review the materials based on the following criteria:

Table 22. Evaluation Criteria

No.	Criteria	Details
1	Relevance and Clarity of Learning Objectives	- Are the learning objectives well-defined and aligned with the goals of sustainable hospitality education? - Do they adequately reflect the program's emphasis on critical thinking and sustainability?
2	Content Quality and Depth	- Is the content appropriate for the target student level? - Does it cover essential topics in ESG and sustainability, particularly as they relate to the hospitality industry?

No.	Criteria	Details
3	Pedagogical Approaches and Teaching Methods	- Are the teaching methods and materials engaging and effective? - Do they promote active learning and critical thinking?
4	Practical Applicability and Industry Relevance	- Is the program content relevant to current industry practices and trends? - Does it prepare students for real-world challenges in the hospitality industry?

3) Invitation to Evaluate

Each selected expert will receive a formal invitation, clearly outlining the purpose and significance of the evaluation. This invitation will detail the necessity of their specialized knowledge in assessing the program's structure, content, and pedagogical strategies. The importance of the evaluation in refining the SHE program and enhancing its alignment with academic and industry standards will be emphasized. The experts will be provided with comprehensive materials for review, including the program outline, a glossary of "ESG in the Hospitality Industry" terminology, and selected assessment questions. They will be instructed to evaluate these materials based on a predefined set of criteria, with a scoring system ranging from 1 to 5, where 1 represents the lowest and 5 the highest level of quality. In addition to quantitative ratings, experts will be encouraged to offer qualitative feedback, highlighting strengths and suggesting areas for improvement. The evaluation of the "ESG in the Hospitality Industry" program involves using the Index of Consistency (IOC) method to ensure the program's content aligns with its learning objectives. This evaluation will help refine and enhance the program, ensuring it meets academic and professional standards in the hospitality industry. Considering the consistency (IOC) between evaluation items and evaluation criteria, the evaluation criteria are as follows:

+1 The evaluated item is within the evaluation criteria

0 The evaluated item is outside of the evaluation criteria

-1 Evaluated item does not meet assessment criteria

Experts will be assured of the confidentiality of their feedback, with a guarantee that their insights will be utilized solely for academic research and program

enhancement purposes. The invitation will specify an estimated time commitment of approximately 60 minutes to complete the evaluation, ensuring the experts can plan accordingly. This approach ensures that the experts' contributions are not only valuable but also recognized as a significant component in the development and success of the SHE program.

4.2.2.4 Collection and Summary of Expert Feedback

Experts were selected based on their specialized knowledge in education and ESG principles within the hospitality industry, ensuring a comprehensive evaluation of the program. Their diverse backgrounds provided a well-rounded perspective on the program's effectiveness. Consensus among the experts confirmed that the chapters are highly relevant to the learning targets and align well with the course objectives. The clarity and comprehensibility of the instructional materials were rated exceptionally well by all experts. Furthermore, there was unanimous agreement that the program effectively meets the stated learning goals. Most experts found the teaching methods engaging and clear, though some minor improvements were suggested. The majority considered the content both interesting and useful, with a few experts identifying areas for potential enhancement. The bilingual approach was generally well-received; however, feedback indicated that adjustments could enhance its effectiveness. While the content coverage was largely deemed comprehensive, there were suggestions for refining certain chapters. Additionally, the difficulty level of the program received mixed reviews, with concerns that it may be too challenging for some students.

Experts recommended reviewing and modifying the difficulty level to ensure it is appropriately challenging yet accessible to all university students. They also suggested incorporating additional interactive elements and diverse pedagogical strategies to further engage students and improve the comprehensibility of the teaching methods. It was advised to evaluate and adjust the bilingual teaching approach to optimize its effectiveness and clarity. Furthermore, addressing any gaps in the chapter content was recommended to ensure comprehensive coverage of all relevant ESG

topics. By addressing these recommendations, the program can be refined to better meet educational goals and enhance student learning outcomes.

The evaluation results indicate that the "ESG in the Hospitality Industry" program is well-designed and effectively meets its learning objectives. However, some aspects, particularly the difficulty level, may require slight adjustments to ensure optimal suitability for all university students. Overall, the program is highly relevant, engaging, and comprehensive, providing a solid foundation for students to develop critical thinking skills and a deep understanding of ESG principles in the hospitality industry.

4.3   How effective is the implementation of the developed SHE program in enhancing Beijing Hospitality Institute students' Critical Thinking skills?

In this study, we conducted a quasi-experimental investigation to evaluate the impact of the SHE program on the critical thinking dispositions of junior students in the international hospitality track at BHI. We began by recruiting 36 students through a rigorous process of solicitation, registration, and review, ensuring a diverse and motivated participant group. The participants initially completed a pre-test using the CTDI-CV to establish a baseline measurement of their critical thinking dispositions. Subsequently, they engaged in an eight-week SHE program, carefully designed to incorporate sustainability education into the hospitality industry and to foster a deeper understanding of ESG principles. Upon completion of the program, the students participated in a post-test with the CTDI-CV, allowing us to evaluate any changes in their critical thinking skills. An outline of the methodology for the current study, including the data collection procedure, is presented in the figure below.
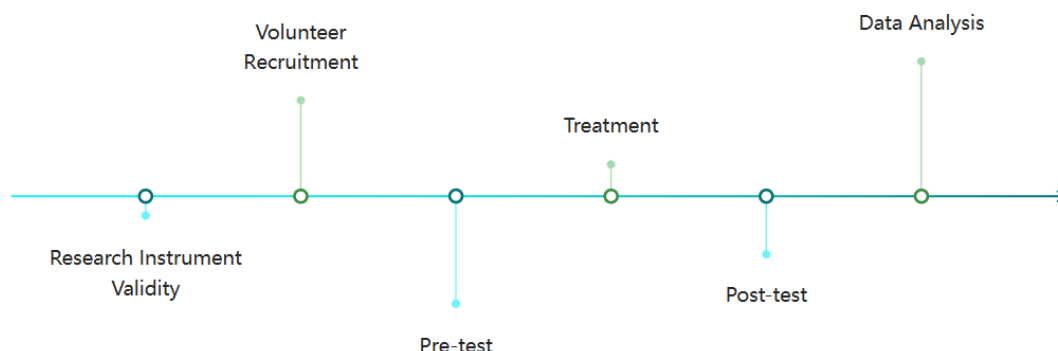
Figure 23. Summary of the data collection procedure

Research Question 4 aims to assess the impact of implementing Sustainable Hospitality Education (SHE) programs on the critical thinking skills of university students. To investigate this, quantitative data were collected through pre-test and post-test using CTDI-CV. The data were analyzed using SPSS software, which allowed for a comprehensive examination of changes in the participants' critical thinking skills. The pre- and post-treatment CTDI-CV items were carefully analyzed to identify any shifts in critical thinking dispositions. This process involved comparing the mean scores from the pre-test and post-test to evaluate the effectiveness of the program in enhancing critical thinking skills. The use of SPSS software ensured accuracy and reliability in the statistical analyses, providing a robust framework for interpreting the data. The analysis centered on comparing the results from the pre- and post-treatment questionnaires to assess the impact of the "ESG in the Hospitality Industry" program on the participants' critical thinking skills. By examining the differences in scores, we could determine whether there was a significant improvement in the critical thinking dispositions of the Chinese university students who participated in the program.

The table below presents a comprehensive overview of the changes in critical thinking skills among participants, offering empirical evidence of the SHE program's impact. This analysis underscores the program's effectiveness in enhancing critical thinking abilities, which are vital for addressing complex issues within the hospitality industry and beyond. The key dimensions evaluated include truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisitiveness, and maturity of judgment. The detailed results are as follows:

Table 23. Pre-Test and Post-Test Comparison of Critical Thinking Performance Among Participants in the SHE Program

Items	Pre-Test		Post-Test		S.D.	t	p
	Score	%	Score	%			
Truth-seeking	3.73	74.6	3.92	78.4	0.74	5.033	*p*<.007**
Open-mindedness	3.09	79.0	4.02	80.4	0.77	0.341	*p*<.750
Analyticity	3.64	72.8	3.78	75.4	0.90	1.698	*p*<.167
Systematicity	3.40	68.0	3.62	72.3	0.77	7.701	*p*<.002**
Critical thinking self-confidence	3.50	70.0	3.72	75.0	0.72	3.214	*p*<.032*
Inquisitiveness	3.88	77.6	4.00	80.0	0.88	2.146	*p*<.097
Maturity of judgment	3.82	76.4	3.90	78.0	0.76	1.431	*p*<.226

* p<0.05 ** p<0.01

The *truth-seeking* dimension exhibited a significant increase from the pre-test to the post-test, with a p-value of less than 0.01, indicating a highly significant change. The average score improved from 3.73 to 3.92, suggesting that participants became more inclined to pursue truth and engage deeply with the core issues after their involvement in the SHE programs. This notable improvement can likely be attributed to the curriculum and activities within the programs, which encouraged participants to actively explore and critically analyze information. Similarly, the *systematicity* dimension showed a considerable enhancement, with post-test scores significantly surpassing pre-test scores ($p < 0.01$). The average score rose from 3.40 to 3.62, reflecting a development in participants' ability to approach information processing and problem-solving in a more organized and methodical manner. This progress may be linked to the structured thinking exercises and activities provided by the SHE programs, which likely emphasized the importance of attention to detail and logical sequencing in addressing complex problems. The *critical thinking self-confidence* dimension also experienced a significant increase, with a p-value of less than 0.05, indicating a statistically significant change. The average score increased from 3.50 to 3.72, demonstrating an enhancement in participants' confidence in their critical thinking abilities. This growth could be associated with the opportunities the SHE programs offered for participants to practice and showcase their critical thinking skills, thereby reinforcing their self-assurance.

The findings indicate that the SHE programs have been effective in significantly enhancing certain critical thinking dispositions among participants. In particular, there were highly significant improvements in the areas of truth-seeking and systematicity, along with a significant increase in critical thinking self-confidence. These results suggest that the SHE programs have successfully fostered a deeper commitment to seeking truth, a more systematic approach to problem-solving, and greater confidence in critical thinking abilities. These skills are essential for participants' future academic and professional development, especially within the context of sustainable hospitality. This emphasizes the importance of integrating sustainability education into higher education, particularly in the hospitality sector.
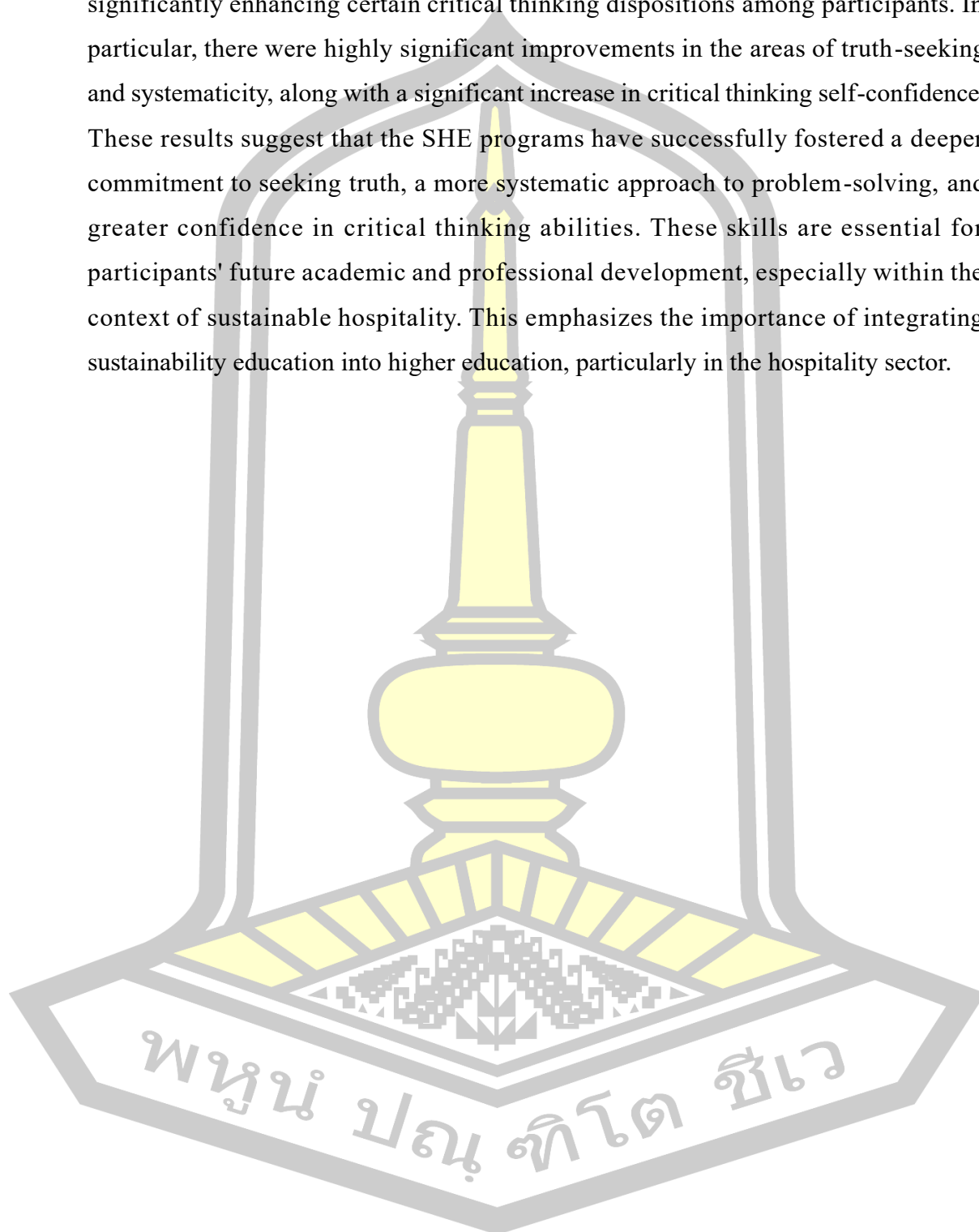
CHAPTER 5
CONCLUSION

5.1 Conclusion

The present study has navigated the intricate domain of Sustainable Hospitality Education in China, systematically addressing the four research objectives outlined. This conclusion synthesizes the main findings, offers definitive statements regarding the research problem, and reflects on the broader significance of the results.

5.1.1 The Current State of Sustainable Hospitality Education in China

The body of SHE research has witnessed a significant and sustained expansion over the past two decades, reflecting a burgeoning academic and practical interest in integrating sustainability within hospitality curricula. The geographic scope of this research is notably diverse, with contributions from various countries underscoring the global relevance of SHE. Thematic analysis reveals a dual focus on theoretical exploration and practical application, with a pronounced emphasis on cross-domain issues, such as policy adherence and technological integration, which are critical for developing comprehensive sustainability strategies in the hospitality sector.Methodologically, SHE research exhibits a multifaceted approach, employing mixed methods, qualitative, and quantitative research designs. This diversity is indicative of the field's complexity and the importance of interdisciplinary and international collaboration. The analysis of educational implementation highlights a variety of delivery modes, each with its unique advantages and challenges, ranging from embedded curriculum to standalone programs and external delivery platforms.While the growth and evolution of SHE research are commendable, the field is not without limitations. The selection of databases and search terms may introduce biases, and the subjective nature of study selection can lead to human error. Moreover, the focus on academic contexts may overshadow professional development initiatives within the industry. Despite these challenges, the trajectory of SHE research points towards a future that values contextual refinement of curricula, interdisciplinary collaboration, and the innovative use of technology in education.In conclusion, the SHE research landscape is dynamic and multidisciplinary, offering a solid foundation

for future scholarly endeavors and practical initiatives aimed at fostering a sustainable and resilient hospitality industry.

The study conducted at the Beijing Hospitality Institute in 2024 reveals that university students possess a varied awareness of SHE, with a significant majority demonstrating at least a moderate understanding. There is a strong willingness among students to engage with SHE, indicating a proactive stance towards sustainable practices in the hospitality industry. The survey responses highlight a preference for practical, hands-on learning experiences, with a notable interest in economic aspects of sustainability. Students also express a keen interest in learning channels beyond the classroom, such as professional teachers and news media.The demographic analysis shows a higher engagement from female students and a substantial participation across different academic levels, with the exception of the Senior year, likely due to graduation-related activities. The attitudes towards SHE are generally positive, with students recognizing its impact on daily life and its importance for future work. They also acknowledge the relevance of sustainability to enterprises and express optimism about the industry's prospects.In terms of preferences, students favor educational models that offer elective courses and project-based learning experiences. They also desire a variety of teaching methods, with a particular inclination towards case studies and lectures. Furthermore, students call for increased support and resources, including practical programs, internships, research funding, and industry expert involvement.The qualitative feedback underscores students' expectations for a SHE program that is practical, innovative, and closely aligned with industry needs. They also suggest the need for clearer career guidance and the integration of sustainability across the curriculum. Overall, the study indicates a fertile ground for SHE initiatives, with students showing a readiness to embrace and contribute to sustainable hospitality education.

The study among hospitality educators reveals a multifaceted understanding of sustainability, with teachers recognizing its environmental, economic, and social dimensions. While some view sustainability as integral to business and societal goals, others express skepticism due to the gap between ideals and industry practices. The integration of SHE in the curriculum is seen as crucial for preparing students to meet the demands of the hospitality industry, yet it is met with challenges

such as resource limitations, a lack of teacher training, and insufficient student interest. Teachers propose strategies to overcome these barriers, including securing funding, enhancing professional development, increasing student engagement, strengthening industry partnerships, and integrating sustainability into the curriculum. They also highlight the importance of critical thinking in SHE, noting that students with higher critical thinking skills are more engaged and capable of deeper understanding and problem-solving related to sustainability issues. Overall, the teacher perspectives underscore the need for a concerted effort to embed SHE into hospitality education, with a focus on practical application, interdisciplinary approaches, and the development of critical thinking skills to prepare students for the sustainable practices of the future.

5.1.2 Components of a SHE Program Can Enhance Critical Thinking for University Students in China

To effectively cultivate critical thinking skills in university students in China, the Sustainable Hospitality Education program should adopt a multi-faceted approach. Guided by Hilda Taba's seven-step model, the program includes the following components:

1) Diagnosis of Learner Needs: Surveys and interviews will be conducted to evaluate students' current knowledge and attitudes towards sustainability. This process will help identify learning gaps and enable the curriculum to be customized to address these needs effectively.

2) Formulation of Objectives: Clear educational objectives will be established, focusing on both sustainability knowledge and critical thinking skills. These objectives will be aligned with industry standards and academic requirements to ensure relevance and rigor.

3) Selection of Content: The curriculum will include essential topics in sustainability within the hospitality industry, such as environmental management, social responsibility, and economic viability, with a particular focus on ESG (Environmental, Social, and Governance) issues.

4) Organization of Content: Content will be organized sequentially to facilitate progressive development of knowledge and skills, integrating

sustainability concepts across various subjects to provide a cohesive learning experience.

5) Selection of Learning Experiences: Active learning strategies, including debates, role-plays, and simulations, will be employed to connect theoretical knowledge with practical sustainability issues, enhancing student engagement and application.

6) Organization of Learning Experiences: A diverse array of teaching methods will be used to accommodate different learning styles. Learning experiences will be structured to build upon each other, reinforcing and expanding students' understanding and critical thinking abilities.

7) Evaluation: Continuous assessment strategies will be implemented, with both formative and summative evaluations used to monitor progress and refine the program. Feedback loops will ensure that learning objectives are met and the program remains responsive to student needs.

By incorporating these components, the SHE program aims to deepen students' understanding of sustainability and enhance their critical thinking and responsible action within the hospitality industry, preparing them to contribute effectively to a sustainable future as both professionals and global citizens.

The SHE program, designed to enhance critical thinking among university students in China, has been systematically evaluated by a panel of experts with diverse backgrounds in hospitality education, industry practice, sustainability science, and instructional design. The evaluation criteria focused on the program's relevance, clarity of objectives, content quality, pedagogical effectiveness, and industry relevance. The expert evaluation yielded positive results, indicating that the program is highly relevant and aligned with learning targets. The instructional materials were deemed clear and comprehensible, and the bilingual teaching approach was generally well-received. The program content was found to be engaging, interesting, and useful, effectively meeting the stated learning goals. However, the evaluation also highlighted areas for improvement, particularly regarding the program's difficulty level, which may need adjustment to ensure accessibility for all

students. Suggestions were made to incorporate more interactive elements and diverse teaching strategies to further enhance student engagement and comprehension. In summary, the SHE program is largely effective in achieving its objectives, but minor refinements can optimize its impact and ensure it remains a leading educational initiative in sustainable hospitality education.

5.1.3 The Implementation of the Developed SHE Program Enhance the Critical Thinking of University Students

The SHE program has demonstrated a significant positive impact on enhancing the critical thinking skills of university students in the international hospitality track at Beijing Hospitality Institute. Through a quasi-experimental design, utilizing CTDI-CV, the program showed notable improvements in students' truth-seeking, systematicity, and critical thinking self-confidence. The mean scores in these areas indicated substantial increases from pre-test to post-test, with statistical significance (p < .05 for critical thinking self-confidence and p < .01 for truth-seeking and systematicity), suggesting that the program effectively promotes a systematic approach to problem-solving, a commitment to truth-seeking, and bolsters students' confidence in their critical thinking abilities. While other dimensions like open-mindedness, analyticity, inquisitiveness, and maturity of judgment showed some increase, they did not reach statistical significance. However, the overall trends were positive, indicating a potential area for further development as the program evolves. In conclusion, the SHE program has proven to be effective in nurturing critical thinking skills that are indispensable for the complex demands of the hospitality industry. By integrating sustainability education, the program not only equips students with industry-specific knowledge but also develops their ability to think critically and solve problems effectively, preparing them for future leadership roles in promoting sustainable practices.

The research revealed that while SHE is gaining traction in China, there is substantial room for the integration of sustainability principles within the existing hospitality education framework. The identified components of an effective SHE program, such as interdisciplinary content, active learning strategies, and real-world applications, have been shown to significantly enhance critical thinking skills among

university students. Based on the evidence presented, it is clear that the integration of SHE into university curricula is not only feasible but also profoundly impactful. The developed SHE program has demonstrated effectiveness in achieving its educational goals, particularly in fostering a deeper understanding of ESG principles and improving students' critical thinking dispositions. Theoretically, the study contributes to the growing body of literature on sustainability education by providing empirical evidence of the positive relationship between SHE programs and the enhancement of critical thinking skills. It supports the notion that education can be a catalyst for sustainable development within the hospitality industry by preparing students with the necessary competencies to navigate complex sustainability issues. Practically, the study offers actionable insights for educators and policymakers in the hospitality sector. The findings underscore the importance of incorporating sustainability into the curriculum and highlight the need for ongoing faculty development to support these educational initiatives. The effectiveness of the SHE program suggests a model that can be adapted and implemented in other educational contexts, contributing to the development of a more sustainable and critically thinking workforce. In a broader context, the results of this research resonate with the global movement towards sustainable development and the urgent need for education that prepares individuals to contribute to this agenda. The study's emphasis on critical thinking aligns with the universal goal of fostering informed, engaged, and responsible citizens capable of addressing the challenges of the 21st century.The conclusion drawn from this research is that the SHE program is a vital educational intervention that not only meets its immediate objectives of enhancing students' understanding of sustainability and critical thinking but also contributes to the wider educational and sustainability goals. The study's findings are a testament to the transformative potential of SHE and its significance in shaping a sustainable future for the hospitality industry and beyond.

5.2 Discussion

The findings of this research not only provide clarity on the current state of Sustainable Hospitality Education (SHE) in China but also contribute to a deeper understanding of the impact of such programs on critical thinking skills among university students. This section delves into the interpretation of these results, their fit

within the existing literature, and their broader implications. The results indicate a positive shift in students' critical thinking dispositions following their engagement with the SHE program. This aligns with pedagogical theories that emphasize the importance of active learning and real-world problem-solving in developing higher-order thinking skills. The observed improvements in truth-seeking, systematicity, and critical thinking self-confidence are particularly noteworthy and suggest that the SHE program's components are effective in fostering these skills. Theoretically, this research advances the understanding of SHE by providing a model for integrating sustainability into higher education that is grounded in empirical evidence. It contributes to the theoretical discourse on the intersection of education, sustainability, and critical thinking, offering a framework for future research in this area.

The study's outcomes corroborate existing research that underscores the role of sustainability education in enhancing critical thinking (e.g., Sterling, 2017; Wals, 2014). However, this research extends the literature by providing empirical evidence specific to the Chinese context and the hospitality industry, a domain that has been understudied in the discourse on sustainability education. While the results are largely positive, there are discrepancies in the impact on different dimensions of critical thinking. For instance, open-mindedness and inquisitiveness showed less significant improvements, indicating that while the program is effective in some areas, it may need to place greater emphasis on fostering these particular skills.

The findings have relevance beyond the academic sphere, particularly for the hospitality industry, which is increasingly recognizing the importance of sustainability. The study's insights into effective pedagogical strategies can inform curriculum development and teaching practices, potentially influencing the industry's approach to sustainability education and training. The potential impact of this research lies in its ability to influence educational policy and practice, promoting the integration of sustainability into university programs. It also contributes to the broader goal of developing a future workforce that is equipped to address sustainability challenges in the hospitality sector and beyond. The study offers new insights into the specific components of SHE programs that are most impactful on critical thinking skills. It

highlights the importance of a structured and interdisciplinary approach to teaching sustainability, providing a roadmap for educators looking to enhance their programs.

It is important to acknowledge the limitations of this study, including the potential for selection bias and the generalizability of the findings. The study's sample was drawn from a single institution, which may limit the extent to which the results can be extrapolated to other settings. Furthermore, the quasi-experimental design, while robust, does not fully account for all external variables that might influence the outcomes.

5.3 Suggestion

As Sustainable Hospitality Education gains increasing importance in equipping future professionals to address the evolving challenges of the hospitality industry, this study underscores the critical role SHE plays in enhancing students' critical thinking skills. Nevertheless, there remains significant potential for further development in both research and practical applications.

1）For Future Researchers: Building on the findings of this study, future research should explore the broader application of SHE across various cultural and institutional contexts. Researchers are encouraged to conduct longitudinal studies to assess the long-term impact of SHE programs on students' critical thinking, sustainability practices, and professional development within the hospitality industry. Comparative studies across different countries and educational systems could offer valuable insights into how SHE programs can be adapted globally to meet diverse industry needs and cultural expectations. Furthermore, investigating the integration of emerging technologies, such as digital learning platforms, into SHE programs will be crucial for ensuring that hospitality education evolves alongside industry innovations.

2）For Hospitality Educators: Educators are pivotal in embedding sustainability into the core of hospitality education. To further enhance the effectiveness of SHE programs, educators should prioritize the integration of critical thinking development across the curriculum. By employing models such as the Hilda Taba Model, educators can adopt a bottom-up approach to curriculum design, encouraging active student engagement and reflective learning. Additionally, offering

experiential learning opportunities—such as internships, project-based assignments, and case studies—enables students to apply sustainability principles in real-world hospitality scenarios. Collaboration with industry professionals is also essential to ensure the curriculum remains aligned with current sustainability practices, thus preparing students to meet the future demands of the field.

3）For Hospitality Industry Practitioners: Industry practitioners are uniquely positioned to bridge the gap between education and practice. It is recommended that hospitality organizations actively collaborate with academic institutions to support the development of SHE programs. This could involve offering practical case studies, guest lectures, mentorship programs, and internships that expose students to real-world sustainability challenges and solutions within the industry. Moreover, practitioners should focus on fostering critical thinking and problem-solving skills within their workforce by providing ongoing professional development and sustainability training. By cultivating a culture of sustainability within their organizations, industry leaders can ensure that the next generation of hospitality professionals is well-equipped to drive the industry's sustainable future.

In conclusion, this research addresses the critical challenges faced by sustainable hospitality education in China, particularly the underdeveloped integration of sustainability concepts and the lack of critical thinking among hospitality students. Traditional hospitality curricula are heavily management-oriented and fail to equip students with the necessary skills to engage with the industry's evolving sustainability demands. Furthermore, the prevalent teaching methods in Chinese universities, which emphasize memorization over active, inquiry-based learning, hinder the development of critical thinking, problem-solving, and innovation - skills essential for the modern hospitality industry.

This study's significance lies in its aim to develop a comprehensive SHE program that not only incorporates sustainability into the curriculum but also actively fosters critical thinking among students. By aligning educational strategies with industry needs, this research will bridge the existing gap between academic instruction and real-world application. The findings will provide insights into how SHE programs can cultivate future hospitality leaders who are not only proficient in their fields but

also equipped with the critical thinking skills necessary to address the complex sustainability challenges that define the future of the industry. Ultimately, this work contributes to the advancement of hospitality education in China, ensuring that students are prepared to lead the industry's sustainable transformation.
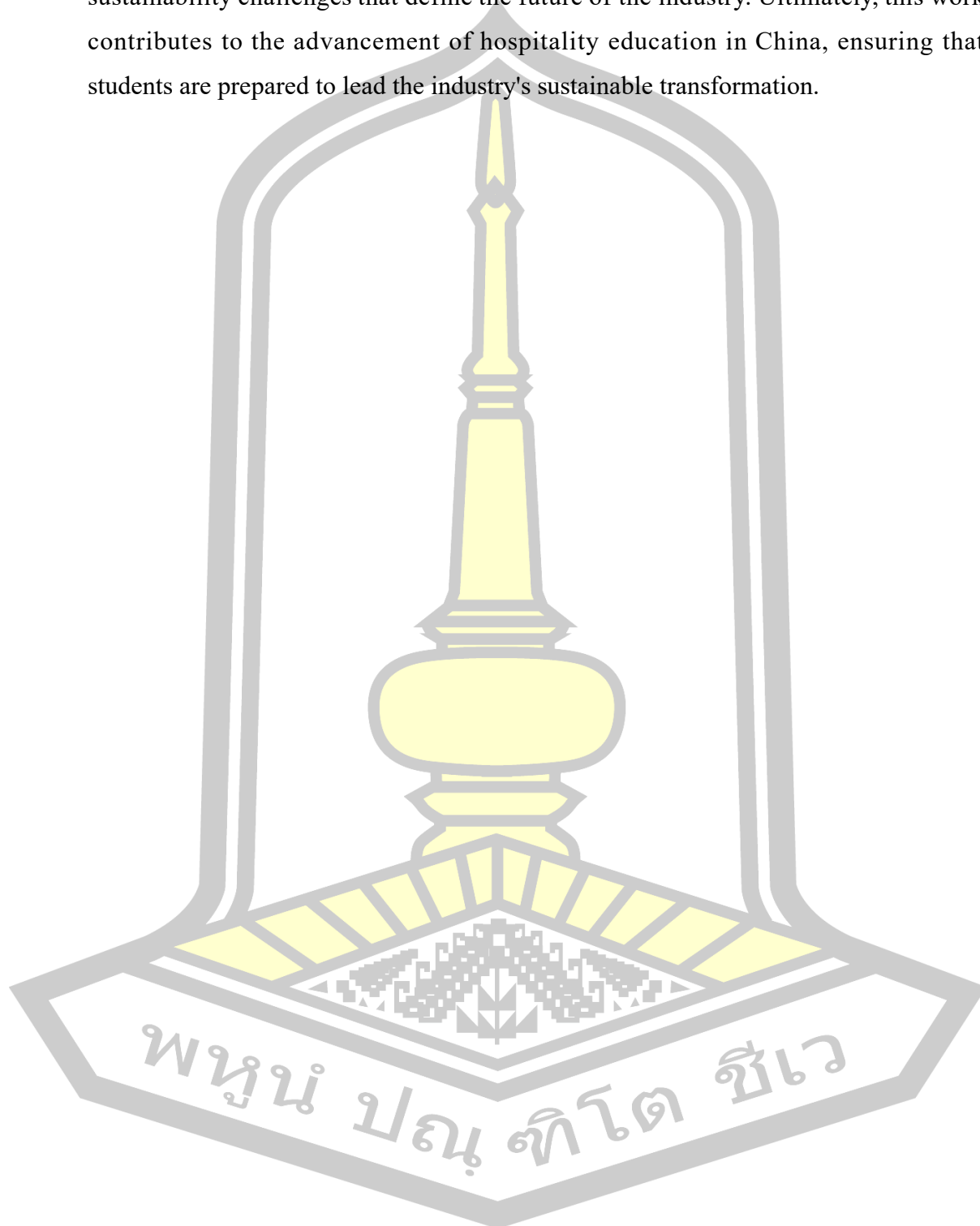
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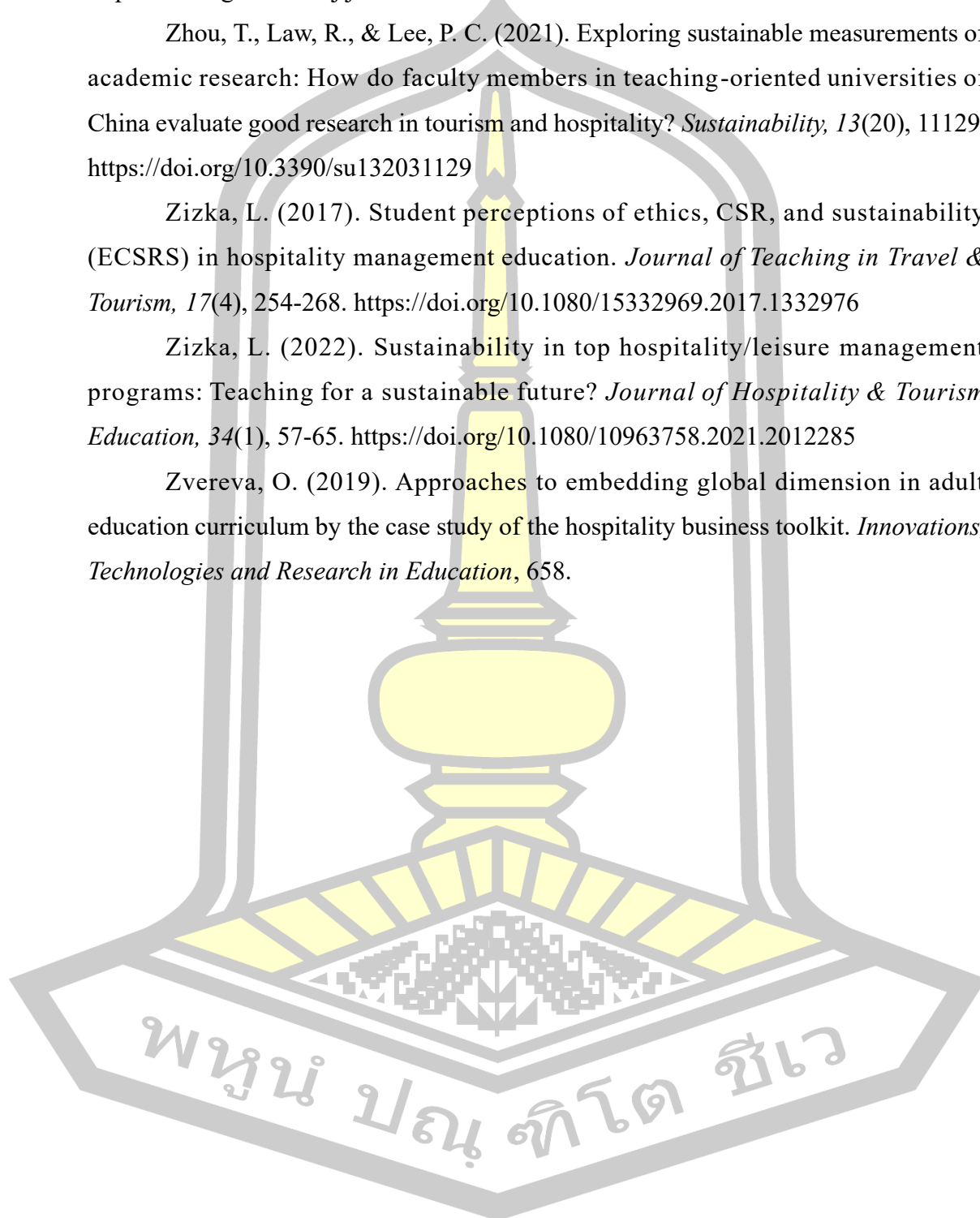
APPENDIX

Appendix A: Questionnaire of University Students' Perceptions

Dear participants,

We are conducting a study on Sustainable Hospitality Education(SHE) in China. This questionnaire aims to collect your views and understanding of SHE and assess your cognition, attitude, preference, etc. for related educational content. Your opinions are crucial for us to understand and improve SHE. This questionnaire is anonymous and all the information you provide will be kept strictly confidential and used only for this study. It is estimated to take 10-15 minutes to complete. Thank you for your valuable time. (* Required questions)

Section 1: Basic Information

1.Your gender: [Single-choice question] *

○ Male ○ Female

2.Your professional field [Single choice] *

○ Hospitality related majors   ○ Non-hospitality related majors

3.Your grade [Single choice] *

○ Freshman   ○ Sophomore ○ Junior year ○ Senior year

Section2: Sustainable Hospitality Education Awareness

4.Have you heard the concept of Sustainable HospitalityEducation?[Single-choice question] *

Strongly Disagree   ○1   ○2   ○3   ○4   ○5Strongly Agree

5.Are you willing to learn about hospitality sustainable education-related information? [Single-choice question] *

Very unwilling○1   ○2   ○3   ○4   ○5   Very willing

6.What aspects of SHE interest you?[Multiple choice] *

□ Economic aspects

□ Social aspects

□ Environmental aspects

7.Which channels can help you learn about SHE? [Multiple choice] *

□ Professional teachers

□ News Media

□ Relatives and friends with industry background

□ Industry activities

□ Training and certification

□ Others _____

8.Which UN Sustainable Development Goals are aligned with the SHE content you have come across? [Multiple choice] *

□ No Poverty

□ Zero Hunger

□ Good Health and Well-being

□ Quality Education

□ Gender Equality

□ Clean Water and Sanitation

□ Affordable and Clean Energy

□ Decent Work and Economic Growth

□ Industry, Innovation and Infrastructure

□ Reduced Inequalities

□ Sustainable Cities and Communities

□ Responsible Consumption and Production

□ Climate Action

□ Life Below Water

□ Life On Land

□ Peace, Justice, and Strong Institutions

□ Partnerships for the Goals

Section3: Sustainable Hospitality Education Attitudes

9. In your opinion, how does SHE affect daily life?[Single-choice question] *

Very unimportant   ○1   ○2   ○3   ○4   ○5   Very important

10. In your opinion, how important isSHE for future work? [Single-choice question] *

Very unimportant   ○1   ○2   ○3   ○4   ○5   Very important

11.In your opinion,issustainable developmentimportant to enterprises？ [Single-choice question] *

Very unimportant   ○1   ○2   ○3   ○4   ○5   Very important

12.In your opinion, what is the prospect of sustainable development in the hospitalityindustry? [Single-choice question] *

Very pessimistic○1   ○2   ○3   ○4   ○5   Very optimistic

Section4: Sustainable Hospitality Education Preference

13. What models do you think are possible for SHE? [Multiple choice] *

□ As a course module, embedded in other professional courses

□ It is a professional course that every student needs to learn

□ Offer elective courses for interested students to choose

□ Designed as a program, centered around the project theme

□ Set as a university degree

□ Extracurricular development

□ Others _____

14. What teaching method do you think can be used to develop SHE?[Multiple choice] *

□ Case Study

□ Lecture / Keynote Report

□ Discussion / Forum / Seminar

□ Group interactive activities

□ Group projects with deliverable to companies or institutions

□ Field investigation

□ Game or simulation

□ Service-learning activities (e.g. volunteering)

□ Personal thesis or personal project

□ Internship

□ Others _____

15.What support or resources do you hope the school will provide in terms of SHE? [Multiple choice] *

□ Add relevant courses

□ Increase practical programs and internship opportunities

□ Invite industry experts to give lectures

□ Provide research funding and resource support

□ Others _____

16.What other expectations or suggestions do you have for SHE? [Fill in the blank]

_____

17. Thank you again for your participation and support! If you are willing to accept further interviews and conduct in-depth exchanges with the project team on this topic, please leave your contact information (WeChat or email) [Fill in the blank]

_____
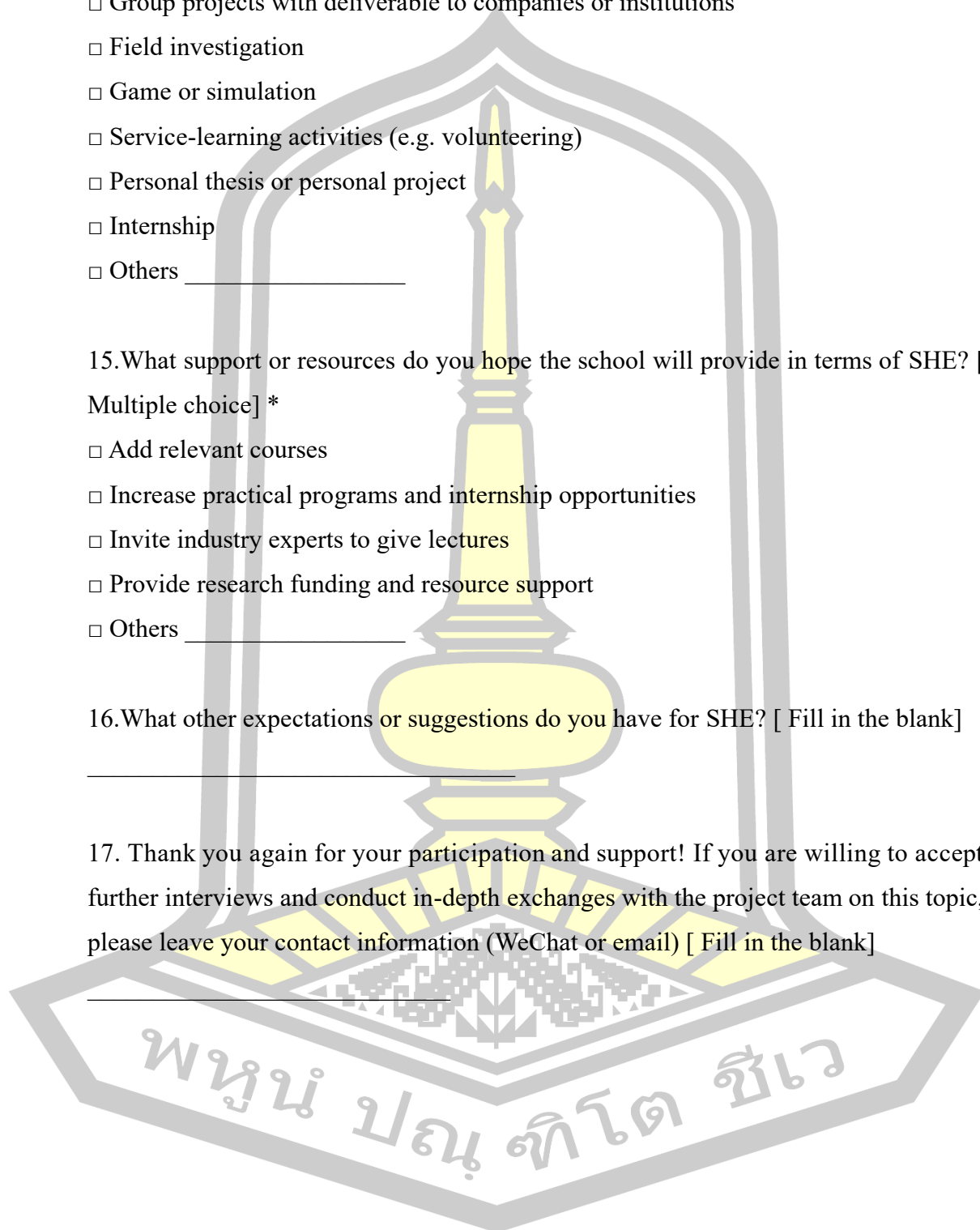
Appendix B: Semi-Structured Interview forTeachers' perspectives

Introduction

This Semi-Structured Interview Guide is designed to explore the multifaceted perspectives of educators on the facilitators and barriers within Sustainable Hospitality Education (SHE). Through a series of thoughtfully curated questions, this guide aims to uncover deep insights into the dynamics of SHE, seeking to understand how various factors contribute to or hinder the integration of sustainable practices and theories into the program. This approach allows for a nuanced exploration of subjective experiences and perceptions, contributing valuable data toward enhancing SHE's effectiveness and relevance in academic and professional settings.

Interview Questions

What does the term 'sustainability' or 'SHE' mean to you?

Which courses or modules that you currently teach include content related to SHE?

What barriers have you observed or experienced when trying to implement SHE in your teaching?

What strategies would you recommend to overcome the barriers identified in implementing SHE?

In your opinion, how does critical thinking among students influence their learning and engagement in SHE?

What strategies do you think can be adopted to enhance students' critical thinking during the implementation of
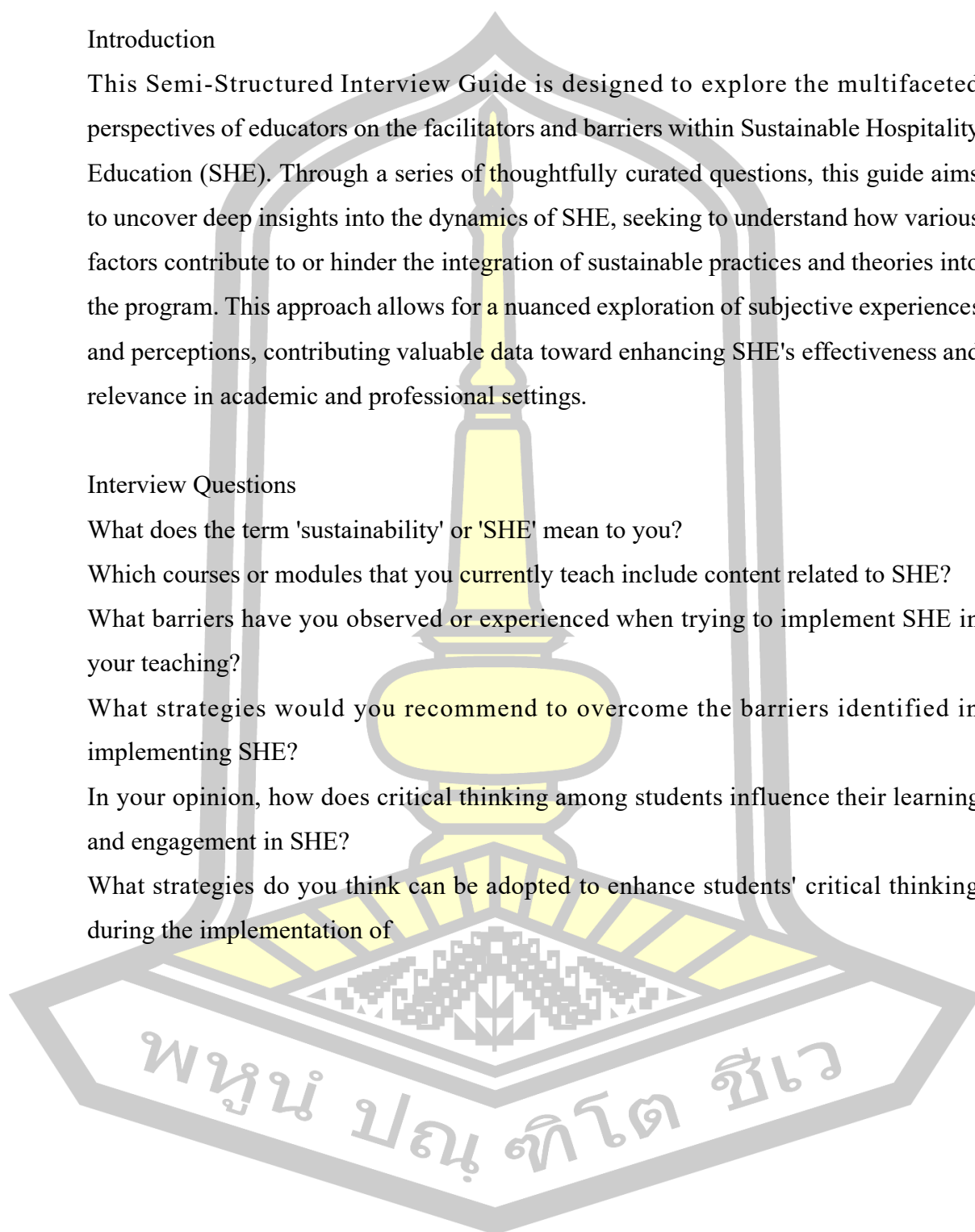
Appendix C: Expert Evaluation Form for Students' Questionnaire

Dear Distinguished Expert,

Greetings! I am Liting Zeng, a doctoral candidate in the Faculty of Education at Mahasarakham University. My research is dedicated to the development of a Sustainable Hospitality Education (SHE) program, which is intended to enhance critical thinking skills among university students in China. Following an exhaustive review of pertinent literature and the conduct of preliminary studies, I have formulated a questionnaire. This instrument is crafted to assess the perspectives of students on the subject of SHE. In the interest of ensuring the content and structural validity of this questionnaire, I am soliciting the valuable insights of esteemed experts such as yourself.

Your expertise and scholarly contributions to the field will greatly inform and refine the research instrument, thereby bolstering its academic rigor and relevance.I look forward to the benefit of your wisdom and experience in this endeavor.

PhD candidate: Liting Zeng

Section: Basic Information of Experts

Expert Name: _____

Title/Position: _____

Work Unit: _____

Research Field/Major: _____

Section 2. Evaluation of Tool Outline

This assessment is for experts to check that each question is appropriate.

Scoring +1 means that you are sure that the questions meet the objectives.

A score of 0 means not sure that the question meets the objective.

A score of -1 means that you are sure that the question does not meet the objective.

No.	EvaluationScore			Suggestion From Expert
	+1	0	-1	
1				

No.	EvaluationScore			Suggestion From Expert
	+1	0	-1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Additional suggestions:

_____

_____

_____

_____

_____

Signed_____(Assessor)

Date_____

Appendix D: Evaluation results of the Students' Questionnaire

No.	Evaluation	IOC Score by Seven Experts							IOC	Result
		1	2	3	4	5	6	7		
1	Your gender	+1	+1	+1	+1	+1	+1	+1	1.00	Valid
2	Your grade	+1	+1	+1	+1	+1	+1	+1	1.00	Valid
3	Do you understand the concept of SHE?	+1	+1	+1	+1	+1	+0	+0	0.71	Valid
4	What are the main topics of SHE that you have been exposed to?	+1	+1	+0	+1	+1	+1	+1	0.88	Valid
5	Through which channels do you learn about SHE?	+1	+1	+1	+1	+1	+1	+1	1.00	Valid
6	What specific content of SHE have you been exposed to?	+1	+1	+1	+0	+1	+1	+1	0.88	Valid
7	In your opinion, how important is SHE to our daily life ?	+1	+1	+1	+1	+1	+1	+1	1.00	Valid

No.	Evaluation	IOC Score by Seven Experts							IOC	Result
		1	2	3	4	5	6	7		
8	In your opinion, how important isSHE for future work ?	+1	+0	+1	+1	+1	+1	+1	0.88	Valid
9	In your opinion, how important is SHE for future career development ?	+0	+1	+1	+1	+1	+0	+0	0.57	Revise
10	In your opinion, how important is sustainability to your business?	+1	+0	+1	+0	+1	+1	+1	0.71	Valid
11	In your opinion, what is the prospect of the hospitality industry achieving sustainable development in the future?	+0	+1	+0	+1	+1	+1	+1	0.71	Valid
12	How interested are you in studying SHE?	+0	+1	+0	+1	+1	+1	+1	0.71	Valid
13	What models do you think are possible for SHE?	+0	+1	+1	+0	+1	+1	+1	0.71	Valid

No.	Evaluation	IOC Score by Seven Experts							IOC	Result
		1	2	3	4	5	6	7		
14	What are the possible teaching methods for SHE?	+1	+1	+1	+1	+0	+1	+0	0.71	Valid
15	What support or resources do you hope the school will provide in terms of SHE?	+1	+0	+1	+1	+1	+1	+1	0.88	Valid
16	What are your expectations or suggestions for the school in terms of SHE?	+1	+1	+1	+1	+1	+1	+1	1.00	Valid
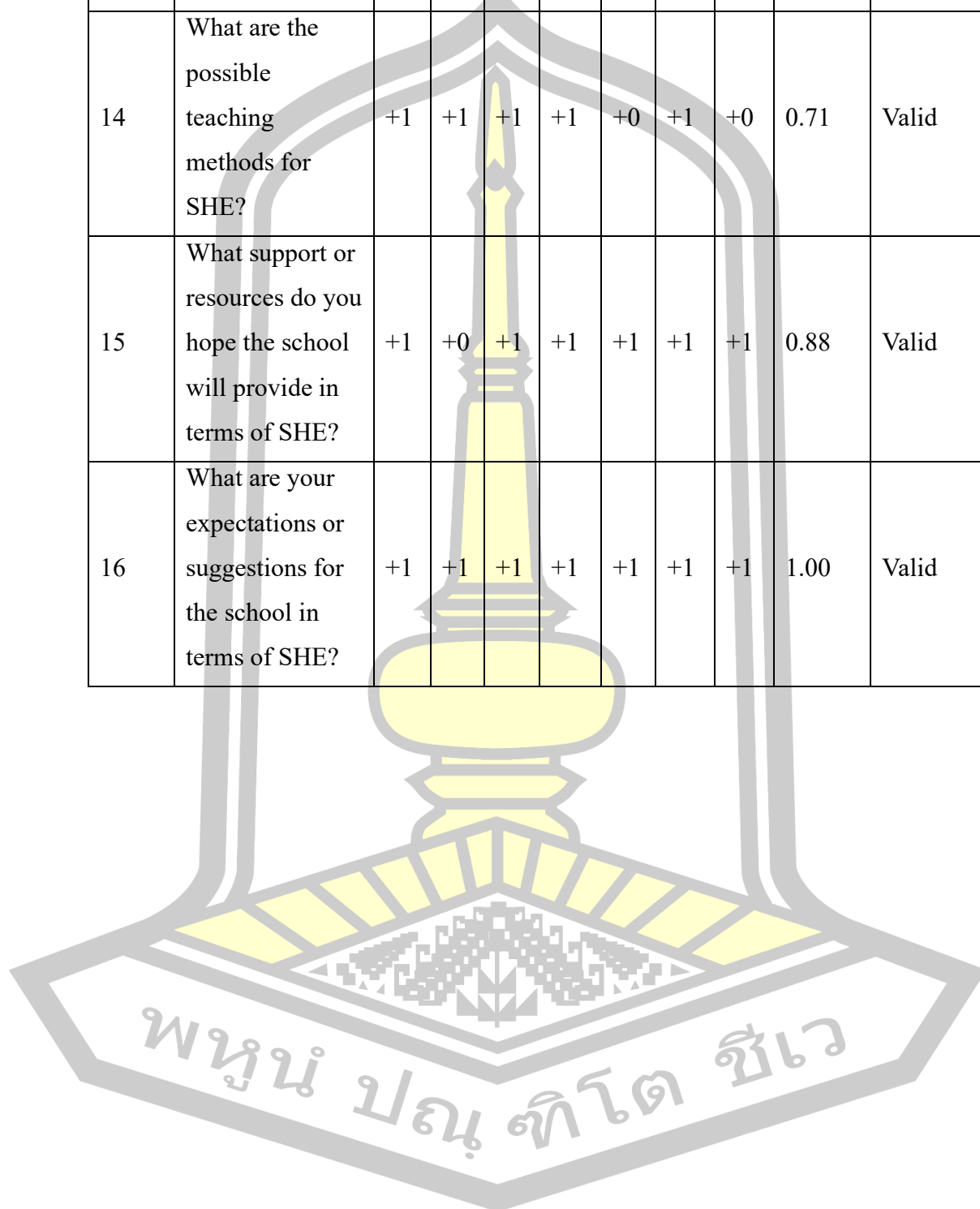
Appendix E: Expert Evaluation Form for Teacher's Interview

Dear Distinguished Expert,

Greetings! I am Liting Zeng, a doctoral candidate in the Faculty of Education at Mahasarakham University. My research is dedicated to the development of a Sustainable Hospitality Education (SHE) program, which is intended to cultivate and enhance critical thinking skills among university students in China. Following an exhaustive review of pertinent literature and the conduct of preliminary studies, I have formulated an interview. This instrument is crafted to assess the perspectives of students on the subject of SHE. In the interest of ensuring the content and structural validity of this interview, I am soliciting the valuable insights of esteemed experts such as yourself.

Your expertise and scholarly contributions to the field will greatly inform and refine the research instrument, thereby bolstering its academic rigor and relevance.I look forward to the benefit of your wisdom and experience in this endeavor.

PhD candidate: Liting Zeng

Section1. Basic Information of Experts

Expert Name: _____

Title/Position: _____

Work Unit: _____

Research Field/Major: _____

Section 2. Evaluation of Interview Question Outline（Means on a 5-point scale: 1 = strongly disagree to 5 = strongly agree.）

Items	1	2	3	4	5
1.Content Relevance					
1.1 Does the question outline comprehensively cover the key areas of the research topic?					
1.2 Are the questions in the question outline closely related to the research objectives?					
2.Clarity of Expression					
2.1 Are the questions in the question outline clearly and accurately expressed?					
2.2 Are there any terms or concepts that may lead to misunderstanding?					
3.Structure and Logic					
3.1 Is the structure of the question outline logically clear and well-organized?					
3.2 Are the questions in the outline arranged in an appropriate logical order?					
4.Cultural Appropriateness					
4.1 Does the outline take into account cultural differences and contextual appropriateness?					
4.2 Are there any contents that need to be localized?					
5.Overall evaluation					
What is your overall evaluation of the interview outline?					

Additional suggestions:

_____

_____

_____

Signed_____(Assessor)

Date_____
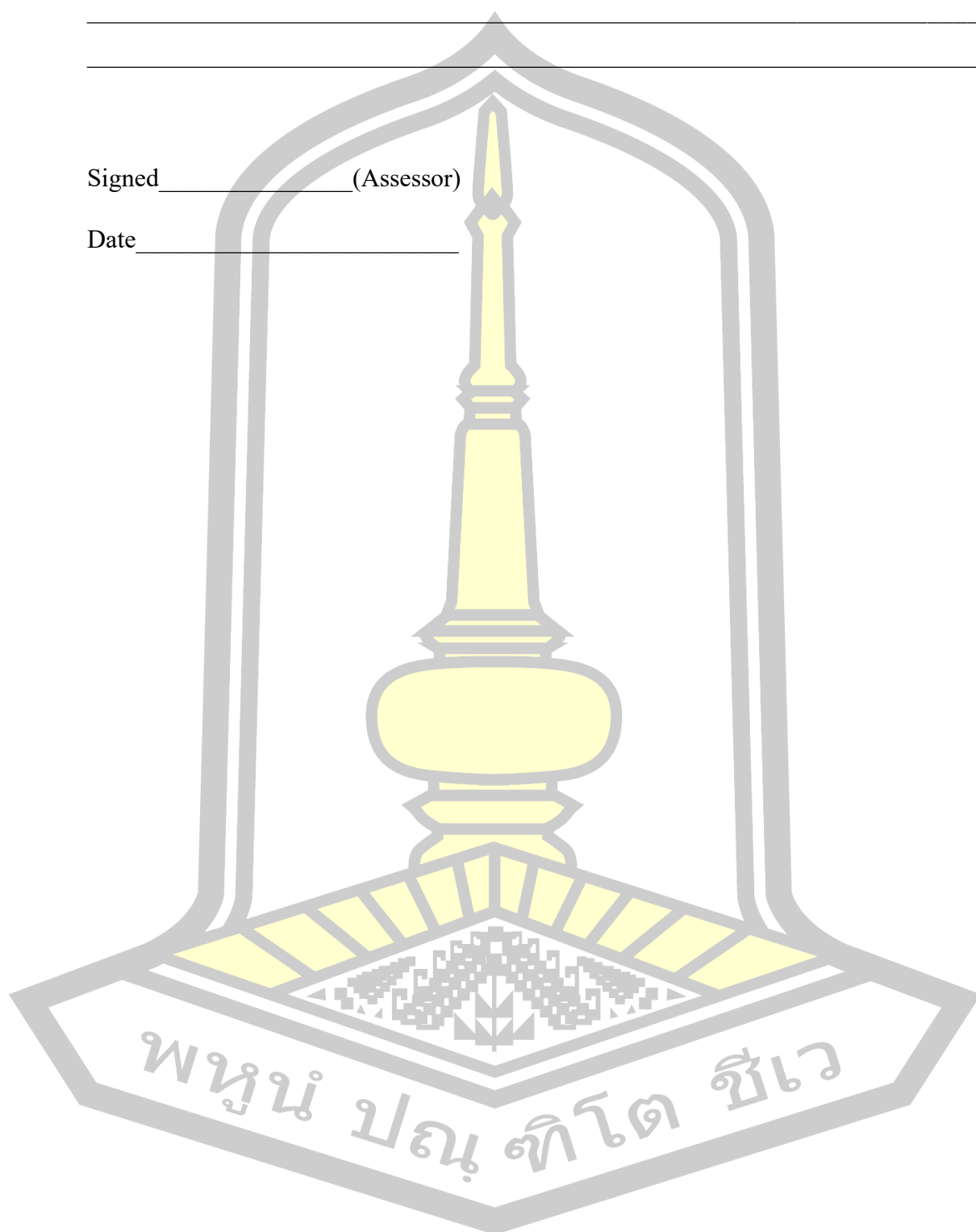
Appendix F: A Structured Comparison of Related Literature Reviews

Comparison items	Berjozkina & Melanthiou (2021)	Chen et al. (2022)	Santos et al. (2023)	Piramanayagam et al. (2023)
Covered Period	Before 2021	2000-2022	1996-2021	2009-2022
Methodology	Review of data/evidence	Systematic literature review	Bibliometric data analysis	Systematic literature review bibliometric analysis
Reviewed Material Types	Publicly available data	Articles	Scientific publication	Articles
Sample	11 HEI and 14 tourism-related BA programs	32 articles	113 articles	18 articles
Analysed Content	-Contribution to education -Current situation in Cyprus	-Teaching and Learning Methods -The Key Point -Knowledge and Cognitive Skills -Supporting	-Trends -Influence -Authors -Research areas -Future research	-Constituents -Topics -Thematic structure
Research trends	No	No	Yes	No
Bibliometric Analysis	No	Yes	Yes	Yes

Appendix G: The Summary Table of Reviewed Studies (Arranged Alphabetically by Author's Last Name)

No.	Authors	Year	Sample Size	Country/Region	Study Length	Method
1	Akinci et al.	2018	>200	Turkey	N/A	QT
2	Akinci et al.	2018	>200	Turkey	N/A	QT
3	Ali et al.	2017	<50	Globally	N/A	QL
4	Chawla & Manhas	2015	>200	India	N/A	QT
5	Chawla, G.	2015	<50	British	N/A	QL
6	Chen et al.	2021	50-100	China	1–6 months	QT
7	Chou et al.	2019	50-100	China	1–6 months	QT
8	Cynthia et al.	2009	151-200	Globally	1–6 months	MM
9	Dashper et al.	2023	<50	UK	N/A	MM
10	Deaconu et al.	2018	>200	Romania	>1 year	QT
11	Deale & Barber	2012	>200	Globally	N/A	QT
12	Farsari, I.	2022	0	Sweden	N/A	QL
13	Fuchs, K.	2022	>200	Thailand	1–6 months	QT
14	Hughes & Scheyvens	2021	50-100	Fiji	1–6 months	QL
15	Hung et al.	2023	50-100	China	>1 year	QL
16	Iriste & Fox	2019	<50	Globally	6–12 months	QL
17	Jurowski, C.	2001	<50	USA	N/A	QL
18	Karakiraz et al.	2021	101-150	Turkey	6–12 months	MM

No.	Authors	Year	Sample Size	Country/Region	Study Length	Method
19	Kiryakova-Dineva et al.	2019	101-150	Bulgaria	6–12 months	MM
20	Koblianidze & Sachaleli	2023	0	Georgia	1–6 months	MM
21	Lampoltshammer et al.	2023	0	Austria	N/A	QL
22	Liu et al.	2017	>200	N/A	1–6 months	MM
23	Liu et al.	2024	151-200	China	N/A	QT
24	Lo, W. S.	2022	<50	China	6–12 months	QL
25	Millar, M., & Park	2013	<50	USA	1–6 months	QL
26	Miller, A.	2020	<50	Cambodian	>1 year	QT
27	Mínguez et al.	2021	>200	Spain	1–6 months	QT
28	Sezen-gültekin & Argon	2022	<50	Turkey	N/A	QL
29	Tavitiyaman & Zhang	2024	>200	China	6–12 months	QT
30	Van & Cavagnaro	2014	0	South Africa	N/A	QL
31	Vespestad & Smørvik	2020	<50	Norway	>1 year	QL
32	Yu et al.	2021	>200	China	1–6 months	QT
33	Zhang & Tavitiyaman	2022	>200	China	N/A	QT
34	Zhang et al.	2020	50-100	Globally	6–12 months	QT
35	Zhou et al.	2021	<50	China	1–6 months	QL
36	Zizka & Varga	2021	>200	Switzerland	1–6 months	QT
38	Zizka, L.	2022	>200	Globally	N/A	QL
37	Zizka, L.	2017	0	Switzerland	N/A	QT

No.	Authors	Year	Sample Size	Country/Region	Study Length	Method
39	Zvereva, O.	2019	<50	Latvia	1–6 months	QL
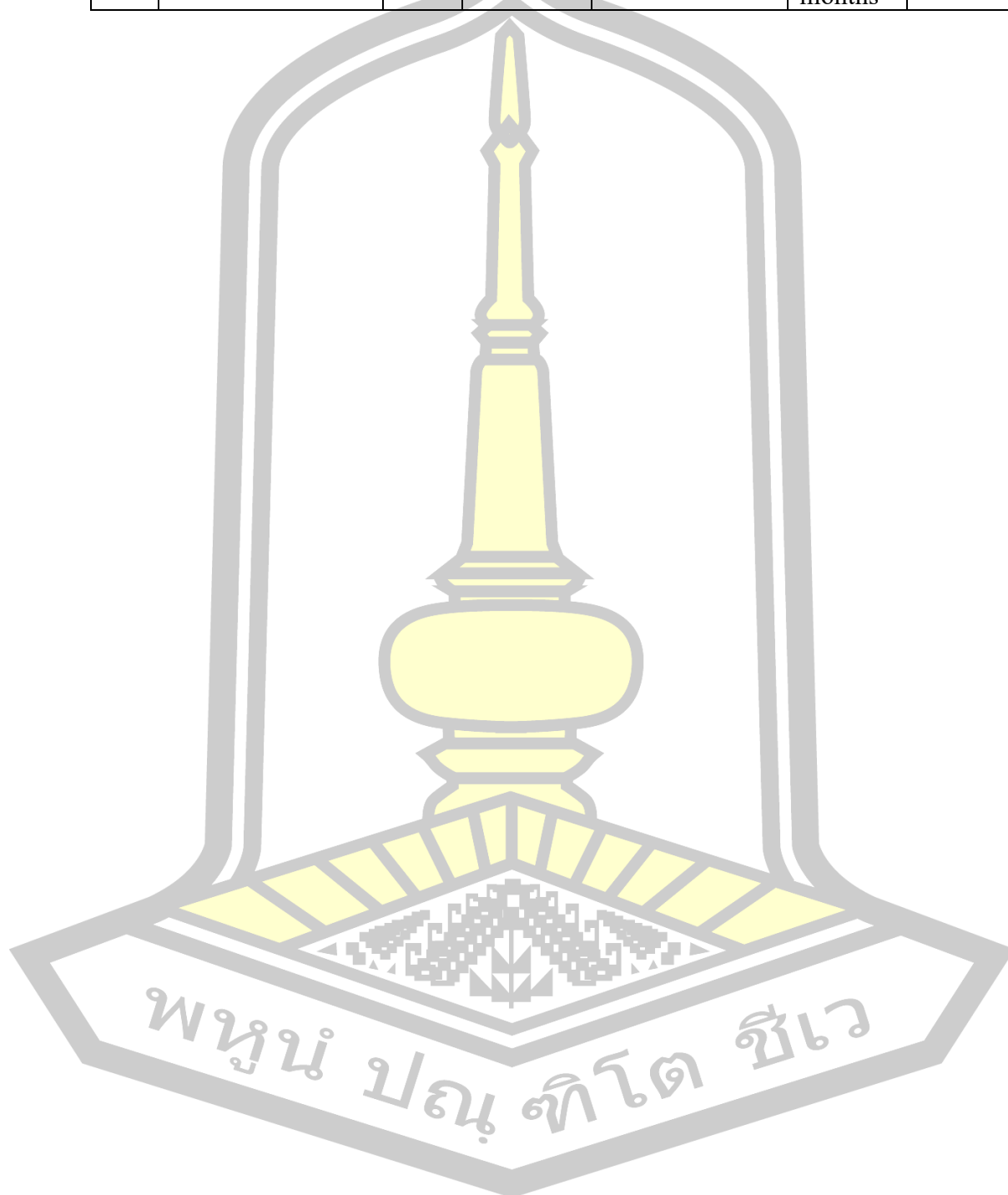
Appendix H: "ESG in the Hospitality Industry" Program Outline

1. Basic information of the Program

ProgramTitle	ESG in the Hospitality Industry
Total Hours	32 hours (4 hours per week, 8weeks)
Applicable Majors	Hospitality Management
Prerequisite Basic	Introduction to Hospitality Management, Environmental Science

2. Program Description

The "ESG in the Hospitality Industry" program is a specialized Sustainable Hospitality Education (SHE) initiative designed to equip university students in China with critical thinking skills while deepening their understanding of Environmental, Social, and Governance (ESG) principles within the hospitality sector. This program acknowledges the growing importance of sustainable practices in global business and prepares students to become future leaders who can navigate and address complex sustainability challenges.

Sustainable Hospitality Education is a broad and comprehensive field encompassing various aspects of sustainability in the hospitality industry. To provide focused, impactful education that fosters critical thinking, this program concentrates on the ESG dimensions. By emphasizing ESG, students gain a holistic view of sustainability, integrating environmental stewardship, social responsibility, and robust governance practices. This focused approach ensures that students are not only well-versed in sustainability concepts but also proficient in critical analysis and problem-solving, essential skills for the modern business landscape.

ESG issues are at the forefront of global business practices, with companies worldwide recognizing the need to address environmental sustainability, social responsibility, and governance issues to remain competitive and responsible. In China, the hospitality industry is rapidly growing, and there is an increasing awareness of sustainability issues. The government's emphasis on green development and

sustainable practices aligns well with the principles of ESG, making this program particularly timely and relevant for Chinese university students.

3. Learning Objectives

After studying this program, students will be able to:

3.1 Knowledge Objectives

1) Define key ESG concepts and principles in the hospitality industry.
2) Understand the environmental, social, and governance impacts of hospitality operations.
3) Analyze case studies to identify best practices and areas for improvement.

3.2 Competencies Objectives

1) Critically evaluate the ESG practices of various hospitality businesses.
2) Propose innovative solutions for enhancing sustainability within the hospitality sector.
3) Conduct sustainability audits and generate ESG reports for hospitality businesses.
4) Demonstrate ethical reasoning by assessing the implications of ESG decisions on different stakeholders.

3.3 Mindset Objectives

1) Demonstrate a commitment to integrating ESG principles in their professional and personal lives.
2) Exhibit a proactive attitude towards continuous learning and improvement in the field of sustainability.
3) Show a willingness to collaborate with others to promote sustainable practices in the hospitality industry.
4) Cultivate a global perspective on sustainability, understanding and respecting diverse cultural approaches to sustainable hospitality practices.

4. Program Content Arrangement

Module	Content	Hour
Module 1: Introduction to ESG in Hospitality	Definition and importance of ESG in the hospitality industry. Historical development and evolution of ESG concepts. Global and regional trends in ESG.	2
Module 2: Environmental Sustainability	Key environmental issues in hospitality, including climate change, resource management, and pollution. Best practices for environmental sustainability in hotels: waste management, energy efficiency, water conservation, and green building design. Case studies of successful environmental sustainability initiatives in the hospitality sector.	4
Module 3: Social Responsibility	Understanding social responsibility in hospitality: labor rights, community engagement, and customer well-being. Strategies for promoting social responsibility: ethical sourcing, fair labor practices, and community development programs. Case studies highlighting exemplary social responsibility practices in hotels.	4
Module 4: Governance in Hospitality	Importance of corporate governance in the hospitality industry. Key principles of good governance: transparency, accountability, and ethical behavior. Governance structures and roles: boards of directors, management, and stakeholders. Case studies of effective governance practices in hospitality companies.	4
Module 5: Integrating ESG into Business Strategy	The role of ESG in shaping business strategy and driving competitive advantage. Tools and frameworks for integrating ESG into hospitality business models. Developing and implementing an ESG strategy in hospitality operations.	4

Module 6: Assessing and Reporting ESG Performance	Methods for measuring and assessing ESG performance in the hospitality industry. ESG reporting standards and frameworks: GRI, SASB, and others. Developing sustainability reports and communicating ESG performance to stakeholders.	6
Module 7: Ethical Decision-Making and Stakeholder Engagement	Ethical dilemmas and decision-making in the context of ESG. Engaging with stakeholders: employees, customers, investors, and communities. Strategies for effective stakeholder communication and collaboration.	4
Module 8: Innovative Practices and Future Trends	Emerging trends and innovations in ESG within the hospitality industry. The future of ESG: opportunities and challenges. Exploring innovative practices and technologies that support sustainability in hospitality.	4
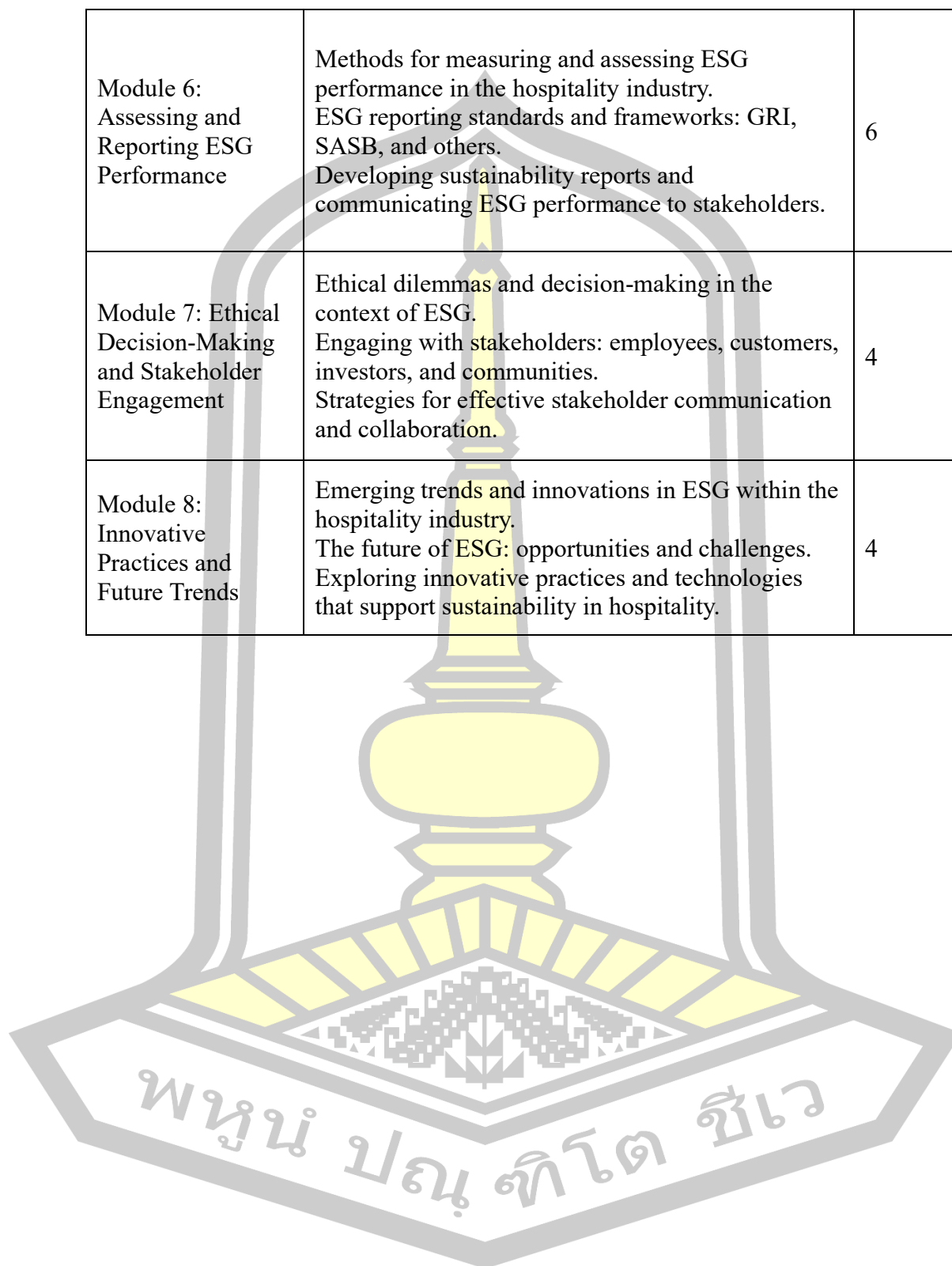
5. Teaching Methods

Module	Activity	TeachingMethod	Critical Thinking
Module 1	Debate on ESG Significance	Debate	Truth-seeking, Open-mindedness
Module 2	Analyze a real-world case study on environmental sustainability	Case Study Analysis, Group Work	Analyticity, Systematicity
Module 3	Role-Playing Exercise(different stakeholders)	Role-Playing, Discussion	Open-mindedness, Maturity of Judgment
Module 4	Governance Simulation(a board meeting)	Simulation, Discussion	Critical Thinking Self-confidence, Maturity of Judgment
Module 5	Strategic Planning Workshop	Workshop, Group Work	Systematicity, Inquisitiveness
Module 6	ESG Performance Assessment	Project, Presentation	Analyticity, Critical Thinking Self-confidence
Module 7	Ethical Dilemma Exercise	Scenario Analysis, Group Work	Truth-seeking, Maturity of Judgment
Module 8	Brainstorming Future ESG Practices	Brainstorming, Group Work	Inquisitiveness, Critical Thinking Self-confidence

6. Time Allocation

Teaching Method	Time allocation (Class Hours)
Theoretical Lectures	26
Practice (Presentationet al.)	6
Total	32

7.Assessment and Evaluation

AssessmentContent	Proportion
Class Participation and Engagement	10%
Quizzes and Short Tests	20%
Group Projects and Presentations	20%
GroupResearch Paper	20%
Final Examination	30%
Total	100%

8. Teaching Resources

8.1 Reference Books

Chen, J., & Gunn, C. *Sustainable Hospitality and Tourism Management*.

Azman, I. W. *Environmental Management for Hotels: The Industry Guide to Sustainable Operation*.

Henriques, A., & Richardson, J. (Eds.). *The Triple Bottom Line: Does It All Add Up?*

Legrand, W., Sloan, P., & Chen, J. S. *Corporate Social Responsibility in the Hospitality Industry*.

Sheward, R. *Green Hotelier's Handbook*.

8.2 Online Resources

Global Reporting Initiative (GRI), Website: https://www.globalreporting.org/

Sustainability Courses, Website:https://online.hbs.edu/subjects/sustainability

Sustainable Hospitality Alliance, Website:https://sustainablehospitalityalliance.org/

Business Enterprise for Sustainable Travel (BEST), Website:http://www.sustainabletravel.org/

United Nations World Tourism Organization (UNWTO), Website:https://www.unwto.org/

Harvard Business Review (HBR), Website:https://hbr.org/

Top universities pursuing sustainable development goals in 2024, Website:https://www.timeshighereducation.com/impactrankings

Coursera Platforms: https://www.coursera.org/

edX Courses, Platforms: https://www.edx.org/
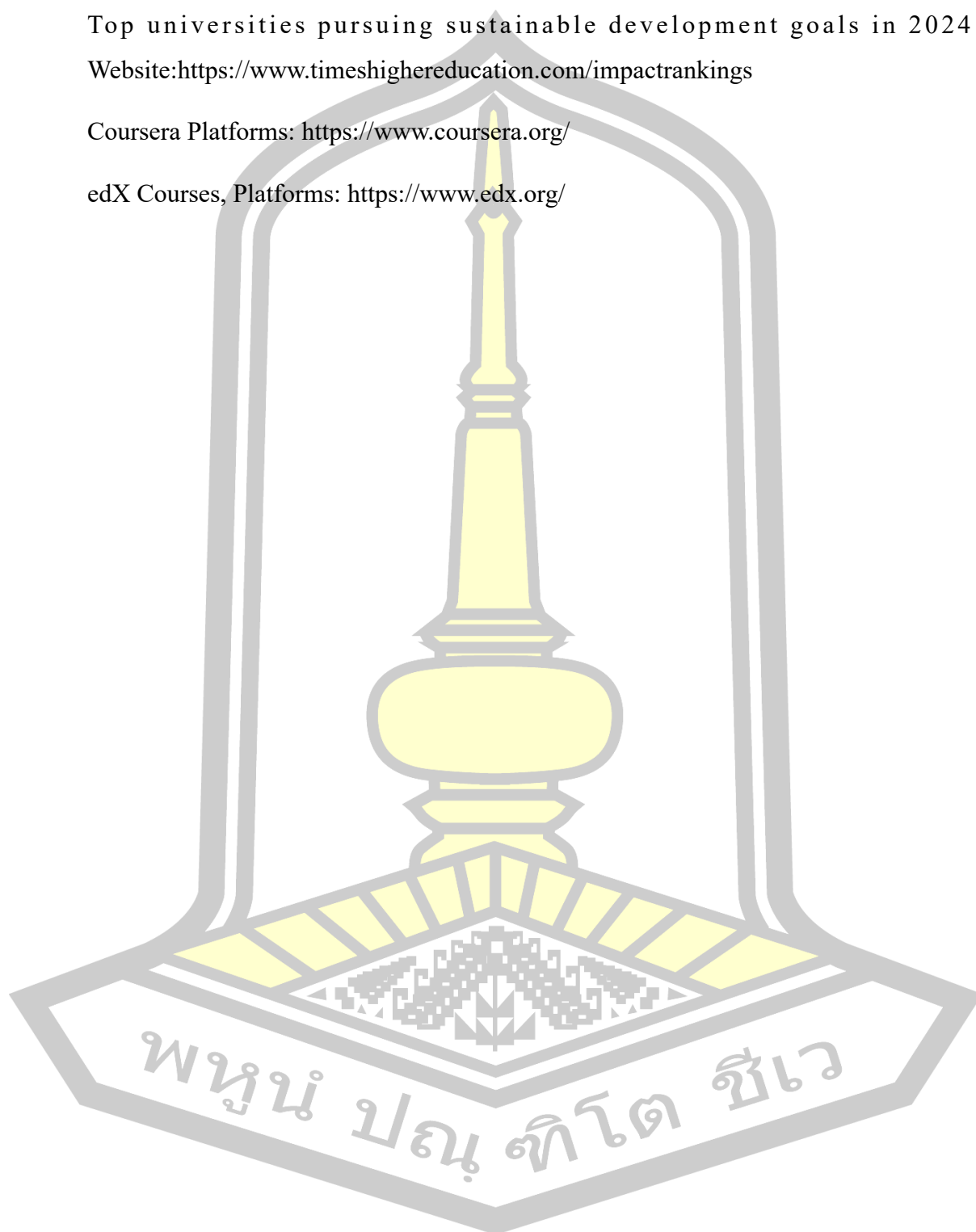
Appendix I: 100 "ESG in the Hospitality Industry" Common Vocabulary List

No.	Vocabulary	Meaning
1	AGM	Annual general meeting, a formal gathering of shareholders to conduct official business of a company. The shareholders have the right to make some decisions about the future of the company, and these meetings are the occasions when those decisions are made. The agendas very much depend on the law of the state or country of the company's incorporation.
2	Carbon dioxide (CO2)	A colourless, odourless,non-poisonous gas that results from fossil fuel combustion, and is normally part of the ambient air.
3	Carbon footprint	The annual amount of greenhouse gas emissions, mainly carbon dioxide(CO2), that result from the activities of an individual or a group of people, especially their use of energy and transport and consumption of goods and services. It is measured as the mass, in kilogrammes or tonnes per year, either of carbon dioxide emissions alone, or of the carbon dioxide equivalent effect of other greenhouse gasemissions.
4	Carbon market	A market that is created from the trading of carbon emission allowances to encourage or help countries and companies to limit their carbon dioxide(CO2) emissions. This is also known as emssions or carbontrading.
5	Carbon tax	Directly sets a price on carbon by defining a tax rate on greenhouse gas emissions or – more commonly – on the carbon content of fossil fuels.
6	Climate change	Climate change is defined as a change of climate, directly or indirectly attributed to human activity, that alters the composition of the global atmosphere and which is, in addition to natural climate variability,observed over comparable time periods.
7	Climate change adaption	Climate change adaptation is about adapting to a changing climate - involving adjusting to actual or expected future climate events –thereby increasing society's resilience to climate change and reducing vulnerabilities to its harmful effects.

8	Climate change mitigation	Human intervention that involves reducing the sources of greenhouse gas emissions (for example, the burning of fossil fuels for electricity, heat or transport) or slowing down the process or enhancing the 'sink' that store these gases, such as forests, oceans and soil.
9	Climate Disclosure Standard Board(CDSB)	Climate Disclosure Standards Board (CDSB) is an international consortium of business and environmental non- governmental (CDSB) organisations (NGOs) with the mission to create the enabling conditions for material climate change and natural capital information to be integrated into mainstream reporting.
10	Circular economy	An economic model based inter alia on sharing, leasing, reuse, repair, refurbishment and recycling, in an (almost) closed loop, which aims to retain the highest utility and value of products, components and materials at all times.
11	Community engagement	Active involvement with and investment in local communities, including supporting community projects, providing volunteer opportunities, and engaging with local stakeholders.
12	Conference of the Parties(COP)	The COP is the supreme decision-making body of the United Nations Framework Convention on Climate Change (UNFCCC). All states and countries that are parties to the convention are represented on the COP, which meets every year in a city around the world (invariably in November or December).
13	Consumer protection	Laws and other forms of government regulation designed to protect the rights of consumers.
14	Controversial sourcing	Ethically debatable cost-driven practices of companies in their value chain.
15	Controversy case	A controversy case is defined as an instance or ongoing situation in which company operations and/or products are perceived to have a negative environmental, social and/or governanceimpact.
16	Corporate Reporting Dialogue(CRD)	CRD is a joint project led by the CDP, the CDSB, the Global Reporting Initiative (GRI), the International Integrated Reporting Council (IIRC) and the Sustainability Accounting Standards Board (SASB). Its objective is to drive better alignment of sustainability reporting frameworks, as well as with frameworks that promote further integration of non-financial and financial information.

17	Corporate Social Responsibility (CSR)	A self-regulating business philosophy that helps companies be socially accountable to themselves, their stakeholders, and the public. It involves a company making decisions that are not only good for the business, but also beneficial to the society and environment.
18	Digital Disruption	The change that occurs when new digital technologies and business models affect the value proposition of existing goods and services
19	Disposal	Final placement or destruction of toxic, radioactive or other wastes; surplus or banned pesticides or other chemicals; polluted soils;and drums containing hazardous materials from removal actions or accidental releases. Disposal may be accomplished through the use of approved secure landfills, surface impoundments, land farming, deep well injection, ocean dumping or incineration
20	Dynamic asset allocation	Dynamic asset allocation is an investment strategy premised on longterm asset allocation, but employing short-term, tactical trading to maintain investment allocation targets
21	Eco-friendly practices	Strategies and initiatives that a hospitality business adopts to reduce its environmental impact, such as using renewable energy sources, minimizing waste, and promoting sustainable consumption.
22	Ecosystem	The interacting system of a biological community and its non-living environmentalsurroundings.
23	Emission	Pollution discharged into the atmosphere from smokestacks, other vents and surface areas of commercial or industrial facilities; residential chimneys; and motor vehicle, locomotive or aircraft exhausts.
24	Energy efficiency	The degree to which a system uses energy in an effective way, reducing the amount of energy wasted and improving the performance of equipment and buildings.
25	Engagement	The active process of dialogue with a company where the investor is seeking specific change. This can often be a lengthy process and involve many iterations of contact with senior representatives of the company.
26	Environment	The sum of all external conditions affectingthe life, development and survival of an organism.

27	Environmental audit/assessment	1. An independent assessment of the current status of a party's compliance with applicable environmental requirements. 2. An independent evaluation of a party's environmental compliance policies, practices and controls.
28	Escalation	The process whereby an investor takes increasingly strong steps to advance their engagement agenda. This can involve seeking additional meetings, going public, working with others and so on.
29	ESG integration	The inclusion of ESG considerations within financial analysis and investment decisions. This may be done in various ways, tailored to the investment style and approach of the fund manager.
30	ESG Investing	ESG investing is an approach to managing assets where investors explicitly acknowledge the relevance of environmental, social and governance (ESG) factors in their investment decisions, as well as their own role as owners and creditors, with the long-term return of an investment portfolio in mind. It aims to correctly price social, environmental and economic risks and opportunities.
31	Ethical and faith-based investment	Ethical (also known as values-driven) and faith-based investment refers to investing in line with certain principles, usually using negative screening to avoid investing in companies whose products and services are deemed morally objectionable by the investor or certain religions,international declarations, conventions or voluntaryagreements.
32	Exclusion list	A formal list of companies (in some cases whole sectors) that an investment institution may not invest in. These companies are said to be excluded or onoccasions, screened out.
33	External social factors	Social factors related to how the product impacts society, such as payment of taxes, social media, tobacco etc.
34	Externalities	This refers to situations where the production or consumption of goods and services creates costs or benefits to others that are not reflected in the prices charged for them. In other words, externalities include the consumption, production and investment decisions of firms (and individuals) that affect people not directly involved in the transactions. Externalities can either be negative or positive.

35	Fair labor practices	Policies and actions that ensure employees are treated fairly and with respect, including fair wages, safe working conditions, and equal opportunities for all employees.
36	Forced labour	All work or service that is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.
37	Foreign direction investmen(FDI)	FDI is an investment with a controlling stake in a business entity domiciled inanother country.
38	Forest Stewardship Council(FSC)	The FSC was formed through a collaboration of social, economic and environmental interests including World Wide Fund for Nature (WWF),IKEA and B&Q, among others. It gained momentum through the United Nations Conference on Environment and Development in 1992, which provided a platform for multi- stakeholder support.
39	Fossil fuels	Buried fuels derived from past living plant and animal materials that have been modified and buried by geological processes (e.g. coal, oil or gas)
40	Freedom of association	The right that employees should have the freedom to form or join an association or a trade union, which advocates for the interests of the employees.
41	Fund of funds	A fund of funds, sometimes called a multimanager platform, is an investment strategy that allocates to other investment managers instead of directing investments into single securities and issuers.A fund of funds provides value by identifying and investing in better underlying managers.
42	Global Impact Investing Network(GIIN)	The GIIN focuses on reducing barriers to impact investment by building critical infrastructure and developing activities, education and research that help accelerate the development of a coherentimpact investing industry.
43	Global Reporting Initiative	The GRI publishes the GRI Standards, which provide guidance on disclosure across environmental, social and economic factors for all stakeholders, including investors. Used by organisations worldwide, the GRI framework is among the most well-known.
44	Globalisation	The integration of local and national economies into a global (and less regulated) market economy, which is caused by a rapid increase in crossborder movement of goods, services, technology and capital.
45	Green building	The practice of designing, constructing, and operating buildings to maximize occupancy comfort

		and productivity, while minimizing environmental impact, energy consumption, and life-cycle costs.
46	Green bonds	Innovative financial instruments where the proceeds are invested exclusively (either by specifying the use of the proceeds, direct project exposure or securitisation) in green projects that generate climate or other environmental benefits.
47	Greenhouse effect	The warming of the earth's atmosphere caused by a buildup of carbon dioxide (CO_2) or other trace gases. Many scientists believe that this buildup allows light from the sun's rays to heat the earth, but prevents a counterbalancing loss of heat.
48	Greenhouse gas(GHG)	Gases (including carbon dioxide (CO_2), water vapour, methane and nitrous oxide) that interact with infrared radiation and when present in the atmosphere, have the effect of warming the global climate. Without naturally occurring greenhouse gases, the earth's temperature would be several tens of degrees Celsius colder than it is now (and life would not have evolved in its current form).
49	Greenwashing	Greenwashing is the overrepresentation or misrepresentation – either intentionally or unintentionally – of the qualifications and credibility of an investment portfolio that promotes itself as green,sustainable,responsible or ESG.
50	Habitat	The place where a population (e.g., human, animal, plant, or microorganism) lives, and its surroundings, both living and non-living.
51	Hazardous wastes	By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed.Substances classified as hazardous wastes possess at least one of four characteristics – ignitability, corrosivity, reactivity or toxicity – or appear on special lists.
52	Health and safety	Activity aimed at protecting the workforce from accidents and fatalities. Occupational health is about limiting workforce exposures to minimise the risk of occupational diseases or injury.
53	Human capital development	Organisational activity aimed at bettering the job performance of individuals and groups in organisational settings.

54	Human rights	Rights inherent to all human beings, regardless of race, sex, nationality, ethnicity, language, religion or any other status. Human rights include the right to life and liberty, freedom from slavery and torture, freedom of opinion and expression, the right to work and education, and many more. Everyone is entitled to these rights, without discrimination.
55	Inequality	An extreme concentration of wealth or income in the hands of a small percentage of a population.
56	Integrated Reporting Framework(IRF)	The IRF, put forward by the IIRC, encourages companies to integrate sustainability within their strategy and risk assessment by integrating it into the traditional annual report. The integrated report aims to make it easier for investors to review such information as part of normal research processes and thus increase the likelihood that sustainability information is material to investment decisions.
57	Inclusive design	Design principles that ensure products, services, and environments are accessible and usable by people of all abilities, including those with disabilities.
58	Internal social factors	Social factors within a company, such as fatalities, employee treatment, gender balance, and pay ratios.
59	Intergovernmental Panel on Climate Change(IPCC)	A United Nations intergovernmental body dedicated to providing an objective, scientific view of climate change and its impacts. Thousands of scientists and experts from around the world contribute to IPCC reports, who issue reports every seven years reviewing the state of climate science. They also produce special reports, e.g. the 2018 report on how to prevent global warming of more than 1.5°C (compared with pre-industrial levels)
60	Internal social factors	Social factors within a company, such as fatalities, employee treatment, genderbalance and pay ratios.
61	International Integrated Reporting Council(IIRC)	An organisation encouraging companies to produce integrated reports,which unite financial and ESG considerations in asingle document.
62	International Renewable Energy Agency(IRENA)	Established in 2009 to promote the adoption and usage of sustainable energy. Based in Abu Dhabi, IRENA has become an increasingly authoritative body on the trends and best practices of the global renewables sector.

63	Labour rights	Rights that aim at promoting opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and dignity.
64	Living Wage	A wage that is sufficient to cover workers' basic living expenses, such as food, clothing, housing, healthcare and education.
65	Local sourcing	The practice of sourcing goods and services from local suppliers, which can reduce the carbon footprint of transportation and support the local economy.
66	Longevity	Increased life expectancy of people due to improvements made in healthcare and changes in lifestyle.
67	Manageable risk	This is share of risk that is manageable, as opposed to the share of risk that is unmanageable, on a material ESG issue that is predefined at a subindustry level by a manageable risk factor. Every material ESG issue has a manageable risk factor (MRF), ranging from 30% (indicating that a high level of the issue risk is unmanageable) to 100% (indicating that the issue risk is considered fully manageable).
68	Management Gap	Risks that could be managed by a company through suitable initiatives, but which may not yet be managed.
69	Mandate	The formal agreement between a client and a fund manager mandating (setting out) the approach to investment as well as risk and other parameters that surround it.
70	Materiality	A core consideration in ESG investing; a factor is material if it will drive long-term financial value in a particular business. Not every ESG factor is material at every company all the time. A core challenge for ESG investors is to identify the factors that are material to a business at a particular time.
71	Millennials	Millennials, also known as Generation Y, are the generational demographic cohort following Generation X and preceding Generation Z. There are no precise dates for when this cohort starts or ends. Demographers and researchers typically use birth years ranging from the early 1980s to the mid-1990s or early 2000s.
72	Net zero emissions	The equilibrium point when no more greenhouse gas emissions are added to the atmosphere than are

		being removed (through carbon sequestration), which is required to stabilise global temperatures. The earlier net zero occurs, the lower global temperatures are likely to be.
73	Non-discrimination policy	A policy that prohibits discrimination based on race, color, religion, gender, sexual orientation, age, national origin, or disability, ensuring equal treatment for all guests and employees.
74	Physical climate-related risks	These are risks resulting from extreme weather events, either acute or chronic risks from longer-term shifts in climate patterns, for example, higher temperatures
75	Pollution	The introduction into the environment (air, water or land) of substances or energy liable to: cause harm to human health, other animals or plants and ecosystems; damage a structure or amenity; or interfere with legitimate uses of the environment.
76	Principle for Responsible(PRI) Investment	The PRI comprises an international network of investors – signatories– working together towards a common goal to understand the implications of ESG to investment and ownership decisions and practices.
77	Precautionary principle	A policy principle suggesting that, in the case of potentially catastrophic or irreversible harm, preventative action may be justified even in the absence of complete certainty about all future costs and benefits; 'better safe than sorry'.
78	Recycling programs	Initiatives to collect, sort, and process materials that would otherwise be thrown away as trash and turn them into new products, reducing waste and conserving natural resources.
79	Risk premia	Risk premia represent the return in excess of risk-free rate of return for a given investment. Risk premia, more commonly called factors, is the premium or extra compensation that an investor expects by assuming the risk of investing in a particular factor. The most well-established factors are value, size, quality, momentum and liquidity.
80	Roundtable on Sustainable Palm Oil(RSPO)	The RSPO began as an informal engagement between WWF, Unilever, Aarhus United UK Ltd, Migros and the Malaysian Palm Oil Association, which then formed an organising committee.
81	Secularism	The societal shift from close identification and affiliation with religious values and institutions toward nonreligious values and more secular institutions.

82	Scope 1,2 and 3 emissions	A categorisation of the sources of greenhouse gas emissions fromcompanies: • direct emissions from a company's core operations ('Scope 1' emissions); • indirect emissions from purchased energy ('Scope 2'); and • indirect emissions from the broader value chain, e.g. those produced by suppliers and customers ('Scope 3' emissions).
83	Shareholder engagement	Shareholder engagement reflects active ownership by investors in which the investor seeks to influence a corporation's decisions on matters of ESG, either through dialogue with corporate officers or votes at a shareholder assembly (in the case of equity).
84	Shareholder Rights Directive(SRD)	An EU law implemented in June 2019 into the local laws of each member country. It sets standards for the treatment of shareholders by European companies. The second Shareholder Rights Directive (often abbreviated as SRD II) relates more to shareholder responsibilities than rights and covers mandates and stewardship obligations.
85	Shariah-compliant funds	Like other faith-based screening approaches, Shariah-compliant funds operate on exclusionary screening that typically excludes: conventional banking and insurance; pork and non- Halal foods; alcohol; gambling; tobacco; adult entertainment; synthetic instruments like derivatives and swaps; and weapons. The Shariah Supervisory Board applies and arbitratesexclusionary criteria.
86	Social megatrends	Long-term social changes that affect governments, societies and economies permanently over a long period of time, such as increased globalisation; changes in work, family and leisure time; and the rise of automation and artificial intelligence (AI) in manufacturing and service sectors.
87	Social opportunites	The difference in opportunities between people based on their social networks and the overall environment in which they live.
88	Social topics	Issues that affect the business more directly, such as violations of human and labour rights, issues regarding occupational health and safety of employees, and product recalls due to safety issues.
89	Socially reponsible investment (SRI)	One of the subsets of ESG investing. Generally used as a catch-all term for investments made with a conscious desire for lower exposure to assets deemed to be less sustainable or responsible, and/or

		increased exposure to those displaying greater sustainability or responsibility.
90	Stakeholder opposition	Political interference or informal protest and disruption due to the activities or presence of a company.
91	Stranded assets	Assets that are at risk of facing severe impairment because of regulatory or environmental change. Generally accepted to be fossil fuel supply and generation resources, which, at some time prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return (i.e. meet the company's internal rate of return) as a result of changes associated with the transition to a low-carbon economy.
92	Sustainablity Accounting Standards Board(SASB)	The SASB issues standards that are focused on the key material sustainability issues that affect 70-plus industry categories. These, along with the SASB materiality maps, are particularly helpful for investors determining what is material for reporting, and aids more standardised benchmarking.
93	Sustainable Development Goals (SDGs)	A set of global goals set in 2015 by the UN General Assembly (UNGA),succeeding the Millennium Development goals. The SDGs seek to address the key global challenges, including those related to poverty,inequality, climate change, environmental degradation, peace and justice. There are 17 interconnected goals.
94	Sustainable supply chain	A supply chain that operates in a way that minimizes negative environmental impacts while also ensuring the long-term viability of the business and its suppliers, often through ethical sourcing and fair labor practices.
95	Transition risk	Transition risk relates to risks that result from changes in climate and energy policies, a shift to low-carbon technologies and liability issues.
96	Triple bottom line (TBL)	The triple bottom line (TBL or 3BL) is an accounting framework with three parts: social, environmental (or ecological) and financial (people, planet and profit).

97	UN Framework Convention on Climate Change(UNFCCC)	An international treaty adopted in 1992 to stabilise greenhouse gas emissions in the atmosphere that would prevent dangerous man-made interference with the climate system. The UNFCCC is also the name of the UN Secretariat, based in Bonn, that has the responsibility to support the operation of the treaty.
98	United Nations Environment Programme Finance Initiative (UNEP FI)	UNEP FI is a partnership between UNEP and the global financial sector to mobilise private sector finance for sustainable development.
99	Water conservation	Efforts to use water resources more efficiently and protect them from pollution, including reducing water usage, reusing water where possible, and treating wastewater before release.
100	Workplace diversity	The inclusion of individuals from different backgrounds, cultures, genders, ages, and experiences in the workplace, which can lead to a more innovative and productive work environment.
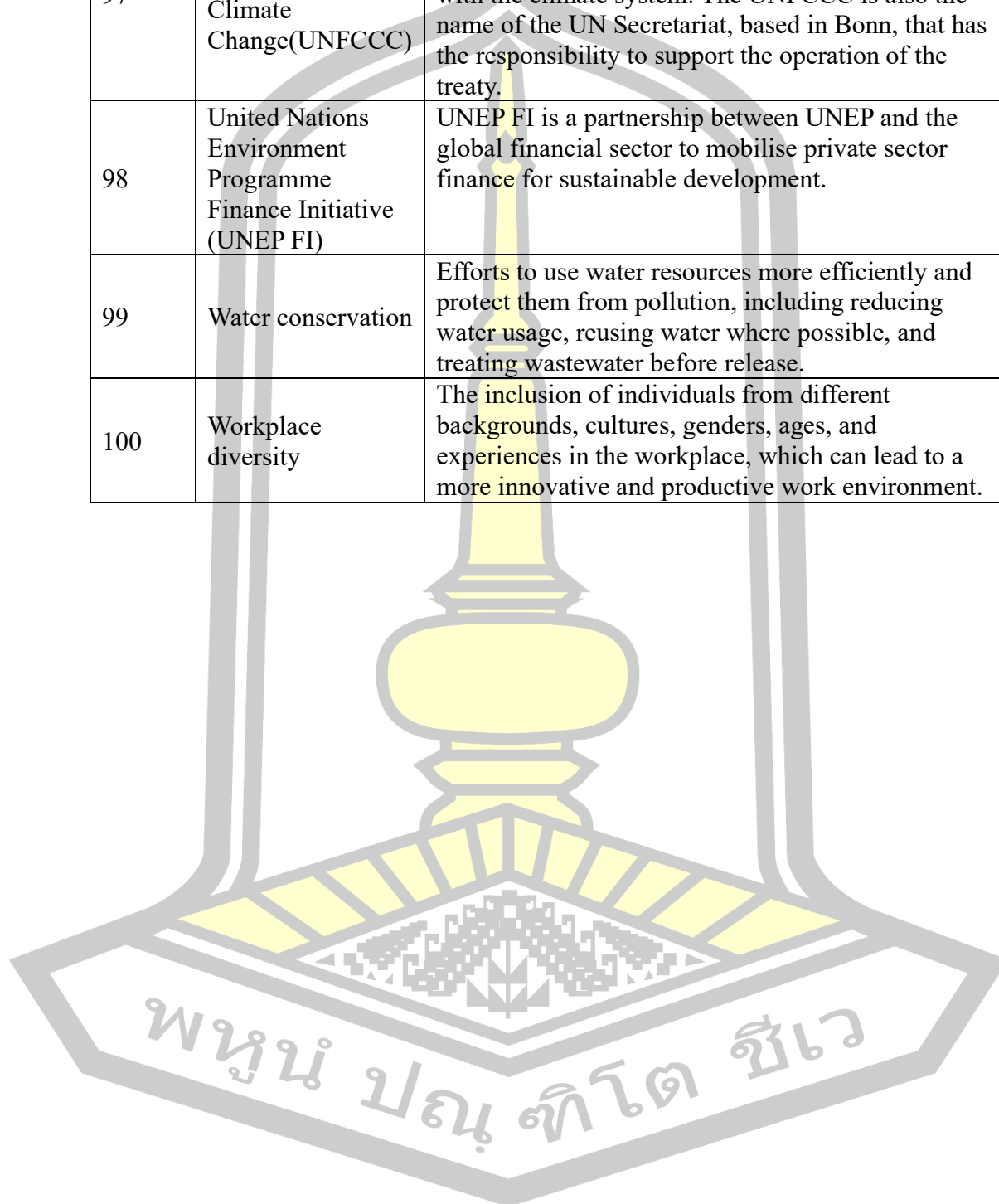
Appendix J: Critical Thinking Disposition Inventory Test

Dear students,

Thank you very much for participating in this survey. Critical thinking is both a skill and a habit of thinking. Want to test your critical thinking ability? There are no standard answers to all the questions in this questionnaire about thinking tendencies, and there are no right or wrong answers. Please read each sentence carefully and choose the corresponding answer based on your agreement with each sentence. Means on a 5-point scale: 1 = strongly disagree to 5 = strongly agree.）. Please note that you need to make a true assessment based on your situation. Every question is a must-answer, so don't miss anything.

Items	1	2	3	4	5
Section 1. Truth-seeking					
1. When faced with controversial topics, it is extremely difficult to choose one of the different opinions.					
2. If there are four reasons for agreeing with something and only one reason for opposing it, I will choose to agree with it.					
3. Even if there is evidence that contradicts my ideas, I will stick to my ideas.					
4. I feel panicked when dealing with complex problems.					
5. When I express my opinions, it is impossible to remain objective.					
6. I will only look for facts that support my opinions, not facts that contradict my opinions.					
7. There are many problems that I would be afraid to find the truth about.					
8. Now that I know how to make this decision, I will not repeatedly consider other options.					

Items	1	2	3	4	5
9. We don't know what standards we should use to measure most problems.					
10. Personal experience is the only criterion for verifying truth.					
Section 2. Open-mindedness					
11. It is important to me to understand other people's thoughts on things.					
12. I am trying to make less subjective judgments.					
13. It is very meaningful to study the ideas of foreigners.					
14. When facing difficulties, it is impossible for me to consider all possibilities of the event.					
15. During group discussions, if someone's opinion is considered wrong by others, he has no right to express his opinion.					
16. Foreigners should learn our culture instead of asking us to understand theirs.					
17. I should not be forced to defend my opinions.					
18. Being open to different worldviews (e. g. evolution, theism) is not that important.					
19. Everyone has the right to express their opinions, but I will not pay attention to them.					
20. I will not doubt what everyone takes for granted.					
Section3. Analyticity					
21. I feel anxious when others only use superficial arguments to defend good ideas.					
22. My beliefs must be supported by evidence.					

Items	1	2	3	4	5
23. If you want to oppose other people's opinions, you must give reasons.					
24. I find myself constantly evaluating other people's arguments.					
25. I can be considered a logical person.					
26. When dealing with a difficult problem, you must first understand the crux of the problem.					
27. I am good at handling problems in an organized manner.					
28. I am not a very logical person, but I often pretend to be logical.					
29. It is impossible to know which is the better solution.					
30. Life experience tells me that you don't have to be too logical in dealing with things.					
Section4. Systematicity					
31. I always analyze the key points of a problem before answering it.					
32. I organize my thoughts easily.					
33. I am good at planning a systematic plan to solve complex problems.					
34. I often think repeatedly about what is right and wrong in practice and experience.					
35. My attention is easily affected by external circumstances.					
36. I can keep talking about a problem without caring whether it is solved.					

Items	1	2	3	4	5
37. When I see that the instructions for a new product are complicated to understand, I give up reading.					
38. People say I make decisions too impulsively.					
39. People think I am hesitant when making decisions.					
40. My opinions on controversial topics mostly follow the last person I talk to.					
Section 5. Critical thinking self-confidence					
41. I appreciate my ability to think accurately.					
42. Tests that require thinking rather than relying solely on memory are more suitable for me.					
43. My curiosity and thirst for knowledge are appreciated by others.					
44. When faced with problems, because I can make objective analysis, my peers will come to me to make decisions.					
45. I am satisfied that I can come up with creative choices.					
46. Others look to me to establish appropriate guidelines for guidance when making decisions.					
47. I have a strong thirst for knowledge.					
48. I am satisfied that I can understand other people's perspectives.					
49. When a problem gets tough, others look to me to get on with it.					
50. I am afraid to ask questions in class.					
Section 6. Inquisitiveness					

Items	1	2	3	4	5
51. Studying new things makes my life richer.					
52. When faced with an important decision, I will try my best to collect all relevant information.					
53. I look forward to facing challenging things.					
54. Solving puzzles is fun.					
55. I like to find out how things work.					
56. No matter what the topic is, I am eager to know more about it.					
57. I try to learn everything I can, even if I don't know when it will be useful.					
58. Most of the school courses are boring and not worth taking.					
59. Required subjects in school are a waste of time.					
60. Taking the initiative to try to solve various problems is not that important.					
Section 7. Maturity of judgment					
61. The best arguments often come from a momentary feeling about a certain issue.					
62. The so-called truth is nothing more than personal opinions.					
63. If you pay a high price (for example: money, time, and energy), you will be able to get better opinions.					
64. When I keep an open mind, I don't know what is true and what is false.					
65. If possible, I try to avoid reading.					
66. I firmly believe in what I believe in.					

Items	1	2	3	4	5
67. Use "metaphors" to understand problems, like driving a boat on the road.					
68. The best way to solve a difficult problem is to ask others for the answer.					
69. The essence of a thing is consistent with its appearance.					
70. The decision made by the powerful is the right decision.					
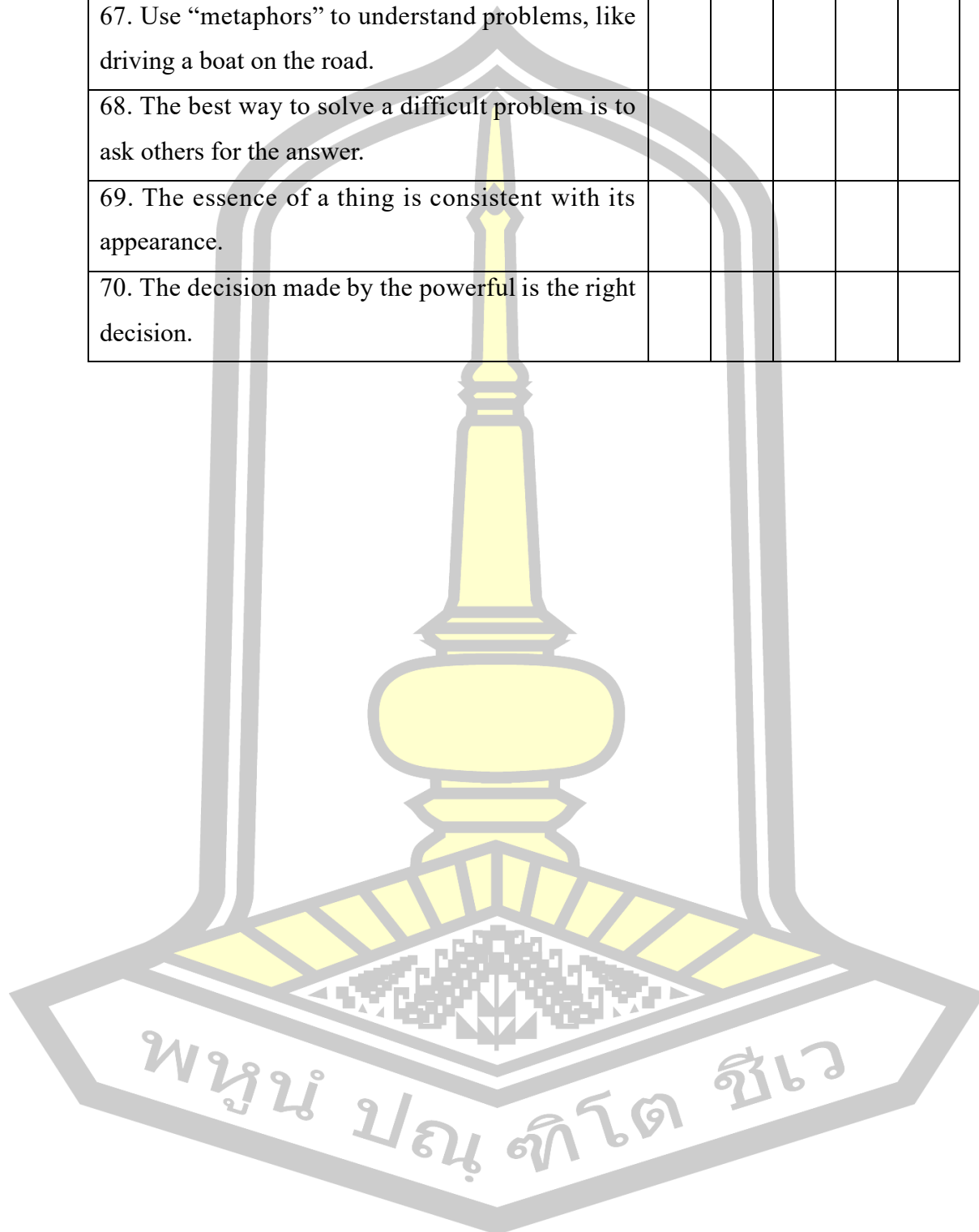
Appendix K: Expert Evaluation Form for Assessing the Validity of the Critical Thinking Adaptability Test Tools

Dear Distinguished Expert,

Greetings! I am Liting Zeng, a doctoral candidate in the Faculty of Education at Mahasarakham University. My research is dedicated to the development of a Sustainable Hospitality Education (SHE) program, which is intended to cultivate and enhance critical thinking skills among university students in China.In this research The Critical Thinking adaptability test is applied the Chinese Version of Critical Thinking Disposition Inventory, which was translated and revised by Meici Peng et al.(2004). In the interest of ensuring the content and structural validity of this tool, I am soliciting the valuable insights of esteemed experts such as yourself.

Your expertise and scholarly contributions to the field will greatly inform and refine the research instrument, thereby bolstering its academic rigor and relevance.I look forward to the benefit of your wisdom and experience in this endeavor.

PhD candidate: Liting Zeng

Section1. Basic Information of Experts

Expert Name: _____

Title/Position: _____

Work Unit: _____

Research Field/Major: _____

Section 2. Evaluation of Tool Outline

This assessment is for experts to check that each question is appropriate.

Scoring +1 means that you are sure that the questions meet the objectives.

A score of 0 means not sure that the question meets the objective.

A score of -1 means that you are sure that the question does not meet the objective.

| No.	Evaluation Score			Suggestion From Expert
	+1	0	-1	
1				
2				
3				
4				

No.	Evaluation Score			Suggestion From Expert
	+1	0	-1	
5				
6				
7				
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No.	Evaluation Score			Suggestion From Expert
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No.	Evaluation Score			Suggestion From Expert
	+1	0	-1	
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70				

Additional suggestions:

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Signed_____(Assessor)
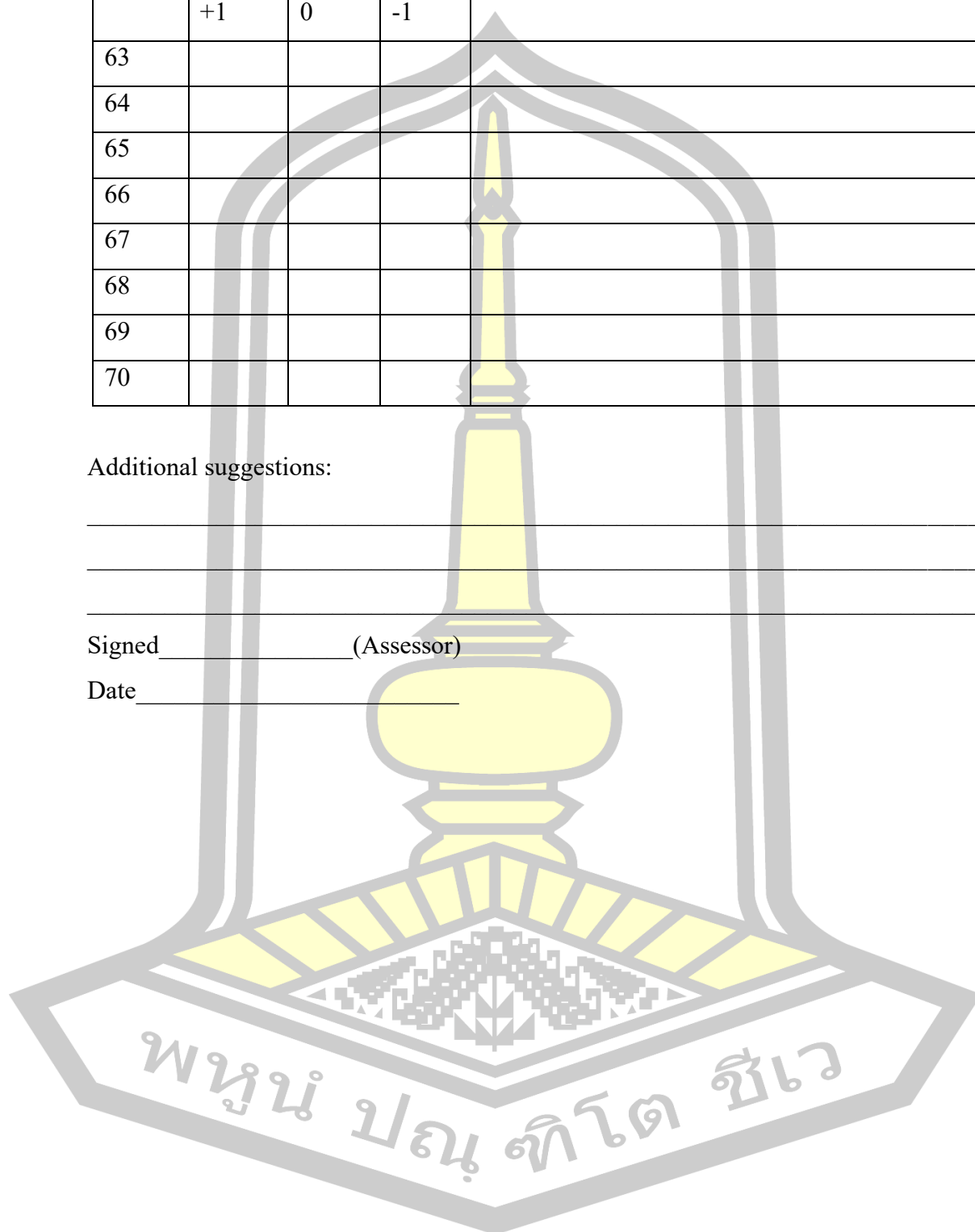
Date_____

Appendix L: Expert Evaluation Form for the Sustainable Hospitality Education Program

Dear Distinguished Expert,

Greetings! I am Liting Zeng, a doctoral candidate in the Faculty of Education at Mahasarakham University. My research is dedicated to the development of a Sustainable Hospitality Education (SHE) program, which is intended to cultivate and enhance critical thinking skills among university students in China. The evaluation aims to solicit expert opinions on the structure, content, and pedagogical strategies of the Sustainable Hospitality Education Program, ensuring it meets the academic and professional needs of the hospitality industry.Your expertise and scholarly contributions to the field will greatly inform and refine the program, thereby bolstering its academic rigor and relevance.I look forward to the benefit of your wisdom and experience in this endeavor.Please spend approximately 60 minutes to thoroughly evaluate the program based on the criteria.

PhD candidate: Liting Zeng

Section1. Basic Information of Experts

Expert Name: _____

Title/Position: _____

Work Unit: _____

Research Field/Major: _____

Section 2. Evaluation of Program Outline

Please rate each item on a scale of 1-5, with 1 being the lowest and 5 being the highest.(1=Unqualified; 2=To beImproved; 3=Qualified; 4=Good; 5=Excellent)

No.	Section	Item	Grade				
			1	2	3	4	5
1	Learning Target	1.1 Relevance of chapters to learning targets					

		1.2 Engaging and comprehensibility of teaching methods					
2	Teaching Contents	2.1 Appropriate difficulty level for university students					
		2.2 Interest and usefulness of knowledge content					
3	Language Use	3.1 Clarity and comprehensibility of speech					
		3.2 Bilingual teaching approach					
4	Evaluatio n	4.1 Alignment with learning goals					
		4.2 Comprehensiveness of chapter content coverage					

Additional suggestions:

_____

_____

_____

Signed_____(Assessor)

Date_____

Appendix M: Assessment Framework and Roster of Experts for SHE Program Evaluation

A diverse panel of seven experts has been selected to thoroughly evaluate the SHE program's alignment with sustainable education objectives, ensuring a multifaceted assessment. The preliminary program framework will be rigorously reviewed to ensure it enhances students' critical thinking, which is crucial for its success. The evaluation aims to refine the program, making it more enriching and aligned with sustainable development in the hospitality industry. Expert feedback, treated confidentially, will be used solely for academic research and program enhancement, directly contributing to improved educational practices and student outcomes in sustainable hospitality education.

Section1.Panel of Evaluators

No.	Role	Expertise	Qty.	Evaluation Focus
1	Hospitality Educator	Hospitality Education	2	Quality of the program, relevance to hospitality education, potential to foster critical thinking
2	Industry Practitioner	Hospitality Industry	2	Industry relevance, practical applicability, responsiveness to industry needs
3	Sustainability Scholar	Sustainability Science	1	Alignment with sustainability goals, environmental responsibility
4	Instructional Designer	Curriculum and Instruction Design	2	Pedagogical soundness, innovation in curriculum design, optimization of learning experience

Section2.Expert Roster for SHE Program Evaluation

No.	Name	Title	Expertise	Affiliation
1	Long Yang Xu	Professor	Hospitality Education Expert	Dean of Academic Affairs, Beijing Hospitality Institute (BHI)
2	Wei Min Yu	Professor	Hospitality Education Expert	Vice Dean and General Manager of Teaching Hotel, BHI
3	Jian Li	Researcher	Sustainability Expert	Researcher at Tsinghua University's Center for Architectural Energy Efficiency, Chief Expert of China Hotel Engineering Alliance, Expert Committee Member of China Hotel Association's Design and Engineering Committee, Green Building and Safety Management Expert
4	Quanfeng Xie	Associate Professor	Curriculum and Instruction Design Expert	Doctor of Education, Hunan Normal University, Director of the Department of Education, Hunan First Normal University
5	Qing Wang	Assistant Professor	Curriculum and Instruction Design Expert	School of Humanities and Social Sciences, Beijing Institute of Technology, Special Deputy Researcher, Master's Supervisor, Doctoral Candidate
6	Mingliang Yang	Group Vice President	Hospitality Industry Professional	Group Vice President of Shenzhen Huamei Consulting Co., Ltd., General Manager of Beijing Company

No.	Name	Title	Expertise	Affiliation
7	Sen Tian	CEO	Hospitality Industry Professional	Founder and CEO of Menduner Recruitment Platform, Former Vice President of Operations and Opening for Accor Greater China, Doctor of Hotel and Tourism Management from Hong Kong Polytechnic University

Appendix N: Evaluation results of the "ESG in the Hospitality Industry"

No.	Evaluation	IOC Score by Seven Experts							IOC	Result
		1	2	3	4	5	6	7		
1	Relevance of chapters to learning targets	+1	+1	+1	+1	+1	+1	+1	1.00	Valid
2	Engaging and comprehensibility of teaching methods	+0	+1	+1	+1	+1	+1	+1	0.88	Valid
3	Appropriate difficulty level for university students	+1	+1	+1	+1	+1	+0	+0	0.71	Valid
4	Interest and usefulness of knowledge content	+1	+1	+0	+1	+1	+1	+1	0.88	Valid
5	Clarity and comprehensibility of speech	+1	+1	+1	+1	+1	+1	+1	1.00	Valid
6	Bilingual teaching approach	+1	+1	+1	+0	+1	+1	+1	0.88	Valid
7	Alignment with learning goals	+1	+1	+1	+1	+1	+1	+1	1.00	Valid
8	Comprehensiveness of chapter content coverage	+1	+0	+1	+1	+1	+1	+1	0.88	Valid

Appendix O: Thesis Reviewer Invitation

To:

Subject:Thesis Reviewer Invitation

StudentLiting Zeng, student ID 64010562019 majoring in the Curriculm and Instruction program is currently undertaking a research project titled "Developing a Sustainable Hospitality Education Program to Enhance Critical Thinking for University Students in China" under the guidance of Asst. Prof. Wichaya Yoshida and Asst. Prof. Jiraporn Chano.

To ensure the successful execution and the highest quality of this research project, we are seeking your valuable expertise and experience. Therefore, I am delighted to extend a formal invitation to you to serve as a reviewer for the research instrument designed for this thesis project.

Your participation in this academic endeavor is highly valued and appreciated. Should you require any further information or have questions regarding this invitation, please do not hesitate to contact us be email.

Yours sincerely,

PhD candidate: Liting Zeng
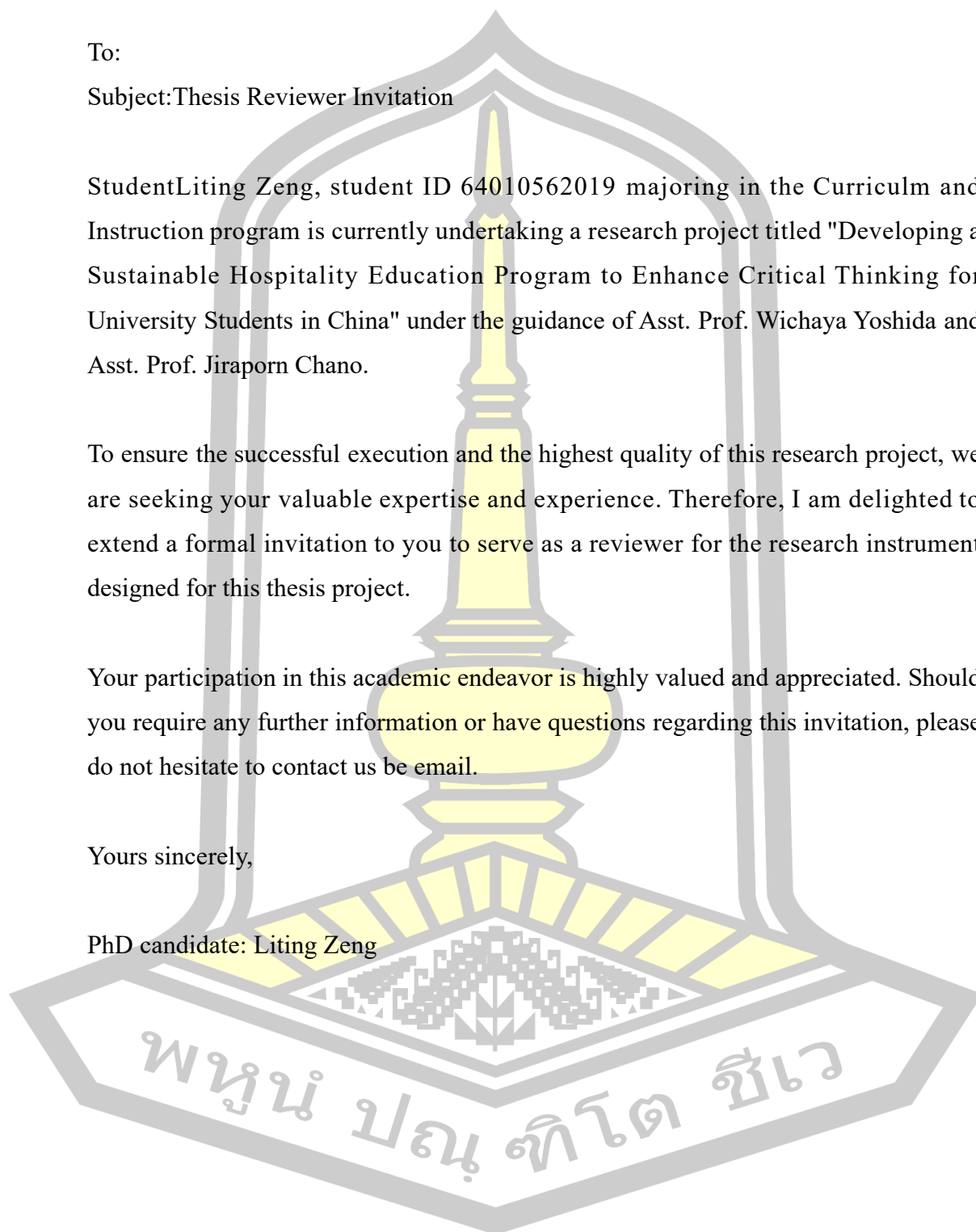
Appendix P: Researchers participated in the "Sustainable Innovation" seminar held by China Open University

REFERENCES

BIOGRAPHY

NAME	Liting Zeng
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EDUCATION	2002-2006 Bachelor's Degree (B.A.), Hotel Management, Central South University of Forestry and Technology 2009-2012 Master's Degree, Ecology(Hotel Management), Central South University of Forestry and Technology 2021-2025 Doctor of Philosophy (Ph.D.), Curriculum and Instruction, Mahasarakham University