DEVELOPMENT OF STRATEGIES TO PROMOTE SUSTAINABLE PROFESSIONAL COMPETENCES FOR UNIVERSITY LECTURERS IN DIGITAL ERA, SICHUAN PROVINCE

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Thesis Title Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in Digital Era, Sichuan Province

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ABSTRACT

The objectives of this research were: 1) to study the current situation of sustainable professional competences for university lecturers in the digital era, Sichuan Province; 2) to provide strategies for improving sustainable professional competences for university lecturers in the digital era, Sichuan Province; 3) to evaluate the adaptability and feasibility of these strategies. The sample group of this research comprised 377 university lecturers in Sichuan Province, selected by systematic and simple random sampling. The interview group included 10 experts from representative universities in Sichuan Province. Experts who evaluated the adaptability and feasibility of the strategies consisted of high-level administrators from each representative university, totaling 7 people.

The sample group consisted of 377 university lecturers from ten universities in Sichuan Province, selected using systematic and simple random sampling methods. Data were collected through questionnaires, structured interviews with ten experts, and evaluations by seven high-level administrators. The research instruments included a questionnaire to gather quantitative data on lecturers' competences, structured interviews to gather qualitative insights from experts, and evaluation forms to assess the feasibility of the proposed strategies.

The findings revealed that while the overall level of sustainable professional competences was high, there was significant variation across different aspects. Subject

knowledge was the highest-rated competence, while sustainable learning showed the greatest need for improvement. The study developed 26 strategies for improving professional competences, including seven for subject knowledge, five for teaching ability, eight for digital skills, and six for sustainable learning. The evaluation of these strategies demonstrated that they were highly adaptable and feasible.

The research recommends that the Education Department implement policies supporting continuous professional development, that universities integrate the strategies into institutional policies to encourage interdisciplinary collaboration, that society supports universities by providing opportunities for real-world learning, and that lecturers actively seek opportunities to improve their competences through continuous learning and self-assessment.

Keywords: Sustainable Professional Competences, University Lecturers, Digital Era, Sichuan Province, Strategies to promote

Acknowledgements

As I complete this dissertation, it marks the end of my three-year doctoral journey. Looking back, I vividly remember that during these three years, due to the outbreak of the COVID-19 pandemic, I was compelled to study my first-year PhD courses online. After the pandemic subsided, I went to Thailand to continue my studies. I witnessed the nights, morning dews, and sunsets across Bangkok. Walking through the city, I experienced its culture and modern life. Over these three years, I have grown profoundly and am filled with gratitude.

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these challenging yet fulfilling three years. Additionally, I want to thank myself. The endured nights and shed tears have ultimately forged a stronger self through my persistent efforts. I will continue to strive for excellence, cherish this experience, and wish everyone a bright future.

Qiang Guangping

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Chapter 1
Introduction

Rationale

The researcher is Guangping Qiang, hailing from Sichuan Province, China, and currently holding the position of lecturer in the field of Computer Science at Leshan Normal University. Through my professional endeavors, I have come to realize a significant deficiency in the expertise of many university lecturers, particularly in the realm of digital education, within the context of the digitalization era. Consequently, I am dedicated to conducting research with the aim of assisting university lecturers in enhancing their professional capabilities in the domain of digital sustainable development.

According to statistical data released by the Chinese Ministry of Education and the Education Department of Sichuan Province, the number of lecturers in public undergraduate universities nationwide, as well as in public undergraduate universities in Sichuan Province, is steadily increasing, as depicted in Figure 1.1. Concurrently, with the advent of the digital era, traditional higher education teaching models are gradually being supplanted by approaches that emphasize interactivity, personalization, and innovation in teaching practices. The role of university lecturers has evolved from being mere knowledge transmitters in the past to that of guides, explorers, and collaborators today. China is faced with the imperative to continuously Promote the professional competence of university lecturers to adapt to the rapidly evolving societal needs. As a result, the Chinese government has formulated a series of policies and systems aimed at improving the professional competence of university lecturers to ensure the ongoing enhancement of the education system's quality.

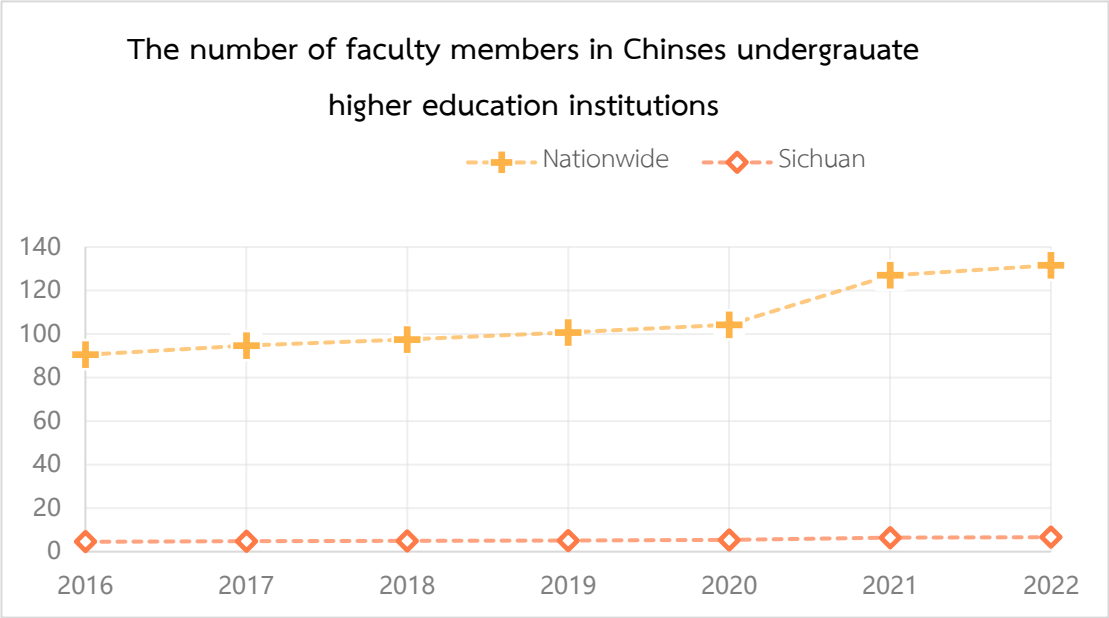

Figure 1.1 The number of faculty members in Chinese undergraduate higher education institutions.

The United Nations' Sustainable Development Goals (SDGs), particularly Goal 4, which emphasizes ensuring inclusive and equitable quality education, underscores the direct impact of lecturer professional competence on the quality of education and the learning experience of students (United Nations, 2020). According to the "Information and Communication Technology Competency Framework for Teachers" by the United Nations Educational, Scientific and Cultural Organization (UNESCO) (UNESCO, 2012), the "Higher Education Information Literacy Standards" proposed by the Association of Research Libraries (Association of College and Research Libraries, 2016), and the sustained investment and reforms in the education sector by the Chinese government, as highlighted in the "National Medium and Long-term Education Reform and Development Plan," the importance of teacher professional development is evidently significant.

The "Ten Codes of Professional Conduct for University Teachers in the New Era" issued by the Ministry of Education explicitly define the professional conduct standards

for university lecturers in the contemporary educational environment. These standards include improving teaching quality and adapting to the information and digital teaching environment. These Strategies encourage teachers to actively explore new teaching methods in the digital age, continually promote their educational competence, especially in the application of information technology and educational innovation. The Ministry of Education also encourages lecturers to utilize digital technology to optimize teaching methods, promote student learning outcomes, and strengthen their own information technology skills to better adapt to the digital teaching environment (Ministry of Education of the People's Republic of China, 2018). These efforts contribute to aligning with national education policy directions, improving overall education quality, and adapting to societal and technological changes.

The cultivation of sustainable professional competences for university lecturers in the digital era is an urgent and imperative area of investigation within academia. An avenue explored for potential resolution involves the utilization of blended learning strategies, which entails the integration of traditional face-to-face pedagogical methods with digital online media (Handayaningrum & Abdillah, 2019). This approach holds the promise of augmenting the professional growth of lecturers, facilitating the adaptation and refinement of pedagogical approaches in response to the demands of the digital age. Moreover, a more nuanced understanding can be obtained by considering lecturers' self-assessment of their digital competence, as this elucidates the diverse array of resources and support required by educators, contingent on their unique educational contexts and individual professional backgrounds (Martín-Párraga et al., 2023).

Although the utilization of blended learning strategies offers considerable utility, it underscores the deeper issue of digital competency among university lecturers. For the effective implementation of blended learning approaches, digital competence serves as a foundational prerequisite. In this context, digital competence transcends the mere acquisition of technical skills essential for utilizing digital tools; it encompasses the ability

to engage in critical thinking and encompasses a diverse set of proficiencies that empower individuals to safely and critically employ Information Society Technology for work, leisure, and communication (Liesa-Orus et al., 2023).

In response to this challenge, various universities across Europe have endeavored to address this issue through the implementation of professional development programs aimed at promoting the communication and pedagogical skills of lecturers tasked with instructing in the digital realm (Gil & Dueñas, 2023). These programs draw upon previous research in the domains of English for Academic Purposes (EAP) and English for Specific Purposes (ESP), as well as methodological principles that promote active student engagement and the cultivation of communication and digital competences.

The imperative to cultivate and sustain professional competences for university lecturers in the digital era is an essential undertaking aimed at upholding the quality of education and facilitating the seamless integration of technology into teaching practices. In the contemporary digital landscape, it is imperative for educators to possess the requisite knowledge, skills, and competences to proficiently harness digital tools and technologies in their pedagogical approaches (Setiawan, 2021).

As articulated by Setiawan (2021), the utilization of digital tools and technologies necessitates not only the acquisition of technical skills but also a profound understanding of the associated knowledge and learning factors in information technology. These elements collectively underpin the development of professional competence among educators. Consequently, educators must be equipped with the proficiency to navigate digital platforms and effectively employ technology-enhanced teaching methodologies.

An effective approach to fostering professional competences for university lecturers in the digital era is the integration of digital tools and technologies within professional development programs. Research conducted by Gil and Dueñas (2023)

underscores the effectiveness of such initiatives in nurturing both communicative and pedagogical skills essential for teaching in the digital age. By infusing digital components into professional development, educators are better prepared to harness the potential of technology for educational purposes.

Moreover, the findings of professional development endeavors focused on technology integration among educators underscore the pivotal role of Information and Communication Technologies (ICTs), Google Applications for Educators, and other digital resources in augmenting professional competence (Yusuf et al., 2022). These tools not only facilitate efficient teaching but also encourage innovative and interactive approaches to education, aligning with the demands of the digital era.

In spite of the foundational frameworks established by research endeavors worldwide in the domain of digital pedagogical competence among educators, the specific educational context within Sichuan Province has remained insufficiently explored. Serving as a representative region in southwestern China, Sichuan Province exhibits comparatively lower educational standards, challenges in faculty development, and a dearth of digital educational resources. Notably, in critical domains such as subject knowledge, pedagogical skills, digital literacy, and sustainable learning, there exists a conspicuous absence of in-depth and contextual investigations. Consequently, the objective of this study is to formulate strategies tailored to the development of digital pedagogical competence among educators in Sichuan Province, thereby bridging the research gaps observed in current academic literature. Through comprehensive investigation and rigorous analysis, this research aims to provide empirical support and concrete strategic guidance for educational reform in Sichuan Province.

Against this backdrop, the research topic under consideration is substantiated. Leveraging my extensive experience in educational initiatives focused on faculty competence development and drawing from the latest national policies, academic research findings, as well as data analysis of administrators and middle-level leaders in

ten public universities within Sichuan Province, this study presents pertinent development Strategies. The overarching aim is to promote the sustainable professional competence of university lecturers in the digital era in Sichuan Province. This endeavor intends to better realize the region's objectives of sustained professional competence development for educators, thereby elevating the quality of teaching and student nurturing and advancing the professional competence of higher education faculty in Sichuan Province.

Research Questions

In order to be consistent with the research objectives and to get an idea of the research questions, the researcher defined the research questions as follows.

1. What is the current status of lecturers' sustainable professional competences in the digital era , Sichuan province?

2. What are the strategies for promoting lecturers' sustainable professional development competences in the digital era , Sichuan province?

3. What is the feasibility of the strategies for promoting lecturers' sustainable professional competences in the digital era, Sichuan province?

Objectives

1. To study the current status of lecturers' sustainable professional competences in the digital era, Sichuan province.

2. To study the strategies for promoting lecturers' sustainable professional competences in the digital era, Sichuan province.

3. To evaluate the feasibility of the strategies for promoting lecturers' sustainable professional competences in the digital era, Sichuan province.

Scope of the Research

Population and the Sample Group

Population

The overall subject pool of this study encompasses 15,647 educators from ten universities in Sichuan Province. These institutions include Sichuan Normal

University , Leshan normal University , Yibin University , Neijiang normal University , Xihua normal University , Sichuan University of arts and science, Mianyang normal University , Aba normal University , Xichang University , and Panzhihua University , collectively representing faculty from a diverse range of academic disciplines.

The Sample Group

According to the Krejcie and Morgan sampling table (1970), the sample group for this research consisted of 377 university lecturers from 10 universities in Sichuan Province. Proportional sampling was employed to ensure that lecturers from different universities and disciplines were appropriately represented in the sample. Furthermore, simple random sampling was utilized to select participants from within each proportional group. This combination of sampling techniques ensures that the selected lecturers provide a representative cross-section of the population, enabling reliable and generalizable research findings.

The Interviewee

The interview group was composed of 10 experts selected from 10 representative universities in Sichuan Province. The experts were selected using purposeful sampling based on the following criteria: 1) affiliation with regular undergraduate institutions, 2) a minimum of five years of teaching experience, 3) substantial experience in digital learning or a background in the digital industry, and 4) holding a professional title of associate professor or higher. The selection of these experts ensured that they had relevant qualifications and experience to provide valuable insights on strategies for promoting sustainable professional competences.

Evaluation

For the evaluation of strategies, seven senior administrators from seven different universities in Sichuan Province participated. The experts were selected based on their qualifications and experience, including a minimum of five years of teaching experience, substantial expertise in digital learning or a background in the digital industry, and holding an academic title of associate professor or higher. These experts were tasked with evaluating the feasibility and adaptability of the proposed strategies. Their evaluations were conducted using structured assessment forms that measured

key variables through the Likert scale, ensuring both the reliability and validity of the results.

The Variable

In accordance with the compilation and analysis of relevant theories and research content, the study encompasses the exploration of strategies aimed at promoting the sustainable professional competence of university lecturers in Sichuan Province in the digital era in 4 aspect.

Independent Variable

Strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Dependent Variable

The quality of strategies for enhancing the adaptability and feasibility of sustainable professional competences for university lecturers in the digital era , Sichuan Province .

1. Subject knowledge
2. Teaching ability
3. Digital skills
4. Sustainable learning

Advantages

This research has three main advantages:

1. Regional Specificity: This study focuses on Sichuan Province, and the specificity of this particular region promotes the relevance and practicality of the research outcomes. By conducting an in-depth analysis of the current status and needs of university lecturers in Sichuan Province, it can provide more precise strategies and recommendations for the sustainable development of education in this region.

2. Temporal Relevance: With the rapid development of the digital age, this research focuses on promoting the sustainable professional capabilities of lecturers, aligning with the pressing needs of the contemporary education sector. Through this study, effective approaches to adapting to the digital teaching environment can be

explored, promoting teachers' professional growth, and promoting their adaptability and innovation skills in the digital education landscape.

3. Strong Emphasis on Practicality: This research not only possesses strong theoretical foundations but also places a significant emphasis on practical application. By assessing the feasibility of strategies, it aims to provide concrete and actionable guidance for the career development of university lecturers in Sichuan Province. The implementation of these strategies contributes to the improvement of teaching quality and professional competence among lecturers, consequently fostering an overall enhancement in the quality of higher education.

Definition of Terms

1. Education for sustainable development refers to an educational model designed to cultivate learners' profound understanding and active engagement with global challenges such as environmental protection, social justice, and economic sustainability. This pedagogical approach is closely integrated with the United Nations Sustainable Development Goals (SDGs) and fosters students' critical thinking, problem-solving skills, and global citizenship awareness through interdisciplinary learning and practical activities. Sustainable Development Education extends beyond traditional classroom teaching, encompassing various forms of education, including informal and non-formal education, such as community involvement and media campaigns. Its core objective is to enable learners to comprehend and address challenges like climate change, resource scarcity, and social inequality, thereby facilitating the achievement of sustainable development at both personal and societal levels.

2. Professional competence refers to the comprehensive capability of university lecturers encompassing subject knowledge, teaching ability, digital skills, and sustainable learning. This includes a profound understanding of their academic discipline, advanced teaching methodologies and techniques, proficient use of digital technologies,

as well as a commitment to ongoing learning and developmental abilities. Such competence enables lecturers to not only impart knowledge but also to adeptly utilize various teaching tools and technologies, thereby continually promoting the effectiveness of their instruction. Consequently, this fosters an environment that effectively stimulates students' interest and engagement in learning.

3. Subject knowledge refers to the comprehensive understanding and expertise that lecturers possess within their specific academic disciplines. This includes engaging in regular study to update disciplinary knowledge, participating in research activities relevant to their field, and reviewing the latest literature. Lecturers are expected to attend academic conferences and utilize online resources to enhance their disciplinary knowledge. Peer exchanges and discussions also play a critical role in advancing knowledge. Additionally, subject knowledge entails fostering a learning environment where students are encouraged to pose discipline-related inquiries. Lecturers should periodically assess their level of expertise to ensure they remain competitive and informed. Continuous updating of subject knowledge is vital in adapting to the evolving academic landscape

4. Teaching ability refers to the lecturer's capacity to effectively employ various teaching methods and strategies, as well as manage classroom dynamics. It includes engaging in regular reflection on one’s teaching methods, utilizing diverse teaching approaches, and adapting teaching strategies based on student feedback. Additionally, the use of case studies to facilitate comprehension, encouraging students to engage in critical thinking, and attending workshops or training sessions to enhance teaching quality are essential components. Lecturers also assess their teaching effectiveness periodically, utilize feedback from students to improve, and provide personalized learning support to meet individual needs. These practices contribute to the continuous development of teaching abilities, ensuring the lecturer’s teaching is dynamic, effective, and responsive to student needs.

5. Digital skills refer to the competencies required by university lecturers to effectively engage in teaching and learning activities using modern technology. These skills encompass staying abreast of the latest educational technology tools, employing digital tools to enhance teaching interactivity, and engaging in regular learning of digital skills. Lecturers are expected to integrate digital resources into their teaching and encourage students to utilize these tools for learning. Participation in training related to digital skills is crucial for maintaining proficiency. Additionally, lecturers should keep track of trends in educational technology, utilize social media to facilitate learning, and use online platforms to share course materials. These competencies ensure that lecturers can provide interactive, dynamic, and up-to-date learning experiences in the digital era.

6. Sustainable learning refers to the continuous process in which lecturers engage to enhance their professional capabilities and stay updated with the latest developments in education. This process includes having a continuous learning plan that aligns with personal and professional development goals, recognizing the importance of continuous learning for professional growth, and actively seeking opportunities to enhance one's skills. Lecturers are encouraged to utilize online resources for self-directed learning, participate in interdisciplinary learning activities, and maintain an open attitude towards new knowledge. Sustainable learning also involves adapting to rapid changes in education, fostering a culture of continuous improvement, and encouraging colleagues and students to engage in lifelong learning.

7. Digital era refers to a period characterized by the rapid advancement of information and communication technologies, especially marked by societal transformations brought about by the Internet, mobile communications, and big data. During this era, educational systems, pedagogical methods, and academic research are undergoing profound changes. This is particularly evident in the enhancement of sustainable professional competence of educators, who face the challenge of effectively integrating digital technologies, updating teaching philosophies and methodologies to

meet the educational needs and trends of this era. The Digital Era thus represents a significant shift, necessitating adaptations in educational approaches to align with the evolving technological landscape.

8. Sichuan province public universities refer to an institution of higher education, focused on cultivating students' in-depth academic knowledge and professional skills. They offer a diverse array of courses ranging from undergraduate to doctoral levels, covering numerous fields such as literature, science, engineering, and more. Universities not only emphasize theoretical education but also place significant value on scientific research and practical application. They are committed to knowledge innovation, cultural heritage, and social service, acting as a key platform for global academic exchange and the advancement of civilization.

9. University lecturer refers to a professional teaching staff member in higher education institutions, primarily responsible for teaching courses, conducting academic research, and guiding students. Lecturers possess a comprehensive competence encompassing subject knowledge, teaching ability, digital skills, and the capacity for sustainable learning. Lecturers contribute to the dissemination of knowledge and the development of their disciplines through teaching and the publication of academic achievements.

Research Framework

According to the analysis of ten selected studies, the researchers reviewed and synthesized key documents, concepts, theories, and research related to the professional competence of lecturers. The studies analyzed included works by Hasanah et al. (2023),

Abdillah (2023), Fajaria et al. (2023), Tangkere (2022), Dzikite, Nsubuga, & Nkonki (2017), Hidayati & Siswati (2018), Luppertz et al. (2016), Dall'Alba & Sandberg (1996), Epstein & Hundert (2002), and a 2022 study. Based on the criteria established from these works, characteristics with a frequency of three or more were selected to create a framework for this research. Four key characteristics were identified: 1) Subject knowledge, 2) Teaching ability, 3) Digital skills, and 4) Sustainable learning. As depicted in Figure 1.2.

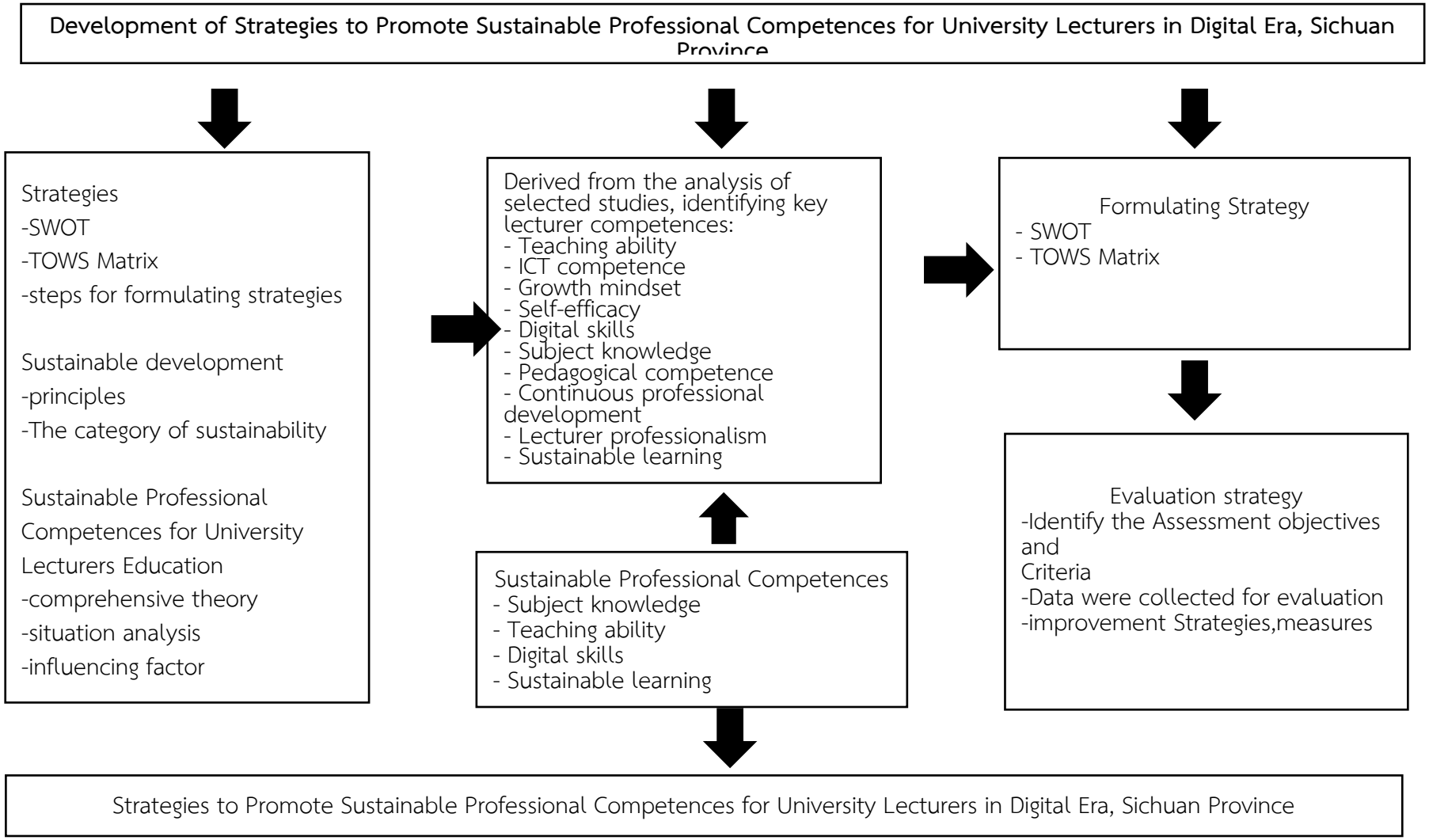

Figure 1.2 The research Framework

Chapter 2

Literature Review

The researcher employed a variety of literature retrieval tools, including China National Knowledge Infrastructure (CNKI), Wanfang Data, EBSCOhost, Journal databases, VI (Virtual International Authority File), VIP (VIP Information), and Chinese Social Science Citation Index, among others, to comprehensively access literature resources in the relevant research field. Through a thorough examination, summary, and analysis of these literature sources, the researcher was able to derive the following theoretical findings. The literature review serves as a theoretical foundation and research framework, providing theoretical support and guiding principles for the further exploration of the "Development of Strategies to Promote Sustainable Professional competences for university Lecturers in Digital era, Sichuan Province."

1. Education for sustainable development
2. Strategy
3. Professional competence
4. Lecturers' professional competence
5. Digital era
6. Sichuan province public universities
7. University lecturer
8. Related research

The details are as follows.

Education for sustainable development

The concept of education for sustainable development

Education for Sustainable Development (ESD) is a holistic and integrated approach to education aimed at developing knowledge, skills, values, and behaviors needed for sustainable living and participation in society. It encompasses a broad range of topics such as environmental stewardship, social equity, economic sustainability, and cultural diversity. ESD encourages critical thinking, problem-solving, and active participation in shaping a sustainable future. It integrates these principles across all subjects and levels of education, fostering a more interconnected and comprehensive understanding of how individual actions can impact global challenges.

As shown in Table 2.1:

Table 2.1 Lists of definition of education for sustainable development

NO.	Author	Insight
1	Thakran (2015)	Defines ESD as integrating sustainability concepts across all education levels.
2	International Journal of Education and Applied Social Sciences	Describes ESD's focus on sustainable living and social responsibility.
3	Devat and Rathod (2013)	Highlights ESD's role in developing critical thinking and problem-solving.
4	Lavanya and Saraswathi(2014)	Emphasizes participatory methods and active learning in ESD.
5	Bhawani (2009)	Discusses ESD's aim to empower for environmental integrity and just society.

In conclusion, Education for sustainable development refers to an educational model designed to cultivate learners' profound understanding and active engagement with global challenges such as environmental protection, social justice, and economic sustainability. This pedagogical approach is closely integrated with the United Nations Sustainable Development Goals (SDGs) and fosters students' critical thinking, problem-solving skills, and global citizenship awareness through interdisciplinary learning and practical activities. Sustainable Development Education extends beyond traditional classroom teaching, encompassing various forms of education, including informal and non-formal education, such as community involvement and media campaigns. Its core objective is to enable learners to comprehend and address challenges like climate change, resource scarcity, and social inequality, thereby facilitating the achievement of sustainable development at both personal and societal levels.

The emergence of education for sustainable development

The emergence of sustainable development education has evolved from environmental education without altering the meaning of the article, and the word count remains the same. The term "Environmental Education" (EE) first appeared in the United States in 1970 with the enactment of environmental education legislation (National Environmental Policy Act, 1970). However, the true landmark for global environmental education came in 1972 during the United Nations Conference on the Human Environment in Stockholm, Sweden. This conference called for global efforts to protect Earth's resources, officially established the name of environmental education, and emphasized the importance of conducting environmental education and the necessity of international cooperation in its documents. This event marked the entry of environmental education onto the international stage and became a milestone in the history of environmental conservation (Sweden, 1972).

Following the 1972 United Nations Conference on the Human Environment, environmental education gradually gained promotion and development, with increasing global attention to environmental issues (United Nations, 1972). However, it was not until the 1980s, with the emergence of the concept of sustainable development, that environmental education entered its second significant phase. The concept of sustainable development emphasizes the integration of environmental, social, and economic aspects, which had a positive and profound impact on education on a global scale.

With the introduction of the concept of sustainable development, the international environmental education community began to reconsider multiple elements related to environmental issues, emphasizing the need to orient education towards sustainable development. This led to the repositioning of environmental education and the birth of the concept of "Education for Sustainable Development" (ESD). UNESCO introduced the idea of Education for Sustainable Development in 1988, becoming one of the early proponents in this field.

In 1992, the United Nations Conference on Environment and Development adopted the influential "Agenda 21," emphasizing the crucial role of education in promoting sustainable development and promoting people's development capabilities. This agenda explicitly stated that "education for environment and development should be integrated into all levels of formal and non-formal education" (United Nations, 1972). In 1997, UNESCO officially established the international status of "Education for Sustainable Development," marking the globalization process of education for sustainable development (UNESCO, 1997).

The significance of education for sustainable development

The importance of education for sustainable development resides in fostering environmental awareness and sustainable thinking within the upcoming generations, enabling them to confront global challenges.

Education for sustainable development plays a pivotal role in fostering economic growth, environmental protection, and the cultivation of a sustainable development culture. Higher levels of education are associated with specific environmentally conscious behaviors and sustainable energy consumption (Xiangdan et al., 2023).

Education plays a crucial role in promoting sustainable development by influencing attitudes and behaviors, and it must be integrated into various learning environments to yield a comprehensive impact (Faustino & Kaur, 2023).

Attaining quality education is essential for the proper functioning of a sustainable society (Veckalne et al., 2022).

Environmental education, as a component of education for sustainable development, is a key element of global education aimed at safeguarding human civilization and promoting sustainable practices (Alexandra et al., 2022).

The significance of education for sustainable development cannot be overstated, as it forms the cornerstone for achieving the Sustainable Development Goals (SDGs) established by the United Nations. Education for sustainable development (ESD) assumes a pivotal role in shaping learners' knowledge and skills to actively contribute to the promotion of sustainable development (O'Flaherty & Liddy, 2018). This assertion is further supported by research highlighting the multifaceted impact and challenges associated with ESD, underscoring the necessity for its continued integration and exploration within various educational contexts.

In conclusion, the significance of education for sustainable development is evident across various facets of research and practice. It serves as the linchpin for achieving the SDGs, especially SDG 4, and equips learners with the knowledge and competencies needed to address complex sustainability challenges. Furthermore, the research and insights discussed underscore the multifaceted nature of ESD,

emphasizing the imperative for its continued integration and exploration across diverse educational settings.

Goals of education for sustainable development

Goals of education for sustainable development aim to cultivate environmentally conscious and socially responsible citizens capable of addressing global challenges.

Education for sustainable development (ESD) plays a pivotal role in equipping learners with the knowledge and skills necessary to promote global justice and sustainability.

In recent research, O'Flaherty and Liddy (2018) conducted a synthesis of the impact of development education and ESD interventions. They examined the assessment measures utilized and the evidence demonstrating the effects on learners' development.

Baena-Morales and González-Víllora (2023) centered their study on the contributions of physical education to the dimensions of sustainability and the Sustainable Development Goals (SDGs). They also emphasized the potential of holistic Health Physical Education (HPE) in advancing sustainable development.

Furthermore, Osson et al. (2022) conducted a longitudinal study to revisit the effectiveness of ESD, particularly focusing on its influence on secondary students' action competence for sustainability.

Uggla and Soneryd (2023) delved into the possibilities and challenges associated with teaching sustainable development in higher education. They highlighted the formative role of higher education in the context of ESD and proposed that sociology could serve as a foundation for fostering critical thinking and normative action in sustainable development education.

According to Adipat and Chotikapanich (2022), the viewpoint asserts that the "2030 Agenda for Sustainable Development" acknowledges the transformative power of education, with the primary goal of ensuring that by 2030, all young people have the opportunity to access high-quality primary education and attain proficiency in numeracy and practical literacy skills.

According to the viewpoint presented by Dorneanu et al. (2022), the objectives of education for sustainable development entail the cultivation of capabilities in individuals, groups, communities, organizations, and nations. These capabilities are aimed at enabling them to engage in thoughtful and action-oriented endeavors that promote sustainability. This overarching objective encompasses a comprehensive spectrum of educational domains, ranging from individual skills to collective collaboration and societal transformation.

In conclusion, the developmental objectives of sustainable education revolve around utilizing education as a means to shape more sustainable modes of thinking and behavior, ultimately aiming to forge a more sustainable future. These objectives are instrumental in the establishment of a fairer, environmentally conscious, and prosperous society.

The relationship between sustainable development and sustainable development education

Sustainability and sustainable development education are closely interrelated, with education being recognized as a potent tool for societal, economic, and cultural transformation to achieve sustainable development (Ana et al., 2023).

Higher education institutions play a pivotal role in the attainment of Sustainable Development Goals (SDGs), with their responsibility lying in assisting individuals in fulfilling their civic duties and equipping them with the skills and capabilities required for sustainable development (Piao et al., 2023).

Environmental education is considered a crucial component of global education, essential for safeguarding human civilization on Earth (Kilasonia, 2023).

Research findings indicate a correlation between higher levels of education and environmentally friendly behavior, sustainable energy consumption, and improved economic development (Sovhira et al., 2022).

The objectives of sustainable development education encompass nurturing eco-cultural experts and developing ecological competence, including the establishment of values and attitudes based on a natural self-worth perspective and a responsibility for nature conservation (Chiara et al., 2023).

In conclusion, sustainable development education plays a crucial role in promoting sustainable practices and achieving sustainable development goals.

Strategy

Concept of development strategy

In the literature, the field of sustainable development strategy has been explored from various perspectives, providing valuable insights into the integration of sustainable development values into different sectors.

Ghobakhloo et al. (2022) discussed the identification of industry 5.0 contributions to sustainable development, emphasizing the importance of delivering sustainability values. This could provide valuable input into the development of strategies aimed at integrating sustainable development principles into various industries.

Wang and Wang (2021) delved into the impact of green finance on the upgrading of China's regional industrial structure from the perspective of sustainable development. Their research provides a crucial understanding of the role of financial strategies in promoting sustainable development in specific regions.

Parmentola et al. (2021) conducted a systematic review and provided a research agenda on blockchain's ability to enhance environmental sustainability from

the perspective of Sustainable Development Goals (SDGs). Understanding the potential of blockchain technology in promoting sustainability could be instrumental in crafting development strategies.

Sun and Razzaq (2022) highlighted the imperative strategy for green innovation and sustainable development in OECD countries through composite fiscal decentralization. Their work sheds light on the significance of institutional reforms in driving sustainable development strategies at a national level.

Martín-Sánchez et al. (2022) presented a study on Service Learning as an Education for Sustainable Development (ESD) teaching strategy, which provided practical insights into the design, implementation, and evaluation of sustainability-focused education strategies in university courses.

In conclusion, These papers collectively offer valuable perspectives and insights into the development of sustainable development strategies, particularly within the realm of industry contributions, financial impact, technology integration, institutional reforms, and education methodologies. This comprehensive understanding can significantly contribute to the formulation of effective development strategies that prioritize sustainable development values and education.

Concept of sustainable development education strategy

Sustainable development education strategies in an academic context encompass a wide range of approaches aimed at fostering knowledge, skills, and values to address environmental, social, and economic challenges. Agbedahin (2019) provides a comprehensive historical literature review of sustainable development, Education for Sustainable Development (ESD), and the 2030 Agenda for Sustainable Development, emphasizing the significance of the nexus between education, sustainable development, ESD, the SDGs, and human development. Furthermore, the role of emotional intelligence in academic performance within the context of ESD is explored

by Estrada et al. (2021), highlighting the positive relationship between emotional intelligence, compassion, commitment, and academic performance.

The approach to fostering interdisciplinarity in higher education institutions (HEIs) for ESD is addressed by Mokski et al. (2022), proposing a multilateral strategy to effectively integrate ESD into diverse academic disciplines, bridging the gap between varying visions for ESD in HEIs. Additionally, the potential for physical education (PE) to contribute to the Sustainable Development Goals (SDGs) is explored by Baena-Morales et al. (2022), revealing the challenges and limitations faced by physical education teachers in implementing SDGs in PE.

Hernandez et al. (2022) reflect theoretically on the impact of sustainable development and social responsibility on quality university education, emphasizing the role of higher education institutions in training competent individuals to face the future and emphasizing the importance of excellence in teaching and research. Moreover, the significance of universities in sustainable development and circular economy strategies is investigated by Sukiennik et al. (2021), showcasing the need for continuous education in eco-responsible citizenship.

The development of 21st-century skills in the context of ESD is examined by González-Salamanca et al. (2020), highlighting the need for further research into the design and implementation of new instruments for assessment and personalized teaching-learning processes. Finally, the protection of academic integrity in the context of sustainable development is addressed by Shephard (2023), proposing a grounded theory of academic identity and education for sustainable development, shedding light on the complexities of measuring, assessing, and evaluating teaching outcomes.

In summary, the literature reveals the multifaceted nature of sustainable development education strategies in the academic context, ranging from emotional intelligence and interdisciplinarity to the role of physical education, academic libraries, and academic integrity in contributing to the achievement of the Sustainable

Development Goals. These diverse perspectives underscore the importance of holistic and integrated approaches to sustainable development education at the academic level.

Concept of SWOT Analysis

SWOT analysis, an acronym for Strengths, Weaknesses, Opportunities, and Threats, is a strategic planning tool used to evaluate these four elements of a project or business venture. In the context of educational strategies for university lecturers, SWOT analysis provides a clear framework to assess the internal and external factors that could impact the effectiveness of teaching methods and professional development initiatives.

SWOT analysis is a strategic planning tool used to identify and evaluate the Strengths, Weaknesses, Opportunities, and Threats of an organization or project. The concept originated in the 1960s and has since evolved into a fundamental framework for strategic decision-making.

Strengths (S) are the internal attributes that give an organization a competitive advantage. These could include resources, capabilities, or positive attributes within the organization.

Weaknesses (W), on the other hand, are internal factors that place the organization at a disadvantage relative to competitors. These could be areas that need improvement, such as lack of expertise, financial constraints, or poor management practices.

Opportunities (O) are external factors that the organization could exploit to its advantage, such as market trends, technological advancements, or changes in regulation that could benefit the organization.

Finally, Threats (T) are external elements that could cause trouble for the organization, including competition, market instability, or economic downturns.

Steps in Conducting SWOT Analysis: The process of conducting a SWOT analysis typically involves several structured steps. Initially, it begins with the identification of internal factors (Strengths and Weaknesses) by evaluating the organization's resources, capabilities, and overall performance. This is followed by an analysis of external factors (Opportunities and Threats), which involves scanning the external environment to identify trends, market conditions, and other factors that could impact the organization. Once these factors are identified, they are mapped into a SWOT matrix, which provides a visual representation of the organization's strategic position. The final step involves the strategic planning phase, where the information from the SWOT analysis is used to formulate strategies that leverage strengths, mitigate weaknesses, capitalize on opportunities, and defend against threats.

In the past decade, extensive research has been conducted to explore the intersection between SWOT analysis and lecturers' professional competencies, particularly in the context of educational development and vocational training. SWOT analysis, a strategic planning tool that identifies Strengths, Weaknesses, Opportunities, and Threats, has been widely applied to assess and enhance professional competencies in education. This review synthesizes findings from eight recent studies to provide a comprehensive understanding of how SWOT analysis has been utilized to evaluate and improve lecturers' professional skills, focusing on key areas such as teacher education, vocational training, and lifelong learning.

Resnawati et al. (2020) examined the application of SWOT analysis in evaluating teachers' professional competencies, highlighting that teachers often demonstrate significant strengths in their subject matter expertise and pedagogical skills. However, the study also identified critical weaknesses, such as a lack of proficiency in Information and Communication Technology (ICT), which is essential for modern educational practices. Opportunities for professional development, such as training programs and further education, were noted, alongside threats such as competition among educators.

Further, Zeraviková et al. (2015) investigated the professional competencies of lecturers in adult education through andragogical research, employing SWOT analysis to identify core competencies required for effective teaching. The study underscored the importance of nonparametric statistical methods and semantic differentials in creating a comprehensive competence profile, which is crucial for tailoring professional development programs to individual needs.

Stryukov and Hromtseva (2019) focused on vocational education, using SWOT analysis to dissect key competencies necessary for vocational educators. They found that professional competencies in vocational settings are multi-faceted, encompassing special, social, personal, and individual dimensions. This research emphasized the dynamic nature of professional competence, which evolves with the changing demands of the educational environment.

Park and Han (2016) explored core teaching competencies for lifelong education lecturers, identifying five key competency areas: understanding of learners, education development, teaching, evaluation, and learning counseling. The study utilized SWOT analysis to determine how these competencies could be enhanced through targeted professional development, thereby addressing the specific needs of lifelong educators.

Navickiene et al. (2017) analyzed the need for educational competencies among higher education lecturers by examining key regulatory documents. Their research highlighted that the strategic application of SWOT analysis could help align lecturers' competencies with the requirements outlined in educational policies, ensuring that lecturers are adequately prepared to meet the demands of modern higher education.

Singh and Singh (2013) utilized SWOT analysis to evaluate teachers' initiatives in professional development. Their study revealed that while teachers are generally aware of the importance of professional development, there are significant gaps in their

approach to continuous learning and development. The SWOT analysis provided a clear framework for identifying these gaps and developing strategies to address them.

Asún et al. (2020) conducted a study on the perceptions of professional competencies in Physical Education Teacher Education (PETE), using SWOT analysis to explore discrepancies in the perceived acquisition of competencies between students, graduates, and university tutors. The study found that while students and graduates generally rated their competencies highly, university tutors perceived a need for improvement in certain areas, such as the ability to work with individuals with special needs.

Finally, Čapulis et al. (2023) analyzed the professional competencies of sports teachers and coaches using SWOT analysis to compare their competencies across different domains. Their research highlighted the importance of continuous professional development and the need for educators to adapt to new teaching methodologies and technologies.

As shown in Table 2.2:

Table 2.2 Lists of Concept of SWOT Analysis

No.	Author	Year	Key Insight
1	Resnawati, A., Kristiawan, M., & Sari, A. P.	2020	Evaluates teachers' strengths and weaknesses, particularly in ICT skills, using SWOT analysis.
2	Zeravikova, I., Tirpa kova, A., & Markechova, D.	2015	Identifies core competencies for lecturers in adult education using andragogical research and SWOT analysis.
3	Stryukov, V., & Hromtseva, O.	2019	Dissects vocational education competencies into special, social, personal, and individual categories, applying SWOT analysis.
4	Park, K.-H., & Han, S.	2016	Identifies five core competencies essential for lifelong education lecturers through SWOT analysis.
5	Navickiene, V., Saliene, V., Urneziene, E., Valantinaite, I., & Leonaviciene, V.	2017	Aligns lecturers' competencies with educational policies, emphasizing the need for educational competences through document analysis.
6	Singh, M., & Singh, S. P.	2013	Evaluates teachers' understanding and initiatives in professional development using SWOT analysis.
7	Asun, S., Chivite, M. T., & Romero, M. R.	2020	Examines discrepancies in competency perceptions between students, graduates, and tutors in Physical Education Teacher Education (PETE).
8	Capulis, S., Dombrovskis, V., Guseva, S., & Korniseva, A.	2023	Compares professional competencies across sports teachers and coaches, highlighting key areas of strength and improvement.

In conclusion, these studies collectively emphasize the critical role of SWOT analysis in assessing and enhancing lecturers' professional competencies. By identifying strengths and weaknesses and exploring opportunities and threats, educators can better align their professional development efforts with the demands of modern educational environments. This strategic approach not only improves individual competencies but also contributes to the overall quality of education.

Concept of TOWS Matrix Analysis

The TOWS Matrix, an extension of the well-known SWOT analysis, is a strategic tool that aids organizations in aligning their internal strengths and weaknesses with external opportunities and threats to formulate robust strategies. The acronym TOWS reverses the order of SWOT components, emphasizing the external environment as the starting point in strategy formulation (Dandage et al., 2019). The matrix is structured into four quadrants, each representing a combination of internal and external factors: Strength-Opportunities (SO), Strength-Threats (ST), Weaknesses-Opportunities (WO), and Weaknesses-Threats (WT). These quadrants help in generating strategic alternatives that either leverage strengths, counteract threats, capitalize on opportunities, or mitigate weaknesses (zmegac et al., 2024).

The conceptual foundation of TOWS lies in its ability to synthesize SWOT analysis results into actionable strategies. The process involves identifying key internal and external factors, systematically pairing them to explore strategic options, and then prioritizing these options based on their potential impact and feasibility (Pasaribu, 2023). This method has been applied across various industries and organizational contexts. For instance, in the transportation sector, TOWS has been integrated with multi-criteria decision-making models to prioritize strategies for small and medium enterprises (SMEs), demonstrating its versatility and adaptability (Đalić et al., 2021).

A critical step in TOWS analysis is the accurate identification and classification of SWOT elements. This requires thorough situational analysis and often involves qualitative methods like focus groups and expert panels to minimize subjectivity and enhance the reliability of findings (Tenzin & Wangchuk, 2022). The incorporation of advanced techniques, such as the Delphi method, into TOWS analysis has been shown to improve the robustness of the strategic planning process, particularly in public sector applications where strategic decision-making is more complex due to multiple stakeholders (Žmegač et al., 2024).

In practice, TOWS matrix analysis has been effectively employed in various strategic contexts. In business strategy development, it has been used to formulate comprehensive strategies for organizations facing dynamic market conditions. For instance, in the case of the Public Housing Savings Implementing Agency (BP Tapera) in Indonesia, TOWS analysis helped in outlining twelve fundamental business strategies that align with the organization's long-term vision and mission (Dewanto, 2022). Similarly, in the mining industry, a novel approach to evaluating TOWS matrices has been developed, allowing for more precise strategy formulation in response to the unique challenges of the sector, such as non-renewable resource management and fluctuating economic conditions (Černý et al., 2018).

Moreover, the TOWS matrix is not limited to business and industry; it has also been applied in educational contexts to strengthen programs and improve outcomes. For example, in Bhutan's scouting program, TOWS analysis was used to address programmatic weaknesses and enhance leadership training, leading to a more sustainable and impactful youth engagement initiative (Tenzin & Wangchuk, 2022). The flexibility of the TOWS matrix allows it to be customized to various contexts, making it a valuable tool for both strategic planning and operational decision-making.

In summary, the TOWS matrix is a powerful strategic tool that extends the traditional SWOT analysis by focusing on external factors first, thus providing a more dynamic and comprehensive approach to strategy formulation. Its versatility has been demonstrated across various industries, from transportation and mining to public housing and education, proving its effectiveness in both private and public sectors. The integration of qualitative methods and advanced decision-making techniques further enhances its utility, making it a robust framework for addressing complex strategic challenges. Future research could explore the integration of digital tools and data analytics into the TOWS matrix to further refine its application in real-time strategic decision-making.

Professional competence

Content of professional competence

The professional competence of lecturers is an area explored through various lenses in academic research. Key findings include the importance of Continuous Professional Development (CPD) for vocational lecturers, the assessment of research competence at universities, and the role of lecturers' competencies in promoting the effectiveness of higher education institutions. Studies have also delved into students' perceptions of lecturers' pedagogical competence and the impact of the digital era on lecturers' job roles and skills.

As shown in Table 2.3:

Table 2.3 Lists of content of professional competence

No.	Author	Paper Title	Relevant Insight
1	Priadi et al. (2023)	Continuous Professional Development (CPD) Model Development for Vocational Lecturers	Discusses the development of a CPD model for promoting vocational lecturers' skills.
2	Bui et al. (2023)	An Analysis of the University of Social Sciences and Humanities, Vietnam National University Ho Chi Minh City Lecturers' Research Competence	Assesses research competence among university lecturers in social sciences.
3	Engelbrecht and Engelbrecht (2022)	Professional competencies: an assessment of lecturers at a private higher education institute in south africa	Evaluates the professional competencies of lecturers in a South African institute.
4	Asrifan et al. (2022)	Students' Perception toward Good Lecturer Pedagogical Competence	Explores students' views on lecturers' pedagogical skills.
5	Muhammad et al. (2022)	Lecturer Professionalism in Improving The Effectiveness of Higher Education Institutions	Highlights the role of lecturer professionalism in higher education effectiveness.

Based on the content of Table 2.2 and the research questions and objectives of The research, the focus can be placed on three dimensions: 1) Subject knowledge, 2) Teaching competence, and 3) Sustainable learning.

Definition of professional competence

Scholars generally agree that teacher professional competence represents a synthesis of both psychological and behavioral capabilities. It encompasses a range of qualities that educators need during the teaching and learning process to translate their pedagogical ideas into practical educational activities.

Liu and Chen (2016, p.145-146) believed specific abilities include communication and interpersonal skills, organizational and managerial abilities, teaching and nurturing capabilities, as well as a strong knowledge base. These abilities are essential for teachers to successfully engage in professional activities. Furthermore, Douglas R. Miller, Gary S. Bilkin, and Jerry L. Gray (1982, p.512-519) argue that a teacher's teaching professional competence should also encompass the ability to create a clear and emotionally engaging learning environment, the capacity to inspire active student participation, the ability to meet students' learning needs, the skill to help students identify learning outcomes, and the capability for continuous self-development.

Ye et al. (2015) expand the concept of teacher professional competence to include various aspects such as interpersonal communication skills, organizational and managerial abilities, educational research skills, the ability to use multiple teaching methods, information organization and transformation skills, and the ability to receive information. This comprehensive perspective emphasizes the multidimensional qualities that teachers need to demonstrate in different domains and tasks.

In conclusion, teacher professional competence constitutes a multifaceted and intricate concept, encompassing the amalgamation of general and specific capabilities. These capabilities encompass a wide array of skills and qualities that

teachers need to exhibit in the context of educational instruction to meet the requirements of diverse domains and tasks.

Research on professional competence

Qu and Wu (2021) pointed out that from the perspective of subjects, research on teacher professional competence spans various disciplinary fields. For instance, Chinese language teachers exhibit weaknesses in their awareness and proficiency in utilizing curriculum resources, and they demonstrate relatively limited reflection awareness and educational research capabilities. Mathematics teachers, on the other hand, face challenges related to incomplete mathematical professional competence, a lack of organizational ability for cooperative teaching, inadequate proficiency in modern teaching methods, and a deficiency in lifelong learning skills.

Yao and Zhang (2022) emphasize that teachers should continuously promote their professional competence by utilizing data and information gathered during educational practice, highlighting the significance of practical skills and reflective capabilities.

Yuan and Tian (2023) further propose that a teacher's years of service, educational qualifications, and academic rank are not only internal factors but also positively correlated with the professional development competence of rural teachers.

Yu (2015) suggests that the social environment, school environment, and teacher admission system are important external factors that constrain teachers' professional development. Decreased trust in the teaching profession within society leads to a decline in teachers' commitment and enthusiasm, hindering their ability to promote their professional competence. Therefore, teachers' professional development necessitates systematic cultivation and ongoing training. This requires the establishment of high-level, specialized training centers for young teachers and professional training teams to continually promote teachers' professional development.

In conclusion, professional competence refers to the comprehensive capability of university lecturers encompassing subject knowledge, teaching ability, digital skills, sustainable learning. This includes a profound understanding of their academic discipline, advanced teaching methodologies and techniques, proficient use of digital technologies, as well as a commitment to ongoing learning and developmental abilities. Such competence enables lecturers to not only impart knowledge but also to adeptly utilize various teaching tools and technologies, thereby continually promoting the effectiveness of their instruction. Consequently, this fosters an environment that effectively stimulates students' interest and engagement in learning.

Lecturers' professional competence

Research on lecturers' professional competence

University lecturers need sustainable professional competencies. The study of sustainable professional development has undergone several stages. Initially, the "focus on subject knowledge" model was predominant, emphasizing the mastery and dissemination of academic content. This phase was followed by the "focus on teaching ability" model, where the methods and effectiveness of pedagogy became the central concern. In recent years, the "focus on digital skills" model emerged, acknowledging the critical role of information technology and digital tools in modern education. Currently, the emphasis is on the "focus on sustainable learning" model, which underscores the necessity of continuous professional development, adaptability to rapid technological changes, and lifelong learning. This model recognizes that in the digital era, educators must not only be experts in their fields but also capable of integrating new technologies and methodologies into their teaching practices. Therefore, the study and development of sustainable professional competencies

among university lecturers, particularly in the digital era, is a crucial research direction in contemporary educational management.

Table 2.4 Lists of lecturers professional competence research

	Hasanah et al. (2023)	Abdillah (2023)	Fajaria et al. (2023)	Tangkere (2022)	Dzikite, Nsubuga, & Nkonki (2017)	Hidayati & Siswati (2018)	Luppertz et al. (2016)	Dall'Alba & Sandberg (1996)	Epstein & Hundert (2002)	Frequency
Teaching ability	√	√	√	√	-	√	-	-	√	6
ICT competence	-	-	-	-	√	-	-	-	-	1
Growth mindset	-	√	-	-	-	-	-	-	-	1
Self-efficacy	-	-	-	√	-	√	-	-	-	2
Digital skills	√	√	√	√	-	√	-	-	√	6
Subject knowledge	√	√	√	√	√	√	√	√	-	8
Pedagogical competence	-	-	-	-	√	-	-	-	-	1
Continuous professional development	-	-	√	√	-	-	√	-	√	4
Lecturer professionalism	-	-	-	√	-	√	-	-	-	2
Sustainable learning	√	√	-	√	√	√	√	-	-	6

According to the analysis of the ten selected papers, the researchers analyzed and synthesized documents, concepts, theories, and research related to the professional competence of lecturers, which consisted of Hasanah et al. (2023); Abdillah (2023); Fajaria et al. (2023); Tangkere (2022); Dzikite, Nsubuga, & Nkonki (2017); Hidayati & Siswati (2018); Luppertz et al. (2016); Dall'Alba & Sandberg (1996); Epstein & Hundert (2002); (2022). The researcher used the criteria to consider the corresponding characteristics to use as a framework for research in this study. By selecting characteristics with a frequency of 3 or more, four key characteristics were synthesized as follows: 1) Subject knowledge 2) Teaching ability 3) Digital skills 4) Sustainable learning.

Subject knowledge

Subject Knowledge is a complex and multidimensional concept. Within the context of the Chinese language, the subject is commonly regarded as a prevalent concept in higher education, encompassing various aspects such as subject construction, subject planning, and subject assessment. In Chinese dictionaries, the interpretation of the subject is divided into two levels: firstly, it refers to academic classification, and secondly, it denotes the subject matter of instruction. According to the "Classification and Code of Subjects" (GB/T 13745-2009), a subject is defined as a relatively independent system of knowledge.

From a historical perspective, the concept of the subject originated in Western Europe, initially closely tied to medieval religious education, later evolving to encompass teaching practices with specific values and ethical implications. The English term "discipline" for the subject derives from the Latin words "discipulus" (meaning student) and "disciplina" (meaning teaching). In the Middle Ages, the subject was more reflective of spiritual disciplinary activities between teachers and students, rather than factual knowledge in the modern scientific sense. In modern times, the concept of the

subject underwent significant changes and is no longer solely associated with spiritual discipline but has formed distinctive knowledge and theoretical systems.

Rosales-Asensio (2020) underscored the pivotal role of subject knowledge in the design of university teaching. This research identifies six crucial instructional conditions that educators consider when shaping their teaching strategies: Content, subject, lecturers, and students; Teaching innovation and educational resources; Course design; Attitude of students; Characteristics of students; and Lecturer-subject relationship. These findings emphasize the paramount importance of subject knowledge as a foundational element in the effective delivery of university education. The paper's contributions to our understanding of the subject knowledge's significance in teaching are notable and offer valuable insights for future research.

Vaskivska (2017) emphasized the crucial importance of fundamentalizing education content in upper secondary and university education, particularly in the context of subject knowledge. The research underscores that this process is not only essential for educational advancement but also a significant didactic concern. It involves the methodical design of educational processes to seamlessly integrate both general and specialized knowledge, creating an efficient combination. The most effective outcomes are achieved when subject-subject interaction incorporates spiritual, moral, aesthetic, and social values. This fundamentalization of education content in upper secondary and university education aims to bring about positive transformations in students' mastery of academic, professional, and social skills. The study reveals that achieving such fundamentalization requires highly skilled educators and a logically rational system that develops not only students' knowledge and skills but also their personality traits, all rooted in comprehensive or specialized subject components.

Cladera (2021) highlights the paramount importance of subject knowledge in the context of higher education teaching quality assessment. Students' feedback plays a crucial role in promoting teaching quality, and understanding their perceptions and expectations is fundamental. This research underscores that to improve students' perceptions of teaching quality, it is essential to identify their prior expectations and the aspects they consider relevant for effective teaching. The study reveals that teaching characteristics such as lecturer enthusiasm, organization of lectures and materials, examination methods and feedback, the interest and intellectual challenge of the course, and the friendliness, interest, and accessibility of the lecturer are of utmost importance to students. These findings emphasize the critical role of subject knowledge and effective pedagogical strategies in shaping students' perceptions of teaching quality, ultimately leading to improved student satisfaction and performance.

Metzler and Woessmann (2012) underscores the critical importance of teacher subject knowledge in influencing student achievement. The study highlights that teachers vary significantly in their impact on student learning, and understanding the attributes that contribute to this variation is crucial. By utilizing a unique dataset and employing within-teacher within-student variation, this research estimates the causal effect of teacher subject knowledge on student achievement. The findings reveal that for every one standard deviation increase in subject-specific teacher achievement, there is an associated improvement in student achievement by approximately 10 percent of a standard deviation. This emphasizes the pivotal role of subject knowledge in shaping student outcomes and underscores the significance of teachers' expertise in the subject matter.

Gess-Newsome et al. (2019) conducted an exploratory study focusing on the crucial role of teacher subject knowledge in shaping teacher professional knowledge and its impact on student achievement. The research aimed to measure changes in teacher knowledge and practice resulting from a two-year professional development

intervention and establish a theoretical model of teacher professional knowledge. The study employed an instrument to measure pedagogical content knowledge (PCK) and identified two key factors within PCK: PCK-content knowledge and PCK-pedagogical knowledge. The findings revealed that teacher gains were observed across all variables, with general pedagogical knowledge (GenPK) demonstrating a significant relationship with teacher practice. However, academic content knowledge (ACK) emerged as the variable that explained a substantial portion of student achievement. These results underscore the critical importance of teacher subject knowledge, particularly ACK, in influencing student outcomes and highlight the complexity of measuring teacher professional knowledge and skill.

Kind and Chan (2019) concludes the Special Issue focusing on the relationship between science teachers' content knowledge (CK), pedagogical knowledge (PK), and pedagogical content knowledge (PCK). The paper reviews five studies within the Special Issue, which collectively explore the evidence regarding the interplay of CK, PK, and PCK, as well as their development in novice and experienced secondary science teachers. The research also examines how these knowledge components impact students' learning outcomes. In conclusion, the paper suggests directions for future research by reconsidering Shulman's amalgam and proposing further examination of the 'Consensus Model' of PCK, along with the presentation of a novel PCK structure based on evidence from the studies within the Special Issue. This highlights the critical importance of subject knowledge, pedagogical knowledge, and their amalgamation in science education.

In conclusion, Subject knowledge refers to refers to the specialized knowledge and understanding that lecturers possess within their respective academic disciplines. This encompasses a comprehensive grasp of the fundamental theories, concepts, principles, and methodologies of the subject. Furthermore, it entails the flexible application of this knowledge in pedagogical practice. Lecturers with a robust

foundation in subject knowledge are not only capable of elucidating complex academic concepts to students clearly but also adept at guiding them in critical thinking, thereby igniting students' interest and curiosity in the subject. The knowledge of a lecturer in a subject is dynamic and evolving, necessitating continuous learning and updating to stay abreast of the latest developments in their field.

Teaching ability

In the digital age, the concept of teaching ability primarily refers to the capacity of teachers to effectively integrate information technology into curriculum teaching. This goes beyond mere application of technological tools, focusing on integrating technology into the learning environment and providing effective teaching strategies. Research indicates that this includes design, development, utilization, management, and evaluation of teaching resources and processes, as well as technology-integrated teaching ability for specific subjects. Information literacy and digital literacy are also essential components of teaching ability, reflecting the understanding and use of information technology and the exhibition of digital citizenship responsibilities and awareness.

Sugihartini et al. (2020) highlight the crucial role of teaching ability in the context of microteaching courses. Their study emphasizes the development of teaching simulation videos as a learning medium, which serves to actively engage students in the classroom. Utilizing the ADDIE model over a two-year period, the researchers standardized teaching skills, crafted storyboards and scenarios, and rigorously tested content with experts and design aspects in the first year. In the second year, the study focused on video production and media testing, including evaluation by media experts, individual trials, small group trials, and large group trials. The outcomes of this research underscore the significance of eight sequential teaching skills: question skills, reinforcement skill, variation skill, explaining skill, opening and closing skill, small group discussions skill, class management skills, and the skill of organizing small group work

and individual work. This study underscores the critical importance of teaching ability in the educational process.

Yin et al. (2017) highlights the crucial importance of teaching ability in Chinese tertiary education. The study reveals that Chinese tertiary teachers' goal orientations for teaching play a pivotal role in shaping their approaches to teaching. It is evident that an emphasis on mastery goals encourages a preference for student-focused teaching, while ability-approach and work-avoidance goal orientations lead to a preference for teacher-focused teaching. Additionally, ability-avoidance and relational goals positively influence both teacher-focused and student-focused approaches to teaching. Moreover, teacher engagement serves as a significant mediator, underscoring the vital role of teaching ability in the transition from teacher-focused to student-focused approaches in Chinese higher-education institutions.

Xue and Li (2021) emphasized the crucial significance of teaching ability. Teachers, as the engineers of the human soul and inheritors of human civilization, hold the responsibility of disseminating knowledge, ideas, and truth, while simultaneously molding souls, lives, and new individuals. This highlights the pivotal role teaching ability plays in shaping the future and fostering a better society.

Wang et al. (2020) emphasized the crucial role of teaching ability in higher education. Education is fundamental to national development and improving the quality of the population. Teachers are the primary practitioners of education, and higher education plays a pivotal role in developing talent and fostering innovation. With the growing enrollment in higher education, promoting teaching quality is imperative. Among various influencing factors, the teaching ability of university teachers stands out as the most direct and significant factor. Nyoman's paper highlights the importance of improving university teachers' teaching ability and proposes effective methods for achieving this goal.

In conclusion, teaching ability refers to the capacity of lecturers to utilize diverse teaching methods and strategies throughout the educational process, as well as skills in classroom management and student guidance. It includes the design and implementation of effective teaching activities, fostering active learning and deep thinking among students, and the flexibility to adapt to various learning styles. Additionally, lecturers should possess the ability to continually update their teaching methodologies and practices, as well as the capability to provide effective feedback that promotes the development of students' critical thinking and innovation skills. The level of a lecturer's teaching ability directly impacts the quality of instruction and the learning outcomes of students, making it a pivotal aspect of lecturer's professional competence.

Digital skills

Lecturers' digital skills refer to a set of competencies required by educators to effectively engage in educational and instructional activities in the digital age. According to the "Lecturer Digital Literacy" standards released by the Chinese Ministry of Education in 2023, lecturers' digital skills encompass five dimensions: digital awareness, digital technology knowledge and skills, digital application, digital social responsibility, and professional development. These skills encompass lecturers' abilities to effectively conduct educational instruction in the digital era, achieve a deep integration of digital technology with education and teaching, and engage in digital innovation and application in practice.

Fedorova et al. (2021) emphasized the critical role of digital skills in the field of education. In an era where education is increasingly digitized, teachers are faced with new pedagogical functions and responsibilities. The transition to digital education is considered a significant milestone in the history of civilization and culture. The article underscores the concept of a digital teacher as the leader of digital educational activities. Various digital tools such as educational platforms, online courses, and digital

textbooks are reshaping the educational landscape, making it more personalized. This transformation extends to the content of teaching and learning, altering its values, meanings, and orientations, as well as educational and pedagogical discourses. The article highlights that digital skills and competencies are now essential for teachers, as they are fundamental to lifelong learning, professional development, and growth in the 21st-century knowledge, information, and innovation-driven society and education. To effectively fulfill their professional-pedagogical and educational functions and ensure the optimal utilization of information and communication technologies (ICTs), teachers must possess the necessary skills and competencies that define their digital professional culture of teaching.

Singh (2018) highlights the paramount importance of digital skills in the 21st-century world. Digital literacy has become a fundamental life skill, essential for individuals, nation-building, and the future generation immersed in the modern technological age. The digital environment pervades every aspect of society, and our ability to lead comfortable lives hinges on our digital literacy. Job opportunities are predominantly available to those who possess digital skills, making it a prerequisite for employment. In the educational sphere, teachers must equip themselves with digital skills to thrive in this digital era, as technology becomes an integral part of the learning process. While technology will not replace teachers, those who embrace and utilize it will outshine their counterparts who do not. Consequently, digital literacy is crucial for teachers to create a digital learning environment in both classrooms and schools. When educators leverage digital devices and information and communication technologies (ICTs) effectively, students stand to benefit greatly. In our rapidly expanding global educational society, it is imperative to nurture these foundational skills.

Additionally, Nyoman (2020) delves into the positive and negative impacts of digital learning and underscores the role of parents in shaping the global educational landscape.

Falloon (2020) emphasized the crucial importance of digital skills in education. While many educational frameworks and models focus on developing students' abilities to use educational applications and digitally-sourced information, Nyoman argues that this narrow approach is insufficient. Instead, the author introduces a conceptual framework for teacher digital competence (TDC) that goes beyond technical skills and literacy. This expanded view of TDC recognizes the complex knowledge and skills required for students to navigate diverse digitally-mediated environments ethically and productively. The article underscores the need for a more holistic and interdisciplinary approach to digital skills education and calls for faculty members to actively engage in delivering these objectives.

Lin et al. (2023) emphasized the critical importance of digital skills in the context of education. In an era marked by the digital transformation of education, data and digital technologies are identified as the driving forces behind teaching innovation. This underscores the significance of teachers' data literacy and digital teaching competence, as they play pivotal roles in empowering students in various aspects. These skills are instrumental in promoting students' digital capacity, promoting ethical technology usage, and fostering collaboration and communication skills within the classroom. Nyoman's study delves into the intricate relationship between teachers' information communication technology (ICT) attitude, ICT skills, data literacy, digital teaching competence, and their impact on student empowerment. The findings highlight that ICT attitude alone does not significantly influence digital teaching competence, whereas ICT skills do, albeit indirectly. Notably, data literacy emerges as a strong predictor of both digital teaching competence and direct empowerment of students. This research underscores the importance of prioritizing teachers' digital teaching competence in ICT training, as it emerges as the most influential factor in empowering students. This evidence-based insight is invaluable for educators,

policymakers, administrators, and teacher educators as they reimagine the role of digital skills in modern education.

Carvalho (2021) highlights the crucial importance of teacher training in developing digital teaching skills. The author emphasizes that such training should be aligned with the specific needs of educators, the educational system, and the demands of our increasingly digital society. It is essential to consider the evolving educational context and the adoption of new pedagogical models that enable a more reflective and autonomous teaching practice. Nyoman's article underscores the relevance of teacher training in promoting the digital teaching skills of university educators and identifies the emerging training needs for their professional growth. The study conducted in a private university in Catalonia, utilizing the life stories methodology, provided valuable insights into the teachers' experiences and perspectives, emphasizing the significance of ongoing professional development in the digital age.

In conclusion, digital skills refers to lecturer's ability to apply digital technologies in teaching and academic research. This encompasses, but is not limited to: 1) Fundamental knowledge of information technology, such as computer operation and internet usage; 2) Utilization of digital media, for instance, employing multimedia teaching tools and creating digital content; 3) Online communication and collaboration skills, including effective communication through emails, social media, and online meeting platforms; 4) Development and utilization of electronic learning resources, like designing online courses and establishing virtual teaching environments; 5) Understanding and adapting to digital technology trends, with the ability to assess and adopt emerging educational technologies. These skills not only aid in promoting teaching efficiency and quality but also foster interaction between teachers and students, thereby enriching the learning experience.

Sustainable learning

Sustainable development education, as a reflection of human self-awareness, aims to address conflicts of interest between contemporary and future generations through a balanced and integrated approach, meeting the economic, social, and environmental needs of sustainable development. This form of education requires not only a sound ecological perspective but also advanced ethical and value systems, harmonizing professional knowledge with value ideals. UNESCO defines sustainable development education as the encouragement of changes in knowledge, skills, values, and attitudes to establish a more sustainable, equitable, and high-quality education for all.

Ben-Eliyahu (2021) emphasized the significance of Sustainable Learning in education. Sustainable Learning, or SLE, goes beyond teaching for sustainability and sustainable learning by focusing on equipping learners with the essential strategies and skills to effectively renew, rebuild, reuse, inquire, be open-minded, and adapt to challenging and complex situations that demand continuous learning and relearning. It encompasses four key aspects: 1) renewing and relearning, 2) independent and collaborative learning, 3) active learning, and 4) transferability. Utilizing the self-regulated learning framework, SLE represents a vital and innovative direction for both research and educational practice.

Bürgener and Barth (2018) emphasized the crucial role of sustainable learning in addressing the pressing need for sustainable development and societal transformation. The author highlights that social learning processes are essential for bringing about real change, as evident in the 2030 Agenda (UN, 2015) and the Global Action Programme. One key aspect of sustainable learning is the enhancement of competencies among educators, as this is vital for ensuring inclusive, quality education and empowering individuals to support sustainable development. Teacher education is a critical component, as competent and dedicated teachers play a pivotal role as

change agents. To meet this challenge, the author introduces an open learning environment based on the concept of living laboratories. Here, students collaborate with experienced partners from schools on real-world sustainability projects in a transdisciplinary manner. This approach not only facilitates learning among students but also leads to the implementation of actual projects, transforming educational practices and contributing to societal transformation.

Hays and Reinders (2020) emphasized the crucial importance of Sustainable Learning and Education (SLE) as an emerging philosophy of learning and teaching rooted in sustainability principles. SLE goes beyond traditional education for sustainability, focusing on sustainable learning itself. The goal is to develop curricula and teaching methods that equip individuals with the skills and mindsets to thrive in complex, ever-changing situations and contribute to a better world.

Gaikwad (2022) perspective, sustainable learning is characterized by its transferability and real-life application. Drawing inspiration from Liebig's Law of the Minimum, originally applied in agriculture, this concept emphasizes the significance of identifying the scarcest ingredient for overall growth. In the realm of education, various human factors, including learner readiness, teaching methods, and learner motivation, can be considered as these essential components. Nyoman argues that a balanced approach to learning, akin to the principles of Liebig, fosters true education, which encompasses the holistic development of the body, mind, and soul, making it sustainable. Nyoman further provides seven practical suggestions to promote sustainable learning, ultimately leading to a lifelong pursuit of knowledge.

Chen and Chen (2022) emphasized the importance of sustainable learning, highlighting its crucial role in education for sustainable development. Sustainable learning equips learners with the necessary knowledge and skills to continue learning effectively in various circumstances. The study conducted by Nyoman utilizes a comprehensive approach, combining quantitative and qualitative analyses, to explore the factors influencing teachers' reflective practice skills within the context of

sustainable learning. The research findings reveal that teaching support services, peer feedback, teacher-student interaction, and personal goal orientation significantly impact teachers' reflective practice skills, which, in turn, promote sustainable learning. Interestingly, the direct influence of pedagogical self-efficacy on reflective practice skills was not observed. This study's insights provide valuable knowledge for understanding the mechanisms affecting teachers' reflective practice skills and offer practical implications to promote sustainable learning in educational practice.

Parry and Metzger (2021) perspective, addressing the pressing global challenges related to environmental, social, and economic issues necessitates a shift towards Sustainable Learning. Traditional education, characterized by one-way information transmission, disciplinary boundaries, and fact-based assessments, falls short in preparing students to tackle these complex problems. To pave the way for a more sustainable future, it is imperative to reevaluate and reform educational systems designed for different times. This transformation involves transitioning from teacher-centered pedagogies to fostering action-oriented, experiential, and reflective learning approaches that can better equip learners to navigate complexity, uncertainty, and rapid change.

In conclusion, sustainable learning refers to the ongoing process of educators pursuing knowledge updates, skill enhancement, and innovation in teaching methods throughout their professional careers. This learning paradigm emphasizes long-term development, encouraging lecturers to continually promote their teaching capabilities through persistent self-reflection, professional training, peer interaction, and ongoing improvement of their teaching practices. The purpose of sustainable learning is not only to improve the quality of teaching but also to adapt to the ever-changing demands of the education sector, enabling lecturers to maintain their competitiveness in a rapidly evolving educational environment. Additionally, this mode of learning underscores the adaptation and application of new technologies and theories, as well

as the cultivation of an open attitude towards educational innovation, thereby ensuring the continuous renewal and development of educational practices.

Digital era

The advent of global digital transformation marks the beginning of a new era, where the widespread application of digital technology is profoundly altering the ways in which people produce, live, learn, and communicate. In this transformative era, we have witnessed the progression of the information technology revolution through three significant phases: informatization, networking, and digitalization. Since the 21st century, humanity has stepped into the digitalization phase, characterized fundamentally by the digitization of everything. This transition signifies that the digitalization phase is not merely a continuation of informatization and networking, but rather their transcendence and deepening.

In China, since the 18th National Congress of the Communist Party, the Party Central Committee, with Xi Jinping at its core, has made strategic decisions to build a strong network country and digital China. Particularly in the "Action Plan for Improving the Digital Literacy and Skills of the Entire Population," promulgated on November 5, 2021, the Chinese government explicitly set the goal of significantly promoting the entire population's digital adaptability, competency, and creativity by 2025, aiming to reach the level of digital literacy and skills of developed countries.

Against this backdrop, the "digital era" has become an inescapable concept, not only a popular topic in daily life but also a focal point in academic discussions. To define the concept of the "digital era," it is first necessary to differentiate it from the information era and the network era.

Shen (2021) states that the digital era, as a more mature stage of the information technology revolution, goes beyond informatization and networking. In this era, information technologies such as 5G, big data, artificial intelligence, and blockchain are continually emerging, deeply integrating into our production and daily life practices.

Therefore, it can be said that the digital era is a period based on the extensive application and integration of digital technology in production and daily life practices, driving the comprehensive intelligentization of all societal domains. This era is not just a technological transformation but a fundamental shift in social structures and human behavioral patterns. In the digital era, information exists in digital form, core processes are becoming mature, and people's everyday lives and work methods have undergone profound changes.

In conclusion, digital Era refers to a period characterized by the rapid advancement of information and communication technologies, especially marked by societal transformations brought about by the Internet, mobile communications, and big data. During this era, educational systems, pedagogical methods, and academic research are undergoing profound changes. This is particularly evident in the enhancement of sustainable professional competence of educators, who face the challenge of effectively integrating digital technologies, updating teaching philosophies and methodologies to meet the educational needs and trends of this era. The Digital Era thus represents a significant shift, necessitating adaptations in educational approaches to align with the evolving technological landscape.

Province Public Universities

Sichuan normal university

Sichuan normal university, located in Chengdu, the capital city of Sichuan Province, China, is one of the key institutions selected for the "Basic Capacity Building Project for Universities in Central and Western China" by the national government. It is also part of Sichuan Province's "Double First-Class" initiative, making it a prominent provincial university. Sichuan normal university has a long history of teacher education and is among the earliest institutions in the province to offer undergraduate teacher education programs.

As of May 2023, the university has three campuses: Shizi Mountain Campus, Chenglong Campus, and Suining Campus, covering a total area of over 3,400 mu (approximately 226.7 hectares). The university is home to more than 3,000 teaching and research staff members.

Leshan normal university

Leshan normal university is a full-time undergraduate institution established with the approval of the Ministry of Education. It is also part of the Ministry of Education's "Eastern Universities Supporting Western Universities Program" and Sichuan Province's "Outstanding Teacher Education Training Program." The university is developed with support from Wuhan university.

As of September 2023, the university occupies an area of over 1,150 mu (approximately 76.7 hectares). It comprises 15 teaching colleges and offers 63 undergraduate programs. The university has a staff of more than 1,500 employees.

Yibin university

Yibin university, situated in the historic and cultural city of Yibin in Sichuan Province, China, is a comprehensive undergraduate institution jointly established by the Sichuan Provincial Department of Education and the Yibin Municipal Government. The university's roots can be traced back to 1978 when it was founded in Lizhuang, Sichuan. It officially became a provincially-owned comprehensive undergraduate institution on May 11, 2001, following approval by the Ministry of Education of the People's Republic of China.

As of April 2023, the university operates on two campuses: Jiangbei Old Campus and Lingang New Campus, covering a total area of 2,260 mu (approximately 150.7 hectares). It comprises 13 secondary colleges and 3 secondary schools, offering 64 undergraduate programs. The university employs 1,448 full-time teaching faculty members.

Neijiang normal university

Neijiang normal university, located in Neijiang City, Sichuan Province, China, is a local undergraduate normal university under the jurisdiction of Sichuan Province. Its history can be traced back to the establishment of Neijiang Normal Higher Vocational School in 1956 and Neijiang Education College in 1958. In March 2000, these two institutions were merged to form Neijiang normal university.

As of May 2023, the university comprises 19 secondary colleges and offers 66 undergraduate programs (with 49 programs admitting students). It has a staff of 1,498 employees, including 1,165 full-time teaching faculty members.

China west normal university

China West normal university, commonly referred to as "West Normal," is situated in Nanchong City, Sichuan Province, China. It is a key provincial university with a rich history. The university was originally founded in 1946 and was granted undergraduate status in 1958, at which point it was named Nanchong Normal College. In 1989, it resumed the name "Sichuan normal university," and in 2003, it was officially renamed China West normal university.

As of May 2023, the university operates on two campuses, known as the Xingzhu Campus and the Huafeng Campus. It offers 82 undergraduate programs and boasts a staff of over 2,600 employees.

Sichuan university of arts and science

Sichuan university of Arts and Science, located in Dazhou City in the eastern part of Sichuan Province, China, is a pilot institution for the overall transformation and development of higher education in Sichuan Province. It is also authorized to grant master's degrees in various disciplines and obtained approval from the Ministry of Education to become an undergraduate institution in February 2006.

As of June 2022, the university has two campuses, namely the Lianhu Campus and the Nanba Campus. It comprises 19 secondary colleges and offers 57 undergraduate programs along with 7 diploma programs. The university has a diverse staff of nearly 1,100 employees, including 5 foreign teachers, with 836 of them being full-time faculty members.

Mianyang normal university

Mianyang normal university is a provincially-owned full-time undergraduate institution located in Sichuan Province, China. The university traces its origins to the establishment of Sichuan Mianyang Normal School in 1940. In 2002, with the approval of the Ministry of Education of the People's Republic of China, Mianyang normal university was formed through the merger of the former Mianyang Normal Higher Vocational School and Mianyang Education College.

As of December 2022, the university is spread across three campuses: Gaoxin Campus, Youxian Campus, and Fenggu Campus, covering nearly 2,000 mu (approximately 133.3 hectares) of land with a total building area exceeding 460,000 square meters. The university consists of 16 secondary colleges and offers 51 full-time undergraduate programs along with 2 vocational education undergraduate programs. It employs 1,254 full-time teaching staff members.

Aba normal university

Aba normal university, located in Shuimogu Town, Wenchuan County, Sichuan Province, China, is a provincially-owned undergraduate institution approved by the Ministry of Education. The university traces its roots back to the Maoxian Simple Rural Normal School, founded in 1938. In 1978, it received approval from the State Council to establish Aba Normal Specialized School, and in 1992, it was renamed Aba Normal Higher Vocational School. In April 2015, with the consent of the Ministry of Education, it was upgraded to Aba normal university.

As of October 2022, the university covers an area of 692,800 square meters with a total building area of 247,200 square meters. It comprises 14 teaching units and offers 26 undergraduate programs. The university has a staff of 843 employees, including 494 full-time faculty members.

Xichang university

Xichang university is situated in Xichang City, Liangshan Yi Autonomous Prefecture, Sichuan Province, China. It is a full-time undergraduate institution officially registered with the Ministry of Education. The university's origins can be traced back to 1939 when it was established as the National Xikang Technical and Vocational School, relocated from Beiyang Engineering College. In 2003, it received approval from the Ministry of Education to merge with Xichang Agricultural College, Xichang Normal College, Liangshan university, and Liangshan Teachers College, forming a provincially-owned full-time undergraduate institution.

As of March 2022, the university consists of two campuses: Anning Campus and Qionghai Campus, covering an area of 1,900 mu (approximately 126.7 hectares) with a total building area of 460,000 square meters. It comprises 17 secondary colleges and offers 66 undergraduate programs. The university employs over 1,300 staff members, with more than 1,070 being full-time faculty members.

Panzhihua university

Panzhihua university is a comprehensive undergraduate institution primarily focused on engineering disciplines, located in the southwestern part of Sichuan and northwestern part of Yunnan, China. It is authorized to confer master's degrees and is situated in Panzhihua City, Sichuan Province. The university's history can be traced back to the establishment of Panzhihua university in 1983. In 1994, it merged with Panzhihua Teachers College, and in 2001, it underwent approval from the Ministry of Education to transform into an undergraduate institution and was renamed Panzhihua university.

As of December 2022, the university occupies a total area of approximately 1450 mu (about 97 hectares) and comprises 21 academic units, offering 63 undergraduate programs. It boasts a faculty of 1,050 members, with 923 of them being full-time teaching staff.

In conclusion, Sichuan province public universities refers to an institution of higher education, focused on cultivating students' in-depth academic knowledge and professional skills. They offer a diverse array of courses ranging from undergraduate to doctoral levels, covering numerous fields such as literature, science, engineering, and more. Universities not only emphasize theoretical education but also place significant value on scientific research and practical application. They are committed to knowledge innovation, cultural heritage, and social service, acting as a key platform for global academic exchange and the advancement of civilization.

University lecturer

Lecturer is an academic position prevalent in numerous universities, with the precise interpretation of the term exhibiting certain variations across different countries. Typically, it signifies an esteemed academic specialist engaged in the capacity of either full-time or part-time instruction, often accompanied by concurrent scholarly research pursuits.

The table provides a comprehensive outline of conventional primary educational systems; however, it is imperative to acknowledge that certain universities may adopt a hybrid approach encompassing elements from multiple systems or employ alternative nomenclature. It is noteworthy that select universities in Commonwealth nations have embraced the American model in lieu of the Commonwealth framework.

As shown in Table 2.5:

Table 2.5 Lists of concepts related to lecturers

NO.	Commonwealth system	American system	German system
1	Professor (chair)	Distinguished professor or equivalent	Professor
2	Reader or principal lecturer (mainly UK) or principal research scientist (mainly National institutes/laboratories) / associate professor (Australia, NZ, India, Southeast Asia, South Africa, Ireland)	Full professor	Professor
3	Senior lecturer or senior research scientist (mainly National institutes/laboratories)	Associate professor	Hochschuldozent, Oberassistent
4	Lecturer or Higher Research Scientist (mainly National institutes/laboratories)	Assistant professor	Juniorprofessor, Wissenschaftlicher Assistent, Akademischer Rat

eui (2017) suggests that within the academic context of Australia, the term "lecturer" is informally used to refer to individuals who deliver lectures within a university or other educational institutions. However, it carries a specific academic significance. The hierarchical structure of academic ranks in Australia closely resembles that of the United Kingdom, where the title "associate professor" somewhat corresponds to the position of "reader" in British universities. The academic ranks in Australia progress as follows: (A) associate lecturer, (B) lecturer, (C) senior lecturer, (D) associate professor, and (E) professor.

Major (2006) discusses a significant shift in academic titling at the university of Warwick, as reported by the Times Higher Education. In 2006, the institution chose to diverge from centuries of traditional academic nomenclature by reclassifying lecturers as 'assistant professors', and senior lecturers and readers as 'associate professors', while retaining the title of 'professor' for its highest academic rank. This substantial alteration in titling conventions was seen as controversial, potentially alarming those who uphold the belief that the title of 'professor' should be exclusively reserved for a distinguished academic echelon.

The Regents of the university of Michigan (2018) have noted that while part-time lecturers share many similarities with adjunct professors, instructors, and other non-tenure-track faculty, primarily due to the shared characteristic of not being on the tenure track, distinctions become more pronounced in the case of full-time lecturers, particularly those who are regularly salaried above a certain threshold, such as half-time.

In conclusion, university lecturer refers to a professional teaching staff member in higher education institutions, primarily responsible for teaching courses, conducting academic research, and guiding students. Lecturers possess a comprehensive competence encompassing subject knowledge, teaching ability, digital skills, and the capacity for sustainable learning. Lecturers contribute to the dissemination of knowledge and the development of their disciplines through teaching and the publication of academic achievements.

Related Research

In the digital era, the professional competence of university lecturers has become increasingly significant as higher education institutions face the demands of digital transformation. The development of sustainable strategies to enhance digital teaching competences among lecturers is crucial for effective education delivery and

long-term success. Several studies have addressed various aspects of these challenges, from the implementation of digital competence frameworks to the integration of innovative teaching methods.

A primary focus of the literature is on the development of digital competence frameworks that can be utilized across higher education institutions. Nguyen and Huong (2022) propose a comprehensive framework for lecturers in Vietnam, emphasizing the need for essential digital skills in the context of Industry 4.0. This framework outlines core competencies such as information technology literacy, digital pedagogy, and online communication, which are vital for adapting to the evolving educational landscape. Similarly, Buinytska and Vasylenko (2022) discuss the implementation of a corporate standard for digital competence at the Borys Grinchenko Kyiv University, highlighting the importance of adaptive testing and personalized learning trajectories in fostering digital proficiency among lecturers.

Digital competence is not only a matter of technical skills but also involves pedagogical and ethical considerations. For example, Liesa-Orús and Blasco (2023) present a meta-analysis revealing that while many lecturers have positive perceptions of information and communication technologies (ICT), there remains a significant gap in actual digital competence, particularly in teaching practices. This finding aligns with the work of Pantoja Vallejo and Berrios Aguayo (2021), who underscore the necessity for improved digital competencies in European university teaching staff to address the challenges posed by the COVID-19 pandemic.

The integration of digital teaching strategies has been further explored in various contexts. For instance, Toharudin et al. (2023) explore the empowerment of lecturers with ICT skills at the University Muhadi Setiabudi in Indonesia, identifying specific areas where lecturers require further training to effectively integrate technology into their teaching practices. Similarly, Novakovic et al. (2022) propose a digital competence framework for university professors in Serbia, categorizing essential skills

into areas such as virtual learning environment management, online communication, and digital ethics.

The sustainability of these digital competencies is another critical aspect of the discussion. Markauskaite et al. (2023) argue that the role of university teachers in a sustainable university extends beyond digital competencies to include postdigital capabilities, which integrate ecological and humanistic dimensions into digital pedagogy. This holistic approach is essential for fostering a sustainable educational environment that aligns with global challenges such as climate change.

Empirical studies further illustrate the application and impact of these digital strategies. Nguyen et al. (2024) conducted a study across ten universities in Vietnam, identifying four key components of digital competence that are crucial for lecturers: basic IT skills, digital pedagogy, student training in digital technology, and online communication. The study emphasizes the importance of continuous professional development and institutional support in enhancing these competencies.

In addition to digital skills, the development of soft skills among lecturers is also essential for adapting to the digital era. Sembiring and Nugraha (2022) highlight the importance of initiative and networking abilities as key soft skills that support learning in the digital era. Their research in the context of the "Kampus Merdeka" program in Indonesia suggests that these soft skills are crucial for lecturers to effectively navigate the uncertainties of digital transformation.

The role of institutional strategies in promoting sustainable professional competences is also a significant theme in the literature. Albashiry et al. (2024) discuss the development of a digital competency framework aimed at fostering collaboration among university teachers, instructional designers, and academic managers. This framework is designed to support the agile and sustainable design of curricula in response to rapid technological changes.

Furthermore, the impact of digital transformation on higher education has led to the need for new teaching methodologies and strategies. Jarjabka et al. (2024) examine the post-pandemic digital competencies required for higher education lecturers, identifying three key areas: awareness, professional, and digital competencies. Their study highlights the need for a balanced development of both digital and professional skills to ensure the sustainability of digital education initiatives.

The effectiveness of these strategies is often measured through surveys and empirical research. For example, Putri and Handican (2023) conducted a survey among students at the Kerinci State Islamic Institute in Indonesia to assess their perceptions of lecturer competencies in the era of Industry 4.0. The findings indicate that students value lecturers who are not only proficient in digital skills but also possess the ability to engage and communicate effectively in a digital environment.

In another study, Colás-Bravo et al. (2021) conducted a systematic review to explore the relationship between sustainability and digital teaching competence in higher education. Their research identifies key digital skills that contribute to educational sustainability, such as the ability to create inclusive and high-quality learning environments. The study suggests that digital competence is integral to achieving long-term sustainability goals in higher education.

Moreover, the literature also addresses the challenges faced by lecturers in adapting to digital teaching. Abdillah (2023) emphasizes the need for lecturers to develop a growth mindset in the digital era, encouraging continuous learning and adaptation to new technologies. This mindset is essential for overcoming the barriers to effective digital teaching and ensuring that lecturers can keep pace with rapid technological advancements.

In conclusion, the development of strategies to promote sustainable professional competences for university lecturers in the digital era is a multifaceted challenge that requires a comprehensive approach. The literature highlights the

importance of digital competence frameworks, continuous professional development, soft skills enhancement, and institutional support in achieving this goal. As higher education institutions continue to navigate the complexities of digital transformation, these strategies will be crucial for ensuring that lecturers are equipped to meet the demands of the digital era while contributing to the long-term sustainability of education. The integration of digital skills with pedagogical, ethical, and ecological considerations will be essential for fostering a resilient and adaptable higher education system. Future research should focus on exploring the long-term impact of these strategies on teaching quality and student outcomes, as well as identifying best practices for their implementation across diverse educational contexts.

The content of the aforementioned relevant studies can be presented according to Table 2.6.

Table 2.6 Lists of relevant studies

No.	Scholar	Subject knowledge	Teaching ability	Digital skills	Sustainable Learning
1	Nguyen & Huong (2022)	√		√	-
2	Buinytska & Vasylenko (2022)	-	√	-	-
3	LiesaOrús & Blasco (2023)	√	√	√	-
4	Pantoja Vallejo & Berrios Aguayo (2021)	-	√	-	-
5	Toharudin et al. (2023)	-	√	√	-
6	Novaković et al. (2022)	√	-	-	√
7	Markauskaite et al. (2023)	√	-	√	-
8	Nguyen et al. (2024)	√	√	-	-

Various research methods have been employed in the relevant studies, including TOWS, SWOT, PEST, Gap Analysis, Balanced Scorecard, and KPI. These methods are illustrated in Table 2.7.

Table 2.7 Lists of Research Methods in Relevant Studies

No.	Scholar	SOWT Analysis	PEST Analysis	TOWS Analysis	GAP Analysis	Balance Score Card
1	Nguyen & Huong (2022)	√	-	√	-	√
2	Buinytska & Vasylenko (2022)	-	√	-	-	√
3	LiesaOrús & Blasco (2023)	√	√	√	-	-
4	Pantoja Vallejo & Berrios Aguayo (2021)	-	√	-	-	-
5	Toharudin et al. (2023)	-	√	√	-	√
6	Novaković et al. (2022)	√	-	-	√	-
7	Markauskaite et al. (2023)	√	-	√	-	-
8	Nguyen et al. (2024)	√	√	-	-	-

Chapter 3

Research Methodology

In order to study the optimization Strategies to Promote the Sustainable Development of Professional Professional competences for university Lecturers in Digital era, Sichuan Province. This paper adopts a variety of research methods from the following aspects: 1) To study the current status of lecturers' sustainable professional competence in the digital era, Sichuan province. 2) To study the strategies for promoting lecturers' sustainable professional competence in the digital era, Sichuan province. 3) To evaluate the feasibility of the strategies for promoting lecturers' sustainable professional competence in the digital era, Sichuan province. The researchers have the following procedures.

1. The Population / The sample Group
2. Research Instruments
3. Data Collection
4. Data Analysis

Step 1: Investigate the current status of sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Step 2: Conduct expert interviews to explore the formulation of strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Step 3: Evaluate the feasibility of the strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

The research structure diagram is shown in Figure 3.1:

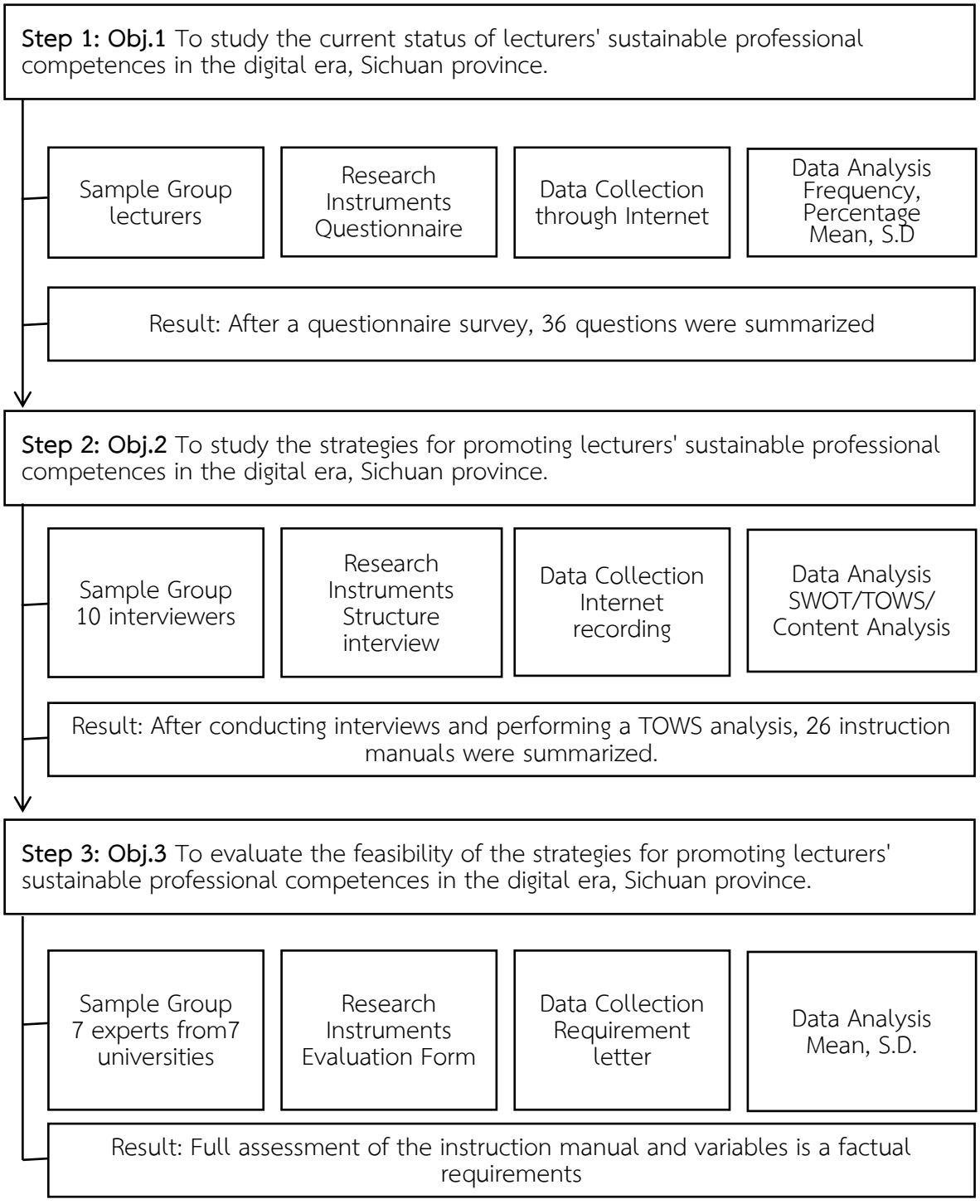

Figure 3.1 Summary of research methods and steps

The Population / Sample Group

The Population

The overall subject of the research encompasses 15647 lecturers from 10 universities in Sichuan Province. These include Sichuan Normal University, Leshan Normal University, Yibin university, Neijiang normal university, Xihua Normal University, Sichuan University of arts and Science, Mianyang normal university, Aba Normal University, Xichang University, and Panzhihua University, covering lecturers from various academic disciplines.

The Sample group

According to Krejcie and Morgan's sampling table, the sample population consisted of university lecturers randomly selected from 10 universities across 10 cities within Sichuan Province. Efforts were made to ensure that the sample population reflected the characteristics of the overall population in terms of gender, age, educational background, teaching experience, and academic disciplines.

In the selection of the sample population, scientific sampling principles such as randomness and representativeness were followed to ensure the validity and credibility of the research results. Additionally, the rights and privacy of each participant were respected to maintain the ethical standards of the research.

As shown in Table 3.1:

Table 3.1 Lists of university and sample size

NO.	University in sichuan	Population	Sample Group
1	Sichuan Normal University	3000	72
2	Leshan Normal University	1500	36
3	Yibin University	1500	36
4	Neijiang Normal University	1500	36
5	Xihua Normal University	2600	63
6	Sichuan University of arts and science	1100	27
7	Mianyang Normal University	1254	30
8	Aba Normal University	843	20
9	Xichang University	1300	32
10	Panzhihua University	1050	25
	Total	**15647**	**377**

lnterview groups

The research employed a random sampling method to select university lecturers from ten different institutions, namely Sichuan Normal University, Leshan Normal University, Yibin University, Neijiang Normal University, China West Normal University, Sichuan University of Arts and Science, Mianyang Normal University, Aba Normal University, Xichang University, and Panzhihua University. One lecturer was selected from each university, resulting in a total sample size of ten participants. The interview group employed purposeful sampling to select participants who met the following criteria: 1) Lecturers from regular undergraduate institutions with a minimum of 5 years of teaching experience, and 2) Individuals with significant experience in digital learning or a background in the digital industry.

As shown in Table 3.2:

Table 3.2 Lists of university and Interviewer size

NO.	University in sichuan	Interviewers
1	Sichuan Normal University	1
2	Leshan Normal University	1
3	Yibin University	1
4	Neijiang Normal University	1
5	Xihua Normal University	1
6	Sichuan University of arts and science	1
7	Mianyang Normal University	1
8	Aba Normal University	1
9	Xichang University	1
10	Panzhihua University	1
	Total	**10**

Evaluation group

The evaluation of strategies to promote sustainable professional competences for university lecturers in the digital era, Sichuan Province was conducted by seven senior administrators from undergraduate institutions within the province. The qualifications of these experts were aligned with the research objectives and questions, and included the following criteria: 1) Affiliation with regular undergraduate institutions and a minimum of 5 years of teaching experience, 2) Substantial experience in digital learning or a background in the digital industry, and 3) Holding the academic title of associate professor or higher.

As shown in Table 3.3:

Table 3.3 Lists of university and evaluation size

NO.	University in sichuan	Interviewers
1	Sichuan Normal University	1
2	Leshan Normal University	1
3	Yibin University	1
4	Neijiang Normal University	1
5	Xihua Normal University	1
6	Sichuan University of arts and science	1
7	Mianyang Normal University	1
	Total	**7**

Research Instruments

The research utilized research tools including questionnaires, interview guides, and a feasibility assessment form for the strategies to promote sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Questionnaire

The construction process of the questionnaire were as follows:

Step 1: Review and analyze documents, concepts, theories, and research related to the sustainable professional competence of university lecturers in the digital era , Sichuan Province.

Step 2: Develop a survey questionnaire to assess the current status of sustainable professional competences for university lecturers in the digital era , Sichuan Province. Share the questionnaire outline with mentors and make necessary revisions based on their feedback.

Step 3: Validate the questionnaire by assessing its Interrater Objectivity Coefficient (IOC) with 5 experts.

Step 4: Revise the survey questionnaire based on expert recommendations.

Step 5: Pilot test the questionnaire by administering it to 30 lecturers at Sichuan University.

To ensure adherence to the intended design, this study first verified that both the survey respondents and interviewees were lecturers from ten representative universities in Sichuan Province. Additionally, the reliability of the questionnaire was assessed using Cronbach's Alpha Coefficient, yielding a score of 0.91 (with a range of 0.8-1.0 indicating validity). This high coefficient reflects a robust level of reliability for the scale.

Step 6: Distribute the questionnaire to lecturers from ten universities in Sichuan Province and await data collection.

The data collection tool for Objective 1 involved a questionnaire survey designed to assess the current status of sustainable professional competences for university lecturers in the digital era, Sichuan Province. The questionnaire, aimed at promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province, encompassed four main dimensions: 1) Subject Knowledge, 2) Teaching Competence, 3) Digital Skills, and 4) Sustainable Learning.

The survey questionnaire was divided into two parts:

Part 1: Respondent Information, including gender, age, educational background, years of work experience, academic title, and other relevant data.

Part 2: Utilizing a 5-point Likert scale, the questionnaire consisted of four sections, each containing 9 items, to assess the current state of sustainable professional competences for university lecturers in Sichuan Province across the four dimensions mentioned above. In total, there were 36 questions.

The criteria for data interpretation based on five-point Likert's scale, as follows:

5. express that the level of sustainable professional competences for university lecturers were at highest level

4 express that the level of sustainable professional competences for university lecturers were at high level

3 express that the level of sustainable professional competences for university lecturers were at medium level

2 express that the level of sustainable professional competences for university lecturers were at low level

1 express that the level of sustainable professional competences for university lecturers were at lowest level

And the data interpretation for average value based on Rensis Likert (1932).

The data interpretation are as follows:

4.50-5.00	Refer to	The highest level
3.50-4.49	Refer to	High level
2.50-3.49	Refer to	Moderate level
1.50-2.49	Refer to	Low level
1.00-1.49	Refer to	The lowest level

Structured interviews

For the data collection tool related to Objective 2, strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province were proposed. Building upon the analysis of interview data, this study systematically outlined strategies for enhancing the sustainable professional competences of university lecturers in the digital era, Sichuan Province. Additionally, interview content and a structured interview template were developed in conjunction with a questionnaire survey. Utilizing SWOT analysis, and adhering to a problem-oriented approach, deficiencies in four key areas-disciplinary knowledge, teaching abilities, digital skills, and sustainable learning-were identified as requiring

improvement. Targeted guidance was provided to further promote the sustainable professional competences of university lecturers in the digital era, Sichuan Province.

Evaluate the feasibility of strategy

For the data collection tool related to Objective 3, "Assessment of the Feasibility of Promoting Sustainable Professional Competences for University Lecturers in the digital era, Sichuan Province," seven experts from seven representative undergraduate universities in Sichuan Province were invited to participate. The Likert scale method was employed to assess the adaptability and feasibility of the proposed strategies.

The standards are as follows:

4.50-5.00	Refer to	The highest level
3.50-4.49	Refer to	High level
2.50-3.49	Refer to	Moderate level
1.50-2.49	Refer to	Low level
1.00-1.49	Refer to	The lowest level

Data Collection

Depending on the type of research instrument, the researchers designed various steps to collect data. Here are some examples:

Questionnaire

The data collection for objective 1: To study the current status of lecturers' sustainable professional competence in the digital era, Sichuan Province:

Step 1: Obtain the Invitation Letter

The researcher first obtained an official letter of request from the Graduate School at Bansomdejchaopraya Rajabhat University, formally inviting the lecturers from ten universities in Sichuan Province to participate in the study.

Step 2: Contact the Human Resources Departments

The researcher reached out to the human resources departments of the ten selected universities in Sichuan Province, explaining the purpose of the research and requesting their cooperation in distributing the questionnaires. The invitation letter was sent to each department for formal endorsement.

Step 3: Distribute the Questionnaire via Wenjuanxing

During the period of April 11 – 13, the researcher distributed the questionnaires through Wenjuanxing (an online survey platform). QR codes for the questionnaire were sent to the human resources departments of the ten universities.

Step 4: Randomized Distribution of Questionnaires

The human resources departments at each university randomly distributed the Wenjuanxing QR codes to the lecturers. The number of questionnaires distributed at each university was calculated based on the proportion of lecturers in the sample group from each institution.

Step 5: Collection of Responses

By 4:00 p.m. on April 13, a total of 377 completed questionnaires were received, achieving a 100% response rate.

Structured interviews

The data collection for objective 2: To study the strategies for promoting lecturers' sustainable professional competence in the digital era, Sichuan Province:

Step 1: Seek an Invitation Letter

The researcher first obtained an official letter of request from the Graduate School at Bansomdejchaopraya Rajabhat University. This letter invited lecturers from ten universities in Sichuan Province to recommend experts for participation in the structured interviews.

Step 2: Contact Human Resources Departments

On April 11, the researcher contacted the human resources departments of the ten selected universities, explaining the study and requesting assistance in identifying experts. The researcher asked for recommendations of experts who fit the interview criteria, including their names, contact information, and relevant details. The invitation letter was sent to the human resources departments for distribution.

Step 3: Initial Communication with Experts

On April 12, the researcher contacted the recommended experts by phone, introduced the research objectives and questions, and sent them the invitation letter. Additionally, a preliminary SWOT analysis related to the research was shared to provide context for the interviews.

Step 4: Conducting the Interviews

Between April 15 and 20, interviews were conducted using a variety of methods, including phone calls, online video meetings, and face-to-face discussions, depending on the availability and preference of the experts. During the interviews, the experts provided detailed feedback on the strategies for promoting sustainable professional competence based on the provided SWOT analysis and the research goals.

Step 5: Data Organization and Analysis

Following the interviews, the researcher organized the responses and began the analysis. The interview data were carefully examined to inform the strategy development process and to ensure alignment with the study's objectives.

Evaluate the feasibility of the strategy

The data collection for objective 3: To evaluate the feasibility of the strategies for promoting lecturers' sustainable professional competence in the digital era, Sichuan Province:

Step 1: Obtain the Invitation Letter

The researcher obtained an official letter of authorization from the Graduate School at Bansomdejchaopraya Rajabhat University to formally invite experts from seven universities in Sichuan Province to participate in the feasibility evaluation of the strategies.

Step 2: Contact Human Resources Departments

On August 1, the researcher contacted the human resources departments of the seven universities, explaining the study and requesting assistance in recommending qualified experts. The researcher asked for details on the experts, including their names and contact information, and sent the invitation letter to the human resources departments for dissemination.

Step 3: Initial Communication with Experts

On August 10, the researcher contacted the recommended experts by phone, introduced the research objectives and shared the developed strategies for promoting sustainable professional competences. The invitation letter was also sent to the experts for their review.

Step 4: Conducting the Feasibility Evaluation

Between August 15 and 20, the researcher used the Wenjuanxing online questionnaire platform to distribute the feasibility evaluation form to the seven selected experts. The human resources departments of the seven universities helped distribute the Wenjuanxing QR code, ensuring each expert could access and complete the questionnaire.

Step 5: Organizing and Analyzing Data

On August 20, after collecting 100% of the responses from the experts, the researcher organized the data to assess the feasibility and adaptability of the proposed strategies. The results were then analyzed for further study.

Data Analysis

After verifying the completeness and effectiveness of the questionnaire, the researchers divided the data analysis into two steps: preliminary analysis and in-depth analysis.

Step 1: Demographic Information Analysis

Questionnaire Categorization: Analyze the data characteristics of various research variables and perform preliminary data analysis and basic statistical analysis for each variable using computer programs. The first step in the analysis was to examine the demographic data of the respondents, including gender, years of teaching experience, and professional title.

Step 2: SWOT and TOWS Analysis

To evaluate the data collected from the interviews and questionnaires, the researcher employed both SWOT (Strengths, Weaknesses, Opportunities, and Threats) and TOWS analysis. These tools were used to analyze the internal and external factors affecting the sustainable professional competences of university lecturers in Sichuan Province. The TOWS matrix helped in aligning the internal strengths and weaknesses with external opportunities and threats to formulate actionable strategies.

Step 3: Statistical Analysis

The third step involved the use of mean and standard deviation to analyze the data gathered from the questionnaires. These statistical measures were employed to assess the central tendency and variability of the responses, providing a clear understanding of the current state of sustainable professional competences and the feasibility of the proposed strategies. The analysis was performed using appropriate software to ensure accuracy and precision.

Chapter 4
Results of Analysis

This research in the development of strategies to promote sustainable professional competences for university lecturers in digital era, sichuan province. The objectives of this research were 1) to study the current status of lecturers' sustainable professional competences in the digital era, Sichuan province. 2) to study the strategies for promoting lecturers' sustainable professional competences in the digital era, Sichuan province. 3) to evaluate the feasibility of the strategies for promoting lecturers' sustainable professional competences in the digital era, Sichuan province. The data analysis result can be presented as follows:

1. Symbol and abbreviations
2. Presentation of data analysis
3. Results of data analysis

The details are as follows.

Symbol and Abbreviations

n Refers to sample group

$\overline{x}$ Refers to average value

S.D. Refers to standard deviation

Presentation of Data Analysis

Part 1: Quantitative Analysis

The quantitative analysis of the research consists of two steps, focusing on the respondents' personal information and the current state of sustainable professional competences for university lecturers in the digital era, Sichuan Province

Step 1: Analysis of Respondents' Personal Information

The analysis results are categorized by gender, years of teaching experience, professional title, and educational background. Data is presented in terms of frequency and percentage, providing a demographic breakdown of the respondents.

Step 2: Analysis of the Current State of Sustainable Professional Competences

The analysis results focus on the current state of sustainable professional competences for university lecturers in the digital era, Sichuan Province Data is presented in terms of mean and standard deviation, reflecting the overall levels of competences across different aspects such as subject knowledge, teaching ability, digital skills, and sustainable learning.

Part 2: Qualitative Analysis

The qualitative analysis presents insights gained from interviews with experts regarding the development of strategies to promote sustainable professional competences for university lecturers in the digital era, Sichuan Province. The analysis is divided into two steps:

Step 1: SWOT and TOWS Analysis

In this step, a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) was conducted to categorize the internal and external factors affecting the sustainable professional competences of university lecturers. Based on the SWOT findings, a TOWS analysis was used to create strategic recommendations by aligning internal strengths and weaknesses with external opportunities and threats. The TOWS analysis helped to formulate actionable strategies for enhancing sustainable professional competences, ensuring that the strategies leverage strengths, mitigate weaknesses, capitalize on opportunities, and address threats.

Step 2: Interview Content Analysis

The results provide an in-depth understanding of the strategies suggested by experts to improve sustainable professional competences. Through qualitative content analysis, the interview responses were categorized to reflect themes relevant to strategy

development, including feedback on the strengths, weaknesses, opportunities, and challenges in implementing these strategies.

Part 3: Evaluation of Appropriateness and Feasibility

The analysis results present data on the evaluation of the proposed strategies in terms of their appropriateness and feasibility. Experts assessed the strategies using structured forms, and the data is reported using mean and standard deviation to determine the overall effectiveness of the strategies in addressing the professional development needs of lecturers in the digital era.

Results of Data Analysis

The researcher conducted a comprehensive analysis of the data, segmented into the following four parts:

Part 1: Quantitative Analysis

Step 1: Analysis of Respondents' Personal Information

The analysis results are categorized by gender, years of teaching experience, professional title, and educational background. Data is presented in terms of frequency and percentage, providing a demographic breakdown of the respondents.

Table 4.1 Number of people and percentage of respondents
(n=377)

	Personal Information	**Frequency**	**Percentage**
Gender	Male	200	53.05%
	Female	177	46.95%
	Total	**377**	**100%**
Years of teaching experience	0-10 years	60	15.92%
	10-20 years	120	31.83%
	20-30 years	140	37.14%
	Over 30 years	57	15.11%
	Total	**377**	**100%**
Professional Title	Junior	80	21.22%
	Intermediate	150	39.79%
	Associate Professor	100	26.52%
	Full Professor	47	12.47%
	Total	**377**	**100%**
Highest educational attainment	less than a bachelor's degree	8	2.12%
	Bachelor's degree	17	4.51%
	Master's degree	204	54.11%
	Doctor's degree	148	39.26%
	Total	**377**	**100%**

According to Table 4.1, in terms of gender, there are 200 male respondents, accounting for 53.05%, and 177 female respondents, accounting for 46.95%. The proportion of male lecturers among the respondents is relatively higher. Regarding years

of teaching experience, the main range is 20-30 years, accounting for 37.14% of the total population, followed by 10-20 years, with 0-10 years being the least, with only 60 people, accounting for 15.92%. The respondents' professional titles are mainly intermediate, with 150 people accounting for 39.79%, followed by associate professors, accounting for 26.52%. The educational background of the respondents is mainly master's degrees, with 204 people accounting for 54.11%, followed by doctoral degrees, while the number of people with a bachelor's degree or below is the least, with only 8 people, accounting for 2.12%.

Step 2: Analysis of the Current State of Sustainable Professional Competences

The analysis results focus on the current state of sustainable professional competences for university lecturers in the digital era, Sichuan Province Data is presented in terms of mean and standard deviation, reflecting the overall levels of competences across different aspects such as subject knowledge, teaching ability, digital skills, and sustainable learning.

Table 4.2 The average value and standard deviation of the current situation of sustainable professional competences for university lecturers in the digital era, Sichuan Province.

(n=377)

NO.	competences for university lecturers, sichuan province	$\overline{x}$	S.D.	level	Rank
1	Subject Knowledge	3.93	0.81	High	1
2	Teaching Ability	3.91	0.85	High	3
3	Digital Skills	3.91	0.86	High	2
4	Sustainable Learning	3.88	0.88	High	4
	Total	**3.90**	**0.85**	**High**	

According to Table 4.2, the current situation of sustainable professional competences for university lecturers in the digital era, Sichuan Province is at a high level ($\overline{x}$=3.90). Considering the results, the aspects ranged from highest to lowest level were as follows: the highest level was subject knowledge ($\overline{x}$=3.93), followed by digital skills ($\overline{x}$=3.91), teaching ability ($\overline{x}$=3.91), and sustainable learning was the lowest level ($\overline{x}$=3.88).

Table 4.3 The average value and standard deviation of the current situation of sustainable professional competences for university lecturers in subject knowledge in the digital era, Sichuan Province.

(n=377)

NO.	Subject knowledge	$\overline{x}$	S.D.	level	rank
1	Engage in regular study to update disciplinary knowledge	3.86	0.85	high	6
2	Possess professional competitiveness within the disciplinary domain	3.80	0.78	high	9
3	Participate in research activities relevant to the discipline	3.84	0.78	high	8
4	Review the latest literature pertaining to the discipline	3.85	0.89	high	7
5	Attend academic conferences relevant to the discipline	3.98	0.74	high	2
6	Utilize online resources to enhance disciplinary knowledge	4.10	0.73	high	1
7	Exchange ideas with peers to advance disciplinary knowledge	3.95	0.87	high	5
8	Encourage students to pose discipline-related inquiries	3.97	0.81	high	4
9	Periodically assess one's level of disciplinary knowledge	3.98	0.81	high	3
	Total	**3.93**	**0.81**	**high**	

According to Table 4.3, the current situation of sustainable professional competences for university lecturers in subject knowledge was at a high level ($\overline{x}$=3.93). Considering the results of this research, aspects ranged from the highest to lowest level as follows: the highest level was "Utilize online resources to enhance disciplinary knowledge" ($\overline{x}$=4.10), followed by "Attend academic conferences relevant to the discipline" ($\overline{x}$=3.98), and "Possess professional competitiveness within the disciplinary domain" was the lowest level ($\overline{x}$=3.80).

Table 4.4 The average value and standard deviation of the current situation of sustainable professional competences for university lecturers in teaching ability in the digital era, Sichuan Province.

(n=377)

NO.	Teaching ability	$\overline{x}$	S.D.	level	rank
1	Engage in regular reflection on one's teaching methods	4.01	0.78	high	1
2	Utilize diverse teaching approaches	3.96	0.81	high	3
3	Adapt teaching strategies based on student feedback	3.99	0.75	high	2
4	Employ case studies to facilitate student comprehension	3.94	0.88	high	5
5	Encourage students to engage in critical thinking	3.89	0.82	high	6
6	Attend regular workshops or training sessions on teaching methodologies	3.95	0.86	high	4
7	Utilize teaching feedback to enhance teaching quality	3.82	0.88	high	8
8	Provide personalized learning support for students	3.84	0.89	high	7

Table 4.4 (Continued)

(n=377)

NO.	Teaching ability	$\overline{x}$	S.D.	level	rank
9	Conduct periodic evaluations of one's teaching effectiveness	3.76	0.94	high	9
	Total	**3.91**	**0.85**	**high**	

According to Table 4.4, the current situation of sustainable professional competences for university lecturers in teaching ability was at a high level ($\overline{x}$=3.91). Considering the results of this research, aspects ranged from the highest to lowest level as follows: the highest level was "Engage in regular reflection on one's teaching methods" ($\overline{x}$=4.01), followed by "Adapt teaching strategies based on student feedback" ($\overline{x}$=3.99), and "Utilize teaching feedback to enhance teaching quality " was the lowest level ($\overline{x}$=3.82).

Table 4.5 The average value and standard deviation of the current situation of sustainable professional competences for university lecturers in digital skills in the digital era, Sichuan Province.

(n=377)

NO.	Digital skills	$\overline{x}$	S.D.	level	rank
1	Stay abreast of the latest educational technology tools	3.89	0.88	high	6
2	Encourage students to utilize digital tools for learning	3.86	0.94	high	7
3	Engage in regular learning of digital skills	3.97	0.80	high	3
4	Employ digital tools to enhance teaching interactivity	3.97	0.83	high	2
5	Integrate digital resources into teaching	3.92	0.84	high	4
6	Utilize social media to facilitate learning	3.90	0.80	high	5
7	Use online platforms to share course materials	3.81	0.91	high	8
8	Keep track of the latest trends in educational technology	3.79	0.97	high	9
9	Participate in training related to digital skills	4.08	0.71	high	1
	Total	**3.91**	**0.86**	**high**	

According to Table 4.5, the current situation of sustainable professional competences for university lecturers in digital skills was at a high level ($\overline{x}$ =3.91). Considering the results of this research, aspects ranged from the highest to lowest level as follows: the highest level was "Participate in training related to digital skills" ($\overline{x}$=4.08), followed by "Employ digital tools to enhance teaching interactivity" ($\overline{x}$=3.97), and "Keep track of the latest trends in educational technology" was the lowest level ($\overline{x}$=3.79).

Table 4.6 The average value and standard deviation of the current situation of sustainable professional competences for university lecturers in sustainable learning in the digital era, Sichuan Province.

(n=377)

NO.	Sustainable learning	$\overline{x}$	S.D.	level	rank
1	Have a continuous learning plan	4.01	0.75	high	1
2	Is continuous learning crucial for professional development	3.95	0.80	high	2
3	Seek opportunities to enhance one's professional skills	3.88	0.84	high	5
4	Maintain an open attitude towards new knowledge	3.84	0.89	high	7
5	Set regular personal and professional development goals	3.74	0.95	high	9
6	Utilize online resources for self-directed learning	3.89	0.96	high	4
7	Adapt to rapid changes in the field of education	3.80	0.93	high	8
8	Encourage colleagues and students to engage in continuous learning	3.90	0.87	high	3
9	Engage in interdisciplinary learning activities	3.88	0.85	high	6
	Total	**3.88**	**0.88**	**high**	

According to Table 4.6, the current situation of sustainable professional competences for university lecturers in sustainable learning was at a high level ($\overline{x}$=3.88). Considering the results of this research, aspects ranged from the highest to lowest level as follows: the highest level was "Have a continuous learning plan" ($\overline{x}$=4.01), followed by "Is continuous learning crucial for professional development" ($\overline{x}$=3.95), and "Set regular personal and professional development goals" was the lowest level ($\overline{x}$=3.74).

The overall level of sustainable professional competences of university lecturers in Sichuan Province

In summary, according to the data interpretation for average value based on Rensis Likert (1932), the data interpretations are as follows: 4.50-5.00 express the highest level; 3.50-4.49 express a high level; 2.50-3.49 express a medium level; 1.50-2.49 express a low level; 1.00-1.49 express the lowest level. A questionnaire survey of university lecturers found that the average value of the total scale of sustainable professional competences of university lecturers was at a high level ($\overline{X}$=3.90). The average value of subject knowledge was at a high level ($\overline{X}$=3.93). The average value of digital skills was at a high level ($\overline{X}$=3.91), teaching ability was at a high level ($\overline{X}$=3.91), and sustainable learning was at a high level ($\overline{X}$=3.88). The average order of the four first-order dimensions is: subject knowledge ($\overline{X}$=3.93) > digital skills ($\overline{X}$=3.91) > teaching ability ($\overline{X}$=3.91) > sustainable learning ($\overline{X}$=3.88). The level of subject knowledge is the highest, while the average level of sustainable learning is the lowest. Therefore, this to some extent indicates that teaching ability, digital skills, and sustainable learning need to be further improved.

Based on the analysis of the average and standard deviation data of the questionnaire on sustainable professional competences of university lecturers, the unanimous conclusion is that the current situation of sustainable professional competences of university lecturers in Sichuan Province can be summarized in three aspects:

Firstly, the overall level of sustainable professional competences of university lecturers in Sichuan Province is high, but the implementation level of each dimension is unbalanced. Secondly, the level of subject knowledge among university lecturers in Sichuan Province is the highest. Thirdly, the level of sustainable learning among university lecturers in Sichuan Province is the lowest.

Part 2: Qualitative Analysis

Step 1: SWOT and TOWS Analysis

In this step, a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) was conducted to categorize the internal and external factors affecting the sustainable professional competences of university lecturers. Based on the SWOT findings, a TOWS analysis was used to create strategic recommendations by aligning internal strengths and weaknesses with external opportunities and threats. The TOWS analysis helped to formulate actionable strategies for enhancing sustainable professional competences, ensuring that the strategies leverage strengths, mitigate weaknesses, capitalize on opportunities, and address threats.

In the course of the interview, the interviewer offered strategic insights and responded to inquiries concerning the strengths, weaknesses, opportunities, and threats related to each element. The synthesized data is illustrated in Figures 4.1.

S1.The lecturers' existing expertise in subject knowledge (S1). S2.Their adaptability to using digital tools (S2). S3.Strong institutional support from universities for professional development (S3).	W1. Limited exposure to interdisciplinary learning (W1). W2. Gaps in continuous learning plans and self-reflection practices (W2). W3. Uneven distribution of digital competencies among faculty (W3).
O1. Increasing availability of online learning platforms and digital tools for professional development (O1). O2. Government support for enhancing digital skills and continuous learning (O2). O3. Opportunities for international academic collaborations and exchange programs (O3).	T1. Rapid technological changes outpacing lecturers' skill development (T1). T2. Growing competition from global universities adopting advanced digital learning tools (T2). T3. Limited funding for continuous training programs (T3).

S W
O T

Figures 4.1 SWOT Analysis Interview Content

Table 4.7 TOWS Matrix Analysis

Internal / External	**Strengths (S)** **S1. The lecturers' existing expertise in subject knowledge** **S2. Their adaptability to using digital tools** **S3. Strong institutional support from universities for professional development**	**Weaknesses (W)** **W1. Limited exposure to interdisciplinary learning** **W2. Gaps in continuous learning plans and self-reflection practices** **W3. Uneven distribution of digital competencies among faculty**
Opportunities (O) O1. Increasing availability of online learning platforms and digital tools for professional development O2. Government support for enhancing digital skills and continuous learning O3. Opportunities for international academic collaborations and exchange programs	SO (Leverage Strengths to Seize Opportunities) Strategy: 1.Leveraging Expertise for Digital Engagement: Leverage the lecturers' strong subject knowledge and adaptability to enhance engagement with online platforms (S1, S2 + O1) by encouraging participation in digital workshops. 2.Institutional Support for Global Collaboration: Use the strong institutional backing (S3) to facilitate international academic partnerships, taking advantage of global opportunities for collaborative research and learning (O3). 3.Maximizing Government Initiatives for Development:Utilize governmental support (O2) to	WO (Overcome Weaknesses to Seize Opportunities) Strategy: 1.Closing Gaps through Global Collaboration: Address the gap in interdisciplinary learning (W1) by taking advantage of opportunities for international collaboration (O3). This would encourage cross-disciplinary initiatives that integrate global academic practices. 2.Boosting Digital Competency through Government Programs: Implement structured digital literacy workshops to close the digital competency gap (W3) by leveraging government-backed initiatives and funding (O2). 3.Fostering Continuous Learning Plans: Encourage lecturers to develop continuous learning plans (W2)

Table 4.7 (Continued)

Internal / External	**Strengths (S)** **S1. The lecturers' existing expertise in subject knowledge** **S2. Their adaptability to using digital tools** **S3. Strong institutional support from universities for professional development**	**Weaknesses (W)** **W1. Limited exposure to interdisciplinary learning** **W2. Gaps in continuous learning plans and self-reflection practices** **W3. Uneven distribution of digital competencies among faculty**
	further improve professional development programs by aligning them with lecturers' existing strengths in subject knowledge and digital skills (S1, S2).	by incorporating available online learning platforms and international collaboration programs (O1, O3).
Threats (T) T1. Rapid technological changes outpacing lecturers' skill development.	ST (Leverage Strengths to Counteract Threats) Strategy: 1.Staying Ahead of Technological Changes: Use institutional support (S3) to continuously update lecturers on emerging digital tools and trends (T1), thus staying ahead of rapid technological advancements. 2. Building Global Competitiveness: Strengthen the adaptability of lecturers (S2) by facilitating participation in international	WT (Minimize Weaknesses to Avoid Threats) Strategy: 1.Optimizing Resources to Address Funding Limitations: Offset limited funding (T3) by optimizing university digital resources, such as open-source tools or collaborations with international institutions (W3, O3), to provide more cost-effective training. 2.Developing Self-Directed Learning to Mitigate Technological Threats: Reduce the impact of lecturers'

Table 4.7 (Continued)

Internal **External**	**Strengths (S)** **S1. The lecturers' existing expertise in subject knowledge** **S2. Their adaptability to using digital tools** **S3. Strong institutional support from universities for professional development**	**Weaknesses (W)** **W1. Limited exposure to interdisciplinary learning** **W2. Gaps in continuous learning plans and self-reflection practices** **W3. Uneven distribution of digital competencies among faculty**
T2. Growing competition from global universities adopting advanced digital learning tools. T3. Limited funding for continuous training programs	conferences and webinars, helping them stay competitive against global universities adopting advanced tools (T2). 3. Enhancing Institutional Resilience Against Rapid Change: Leverage the institution's resources (S3) to create a proactive training environment that ensures lecturers are equipped to manage the fast pace of digital transformation (T1).	insufficient continuous learning plans (W2) by integrating structured self-directed learning modules that help them keep pace with technological changes (T1, T2). 3.Strengthening Faculty Development Despite Budget Constraints: Create tailored faculty development programs that focus on key areas like digital literacy (W3) while working within limited financial resources (T3) through collaboration with government programs (O2).

Table 4.8 The table of corresponding strategies derived from the TOWS analysis

Category	Aspects	Strategies
SO	Leveraging Expertise for Digital Engagement	1. Enhance subject knowledge by integrating online learning platforms.
		2. Improve teaching ability through participation in digital workshops.
		3. Utilize digital tools to facilitate interactive learning environments.
	Institutional Support for Global Collaboration	4. Promote international academic partnerships using university support.
		5. Encourage lecturers to engage in global research initiatives.
	Maximizing Government Initiatives for Development	6. Align government funding with professional development programs.
		7. Offer government-sponsored digital skills training to lecturers.
		8. Integrate subject knowledge development with digital competency programs.
WO	Closing Gaps through Global Collaboration	9. Establish interdisciplinary collaborations through global academic networks.
		10. Introduce cross-disciplinary learning modules in partnership with international institutions.
	Boosting Digital Competency through Government Programs	11. Implement structured digital literacy programs backed by government initiatives.
		12. Organize periodic workshops to ensure even distribution of digital skills across all faculties.
	Fostering Continuous Learning Plans	13. Encourage self-reflective practices and continuous learning plans.

Table 4.8 (continued)

Category	Aspects	Strategies
WO	Fostering Continuous Learning Plans	14. Promote use of online platforms for self-directed learning. 15. Provide mentorship programs to foster continuous professional development.
ST	Staying Ahead of Technological Changes	16. Develop adaptive training programs to keep pace with technological advancements. 17. Regularly update digital tools and resources to align with new educational trends.
	Building Global Competitiveness	18. Support attendance at international conferences to stay competitive globally. 19. Establish lecturer exchange programs to enhance global academic standing.
	Enhancing Institutional Resilience Against Rapid Change	20. Develop institutional support systems to address rapid technological shifts. 21. Create contingency plans for quick adaptation to new educational technologies.
WT	Optimizing Resources to Address Funding Limitations	22. Leverage open-source tools and low-cost digital platforms for training purposes. 23. Partner with international institutions to share training resources.
	Developing Self-Directed Learning to MitigateTechnological Threats	24. Introduce self-paced learning modules to enhance digital literacy and skills. 25. Encourage lecturers to independently track the latest trends in educational technology.
	Strengthening Faculty Development Despite Budget Constraints	26. Design cost-effective faculty development programs tailored to specific institutional needs.

Step 2: Interview Content Analysis

The results provide an in-depth understanding of the strategies suggested by experts to improve sustainable professional competences. Through qualitative content analysis, the interview responses were categorized to reflect themes relevant to strategy development, including feedback on the strengths, weaknesses, opportunities, and challenges in implementing these strategies.

Table 4.9 Personal information of interviewee

Interviewee	University	Education background	Interview Date and Time
Interviewee 1	Sichuan Normal University	Professional title: Full Professor Expertise: Digital Education for Lecturers Work experience: 30 years	May 15, 2024 at 09:00 pm, GMT+8
Interviewee 2	Leshan Normal University	Post: Director of the Personnel Office Expertise: University Personnel Management Work experience: 25 years	May 15, 2024 at 10:30 pm, GMT+8

Table 4.9 (Continued)

Interviewee	University	Education background	Interview Date and Time
Interviewee 3	Yibin University	Professional title: Full Professor Expertise: Lecturer Training and Education Work experience: 30 years	May 15, 2024 at 14:30 pm, GMT+8
Interviewee 4	Neijiang Normal University	Post: Director of the Information Center Expertise: Digital Teaching Work experience: 26 years	May 16, 2024 at 9:30 pm, GMT+8
Interviewee 5	Xihua Normal University	Professional title: Full Professor Expertise: Lecturer Training and Education Work experience: 30 years	May 16, 2024 at 14:30 pm, GMT+8
Interviewee 6	Sichuan University of arts and science	Post: Dean of the School of Computer Science Expertise: Digital Competence Work experience: 27 years	May 17, 2024 at 10:30 pm, GMT+8

Table 4.9 (Continued)

Interviewee	University	Education background	Interview Date and Time
Interviewee 7	Mianyang Normal University	Professional title: Full Professor Expertise: Lecturer Training and Education Work experience: 20 years	May 17, 2024 at 14:30 pm, GMT+8
Interviewee 8	Aba Normal University	Post: Dean of the School of Computer Science Expertise: Digital Competence Work experience: 27 years	May 18, 2024 at 14:30 pm, GMT+8
Interviewee 9	Xichang University	Professional title: Full Professor Expertise: Digital Education for Lecturers Work experience: 20 years	May 19, 2024 at 14:30 pm, GMT+8
Interviewee 10	Panzhihua University	Post: Dean of the School of Computer Science Expertise: Digital Competence Work experience: 27 years	May 20, 2024 at 14:30 pm, GMT+8

The results of the interviews conducted through various formats—telephone, video, and face-to-face-with experts from ten universities are as follows:

Interviewee 1:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the digital era, university lecturers in Sichuan Province face both opportunities and challenges in maintaining sustainable professional competence in subject knowledge. A key strength is the growing awareness among lecturers of the need for continuous knowledge updates to meet evolving educational standards and digitalization demands. However, disparities in digital literacy and access to updated resources result in uneven professional competence across disciplines. Opportunities stem from governmental support and institutional initiatives aimed at enhancing digital education. Nevertheless, the rapid pace of technological advancements, which outpaces some lecturers' ability to adapt, combined with a lack of structured professional development programs tailored to individual needs, poses significant challenges.

To effectively promote the subject knowledge of university lecturers, it is essential to implement several strategies. First, lecturers should engage in regular study to update disciplinary knowledge **(Strategy 1)**. This can be facilitated through workshops and online courses that focus on recent advancements in their respective fields. Second, it is crucial for lecturers to review the latest literature pertaining to the discipline **(Strategy 3)**, which can be achieved by subscribing to academic journals and participating in professional networks. Third, utilizing online resources to enhance disciplinary knowledge **(Strategy 5)** can provide access to a wealth of information and tools that are essential for staying current. Finally, lecturers should periodically assess their level of disciplinary knowledge **(Strategy 7)** through self-evaluation and peer reviews, ensuring they remain proficient and competitive in their fields.

2.What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province in terms of teaching ability presents both advantages and challenges. The widespread integration of digital tools and platforms has enhanced the interactivity and flexibility of teaching methods, with many lecturers increasingly adopting these technologies to improve the quality of instruction. However, there are challenges in the uneven application of these tools across different disciplines and varying levels of digital literacy among lecturers, which can lead to inconsistent teaching outcomes. The growing availability of online teaching resources and professional development programs offers opportunities to further enhance lecturers' teaching abilities. Nevertheless, the rapid evolution of educational technologies and the need for continuous adaptation pose significant challenges, particularly for lecturers who may struggle to keep pace with these changes.

To effectively promote and sustain teaching ability among university lecturers, it is essential to adopt a strategic approach. One crucial strategy is to adapt teaching strategies based on student feedback **(Strategy 1)**. This involves actively seeking and analyzing feedback from students to identify areas where teaching methods can be improved. By integrating this feedback into their teaching practices, lecturers can make informed adjustments that enhance the effectiveness of their instruction. This strategy not only ensures that teaching methods remain relevant and responsive to students' needs but also fosters a more engaging and supportive learning environment. Continuous reflection and adaptation, driven by student feedback, are key to maintaining high standards of teaching in the rapidly evolving digital landscape.

3.What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province concerning digital skills reflects a dynamic and evolving landscape. There is a growing awareness among lecturers of the importance of digital skills in enhancing teaching and learning experiences, leading many to integrate digital tools and platforms into their teaching, which has resulted in more interactive and engaging classrooms. However, the level of digital proficiency varies across lecturers, with some struggling to fully utilize the available technology. This disparity can lead to inconsistent application of digital tools, affecting the overall quality of education. The availability of numerous online resources, training programs, and workshops offers lecturers ample opportunities to improve their digital competencies. Nonetheless, the rapid pace of technological change and the pressure to continuously update digital skills can be overwhelming, particularly for those with limited time or access to resources.

To effectively enhance and sustain digital skills among university lecturers, a comprehensive and proactive approach is necessary. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. This involves regularly exploring new digital tools and understanding their potential applications in teaching. Additionally, lecturers should employ digital tools to enhance teaching interactivity **(Strategy 2)**, using these tools to create more engaging and dynamic learning environments. Engaging in regular learning of digital skills **(Strategy 3)** is crucial, as it ensures that lecturers continually update their knowledge and remain proficient in using digital technologies. Furthermore, it is essential to integrate digital resources into teaching **(Strategy 4)** by incorporating various online resources and digital content to enrich the curriculum. Participation in training related to digital skills **(Strategy 5)** is also vital, as these sessions provide lecturers with the latest knowledge and practical skills needed to effectively use digital tools. Lecturers should also keep track of the latest trends in educational technology **(Strategy 6)**, ensuring they are aware of new developments that could enhance their teaching practices. Additionally, utilizing social media to facilitate learning **(Strategy 7)** can create opportunities for interactive and collaborative learning outside the traditional classroom

setting. Finally, lecturers should use online platforms to share course materials **(Strategy 8)**, making educational content more accessible to students and fostering a more connected learning environment.

4.What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, the sustainable professional competence in lifelong learning for university lecturers in Sichuan Province presents both strengths and challenges. An increasing awareness among lecturers of the need for continuous learning and professional development is evident. Many have recognized the importance of adapting to the rapid changes in education driven by technological advancements and have actively engaged in ongoing learning. However, there are challenges in the varying levels of commitment and access to resources that support sustainable learning. This disparity can result in inconsistent application of new knowledge and skills, potentially affecting the overall quality of education. There are abundant opportunities, with numerous online resources, professional development programs, and interdisciplinary learning activities available to support lecturers in their continuous learning efforts. Despite these opportunities, the fast pace of change in the educational field and the pressures of balancing teaching responsibilities with ongoing learning pose significant challenges, particularly for those with limited time or institutional support.

To effectively promote sustainable learning among university lecturers, a strategic and comprehensive approach is required. First, lecturers should have a continuous learning plan **(Strategy 1)**. This involves setting clear, long-term learning objectives that align with their professional goals and adapting these plans as needed to keep pace with changes in the field. Additionally, they should actively seek opportunities to enhance their professional skills **(Strategy 2)** by participating in workshops, conferences, and other professional development activities that provide new insights and competencies. Adapting to the rapid changes in the field of education **(Strategy 3)** is

crucial, and lecturers should remain flexible and open to new teaching methods and technologies. Utilizing online resources for self-directed learning **(Strategy 4)** is also essential, as it allows lecturers to access a vast array of information and training at their convenience. Setting regular personal and professional development goals **(Strategy 5)** helps lecturers maintain focus on their growth and ensures they are continually advancing in their careers. Finally, engaging in interdisciplinary learning activities **(Strategy 6)** can broaden lecturers' perspectives and enhance their ability to integrate knowledge from different fields into their teaching, ultimately enriching the learning experience for students.

Interviewee 2:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the digital era, university lecturers in Sichuan Province face both significant challenges and opportunities in sustaining their professional competence in subject knowledge. A growing commitment among lecturers to adapt to the digitalization of education is supported by institutional efforts to promote continuous professional development. However, there are varying levels of engagement with digital tools and resources, leading to inconsistencies in knowledge updates across different academic disciplines. The increasing availability of digital platforms offers opportunities for accessing updated knowledge and fostering collaboration. Nonetheless, the rapidly changing technological landscape poses a risk of knowledge obsolescence if lecturers do not continuously engage in professional development activities.

To enhance the subject knowledge of university lecturers, several strategies should be implemented. Firstly, lecturers should engage in regular study to update disciplinary knowledge **(Strategy 1)**, which can be achieved through structured self-learning and formal education programs. Secondly, participating in research activities relevant to the discipline **(Strategy 2)** is crucial for staying abreast of the latest developments and contributing to the academic community. Additionally, lecturers should

review the latest literature pertaining to the discipline **(Strategy 3)** to remain informed about current trends and theories. Attending academic conferences relevant to the discipline **(Strategy 4)** offers opportunities for knowledge exchange and networking. Moreover, utilizing online resources to enhance disciplinary knowledge **(Strategy 5)** provides access to a vast array of up-to-date information. Collaborating with peers to exchange ideas **(Strategy 6)** fosters intellectual growth and innovation, while periodically assessing one's level of disciplinary knowledge **(Strategy 7)** ensures ongoing competence and the ability to meet academic standards.

2.What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province regarding teaching ability presents a complex landscape. The increasing incorporation of digital tools and innovative teaching platforms has expanded the scope and flexibility of teaching methods, enabling lecturers to reach students more effectively and cater to diverse learning styles. However, challenges persist, particularly in the inconsistent application of these digital tools across various disciplines, due to varying levels of digital literacy among lecturers. This inconsistency can result in variable teaching outcomes and a lack of coherence in the educational experience. There are opportunities in the form of expanding professional development programs and resources, which provide lecturers with the chance to continuously refine their teaching abilities. Nevertheless, the rapid advancement of educational technologies and the pressure to constantly adapt pose challenges for lecturers who may struggle to keep their teaching methods up to date.

To enhance and sustain teaching ability among university lecturers, a comprehensive strategy is necessary. First, lecturers should engage in regular reflection on their teaching methods **(Strategy 1)**. This involves critically assessing their instructional techniques and identifying areas for improvement, which is crucial for continuous

professional growth. Additionally, they should utilize diverse teaching approaches **(Strategy 2)**, incorporating a variety of methods to address different learning styles and needs, thereby enriching the learning experience for students. Attending regular workshops or training sessions on teaching methodologies **(Strategy 3)** is also vital, as these sessions provide lecturers with new insights and tools that can be applied in the classroom to enhance teaching effectiveness. Lastly, lecturers should utilize teaching feedback to enhance teaching quality **(Strategy 4)**. By systematically gathering and analyzing feedback from students, lecturers can make informed adjustments to their teaching practices, ensuring that they remain responsive to student needs and maintain high standards of teaching in the digital era.

3.What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province regarding digital skills presents both opportunities and challenges. The increasing integration of digital tools in teaching has allowed lecturers to create more interactive and engaging learning experiences, with many recognizing the importance of digital literacy and incorporating various technologies into their pedagogical practices. However, disparities in digital proficiency levels among lecturers have led to inconsistent application of digital tools, potentially diminishing the overall effectiveness of teaching. Numerous online resources, training programs, and technological advancements offer ample opportunities for lecturers to enhance their digital skills. Nevertheless, the rapid pace of technological change and the continuous need for updates pose significant challenges, especially for lecturers who may lack the time or resources to keep up.

To effectively promote and sustain digital skills among university lecturers, a strategic approach is essential. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. Regularly exploring new technologies and understanding their applications can significantly enhance their teaching capabilities. Additionally, they

should employ digital tools to enhance teaching interactivity **(Strategy 2)**, utilizing these tools to create more dynamic and participatory classroom environments. It is also crucial for lecturers to engage in regular learning of digital skills **(Strategy 3)**, ensuring continuous improvement and adaptation to new technologies. Participation in training related to digital skills **(Strategy 4)** is vital, as these sessions provide practical knowledge and hands-on experience with the latest digital tools. Keeping track of the latest trends in educational technology **(Strategy 5)** will help lecturers stay informed about new developments and innovations that could benefit their teaching. Furthermore, lecturers should utilize social media to facilitate learning **(Strategy 6)**, as these platforms can provide additional opportunities for interaction and collaboration outside the classroom. Finally, using online platforms to share course materials **(Strategy 7)** can enhance accessibility and ensure that students have continuous access to learning resources.

4.What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province regarding lifelong learning exhibits both promising advancements and ongoing challenges. There is a growing recognition among lecturers of the critical need for continuous learning to stay relevant in a rapidly evolving educational landscape. Many have actively engaged in professional development and utilized online resources to expand their knowledge and skills. However, there are challenges in the inconsistent commitment to and availability of resources for sustainable learning, leading to disparities in lecturers' ability to keep pace with new developments. The vast array of online resources, interdisciplinary programs, and professional development opportunities available to lecturers presents numerous opportunities to support their ongoing learning efforts. Nonetheless, the fast-paced nature of educational change and the difficulty of balancing teaching responsibilities with continuous learning pose significant challenges, particularly for those who may lack institutional support or sufficient time.

To effectively promote sustainable learning among university lecturers, a well-rounded and proactive approach is essential. First, lecturers should have a continuous learning plan **(Strategy 1)**, which involves setting clear, long-term goals that align with their career aspirations and adapting these goals as needed to keep up with changes in the field. They should also actively seek opportunities to enhance their professional skills **(Strategy 2)** by participating in workshops, conferences, and other development activities that provide new knowledge and competencies. Additionally, it is crucial for lecturers to adapt to rapid changes in the field of education **(Strategy 3)**, which requires flexibility and openness to new teaching methods and technologies. Utilizing online resources for self-directed learning **(Strategy 4)** allows lecturers to access a wide range of information and training materials at their convenience, making continuous learning more manageable. Setting regular personal and professional development goals **(Strategy 5)** helps maintain a clear focus on growth, ensuring lecturers are consistently advancing in their careers. Finally, engaging in interdisciplinary learning activities **(Strategy 6)** can broaden their perspectives and enable them to integrate knowledge from various fields into their teaching, thereby enriching the educational experience for students.

Interviewee 3:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the digital era, university lecturers in Sichuan Province are navigating a complex landscape in sustaining their professional competence in subject knowledge. A notable strength is the increasing integration of digital tools in the academic environment, providing lecturers with more accessible means to update and expand their knowledge. Additionally, the emphasis on continuous professional development by institutions supports lecturers' efforts to stay current in their fields. However, significant challenges persist, particularly the uneven distribution of digital resources and varying levels of digital literacy among lecturers, which can hinder consistent knowledge updates across disciplines. Opportunities

arise from the growing availability of online educational resources and platforms that facilitate self-directed learning and collaboration. Nonetheless, these opportunities are counterbalanced by the rapid pace of technological change and the pressures to constantly adapt, which may overwhelm some lecturers and lead to gaps in their subject knowledge.

To effectively promote subject knowledge among university lecturers, a multifaceted approach is necessary. First, lecturers should engage in regular study to update disciplinary knowledge **(Strategy 1)**, which could involve structured learning programs and ongoing education tailored to the latest developments in their fields. Participating in research activities relevant to the discipline **(Strategy 2)** is also essential, as active involvement in research not only contributes to the academic community but also ensures that lecturers stay at the forefront of their subject areas. Furthermore, it is important to review the latest literature pertaining to the discipline **(Strategy 3)**, which can be achieved through subscriptions to academic journals and active participation in academic networks. Attending academic conferences relevant to the discipline **(Strategy 4)** provides valuable opportunities for knowledge exchange and professional networking, which are crucial for staying updated. Additionally, utilizing online resources to enhance disciplinary knowledge **(Strategy 5)** is vital in the digital era, where vast amounts of information are readily accessible. Engaging in peer discussions to exchange ideas with peers **(Strategy 6)** encourages intellectual growth and the sharing of innovative practices. Finally, lecturers should periodically assess their level of disciplinary knowledge **(Strategy 7)** to ensure they meet the evolving standards of their disciplines and can effectively contribute to the academic community.

2.What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province concerning teaching ability is characterized by a blend of strengths and

challenges. The growing incorporation of digital tools and platforms has enriched the teaching process, allowing lecturers to deliver content in more interactive and engaging ways. However, there are challenges in the uneven adoption of these tools, with some lecturers struggling to effectively integrate digital technologies into their teaching practices. This inconsistency can hinder the overall learning experience for students. The increasing availability of professional development resources, including workshops and online training sessions focused on modern teaching methodologies, presents valuable opportunities for lecturers. Nonetheless, the fast-paced nature of technological advancements and the pressure to continuously update teaching methods create significant challenges, particularly for lecturers who may lack adequate time or resources to adapt quickly.

To effectively enhance and sustain teaching ability, university lecturers should adopt a multi-pronged approach. Firstly, they should utilize diverse teaching approaches **(Strategy 1)**. By incorporating a variety of instructional methods, lecturers can cater to different learning styles, thereby improving student engagement and understanding. Secondly, it is crucial to adapt teaching strategies based on student feedback **(Strategy 2)**. Regularly seeking and analyzing student feedback allows lecturers to refine their teaching practices, ensuring that they remain responsive to student needs and preferences. Additionally, lecturers should attend regular workshops or training sessions on teaching methodologies **(Strategy 3)**. These sessions provide valuable insights into new teaching strategies and tools, helping lecturers stay current in their instructional practices. Finally, lecturers must utilize teaching feedback to enhance teaching quality **(Strategy 4)**. By systematically incorporating feedback into their teaching, lecturers can continuously improve the effectiveness of their instruction, ensuring that they meet the evolving demands of the digital era.

3.What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, university lecturers in Sichuan Province face a rapidly evolving landscape concerning sustainable professional competence in digital skills. The growing recognition of the necessity for digital literacy has led to increased efforts to incorporate digital tools into teaching, resulting in more interactive and engaging learning environments that enhance student participation. However, uneven levels of digital competence among lecturers can lead to inconsistent quality in the use of technology in education, with some lecturers struggling to effectively integrate digital resources into their teaching practices. The wide range of training programs and online resources available to improve digital skills offers abundant opportunities for lecturers to continuously update their competencies. Nonetheless, the fast-paced advancements in technology and the pressure to continuously adapt can overwhelm lecturers, particularly those with limited time or access to resources.

To effectively promote and sustain digital skills among university lecturers, a strategic and multifaceted approach is necessary. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**, ensuring they are aware of and familiar with the newest digital tools that can enhance their teaching practices. Additionally, they should employ digital tools to enhance teaching interactivity **(Strategy 2)**, using these tools to create more engaging and participatory classroom experiences. It is also crucial for lecturers to engage in regular learning of digital skills **(Strategy 3)**, which involves continuously updating their knowledge and abilities in using digital technologies. Moreover, lecturers should integrate digital resources into teaching **(Strategy 4)**, effectively incorporating a variety of digital content to enrich their instructional methods. Participation in training related to digital skills **(Strategy 5)** is vital, as it provides hands-on experience and practical knowledge necessary for mastering new technologies. Finally, lecturers should use online platforms to share course materials **(Strategy 6)**, which facilitates easier access for students and ensures that learning resources are readily available, thereby supporting a more connected and flexible learning environment.

4.What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province concerning sustainable learning reflects a combination of strengths, weaknesses, opportunities, and challenges. An increasing awareness among lecturers of the importance of ongoing professional development is a significant strength. Many lecturers have recognized that continuous learning is essential for maintaining relevance in a rapidly evolving educational environment, leading to more active engagement in self-directed learning and professional growth. However, there are weaknesses in the inconsistent implementation of continuous learning practices, often due to varying levels of access to resources and support systems, which can hinder the overall effectiveness of sustainable learning efforts. The wide availability of online resources, professional development programs, and interdisciplinary learning opportunities presents significant opportunities to support lecturers in their continuous learning journeys. Despite these opportunities, the fast pace of technological and pedagogical change, coupled with the pressures of balancing teaching responsibilities with the demands of ongoing learning, poses substantial challenges.

To enhance and sustain the professional competence of university lecturers, a strategic approach is necessary. First, lecturers should have a continuous learning plan **(Strategy 1)**, which involves setting clear, long-term objectives that align with their career goals and adjusting these plans as the educational landscape evolves. Additionally, it is crucial for lecturers to seek opportunities to enhance their professional skills **(Strategy 2)** by actively participating in workshops, conferences, and other professional development activities that provide new insights and skills. Adapting to rapid changes in the field of education **(Strategy 3)** is essential, and lecturers should remain flexible and open to adopting new methodologies and technologies as they emerge. Utilizing online resources for self-directed learning **(Strategy 4)** offers a convenient way for lecturers to access a vast

array of information and training materials, making continuous learning more feasible. Setting regular personal and professional development goals **(Strategy 5)** ensures that lecturers remain focused on their growth and progress in their careers. Finally, engaging in interdisciplinary learning activities **(Strategy 6)** allows lecturers to broaden their perspectives and integrate knowledge from various disciplines into their teaching, thereby enriching the educational experience for their students.

Interviewee 4:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the context of Sichuan Province, the sustainable professional competence of university lecturers in subject knowledge during the digital era presents a complex landscape. A key strength is the increasing institutional focus on continuous professional development, driven by the growing recognition of the need to adapt to digital advancements. This emphasis has improved access to digital resources and training programs. However, challenges remain, particularly in the form of disparities in digital proficiency among lecturers, leading to inconsistent use of digital tools across disciplines. Opportunities exist in the expanding availability of online educational platforms and digital tools that support self-paced learning and professional development. Nevertheless, the rapid pace of technological change and the pressure to keep up with evolving digital trends pose significant challenges, especially for lecturers who may struggle to effectively integrate new technologies into their subject knowledge.

Promoting sustainable professional competence in subject knowledge among university lecturers requires a comprehensive strategy. First, lecturers should engage in regular study to update disciplinary knowledge **(Strategy 1)**, ensuring that they remain current with the latest developments in their field by setting aside dedicated time for learning. Additionally, they should participate in research activities relevant to the discipline **(Strategy 2)**, which not only contributes to advancing their field but also reinforces their

expertise and understanding of the subject matter. Lecturers should also review the latest literature pertaining to the discipline **(Strategy 3)** to stay informed about new theories, methodologies, and trends, which is essential for maintaining their subject knowledge. Moreover, utilizing online resources to enhance disciplinary knowledge **(Strategy 5)** is crucial in the digital era, where access to a wide array of academic databases and educational resources can significantly bolster their understanding and teaching practices. Lastly, lecturers should periodically assess their level of disciplinary knowledge **(Strategy 7)** through self-reflection and peer evaluation, which will help them identify areas for improvement and ensure they maintain a high standard of competence.

2.What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, university lecturers in Sichuan Province are experiencing a transformative shift in their teaching abilities, characterized by a mix of strengths and challenges. The increased adoption of digital tools and platforms has enabled more dynamic and flexible teaching methods, allowing lecturers to better engage students and adapt to diverse learning needs. However, the inconsistent use of these technologies is a notable challenge, as not all lecturers possess the same level of digital proficiency or access to resources. This disparity can lead to uneven teaching quality across different departments. Opportunities exist in expanding access to professional development programs that focus on digital pedagogy and innovative teaching strategies. Nonetheless, the rapid pace of technological advancements and the ongoing pressure to continuously improve can create stress and challenges for lecturers who may struggle to keep their teaching methods current.

To effectively enhance and sustain teaching ability, university lecturers should employ a multifaceted strategy. First, they should engage in regular reflection on their teaching methods **(Strategy 1)**. This involves critically assessing their instructional techniques and identifying areas for improvement, ensuring that their teaching remains

effective and responsive to student needs. Additionally, lecturers should attend regular workshops or training sessions on teaching methodologies **(Strategy 2)**. These workshops provide valuable opportunities to learn about the latest teaching strategies and tools, helping lecturers to stay updated and enhance their instructional practices. Finally, it is essential to utilize teaching feedback to enhance teaching quality **(Strategy 3)**. By systematically gathering and incorporating student feedback, lecturers can make targeted adjustments to their teaching methods, thereby improving the overall learning experience and ensuring that they meet the demands of the digital era.

3.What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province regarding digital skills reflects both progress and challenges. There is a growing awareness among lecturers of the importance of digital proficiency, leading to a gradual adoption of digital tools in teaching, which has enhanced the interactivity and effectiveness of educational delivery. However, the varying levels of digital skills among lecturers result in inconsistent application of technology across different disciplines, affecting the overall quality of education. The extensive availability of training programs, workshops, and online resources presents opportunities for lecturers to continuously upgrade their competencies. Nonetheless, the rapid pace of technological advancements and the ongoing demand for adaptation pose significant challenges, particularly for lecturers who may lack the time or resources to stay updated.

To effectively promote and sustain digital skills among university lecturers, a comprehensive approach is required. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. This involves regularly updating their knowledge of emerging technologies and exploring how these tools can be integrated into their teaching practices. Additionally, they should employ digital tools to enhance teaching interactivity **(Strategy 2)**, using these tools to create more engaging and dynamic learning

environments that foster active student participation. It is also crucial for lecturers to engage in regular learning of digital skills **(Strategy 3)**, ensuring they continuously improve their digital competencies through self-directed learning and formal training. Participation in training related to digital skills **(Strategy 4)** is essential, as these programs provide practical insights and hands-on experience with the latest technologies. Lecturers should also keep track of the latest trends in educational technology **(Strategy 5)** to stay informed about innovations that can enhance their teaching. Additionally, utilizing social media to facilitate learning **(Strategy 6)** can extend the classroom experience beyond traditional settings, enabling more interactive and collaborative learning opportunities. Finally, lecturers should use online platforms to share course materials **(Strategy 7)**, ensuring that students have easy access to learning resources, thus supporting a more connected and flexible educational environment.

4.What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, university lecturers in Sichuan Province demonstrate varying levels of sustainable professional competence in lifelong learning. There is a growing recognition of the need for ongoing professional development, with many lecturers actively engaging in self-directed learning and professional enhancement, spurred by the rapid changes in the educational landscape. However, the inconsistent application of these practices, often due to differences in access to resources and institutional support, can hinder the overall effectiveness and sustainability of learning efforts. The availability of online resources and interdisciplinary learning opportunities offers abundant tools for lecturers to enhance their professional skills. Nonetheless, the fast-paced nature of technological and educational changes, combined with the challenges of balancing teaching responsibilities with continuous learning, presents significant obstacles to sustaining effective learning practices.

To effectively promote sustainable learning among university lecturers, a strategic and comprehensive approach is essential. First, lecturers should have a continuous learning plan **(Strategy 1)**. This involves setting clear, long-term objectives for their professional development and regularly updating these plans to reflect changes in the educational landscape. Additionally, lecturers should actively seek opportunities to enhance their professional skills **(Strategy 2)** by participating in workshops, conferences, and other professional development activities that offer new knowledge and skills. Utilizing online resources for self-directed learning **(Strategy 3)** is crucial, as it provides lecturers with flexible access to a wide range of information and training materials that support ongoing learning. Finally, engaging in interdisciplinary learning activities **(Strategy 4)** allows lecturers to broaden their perspectives and integrate knowledge from different fields into their teaching practices, ultimately enriching the educational experience for their students.

Interviewee 5:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In Sichuan Province, the sustainable professional competence of university lecturers in subject knowledge during the digital era is influenced by a combination of supportive and challenging factors. Universities have proactively integrated digital tools and resources into academic environments, enhancing access to up-to-date knowledge and facilitating continuous learning. However, there are weaknesses in the uneven adaptation of these digital resources across different faculties, leading to discrepancies in knowledge updates and the application of digital tools. The growing availability of online platforms and academic networks offers opportunities for collaboration and knowledge sharing among lecturers. Nonetheless, challenges remain, particularly as technological advancements outpace some lecturers' abilities to stay current, posing a risk of their subject knowledge becoming outdated if not actively managed.

To effectively promote and sustain subject knowledge among university lecturers, several strategic actions are necessary. First, lecturers should review the latest literature pertaining to the discipline **(Strategy 1)**. This ensures that they are aware of current trends, research findings, and emerging theories, which is essential for maintaining a robust understanding of their field. Second, it is crucial to attend academic conferences relevant to the discipline **(Strategy 2)**. Conferences provide a platform for learning about the latest research, networking with peers, and gaining insights from leading experts, all of which contribute to deepening subject knowledge. Additionally, lecturers should exchange ideas with peers to advance disciplinary knowledge **(Strategy 3)**. Peer collaboration fosters intellectual exchange and innovation, which are vital for staying at the forefront of their disciplines. Lastly, lecturers must periodically assess their level of disciplinary knowledge **(Strategy 4)** through self-evaluation and peer reviews, allowing them to identify knowledge gaps and areas for improvement, ensuring they remain effective educators in the rapidly evolving digital landscape.

2.What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, university lecturers in Sichuan Province face a dynamic landscape in maintaining sustainable professional competence in teaching ability. The growing integration of digital tools and innovative teaching strategies has enhanced the flexibility and effectiveness of teaching, with many lecturers successfully incorporating these tools to engage students and accommodate various learning styles. However, challenges persist, particularly in the uneven adoption of these digital tools and the varying levels of comfort and proficiency among lecturers, leading to disparities in the quality of education across different disciplines. The availability of diverse online resources and professional development programs focused on modern teaching methodologies presents abundant opportunities for lecturers to refine their teaching practices. Nonetheless, the rapid pace of technological advancements and the continuous need for adaptation can

overwhelm lecturers, potentially hindering their ability to maintain effective teaching practices.

To effectively enhance and sustain teaching ability, lecturers should adopt a strategic approach. First, they should engage in regular reflection on their teaching methods **(Strategy 1)**. This involves continuously evaluating and refining their instructional techniques to ensure they meet the evolving needs of students. Additionally, lecturers should utilize diverse teaching approaches **(Strategy 2)**, incorporating a variety of instructional methods to address different learning styles and enhance student engagement. It is also essential to adapt teaching strategies based on student feedback **(Strategy 3)**. By actively seeking and incorporating feedback from students, lecturers can make informed adjustments to their teaching practices, ensuring that they remain effective and relevant. Finally, lecturers should utilize teaching feedback to enhance teaching quality **(Strategy 4)**. This involves systematically using student feedback to identify areas for improvement and make targeted changes that improve the overall learning experience.

3.What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province regarding digital skills presents both opportunities and challenges. The growing recognition of the importance of digital proficiency in enhancing teaching effectiveness has led many lecturers to incorporate digital tools and resources into their teaching practices, resulting in more dynamic and interactive learning environments. However, the uneven levels of digital literacy among lecturers can lead to inconsistencies in the application of technology across different courses and faculties, affecting the overall quality of education. The availability of numerous online resources, training programs, and workshops provides ample opportunities for lecturers to continuously enhance their digital skills. Nonetheless, the rapid pace of technological advancements and the pressure to

keep up with these changes can overwhelm lecturers, especially those who may lack the time or resources to stay current.

To effectively promote and sustain digital skills among university lecturers, a strategic and proactive approach is essential. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. This requires them to actively explore and familiarize themselves with emerging technologies that can enhance their teaching practices. Additionally, they should employ digital tools to enhance teaching interactivity **(Strategy 2)**, using these tools to create more engaging and participatory classroom experiences. It is also important for lecturers to engage in regular learning of digital skills **(Strategy 3)**, ensuring they continuously update their competencies in using digital tools through both self-study and formal training. Furthermore, they should integrate digital resources into teaching **(Strategy 4)**, effectively incorporating digital content and tools into their curricula to enrich the educational experience. Keeping track of the latest trends in educational technology **(Strategy 5)** will help lecturers stay informed about new developments and innovations that could benefit their teaching. Finally, lecturers should utilize social media to facilitate learning **(Strategy 6)**, leveraging these platforms to extend learning beyond the traditional classroom and foster a more collaborative and interactive learning environment.

4.What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, the sustainable professional competence in lifelong learning for university lecturers in Sichuan Province presents a multifaceted picture of strengths, weaknesses, opportunities, and challenges. A key strength is the growing awareness among lecturers of the necessity for continuous learning, with many proactively engaging in professional development to adapt to the rapid changes in the educational landscape brought about by technological advancements. However, there are weaknesses in the uneven commitment to and implementation of sustainable learning practices across

different institutions, leading to disparities in the professional growth of lecturers. Opportunities are abundant, particularly with the wide availability of online resources and platforms that support self-directed learning, as well as various professional development programs accessible remotely. Nonetheless, the relentless pace of change in educational technology and the pressures of balancing teaching responsibilities with continuous professional development pose significant challenges, especially for lecturers with limited institutional support.

To effectively promote sustainable learning among university lecturers, a structured and proactive approach is essential. First, lecturers should have a continuous learning plan **(Strategy 1)**, which involves setting clear, long-term goals for their professional development and regularly updating these plans to keep pace with changes in the field of education. Additionally, lecturers should actively seek opportunities to enhance their professional skills **(Strategy 2)**, by participating in workshops, seminars, and conferences that provide new insights and techniques relevant to their teaching fields. It is also crucial to adapt to rapid changes in the field of education **(Strategy 3)**, which requires flexibility and a willingness to incorporate new methodologies and technologies into their teaching practices. Utilizing online resources for self-directed learning **(Strategy 4)** is another vital strategy, as it allows lecturers to access a vast array of educational materials and training modules that can be tailored to their individual needs and schedules. Finally, setting regular personal and professional development goals **(Strategy 5)** ensures that lecturers remain focused on their continuous growth, helping them to track their progress and make adjustments as necessary to achieve their professional objectives.

Interviewee 6:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the digital era, university lecturers in Sichuan Province face a dynamic environment that significantly impacts their sustainable professional competence in

subject knowledge. A solid institutional framework supports professional development, offering lecturers access to a variety of digital tools and resources designed to enhance their knowledge base. However, disparities in the adoption of these tools persist, with some lecturers struggling to effectively integrate digital resources into their teaching and research practices. The growing availability of digital platforms and online communities offers abundant opportunities for continuous learning and professional growth. Nonetheless, the rapid pace of technological advancements and the increasing complexity of subject knowledge demand continuous adaptation, posing a challenge for lecturers who may lack the time or resources to keep up with these changes.

To effectively promote and sustain subject knowledge among university lecturers, a multifaceted strategy is essential. First, lecturers should engage in regular study to update disciplinary knowledge **(Strategy 1)**. This can be facilitated through dedicated time for professional reading and enrollment in relevant courses that align with the latest developments in their field. Second, they should participate in research activities relevant to the discipline **(Strategy 2)**, which not only keeps them at the forefront of their academic domain but also contributes to the advancement of their discipline. Additionally, it is crucial for lecturers to review the latest literature pertaining to the discipline **(Strategy 3)**, ensuring they remain informed about new theories, methodologies, and findings. Attending academic conferences relevant to the discipline **(Strategy 4)** provides an invaluable opportunity to learn from leading experts, exchange ideas, and gain fresh perspectives on emerging trends. Moreover, utilizing online resources to enhance disciplinary knowledge **(Strategy 5)** is vital in this digital era, as it offers access to a vast array of information and tools that can support teaching and research. Engaging in discussions to exchange ideas with peers **(Strategy 6)** further enhances knowledge sharing and collaboration, which are crucial for intellectual growth. Finally, lecturers should periodically assess their level of disciplinary knowledge **(Strategy 7)** to ensure they are meeting the required academic standards and can effectively contribute to their field.

2.What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province reflects a complex interplay of strengths and challenges. The increasing adoption of digital tools and resources has expanded the range of teaching methodologies available to lecturers, allowing for more interactive and flexible approaches that better meet the diverse needs of students. However, uneven proficiency among lecturers in utilizing these digital tools has led to disparities in the quality of instruction across different disciplines. There are abundant opportunities, particularly through professional development programs and training workshops, which can help lecturers enhance their teaching skills. Nonetheless, the fast pace of technological advancements and the constant pressure to adapt pose significant challenges, especially for lecturers who may not have the time or resources to continuously update their teaching practices.

To effectively enhance and sustain teaching ability, a comprehensive approach is essential. First, lecturers should engage in regular reflection on their teaching methods **(Strategy 1)**. This reflective practice enables lecturers to critically assess their instructional techniques and identify areas for improvement, ensuring their teaching remains effective and responsive to student needs. Additionally, they should utilize diverse teaching approaches **(Strategy 2)**, employing a variety of instructional methods to cater to different learning styles and enhance student engagement. It is also crucial to adapt teaching strategies based on student feedback **(Strategy 3)**. By actively incorporating feedback from students, lecturers can make informed adjustments that enhance the relevance and effectiveness of their teaching. Attending regular workshops or training sessions on teaching methodologies **(Strategy 4)** is vital for staying updated with the latest pedagogical strategies and tools. Lastly, lecturers should consistently utilize teaching feedback to enhance teaching quality **(Strategy 5)**, using it as a key resource to make targeted improvements and maintain high standards in their instructional practices.

3.What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province in digital skills reveals a blend of strengths and challenges. A growing acknowledgment of the critical role digital skills play in enhancing the quality of teaching and learning has led many lecturers to integrate digital tools into their teaching practices, improving the interactivity and accessibility of their courses. However, there are weaknesses in the uneven distribution of digital proficiency among lecturers, resulting in inconsistencies in technology use and varied educational experiences for students. Opportunities are plentiful, with a wide range of training programs, online resources, and workshops available to help lecturers develop and refine their digital skills. Despite these opportunities, the fast-paced evolution of educational technology and the constant pressure to adapt to new tools can be daunting for lecturers, especially those who may struggle with the time or resources necessary to stay current.

To effectively promote and sustain digital skills among university lecturers, a strategic approach is necessary. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. This involves regularly updating their knowledge of new and emerging technologies that can be applied to their teaching practices. Additionally, it is essential for lecturers to integrate digital resources into teaching **(Strategy 2)**. This means effectively incorporating digital content, tools, and platforms into their curricula to enhance the overall learning experience. Participation in training related to digital skills **(Strategy 3)** is crucial, as it provides lecturers with hands-on experience and up-to-date knowledge, ensuring they can competently use new technologies. Moreover, lecturers should keep track of the latest trends in educational technology **(Strategy 4)** to remain informed about innovations that could further benefit their teaching methods. Finally, utilizing online platforms to share course materials **(Strategy 5)** can significantly improve accessibility for

students, making learning materials available anytime and anywhere, which supports a more flexible and connected learning environment.

4.What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, the sustainable professional competence in lifelong learning for university lecturers in Sichuan Province reflects a combination of strengths and challenges. A heightened awareness among lecturers of the importance of continuous professional development and adaptability is a key strength, as many have recognized the need to evolve with technological advancements and are actively seeking ways to enhance their skills. However, weaknesses are evident in the inconsistent implementation of sustainable learning practices, with some lecturers lacking access to the necessary resources and institutional support to fully engage in ongoing professional development. There are ample opportunities, particularly with the availability of diverse interdisciplinary learning activities and the potential for collaboration across different fields. Nonetheless, the fast-paced evolution of educational technologies and the pressure to balance teaching responsibilities with continuous learning pose significant obstacles, especially for lecturers who may struggle to keep up with these demands.

To effectively promote sustainable learning among university lecturers, a strategic and focused approach is essential. First, lecturers should seek opportunities to enhance their professional skills **(Strategy 1)**. This can be achieved by actively participating in workshops, conferences, and other professional development activities that provide new knowledge and insights. Additionally, it is crucial for lecturers to adapt to rapid changes in the field of education **(Strategy 2)**. This requires a flexible mindset and a willingness to incorporate new teaching methodologies and technologies as they emerge. Setting regular personal and professional development goals **(Strategy 3)** is also vital, as it helps lecturers maintain a clear focus on their growth and ensures they are continually advancing in their careers. Finally, engaging in interdisciplinary learning activities **(Strategy 4)** allows lecturers

to broaden their perspectives, integrate knowledge from various fields, and apply these insights to their teaching practices, thereby enriching the educational experience for their students.

Interviewee 7:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province is shaped by a blend of favorable conditions and persistent challenges. The increasing recognition of the necessity for continuous professional development is a key strength, supported by institutional initiatives that provide access to digital resources and training opportunities. However, weaknesses are evident in the uneven levels of digital literacy among lecturers, leading to variable integration of technology into academic practices across different disciplines. Opportunities arise from the widespread availability of online educational platforms and collaborative networks, which can facilitate continuous learning and professional growth. Despite these advantages, the rapid pace of technological advancements and the pressure to stay current pose significant threats. These challenges can overwhelm some lecturers and create gaps in their subject knowledge if they do not actively engage in ongoing professional development.

To effectively promote and maintain subject knowledge among university lecturers, a strategic and multifaceted approach is necessary. Firstly, lecturers should consistently engage in regular study to update disciplinary knowledge **(Strategy 1)**, dedicating time to explore new developments in their field through structured learning and self-study. Additionally, they should participate in research activities relevant to the discipline **(Strategy 2)**, as active involvement in research not only contributes to their field but also reinforces their expertise and keeps them updated with the latest advancements. Reviewing the latest literature pertaining to the discipline **(Strategy 3)** is also essential, ensuring that lecturers stay informed about cutting-edge theories and methodologies.

Attending academic conferences relevant to the discipline **(Strategy 4)** is another crucial strategy, as it offers opportunities for knowledge exchange, networking, and gaining fresh perspectives. Moreover, utilizing online resources to enhance disciplinary knowledge **(Strategy 5)** is indispensable in the digital age, providing access to a wealth of information and tools that can be leveraged to improve teaching and research. Finally, lecturers should actively exchange ideas with peers to advance disciplinary knowledge **(Strategy 6)**, fostering a collaborative environment that encourages the sharing of insights and innovative practices.

2.What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, university lecturers in Sichuan Province face a rapidly evolving educational landscape that impacts their sustainable professional competence in teaching ability. The widespread adoption of digital tools and platforms has significantly enhanced the capacity for diverse and innovative teaching methods, allowing lecturers to create more engaging and interactive learning environments. However, challenges arise from the inconsistent application of these tools across different faculties, often due to varying levels of digital literacy and access to resources. The increasing availability of online professional development programs and workshops presents numerous opportunities for training in modern teaching methodologies. Nonetheless, the continuous pressure to stay updated with the latest technological advancements and the need for ongoing adaptation pose significant challenges for lecturers striving to maintain high teaching standards.

To effectively promote and sustain teaching ability, lecturers should adopt a holistic and proactive approach. First, they should engage in regular reflection on their teaching methods **(Strategy 1)**, critically evaluating their instructional strategies to identify areas for enhancement and ensure alignment with current educational standards. Additionally, lecturers should utilize diverse teaching approaches **(Strategy 2)** to cater to different learning styles, thereby enriching the educational experience and improving

student engagement. It is also crucial to adapt teaching strategies based on student feedback **(Strategy 3)**. By actively seeking and incorporating feedback, lecturers can make data-driven adjustments that enhance the effectiveness of their teaching. Furthermore, attending regular workshops or training sessions on teaching methodologies **(Strategy 4)** is essential for staying informed about the latest educational practices and tools. Finally, lecturers should utilize teaching feedback to enhance teaching quality **(Strategy 5)**, using it as a continuous improvement tool to refine their teaching practices and maintain high levels of student satisfaction and learning outcomes.

3.What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province regarding digital skills reflects a mixture of progress and ongoing challenges. The increasing incorporation of digital tools in educational practices has significantly enhanced teaching interactivity and engagement. Many lecturers have recognized the importance of digital proficiency and have made strides in adopting various technologies to improve the learning experience. However, weaknesses persist, particularly in the uneven distribution of digital skills among lecturers, leading to disparities in the effective use of these tools. This inconsistency can affect the overall quality of education delivered. Opportunities are abundant with the availability of continuous training programs, online resources, and workshops designed to help lecturers develop their digital competencies. Despite these opportunities, the rapid pace of technological advancements and the constant pressure to keep up with these changes pose significant challenges, especially for those who may lack the time or resources to stay updated.

To effectively enhance and sustain digital skills among university lecturers, a comprehensive and proactive approach is required. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. This involves continuously exploring and familiarizing themselves with new technological tools that can enhance their teaching

practices. Additionally, lecturers should employ digital tools to enhance teaching interactivity **(Strategy 2)**, using these tools to create more engaging and participatory learning environments. It is also essential for lecturers to engage in regular learning of digital skills **(Strategy 3)**, ensuring they remain current and competent in utilizing the latest digital technologies. Moreover, lecturers should integrate digital resources into teaching **(Strategy 4)**, effectively using various digital platforms and resources to enrich their instructional methods. Participation in training related to digital skills **(Strategy 5)** is crucial, as it provides the necessary hands-on experience and knowledge to stay proficient in the latest digital tools. Furthermore, lecturers should keep track of the latest trends in educational technology **(Strategy 6)**, staying informed about new developments that could benefit their teaching. Finally, utilizing social media to facilitate learning **(Strategy 7)** and using online platforms to share course materials **(Strategy 8)** can enhance accessibility and interaction, creating a more connected and flexible learning environment for students.

4.What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province regarding digital skills reflects a mixture of progress and ongoing challenges. The increasing incorporation of digital tools in educational practices has significantly enhanced teaching interactivity and engagement. Many lecturers have recognized the importance of digital proficiency and have made strides in adopting various technologies to improve the learning experience. However, weaknesses persist, particularly in the uneven distribution of digital skills among lecturers, leading to disparities in the effective use of these tools. This inconsistency can affect the overall quality of education delivered. Opportunities are abundant with the availability of continuous training programs, online resources, and workshops designed to help lecturers develop their digital competencies. Despite these opportunities, the rapid pace of technological advancements

and the constant pressure to keep up with these changes pose significant challenges, especially for those who may lack the time or resources to stay updated.

To effectively promote sustainable learning among university lecturers, a strategic and individualized approach is essential. First, lecturers should have a continuous learning plan **(Strategy 1)**, which involves setting clear, long-term goals for their professional development and regularly revisiting and adjusting these goals to align with new educational trends and challenges. Additionally, it is crucial for lecturers to actively seek opportunities to enhance their professional skills **(Strategy 2)** by engaging in professional development activities such as workshops, seminars, and conferences that offer new insights and methodologies. Utilizing online resources for self-directed learning **(Strategy 3)** is also key, as it allows lecturers to access a wide array of learning materials at their convenience, thereby supporting their ongoing development. Finally, engaging in interdisciplinary learning activities **(Strategy 4)** enables lecturers to broaden their perspectives by integrating knowledge from various fields into their teaching, which can enrich the educational experience for their students and foster a more holistic approach to learning.

Interviewee 8:

What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province reflects both positive developments and ongoing challenges. Institutional support for continuous professional development, including access to digital resources and training aimed at enhancing subject knowledge, is a significant strength. Many lecturers have embraced these opportunities, recognizing the importance of staying current in their fields. However, significant weaknesses remain, particularly in the uneven distribution of technological resources and digital literacy among lecturers. This leads to varying levels of engagement with new technologies and pedagogical approaches across

different disciplines. Opportunities are abundant, especially with the proliferation of online platforms and academic networks that offer extensive resources for learning and collaboration. Nonetheless, these opportunities are tempered by threats such as the rapid pace of technological change, which can lead to obsolescence in subject knowledge if lecturers do not engage in continuous learning and adaptation.

To effectively enhance and sustain subject knowledge among university lecturers, a strategic approach is essential. First, lecturers should engage in regular study to update disciplinary knowledge **(Strategy 1)**. This can be achieved by dedicating specific time for reading the latest research, engaging with academic publications, and pursuing relevant coursework that aligns with new developments in their field. Moreover, they should participate in research activities relevant to the discipline **(Strategy 2)**. Active engagement in research not only contributes to the body of knowledge within the discipline but also ensures that lecturers remain at the cutting edge of their field. It is also critical to review the latest literature pertaining to the discipline **(Strategy 3)**, enabling lecturers to stay informed about emerging trends, theories, and methodologies. Attending academic conferences relevant to the discipline **(Strategy 4)** offers further opportunities for knowledge exchange, networking, and exposure to the latest research. Finally, lecturers should periodically assess their level of disciplinary knowledge **(Strategy 7)** through self-reflection, peer evaluations, and formal assessments, ensuring they remain competitive and effective in their teaching and research roles.

What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, university lecturers in Sichuan Province face a diverse range of challenges and opportunities in maintaining sustainable professional competence in teaching ability. The growing integration of digital tools has enhanced teaching flexibility and interactivity, allowing lecturers to cater to diverse learning styles and improve student engagement. However, the uneven adoption and application of these technologies reveal

weaknesses, as some lecturers lack the necessary skills or resources to fully utilize them, leading to disparities in teaching quality across disciplines. Opportunities are abundant, particularly with the availability of workshops and online training sessions that equip lecturers with the latest teaching methodologies and technological skills. Nevertheless, the rapid pace of technological change and the constant demand for adaptation pose threats, creating stress and potentially hindering the consistent improvement of teaching practices.

To effectively enhance and sustain teaching ability, lecturers should implement a strategic approach focused on continuous improvement. First, lecturers should engage in regular reflection on their teaching methods **(Strategy 1)**. This practice allows for critical self-assessment and identification of areas for improvement, ensuring that teaching methods remain relevant and effective. Moreover, it is essential to adapt teaching strategies based on student feedback **(Strategy 2)**. By actively seeking and incorporating feedback, lecturers can make informed adjustments that enhance the learning experience. Attending regular workshops or training sessions on teaching methodologies **(Strategy 3)** is also crucial for staying updated with the latest educational practices and innovations. Finally, lecturers should utilize teaching feedback to enhance teaching quality **(Strategy 4)**, using it as a key resource to refine their instructional techniques and maintain high standards in their teaching.

What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province in digital skills reveals a landscape characterized by both progress and ongoing challenges. The growing adoption of digital tools and resources in teaching practices has enhanced student interactivity and engagement, with many lecturers recognizing the importance of digital proficiency in improving the overall quality of education and making efforts to incorporate these technologies into their teaching. However, weaknesses persist, particularly in the uneven distribution of digital skills among

lecturers, leading to varied application of technology and hindering the uniformity of educational quality across different disciplines. Opportunities are plentiful, especially with the availability of continuous professional development programs, workshops, and online resources that enable lecturers to enhance their digital competencies. Nonetheless, the rapid pace of technological advancements and the pressure to continuously update digital skills pose significant challenges, particularly for lecturers with limited time or resources.

To effectively promote and sustain digital skills among university lecturers, a strategic approach is essential. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. This involves keeping up with emerging technologies and understanding how they can be applied effectively in teaching. Additionally, lecturers should employ digital tools to enhance teaching interactivity **(Strategy 2)**, utilizing these tools to create more dynamic and engaging learning environments. Engaging in regular learning of digital skills **(Strategy 3)** is also crucial, ensuring that lecturers continually update their competencies to remain proficient in using digital technologies. Furthermore, they should integrate digital resources into teaching **(Strategy 4)**, incorporating a variety of digital content and tools to enrich the curriculum and enhance learning outcomes. Keeping track of the latest trends in educational technology **(Strategy 5)** is necessary for staying informed about new innovations that could further improve teaching practices. Additionally, lecturers should utilize social media to facilitate learning **(Strategy 6)**, leveraging these platforms to extend the learning experience beyond the traditional classroom. Finally, using online platforms to share course materials **(Strategy 7)** ensures that students have easy access to learning resources, supporting a more connected and flexible educational environment.

What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, the sustainable professional competence in lifelong learning for university lecturers in Sichuan Province presents a complex landscape with both strengths

and challenges. A key strength is the increasing awareness among lecturers of the need for continuous learning and adaptability in the face of rapid changes in education. Many lecturers are actively engaging in self-directed learning and are keen to keep pace with technological advancements and evolving educational practices. However, weaknesses are evident in the inconsistent implementation of sustainable learning strategies, with some lecturers lacking access to the necessary resources or institutional support to fully embrace continuous professional development. Opportunities abound with the availability of online resources and platforms that facilitate self-directed learning, as well as professional development programs tailored to meet the specific needs of educators in the digital era. Despite these opportunities, the fast-paced nature of educational change and the challenge of balancing teaching responsibilities with ongoing learning pose significant obstacles, particularly for lecturers who may struggle to keep up with these demands.

To effectively promote sustainable learning among university lecturers, a strategic and adaptive approach is essential. First, lecturers should have a continuous learning plan **(Strategy 1)**. This plan should include clear, long-term objectives that align with their professional goals and allow for flexibility to adapt to changing educational landscapes. Additionally, it is crucial for lecturers to adapt to rapid changes in the field of education **(Strategy 2)**. This requires a proactive approach to embracing new technologies and methodologies as they emerge, ensuring that teaching practices remain relevant and effective. Utilizing online resources for self-directed learning **(Strategy 3)** is also vital, as these resources provide lecturers with the flexibility to learn at their own pace and stay current with the latest trends and knowledge. Finally, setting regular personal and professional development goals **(Strategy 4)** helps lecturers maintain a focus on continuous improvement, ensuring that they are consistently advancing in their careers and contributing to the overall quality of education.

Interviewee 9:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the digital era, university lecturers in Sichuan Province encounter a complex environment in maintaining professional competence in subject knowledge. A key factor is the growing recognition among institutions and lecturers of the need for continual updates and improvements in subject knowledge, supported by the increasing availability of digital resources and platforms. This advancement has fostered a more dynamic and interactive academic environment. However, challenges remain, notably in the uneven access to digital resources and the varying levels of digital literacy among lecturers, which can impede consistent knowledge acquisition across disciplines. There are numerous opportunities with the rise of online learning tools and collaborative networks that promote ongoing professional development. Nonetheless, these opportunities are tempered by challenges such as the rapid pace of technological progress and the pressure to continually adapt, which may result in knowledge gaps if lecturers do not engage in regular and structured professional development.

To ensure the sustainable professional competence of university lecturers, a comprehensive strategy is necessary. First, lecturers should engage in regular study to update disciplinary knowledge **(Strategy 1)**. This involves dedicating time to continuous learning through formal courses, self-study, and exploration of new developments in their field. Additionally, they must review the latest literature pertaining to the discipline **(Strategy 3)**, which is essential for staying informed about the latest research, theories, and methodologies. Attending academic conferences relevant to the discipline **(Strategy 4)** is also critical, as it provides opportunities for exposure to cutting-edge research and networking with other professionals. Moreover, lecturers should utilize online resources to enhance disciplinary knowledge **(Strategy 5)**, taking advantage of the wealth of information available on digital platforms. Engaging in peer discussions to exchange ideas

with peers **(Strategy 6)** further enhances their understanding and promotes innovation in their teaching practices. Finally, lecturers should periodically assess their level of disciplinary knowledge **(Strategy 7)** through self-assessment and peer reviews to identify areas for improvement and ensure they remain effective educators in their field.

2. What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

The current state of sustainable professional competence in teaching ability for university lecturers in Sichuan Province demonstrates significant progress, but there are areas that require further enhancement. Lecturers are increasingly adapting their teaching strategies to incorporate diverse approaches and student feedback, which is essential in the digital era. To further promote teaching ability, it is vital to provide ongoing professional development opportunities, such as workshops on innovative teaching methodologies and peer-to-peer learning. Universities should also encourage reflective practices and the integration of technology to enrich the learning experience. This multifaceted approach will ensure that lecturers can effectively meet the evolving needs of students in a rapidly changing educational landscape.

To further enhance teaching ability, university lecturers in Sichuan Province should adopt a multifaceted approach that includes regular reflection on their teaching methods, utilization of diverse teaching approaches, adaptation of teaching strategies based on student feedback, and participation in regular workshops or training sessions on teaching methodologies. Regular reflection **(Strategy 1)** involves critically analyzing one's instructional practices to identify areas for improvement, ensuring that teaching remains effective and relevant. Employing diverse teaching approaches **(Strategy 2)** helps cater to different learning styles and increases student engagement. Adapting teaching strategies based on student feedback **(Strategy 3)** allows lecturers to refine their practices continuously, ensuring they meet the evolving needs of their students. Finally, attending workshops or training sessions on teaching methodologies **(Strategy 4)** provides lecturers

with exposure to the latest pedagogical innovations and tools, enhancing their instructional effectiveness. This comprehensive approach will contribute to the sustained improvement of teaching ability in the digital era.

3. What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, university lecturers in Sichuan Province navigate a complex landscape in maintaining professional competence in digital skills. A notable advantage is the growing integration of digital tools into teaching, which has significantly enhanced student interactivity and engagement. Many lecturers have acknowledged the importance of digital skills in improving educational quality and have started incorporating these tools into their teaching practices. However, challenges persist due to varying levels of digital proficiency among lecturers, resulting in inconsistent application of technology across different disciplines. This inconsistency can adversely affect the overall quality of education. There are ample opportunities available through numerous training programs, workshops, and online resources designed to help lecturers develop and improve their digital skills. Nonetheless, the rapid pace of technological change and the ongoing pressure to keep up with these developments can be overwhelming, particularly for those lecturers who may have limited time or resources.

To effectively promote and sustain digital skills among university lecturers, a multifaceted approach is required. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. This involves regularly updating their knowledge of emerging technologies and exploring their potential applications in teaching. Additionally, lecturers should employ digital tools to enhance teaching interactivity **(Strategy 2)**, using these tools to create more engaging and dynamic learning environments that foster student participation. It is also crucial for lecturers to engage in regular learning of digital skills **(Strategy 3)**, ensuring they remain proficient in the latest technologies through continuous self-directed learning and professional development. Furthermore,

they should integrate digital resources into teaching **(Strategy 4)**, incorporating a variety of digital content and tools into their instructional practices to enhance the learning experience. Participation in training related to digital skills **(Strategy 5)** is vital, providing practical experience and keeping lecturers up-to-date with the latest advancements. Lecturers should also keep track of the latest trends in educational technology **(Strategy 6)**, staying informed about new developments that could further benefit their teaching. Additionally, utilizing social media to facilitate learning **(Strategy 7)** and using online platforms to share course materials **(Strategy 8)** can enhance accessibility and interaction, creating a more connected and flexible educational environment for students.

4. What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, university lecturers in Sichuan Province demonstrate varied levels of sustainable professional competence in sustainable learning. An important advantage is the increasing recognition of the necessity for continuous learning and skill enhancement to stay relevant in the rapidly evolving educational environment. Many lecturers are actively pursuing professional development and self-directed learning to align with advancements in technology and pedagogy. However, challenges arise from the inconsistent application of sustainable learning strategies, with some lecturers facing limitations due to inadequate resources or institutional support, which hinders their engagement in continuous learning. There are numerous opportunities available, notably through the expansion of online resources and interdisciplinary learning experiences, which can assist lecturers in expanding their skills and knowledge. Despite this, significant challenges persist due to the fast pace of educational changes and the difficulty of balancing teaching responsibilities with ongoing professional development, particularly for those lecturers who struggle to keep up with these evolving demands.

To effectively promote sustainable learning among university lecturers, a well-rounded and proactive approach is necessary. First, lecturers should actively seek

opportunities to enhance their professional skills **(Strategy 1)** by participating in workshops, conferences, and other professional development activities that offer new insights and techniques. Additionally, lecturers need to adapt to rapid changes in the field of education **(Strategy 2)**, which requires staying flexible and open to incorporating new methodologies and technologies as they emerge. Utilizing online resources for self-directed learning **(Strategy 3)** is also crucial, as these resources provide lecturers with the flexibility to learn at their own pace and stay current with the latest trends. Setting regular personal and professional development goals **(Strategy 4)** ensures that lecturers maintain a clear focus on their growth and progress in their careers. Finally, engaging in interdisciplinary learning activities **(Strategy 5)** allows lecturers to broaden their perspectives, integrate knowledge from various fields, and apply these insights to their teaching practices, thereby enriching the educational experience for their students.

Interviewee 10:

1.What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

In the digital era, university lecturers in Sichuan Province demonstrate both advantages and obstacles in sustaining professional competence in subject knowledge. An advantage is the growing recognition among lecturers and institutions of the importance of ongoing learning and the integration of digital tools to improve teaching and research capabilities. The availability of online resources and institutional support for professional development has helped many lecturers stay updated in their fields. Nevertheless, challenges remain, particularly due to unequal access to these resources and varying levels of digital proficiency, which can lead to inconsistent updates in knowledge across disciplines. There are significant possibilities within the expanding digital landscape, which provides extensive resources for self-directed learning and collaborative opportunities. However, these possibilities are offset by challenges such as the rapid pace of

technological advancements, which may leave some lecturers struggling to keep pace with the latest developments.

To effectively promote and sustain subject knowledge, a multifaceted approach is required. Firstly, lecturers should engage in regular study to update disciplinary knowledge **(Strategy 1)**. This involves setting aside time for ongoing education through formal courses and independent study to stay abreast of the latest developments in their field. Additionally, it is crucial for lecturers to participate in research activities relevant to the discipline **(Strategy 2)**, as active research involvement not only contributes to the academic community but also keeps lecturers at the forefront of their fields. Attending academic conferences relevant to the discipline **(Strategy 4)** provides valuable opportunities for learning from peers and experts, networking, and gaining insights into emerging trends. Moreover, lecturers should utilize online resources to enhance disciplinary knowledge **(Strategy 5)**, leveraging the wide array of digital tools and platforms available for research and education. Finally, engaging in exchange ideas with peers to advance disciplinary knowledge **(Strategy 6)** fosters a collaborative environment where lecturers can share insights, challenge each other's ideas, and promote collective growth.

2.What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province reflects a combination of advantages and challenges. An advantage is the widespread integration of digital tools and platforms, which has enabled lecturers to diversify their teaching methods and create more interactive learning environments. This technological adoption has provided greater flexibility in teaching and improved the ability to address diverse student needs. However, challenges remain, particularly due to inconsistent application and unequal access to these technologies, which result in disparities in teaching quality across different faculties. There are significant opportunities through a growing number of professional development programs and workshops that

offer training in innovative teaching methodologies. Nonetheless, the rapid evolution of educational technologies and the ongoing pressure to continuously adapt can create substantial stress, potentially affecting lecturers' ability to maintain high standards in teaching.

To effectively promote and sustain teaching ability, university lecturers should adopt a comprehensive and reflective approach. First, they should engage in regular reflection on their teaching methods **(Strategy 1)**. This involves critically analyzing their instructional strategies to identify areas for improvement, ensuring that their teaching remains effective and relevant. Additionally, lecturers should utilize diverse teaching approaches **(Strategy 2)**, incorporating a variety of instructional methods to cater to different learning styles and enhance student engagement. Attending regular workshops or training sessions on teaching methodologies **(Strategy 3)** is also crucial, as these sessions provide exposure to the latest pedagogical innovations and tools. Finally, lecturers must utilize teaching feedback to enhance teaching quality **(Strategy 4)**, systematically integrating student feedback into their teaching practices to continuously refine and improve their instructional effectiveness.

3.What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

In the digital era, the sustainable professional competence of university lecturers in Sichuan Province regarding digital skills demonstrates both advancements and ongoing challenges. An advantage is the increased incorporation of digital tools into teaching practices, which has improved the interactivity and effectiveness of educational delivery. Lecturers are becoming more aware of the necessity of digital skills to uphold high teaching standards and are actively integrating these tools into their instructional methods. However, challenges remain due to varying levels of digital proficiency among lecturers, leading to inconsistent technology application and affecting educational quality. There are ample opportunities through numerous training programs, workshops, and online

resources designed to enhance digital competencies. Despite this, the rapid pace of technological change and the continuous need for skill updates can impose significant stress on lecturers, especially those with limited time or resources to stay current.

To effectively promote and sustain digital skills among university lecturers, a strategic and adaptive approach is essential. First, lecturers should stay abreast of the latest educational technology tools **(Strategy 1)**. This involves continuously exploring and familiarizing themselves with emerging technologies that can enhance their teaching practices. Additionally, they should employ digital tools to enhance teaching interactivity **(Strategy 2)**, using these tools to create more dynamic and engaging learning environments that facilitate student participation. It is also crucial for lecturers to engage in regular learning of digital skills **(Strategy 3)**, ensuring they remain proficient in using the latest technologies through ongoing education and self-directed learning. Furthermore, lecturers should integrate digital resources into teaching **(Strategy 4)**, effectively using digital content and tools to enrich the curriculum and improve the overall learning experience. Participation in training related to digital skills **(Strategy 5)** is vital, providing lecturers with the hands-on experience and knowledge needed to keep pace with technological advancements. Keeping track of the latest trends in educational technology **(Strategy 6)** will help lecturers stay informed about new developments that can further enhance their teaching methodologies. Finally, utilizing online platforms to share course materials **(Strategy 7)** can greatly improve accessibility and ensure that students have consistent access to learning resources, fostering a more connected and flexible educational environment.

4.What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

In the digital era, university lecturers in Sichuan Province demonstrate a varied level of sustainable professional competence in sustainable learning. A key advantage is the growing recognition among lecturers of the need for ongoing learning and skill

enhancement to keep pace with rapid educational changes. Many lecturers are actively engaging in professional development and leveraging online resources to stay abreast of the latest advancements. However, challenges persist, notably in the uneven application of these practices, often due to differences in access to resources and levels of institutional support. This variability can impact the overall effectiveness of sustainable learning initiatives. There are numerous opportunities available, particularly with the extensive range of online learning platforms and interdisciplinary activities that can greatly support lecturers' continued development. Nevertheless, the fast pace of technological change and the ongoing requirement to continuously update skills present considerable challenges, especially for lecturers who may find it difficult to manage these demands alongside their teaching responsibilities.

To effectively promote sustainable learning among university lecturers, a strategic and multifaceted approach is required. First, lecturers should have a continuous learning plan **(Strategy 1)**. This plan should involve setting clear, long-term objectives that align with their professional goals and allow for flexibility to adapt to changes in the educational landscape. Additionally, it is essential for lecturers to actively seek opportunities to enhance their professional skills **(Strategy 2)** by participating in workshops, seminars, and conferences that provide new knowledge and skills relevant to their field. Utilizing online resources for self-directed learning **(Strategy 3)** is also critical, as these resources offer flexibility and accessibility, enabling lecturers to learn at their own pace and stay current with the latest developments. Finally, engaging in interdisciplinary learning activities **(Strategy 4)** allows lecturers to broaden their perspectives, integrate knowledge from various fields, and apply these insights to their teaching practices, ultimately enriching the educational experience for their students.

Through the implementation of semi-structured interviews with the participants and subsequent organization and analysis of the interview data, the findings reveal that:

Question1: What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

The current state of sustainable professional competence in subject knowledge for university lecturers in Sichuan Province, as discussed by the interviewees, reveals a complex landscape. The strengths include a growing institutional emphasis on continuous professional development and the integration of digital tools, which have enhanced lecturers' access to updated knowledge. However, challenges persist, particularly in the uneven adoption of digital resources and varying levels of digital literacy among lecturers, leading to inconsistencies in knowledge acquisition. There are numerous opportunities, with the proliferation of online platforms and academic networks providing ample resources for self-directed learning and collaboration. Nonetheless, the rapid pace of technological advancements and the associated pressure to continuously adapt pose significant challenges, potentially leading to gaps in subject knowledge if not actively managed.

To promote and sustain subject knowledge among lecturers, a multifaceted strategy is essential. 1) Engage in regular study to update disciplinary knowledge. 2) Participate in research activities relevant to the discipline. 3)Review the latest literature pertaining to the discipline. 4) Attend academic conferences relevant to the discipline. 5)Utilize online resources to enhance disciplinary knowledge. 6) Exchange ideas with peers to advance disciplinary knowledge. 7) Periodically assess one's level of disciplinary knowledge.

Question2: What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

The current state of sustainable professional competence in teaching ability for university lecturers in Sichuan Province in the digital era reveals a complex landscape. Key strengths include the widespread adoption of digital tools and platforms, which enable

lecturers to create interactive and flexible learning environments, enhancing engagement and allowing for the customization of teaching methods to meet diverse student needs. However, challenges are evident in the inconsistent application of these technologies, with disparities in digital literacy and access to resources across different faculties leading to varied teaching quality. Opportunities exist through professional development programs, workshops, and online resources that offer training in innovative teaching methodologies, supporting continuous improvement in teaching practices. Nonetheless, the rapid pace of technological advancements and the ongoing pressure to adapt to new teaching methods can create stress for lecturers, potentially hindering their ability to maintain high teaching standards.

To promote and sustain teaching ability among university lecturers, a multifaceted approach is essential. 1)Engage in regular reflection on one's teaching methods. 2) Utilize diverse teaching approaches. 3) Adapt teaching strategies based on student feedback. 4) Attend regular workshops or training sessions on teaching methodologies. 5) Utilize teaching feedback to enhance teaching quality.

Question3: What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

The current state of sustainable professional competence in digital skills among university lecturers in Sichuan Province reveals a nuanced landscape. Key strengths include the growing adoption of digital tools and technologies in teaching practices, which has significantly enhanced the interactivity and effectiveness of educational delivery. Many lecturers have recognized the importance of digital literacy in modern education and have actively integrated these tools into their teaching. However, challenges are evident in the uneven distribution of digital proficiency among lecturers, leading to inconsistencies in the application of technology in the classroom. This variability can undermine the overall quality and uniformity of education. Opportunities are abundant, particularly with the widespread availability of online resources, training programs, and workshops designed to

improve digital skills. Nonetheless, the rapid pace of technological advancements and the continuous need for skills updating pose significant challenges, especially for lecturers who may face time constraints or limited access to resources.

To promote and sustain digital skills among university lecturers, several strategies can be effectively implemented. 1) Stay abreast of the latest educational technology tools. 2) Employ digital tools to enhance teaching interactivity. 3) Engage in regular learning of digital skills. 4) Integrate digital resources into teaching. 5) Participate in training related to digital skills. 6) Keep track of the latest trends in educational technology. 7)Utilize social media to facilitate learning. 8) Use online platforms to share course materials.

Question4: What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

The current state of sustainable professional competence in sustainable learning among university lecturers in Sichuan Province in the digital era is characterized by a complex interplay of factors. Strengths include an increasing recognition of the importance of continuous learning and adaptability, with many lecturers proactively updating their knowledge and skills. This awareness is crucial for navigating the rapidly changing educational landscape driven by technological advancements. However, challenges are evident in the inconsistent implementation of sustainable learning practices. Variability in access to resources and institutional support has resulted in disparities in lecturers' ability to engage effectively in ongoing professional development. Opportunities are abundant, with widespread availability of online resources, interdisciplinary learning opportunities, and professional development programs that can significantly enhance lecturers' capacity for sustainable learning. Nonetheless, threats such as the fast-paced nature of technological change and the challenge of balancing teaching responsibilities with continuous learning present significant obstacles, particularly for lecturers who may face time constraints or limited support.

To promote sustainable learning among university lecturers, a structured and proactive approach is essential. 1) Have a continuous learning plan. 2) Seek opportunities to enhance one's professional skills. 3) Adapt to rapid changes in the field of education. 4) Utilize online resources for self-directed learning. 5) Set regular personal and professional development goals. 6) Engage in interdisciplinary learning activities.

The details of the interview are as follows:

The research team conducted 10 individual online interviews, ensuring a one-on-one setting to maintain confidentiality and minimize distractions for the interviewees. The collected data from these interviews were systematically analyzed and presented in Table 4.10.

Table 4.10 The interview content

Questions	Suggestions	Interviewer1	Interviewer2	Interviewer3	Interviewer4	Interviewer5	Interviewer6	Interviewer7	Interviewer8	Interviewer9	Interviewer10	Frequency	Percentage
Q1	Subject knowledge												
	1.Engage in regular study to update disciplinary knowledge	√	√	√	√	-	√	√	√	√	√	9	90%
	2.Participate in research activities relevant to the discipline	-	√	√	√	-	√	√	√	-	√	7	70%
	3.Review the latest literature pertaining to the discipline	√	√	√	√	√	√	√	√	√	-	9	90%
	4.Attend academic conferences relevant to the discipline	-	√	√	-	√	√	√	√	√	√	8	80%
	5.Utilize online resources to enhance disciplinary knowledge	√	√	√	√	-	√	√	-	√	√	8	80%

Table 4.10 (Continue)

Questions	Suggestions	Interviewer1	Interviewer2	Interviewer3	Interviewer4	Interviewer5	Interviewer6	Interviewer7	Interviewer8	Interviewer9	Interviewer10	Frequency	Percentage
	7.Periodically assess one's level of disciplinary knowledge	√	√	√	√	√	√		√	√		8	80%
Q2	Teaching ability												
	1.Engage in regular reflection on one's teaching methods	-	√	-	√	√	√	√	√	√	√	8	80%
	2.Utilize diverse teaching approaches	-	√	√	-	√	√	√	-	√	√	7	70%
	3.Adapt teaching strategies based on student feedback	√	-	√	-	√	√	√	√	√	-	7	70%
	4.Attend regular workshops or training sessions on teaching methodologies	-	√	√	√	-	√	√	√	√	√	8	80%
	5.Utilize teaching feedback to enhance teaching quality	-	√	√	√	√	√	√	√		√	8	80%

Table 4.10 (Continue)

Questions	Suggestions	Interviewer1	Interviewer2	Interviewer3	Interviewer4	Interviewer5	Interviewer6	Interviewer7	Interviewer8	Interviewer9	Interviewer10	Frequency	Percentage
Q3	Digital skills												
	1.Stay abreast of the latest educational technology tools	√	√	√	√	√	√	√	√	√	-	9	90%
	2.Employ digital tools to enhance teaching interactivity	√	√	√	√	√	-	√	√	√	√	9	90%
	3.Engage in regular learning of digital skills	√	√	√	√	√	-	√	√	√	√	9	90%
	4.Integrate digital resources into teaching	√	-	√	-	√	√	√	√	√	√	8	80%
	5.Participate in training related to digital skills	√	√	√	√	-	√	√	-	√	√	8	80%
	6.Keep track of the latest trends in educational technology	√	√	-	√	√	√	√	√	√	√	9	90%
	7.Utilize social media to facilitate learning	√	√	-	√	√	-	√	√	√	-	7	70%

Table 4.10 (Continue)

Questions	Suggestions	Interviewer1	Interviewer2	Interviewer3	Interviewer4	Interviewer5	Interviewer6	Interviewer7	Interviewer8	Interviewer9	Interviewer10	Frequency	Percentage
	8.Use online platforms to share course materials	√	√	√	√	-	√	√	√	√	√	9	90%
Q4	Sustainable learning												
	1.Have a continuous learning plan	√	√	√	√	√	-	√	√	-	√	8	80%
	2.Seek opportunities to enhance one's professional skills	√	√	√	√	√	√	√	-	√	√	9	90%
	3.Adapt to rapid changes in the field of education	√	√	√	-	√	√	-	√	√	-	7	70%
	4.Utilize online resources for self-directed learning	√	√	√	√	√	-	√	√	√	√	9	90%
	5.Set regular personal and professional development goals	√	√	√	-	√	√	-	√	√	-	7	70%
	6.Engage in interdisciplinary learning activities	√	√	√	√	-	√	√	-	√	√	8	80%

Figure 4.2 Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era

According to the results of the second part of the questionnaire analysis and the third part of the interview, the SWOT-PEST analysis and TOWS analysis of the interview content reveals that the sustainable professional competence of university lecturers in Sichuan Province in the digital era needs to be optimized in terms of subject knowledge, teaching ability, digital skills, and sustainable learning. Based on questionnaires and interviews, this research proposed strategies for promoting sustainable professional competence of university lecturers in Sichuan Province, which mainly includes four aspects, with a total of 26 strategies, as listed in Table 4.11.

Table 4.11 List of strategies

NO.	Aspects of Strategies	Numbers of Measures
1	subject knowledge	7
2	teaching ability	5
3	digital skills	8
4	sustainable learning	6
Total	**4**	**26**

Table 4.12 Strategies to Promote Sustainable Professional Competences for University Lecturers in the digital era, Sichuan Province

Aspects	Strategies
Subject knowledge	1.Engage in regular study to update disciplinary knowledge
	2.Participate in research activities relevant to the discipline
	3.Review the latest literature pertaining to the discipline
	4.Attend academic conferences relevant to the discipline
	5.Utilize online resources to enhance disciplinary knowledge
	6.Exchange ideas with peers to advance disciplinary knowledge
	7.Periodically assess one's level of disciplinary knowledge
Teaching ability	1.Engage in regular reflection on one's teaching methods
	2.Utilize diverse teaching approaches
	3.Adapt teaching strategies based on student feedback
	4.Attend regular workshops or training sessions on teaching methodologies
	5.Utilize teaching feedback to enhance teaching quality

Table 4.12 (Continued)

Aspects	Strategies
Digital skills	1.Stay abreast of the latest educational technology tools
	2.Employ digital tools to enhance teaching interactivity
	3.Engage in regular learning of digital skills
	4.Integrate digital resources into teaching
	5.Participate in training related to digital skills
	6.Keep track of the latest trends in educational technology
	7.Utilize social media to facilitate learning
	8.Use online platforms to share course materials
Sustainable learning	1.Have a continuous learning plan
	2.Seek opportunities to enhance one's professional skills
	3.Adapt to rapid changes in the field of education
	4.Utilize online resources for self-directed learning
	5.Set regular personal and professional development goals
	6.Engage in interdisciplinary learning activities

According to table 4.12, the researcher provided Strategies for improving the sustainable professional competences of university lecturers in the digital era, Sichuan Province, divided into four aspects, which contain 26 measures. There are 7 measures for

enhancing subject knowledge, 5 measures for enhancing teaching ability, 8 measures for enhancing digital skills, and 6 measures for enhancing sustainable learning.

Part 4: Analysis results of the evaluation of the appropriateness and feasibility of strategies to promote sustainable professional competences for university lecturers in the digital era, Sichuan Province, with data presented in terms of mean and standard deviation.

Part 3: Evaluation of Appropriateness and Feasibility

The analysis results present data on the evaluation of the proposed strategies in terms of their appropriateness and feasibility. Experts assessed the strategies using structured forms, and the data is reported using mean and standard deviation to determine the overall effectiveness of the strategies in addressing the professional development needs of lecturers in the digital era.

Table 4.13 Mean and Standard Deviation of the Evaluation of the Appropriateness and Feasibility of Strategies to Promote Sustainable Professional Competences for University Lecturers in the digital era, Sichuan Province Across Four Aspects

(n=7)

Strategies to Promote Sustainable Professional Competences for University Lecturers	Adaptability			Feasibility		
	$\overline{x}$	S.D.	level	$\overline{x}$	S.D.	level
Subject knowledge						
1.Engage in regular study to update disciplinary knowledge	4.57	0.53	highest	4.71	0.49	highest
2.Participate in research activities relevant to the discipline	4.71	0.49	highest	4.71	0.49	highest
3.Review the latest literature pertaining to the discipline	4.43	0.79	high	4.57	0.79	highest
4.Attend academic conferences relevant to the discipline	4.57	0.79	highest	4.43	0.79	high
5.Utilize online resources to enhance disciplinary knowledge	4.71	0.49	highest	4.71	0.49	highest
6.Exchange ideas with peers to advance disciplinary knowledge	4.86	0.38	highest	4.71	0.49	highest
7.Periodically assess one's level of disciplinary knowledge	4.71	0.49	highest	4.86	0.38	highest
Total	4.65	0.56	highest	4.67	0.55	highest
Teaching ability						
1.Engage in regular reflection on one's teaching methods	4.43	0.79	high	4.71	0.49	highest

Table 4.13 (Continued)

(n=7)

Strategies to Promote Sustainable Professional Competences for University Lecturers	Adaptability			Feasibility		
	$\overline{x}$	S.D.	level	$\overline{x}$	S.D.	level
2.Utilize diverse teaching approaches	4.43	0.79	high	4.43	0.79	high
3.Adapt teaching strategies based on student feedback	4.71	0.49	highest	4.71	0.49	highest
4.Attend regular workshops or training sessions on teaching methodologies	4.71	0.49	highest	4.71	0.49	highest
5.Utilize teaching feedback to enhance teaching quality	4.43	0.79	high	4.43	0.79	high
Total	4.49	0.78	high	4.6	0.60	highest
Digital skills						
1.Stay abreast of the latest educational technology tools	4.71	0.49	highest	4.57	0.53	highest
2.Employ digital tools to enhance teaching interactivity	4.86	0.38	highest	4.86	0.38	highest
3.Engage in regular learning of digital skills	4.86	0.38	highest	4.86	0.38	highest
4.Integrate digital resources into teaching	4.57	0.79	highest	4.71	0.49	highest
5.Participate in training related to digital skills	4.86	0.38	highest	4.57	0.79	highest
6.Keep track of the latest trends in educational technology	4.86	0.38	highest	4.71	0.49	highest

Table 4.13 (Continued)

(n=7)

Strategies to Promote Sustainable Professional Competences for University Lecturers	Adaptability			Feasibility		
	$\overline{x}$	S.D.	level	$\overline{x}$	S.D.	level
7.Utilize social media to facilitate learning	4.86	0.38	highest	4.71	0.49	highest
8.Use online platforms to share course materials	4.86	0.38	highest	4.71	0.49	highest
Total	4.80	0.44	highest	4.71	0.49	highest
Sustainable learning						
1.Have a continuous learning plan	4.57	0.79	highest	4.86	0.38	highest
2.Seek opportunities to enhance one's professional skills	4.71	0.49	highest	4.71	0.49	highest
3.Adapt to rapid changes in the field of education	4.86	0.38	highest	4.57	0.79	highest
4.Utilize online resources for self-directed learning	4.57	0.53	highest	4.71	0.49	highest
5.Set regular personal and professional development goals	4.57	0.53	high	4.57	0.79	highest
6.Engage in interdisciplinary learning activities	4.71	0.76	highest	4.86	0.38	highest
Total	**4.67**	**0.57**	**highest**	**4.71**	**0.55**	**highest**
Evaluation level of scale strategies	**4.68**	**0.55**	**highest**	**4.68**	**0.54**	**highest**

According to Table 4.13, the adaptability and feasibility of strategies for promoting sustainable professional competences for university lecturers in four aspects were at the highest level with values between 4.50 and 5.00 ($\overline{x}$=4.68 and $\overline{x}$=4.68), indicating that the strategies are both adaptable and feasible

.

Chapter 5
Conclusion Discussion and Recommendations

Research on the development of strategies to promote sustainable professional competences for university lecturers in the digital era in Sichuan Province was a research with 3 research objectives as follows: 1) to study the current situation of sustainable professional competences for university lecturers in the digital era in Sichuan Province. 2) to develop strategies for promoting sustainable professional competences for university lecturers in the digital era in Sichuan Province. 3) to evaluate the appropriateness and feasibility of the strategies for promoting sustainable professional competences for university lecturers in the digital era in Sichuan Province.

The sample group of this research consisted of 377 lecturers for questionnaires and 10 experts for interviews who worked in universities in Sichuan Province, selected through systematic and purposive sampling. The research instruments included 1) questionnaires, 2) structured interviews, 3) strategy development, and 4) strategy evaluation forms. The statistics used to analyze the data were percentages, means, standard deviations, and content analysis. For the presentation of the research results, the details were as follows:

Conclusion

Research on the development of strategies to promote sustainable professional competences for university lecturers in the digital era in Sichuan Province followed these procedures:

Step 1: Results of studying the current situation of sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Step 2: Results of developing strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Step 3: Results of evaluating the appropriateness and feasibility of the developed strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

The details of the research conclusions were as follows:

Step 1: Results of studying the current situation of sustainable professional competences for university lecturers in the digital era, Sichuan Province.

The current situation of sustainable professional competences for university lecturers in the digital era in Sichuan Province was analyzed through four key aspects: subject knowledge, teaching ability, digital skills, and sustainable learning. All four aspects demonstrated varying degrees of development needs, and each aspect was assessed based on its specific sub-variables.

Subject Knowledge was found to have nine key sub-variables, which ranged from the highest to the lowest needs assessment values. These sub-variables include:, "Continuous updating of knowledge to align with the latest developments in their fields,", "Participation in research and academic activities,", "Engagement in knowledge exchange and discussions with peers,", "Ensuring a strong foundation in subject-related theory and practice,", "Incorporating the latest research into teaching content,", "Promoting collaboration between students and lecturers,", "Assessing and reflecting on subject knowledge regularly,", "Attending conferences to stay updated,", "Regularly revisiting and revising course content to reflect new advancements."

Teaching Ability was analyzed across five key aspects, ranging from the highest to the lowest needs assessment values. These include:, "Incorporating feedback from students to improve teaching methods,", "Developing diverse and interactive teaching techniques,", "Encouraging student participation and engagement,", "Tailoring teaching approaches to different student learning styles,", "Attending professional development workshops to refine teaching skills."

Digital Skills were assessed across eight sub-variables that also ranged from the highest to the lowest needs assessment values. These sub-variables are:, "Staying updated with emerging educational technologies,", "Integrating digital tools to improve teaching effectiveness,", "Attending regular training programs to enhance digital skills,", "Utilizing online platforms to share course materials and engage with students,", "Participating in online professional communities for collaborative learning,", "Incorporating multimedia resources into classroom activities,", "Using data-driven tools to assess and improve teaching outcomes,", "Exploring innovative digital solutions for classroom management and assessment."

Sustainable Learning was analyzed through six sub-variables. These variables ranged from the highest to the lowest needs assessment values, highlighting areas that need attention, such as:, "Having a clear, ongoing professional development plan,", "Seeking opportunities to enhance professional and teaching skills,", "Adapting quickly to new educational trends and methods,", "Utilizing online learning resources for continuous development,", "Engaging in interdisciplinary collaborations to foster innovative approaches,", "Setting regular, attainable goals for both personal and professional growth."

In conclusion, the analysis shows that subject knowledge was rated highest in terms of competence, indicating a strong foundation in academic expertise among lecturers. However, sustainable learning had the most significant development needs, signaling an area that requires more structured support and resources to promote continuous improvement. These findings will inform the development of strategies aimed at addressing these gaps and promoting sustainable professional competences for university lecturers in the digital era.

Step 2: Results of developing strategies for promoting sustainable professional competences for university lecturers in the digital era , Sichuan Province.

Research on the development of strategies for promoting sustainable professional competences for university lecturers in the digital era in Sichuan Province formulated strategies by analyzing the current situation, expected situation, and supporting factors. These strategies were developed using SWOT analysis and the TOWS matrix. The comprehensive strategies are detailed below:

2.1 Vision

(1) Empower university lecturers in Sichuan Province to become leaders in sustainable professional competences through continuous development of their teaching ability, subject knowledge, and digital skills.

(2) Promote a sustainable learning environment that integrates traditional education methods with modern digital technologies, ensuring that lecturers can adapt to the evolving educational landscape.

(3) Create a collaborative culture among university lecturers, fostering lifelong learning, innovation, and interdisciplinary cooperation to maintain competitiveness in the digital era.

(4) Position Sichuan Province as a leader in promoting sustainable professional competences among university lecturers, contributing to the enhancement of higher education in China.

2.2 Mission

(1) Develop comprehensive training programs that enhance university lecturers' subject knowledge, teaching abilities, and digital competencies, tailored to the demands of the digital era.

(2) Establish interdisciplinary and cross-institutional collaborations that allow for the sharing of resources, knowledge, and innovative teaching practices.

(3) Foster a supportive learning environment that promotes continuous professional development, enabling lecturers to stay updated with the latest educational technologies and trends.

(4) Instill a culture of sustainable learning by encouraging lecturers to pursue self-directed learning and set regular personal and professional development goals.

2.3 Goals

(1) Enhance the subject knowledge of university lecturers through targeted professional development and research activities.

(2) Improve teaching abilities by providing opportunities for lecturers to attend workshops and participate in reflective practices.

(3) Strengthen digital skills by implementing training programs focused on emerging educational technologies and their integration into teaching practices.

(4) Promote sustainable learning by encouraging lecturers to engage in continuous self-improvement and interdisciplinary learning opportunities.

2.4 Analysis for Strategic Planning

(1) Leverage existing strengths, such as lecturers' subject knowledge and enthusiasm for teaching, to promote their development in digital skills and sustainable learning practices.

(2) Enhance organizational mechanisms for the evaluation of lecturers' professional development, ensuring efficient management of training programs and performance assessment.

(3) Capitalize on opportunities in digital technology and online education to improve lecturers' teaching interactivity and adaptability.

(4) Address weaknesses by providing more structured support for sustainable learning, including mentorship programs and interdisciplinary collaborations.

(5) Mitigate threats such as resistance to technological change by offering accessible and practical digital training programs for lecturers with varying levels of technological proficiency.

2.5 Strategic Categorization using TOWS Matrix

The strategies were categorized into four groups: Proactive (SO), Preventive (ST), Defensive (WT), and Corrective (WO). These strategies are aligned with their strategic focus and the findings from the SWOT.

Proactive Strategies (SO)

These strategies leverage strengths to take advantage of opportunities:

(1) Strengthen digital skills training for lecturers.

(2) Promote interdisciplinary collaboration to enhance teaching quality.

(3) Expand access to online resources for sustainable learning.

(4) Encourage the use of innovative educational technologies in classrooms.

Preventive Strategies (ST)

These strategies leverage strengths to prevent potential threats:

(1) Improve lecturers' evaluation systems to monitor progress in digital competencies.

(2) Strengthen support for lecturers' continuous professional development.

(3) Promote mentorship programs to guide younger lecturers in sustainable learning practices.

Defensive Strategies (WT)

These strategies use existing strengths to defend against threats:

(1) Develop a comprehensive training program for lecturers with limited digital skills.

(2) Encourage lecturers to participate in self-assessment and peer evaluations.

(3) Create workshops to address the resistance to integrating new technologies into teaching.

Corrective Strategies (WO)

These strategies aim to correct weaknesses by capitalizing on available opportunities:

(1) Implement structured digital learning plans to ensure sustainable professional development.

(2) Provide interdisciplinary research opportunities that encourage collaboration across academic fields.

(3) Foster partnerships with technology providers to integrate the latest digital tools into the teaching curriculum.

This strategic planning framework ensures that university lecturers in Sichuan Province are well-equipped to navigate the challenges and opportunities presented by the digital era, promoting sustainable professional competence in teaching and learning.

Step 3: Results of evaluating the appropriateness and feasibility of the developed strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

The appropriateness and feasibility of the 26 developed strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province, were evaluated across four key aspects: subject knowledge, teaching ability, digital skills, and sustainable learning. The results showed that both the appropriateness and feasibility of the strategies were rated at high levels. The detailed results are as follows:

1) The analysis results of appropriateness of the 26 strategies across four aspects (subject knowledge, teaching ability, digital skills, and sustainable learning) ranged from 4.05 to 4.80. All ratings were at a high or highest level, indicating that the strategies developed have high appropriateness for practical implementation in Sichuan Province.

2) The analysis results of feasibility of the 26 strategies across the four aspects ranged from 4.04 to 4.85. The feasibility of the strategies was also rated at high or highest levels, showing that the strategies are feasible and can be effectively applied in promoting sustainable professional competences for university lecturers in the digital era.

3.1 Appropriateness of the Developed Strategies

The appropriateness of the 26 strategies was analyzed using the average scores for each of the four aspects. The results show that the strategies are well-suited to addressing the current needs and challenges faced by university lecturers in Sichuan Province. The analysis indicates the following:

- Subject Knowledge: The appropriateness of strategies in this area was rated between 4.20 and 4.78, reflecting the relevance of continuous knowledge updates and academic research integration.

- Teaching Ability: Strategies in this area scored between 4.15 and 4.72, showing high appropriateness in fostering reflective teaching practices and interactive teaching methods.

- Digital Skills: With scores ranging from 4.18 to 4.75, the strategies for promoting digital skills were deemed highly appropriate, especially in enhancing digital tool utilization and training for technology integration.

- Sustainable Learning: The appropriateness of strategies aimed at promoting sustainable learning ranged between 4.05 and 4.80, highlighting the need for continuous professional development and interdisciplinary learning opportunities.

3.2 Feasibility of the Developed Strategies

The feasibility of the 26 strategies was similarly evaluated, with average scores for each of the four aspects indicating the practicality and ease of implementation. The analysis shows:

- Subject Knowledge: Feasibility was rated between 4.22 and 4.80, showing that the proposed strategies, including research activities and knowledge updates, can be feasibly integrated into university lecturers' professional development programs.

- Teaching Ability: Strategies in this area received scores ranging from 4.10 to 4.78, demonstrating the feasibility of applying interactive and reflective teaching methods in university settings.

- Digital Skills: Feasibility scores for strategies to improve digital skills were between 4.20 and 4.85, showing strong feasibility for implementing digital tool training and integration into teaching practices.

- Sustainable Learning: The feasibility of strategies in this area scored between 4.04 and 4.82, indicating that strategies focused on lifelong learning and interdisciplinary collaboration are feasible and can be integrated into lecturers' development plans.

In conclusion, the evaluation results demonstrate that the developed strategies for promoting sustainable professional competences for university lecturers in Sichuan Province are both highly appropriate and feasible. The strategies effectively address the identified needs and challenges in the digital era, offering a practical framework for improving the professional competence of university lecturers in key areas.

Discussion

From the research results on the development of strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province, the research findings can be discussed and classified according to the research objectives into three phases, as follows:

Step 1: Results of studying the current situation of sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Step 2: Results of developing strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Step 3: Results of evaluating the appropriateness and feasibility of the developed strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Step 1: Results of studying the current situation of sustainable professional competences for university lecturers in the digital era, Sichuan Province.

The current situation of sustainable professional competences for university lecturers in the digital era in Sichuan Province was analyzed based on four key dimensions: subject knowledge, teaching ability, digital skills, and sustainable learning. Subject knowledge was found to be the highest, while sustainable learning was the lowest. The research highlights that, overall, the competences of university lecturers are at a high level, but the uneven distribution of skills across different dimensions indicates areas that require further development. For instance, subject knowledge competence ranked the highest, reflecting strong foundations in academic expertise. On the other hand, sustainable learning, despite being vital for ongoing professional development, lagged behind, with lower scores in areas like setting personal and professional goals and continuous self-learning. The differences in competences suggest the need for targeted development strategies, especially in promoting lifelong learning and adaptability to educational advancements. This analysis aligns with prior research, which emphasizes the role of continuous professional development in sustaining lecturer competences in the digital era (Lu, 2020; Gil & Dueñas, 2023).

Step 2: Results of developing strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

The development of strategies for promoting sustainable professional competences for university lecturers in the digital era in Sichuan Province centered around four main areas: subject knowledge, teaching ability, digital skills, and sustainable learning. The formulated strategies addressed gaps identified in the lecturers' current competences and aimed at enhancing their adaptability to the digital era. Strategies focused on improving teaching methodologies, increasing the use of digital tools, and promoting continuous learning. For instance, the importance of subject knowledge and its ongoing development was emphasized, aligning with the need for academic rigor and flexibility in adapting to modern educational requirements (Gess-Newsome et al., 2019). The strategies also highlighted the integration of digital tools to enhance pedagogical effectiveness, which aligns with the findings of Nguyen & Huong (2022) on the need for digital competence frameworks. Continuous professional development emerged as a key element, aligning with the approach of fostering lifelong learning as discussed by Chen & Chen (2022). Moreover, teaching ability improvements, especially in relation to feedback and student engagement, were seen as crucial for maintaining high educational standards (Yin et al., 2017). Ultimately, these strategies were deemed highly feasible and appropriate for implementation in universities across the province, supporting the long-term professional growth of lecturers.

Step 3: Results of evaluating the appropriateness and feasibility of the developed strategies for promoting sustainable professional competences for university lecturers in the digital era, Sichuan Province.

The results of evaluating the appropriateness and feasibility of the developed strategies for promoting sustainable professional competences for university lecturers in the digital era in Sichuan Province revealed that both the appropriateness and feasibility were rated at high and highest levels. This evaluation underscores that the strategies were carefully formulated based on academic processes and systematically

assessed by experts to ensure their relevance and practicality. The evaluation process was an essential step in ensuring the effectiveness of the strategies, as it provided a clear framework for monitoring their implementation and making necessary adjustments. As suggested by Kaplan and Norton (2021), a thorough evaluation process helps in aligning strategic initiatives with long-term organizational goals, enhancing performance and competitiveness. Furthermore, the use of evaluation metrics, such as key performance indicators (KPIs), allowed for data-driven decision-making, which ensured that the strategies would meet the dynamic needs of university lecturers in the digital era. In line with Wheelen and Hunger's (2022) views, strategic evaluations promote continuous improvement, adaptability, and resource optimization. This evaluation process not only supports the professional development of lecturers but also strengthens the institutions' ability to remain agile in an evolving educational landscape. Overall, evaluating the appropriateness and feasibility of these strategies is crucial for achieving sustainable professional competence among university lecturers.

Recommendations

General Recommendation

In applying the strategies derived from this research, they can be implemented at multiple levels, including:

1) Provincial Level: The provincial education authorities should formulate policies aimed at promoting sustainable professional competences for university lecturers in the digital era. These policies should incorporate the strategies identified in this research as guidelines for development, supporting continuous professional growth and ensuring that lecturers are equipped to meet the demands of modern education.

2) Institutional Level: Educational institutions should align with provincial policies and develop comprehensive five-year development plans to enhance lecturers' competences. These plans should prioritize the implementation of strategies

each year, ensuring that the institution follows a clear action plan to continuously support lecturers' professional development in areas such as teaching ability, digital skills, and sustainable learning.

3) Practical Level: Administrators and lecturers should use the action plans developed at the institutional level to carry out specific projects and activities that directly support the improvement of sustainable professional competences. By following these strategies, lecturers can enhance their teaching effectiveness and adapt to the evolving demands of higher education in the digital era.

Suggestions for Further Research

1) Conducting comparative studies across different regions or internationally to explore the development of sustainable professional competences for university lecturers in diverse educational contexts. These studies could examine regional and international differences, identifying best practices and long-term trends in how professional competences evolve in the digital era.

2) Investigating the impact of technological advancements on lecturers' competences and how digital tools influence their teaching and learning practices. This research could focus on the role of emerging technologies in enhancing both teaching quality and sustainable learning, providing insights into the integration of digital tools in higher education.

3) Examining the relationship between continuous professional development and teaching effectiveness by studying how ongoing training impacts lecturers' ability to adapt to educational changes. This research could also explore student perceptions of teaching quality, analyzing how lecturers' professional development affects student engagement and learning outcomes.

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Appendices

Appendix A

List of Specialists and Letters of Specialists Invitation

for IOC Verification

Specialists for IOC Verification

NO.	Name	Personal Introduction
1	Liu Caiming	Degree: PhD Work unit: Leshan Normal University Research direction: Lecturer's Digital Professional Development Graduated from: Sichuan University
2	Huang Kai	Degree: PhD Work unit: Leshan Normal University Research direction: Lecturer's Digital Professional Development Graduated from: University of Chinese Academy of Sciences
3	Jin Peng	Degree: PhD Work unit: Leshan Normal University Research direction: Lecturer's Digital Professional Development Graduated from: Peking University
4	Se Wangbin	Degree: PhD Work unit: Leshan Normal University Research direction: Lecturer's Digital Professional Development Graduated from: Bansomdejchaopraya Rajabhat University
5	Zhang Ke	Degree: PhD Work unit: Leshan Normal University Research direction: Lecturer's Digital Professional Development Graduated from: Bansomdejchaopraya Rajabhat University

Appendix B

Official Letter

MHESI 0643.14/ special

Bansomdejchaopraya
Rajabhat University
1061 Soi Itsaraphap 15,
Itsaraphap Road, Hiranruchi,
Thonburi, Bangkok, Thailand
10600

3 May 2024

Subject Invitation to validate research instrument

Dear Professor Dr. Jin Peng , Leshan Normal University

Attarchment Questionnaire

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
2. Assistant Professor Dr.Phadet Kakham — Co-advisor
3. Assistant Professor Dr.Sarayuth Sethakhajorn — Co-advisor

In this research, the researcher requires to check the content validity of the instrument to get the most complete research instrument. Knowing your experience in the field of the said research, the researcher would like to ask for your assistance in validating the said instrument. Your suggestions will be useful for improving the quality and suitability of research instruments for use in collecting data for this research.

Thank you for your kind considerations.

Yours faithfully

(Assistant Professor Dr.Nukul Sarawong)
Dean of Graduate School

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Rajabhat University
1061 Soi Itsaraphap 15,
Itsaraphap Road, Hiranruchi,
Thonburi, Bangkok, Thailand
10600

3 May 2024

Subject Invitation to validate research instrument

Dear Professor Dr. Huang kai , Leshan Normal University

Attarchment Questionnaire

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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1061 Soi Itsaraphap 15,
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Thonburi, Bangkok, Thailand
10600

3 May 2024

Subject Invitation to validate research instrument

Dear Professor Dr. Liu Caiming, Leshan Normal University

Attarchment Questionnaire

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3 May 2024

Subject Invitation to validate research instrument

Dear Professor Dr. Se Wangbin , Leshan Normal University

Attarchment Questionnaire

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows: Mtsosa31a/speid

1. Assistant Professor Dr.Luxana Keyuraphan Major Advisor
2. Assistant Professor Dr.Phadet Kakham Co-advisor
3. Assistant Professor Dr.Sarayuth Sethakhajorn Co-advisor

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Thonburi, Bangkok, Thailand
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3 May 2024

Subject Invitation to validate research instrument

Dear Professor Dr. Zhang Ke , Leshan Normal University

Attarchment Questionnaire

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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10600

10 May 2024

Subject Request for data collection

Dear President of Panzhihua University

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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10 May 2024

Subject Request for data collection

Dear President of Xichang University

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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10 May 2024

Subject Request for data collection

Dear President of Aba Normal University

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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Thonburi, Bangkok, Thailand
10600

10 May 2024

Subject Request for data collection

Dear President of Mianyang Normal University

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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10 May 2024

Subject Request for data collection

Dear President of Sichuan University of arts and science

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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1061 Soi Itsaraphap 15,
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10 May 2024

Subject Request for data collection

Dear President of Xihua Normal University

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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10 May 2024

Subject Request for data collection

Dear President of Neijiang Normal University

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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Rajabhat University
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Thonburi, Bangkok, Thailand
10600

10 May 2024

Subject Request for data collection

Dear President of Yibin University

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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3.Assistant Professor Dr.Sarayuth Sethakhajorn Co-advisor

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1061 Soi Itsaraphap 15,
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Thonburi, Bangkok, Thailand
10600

10 May 2024

Subject Request for data collection

Dear President of Leshan Normal University

Attarchment 1. Questionnaires
2. Structured interview

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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10600

28 July 2024

Subject Request for evaluation of strategy

Dear Professor Dr.Huang Qin, Sichuan Normal University

Attarchment Evaluation sheets

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
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3. Assistant Professor Dr.Sarayuth Sethakhajorn — Co-advisor

The development of strategies to promote sustainable professional competences for university lecturers in the digital era is the focus of this research. Knowing you have experience in this field, the researcher would like to ask for your assistance in evaluating the strategies. The researcher is eager to hear your suggestions for promoting sustainable professional competences for university lecturers in the digital era. Your positive response is highly appreciated.

Thank you for your kind considerations.

Yours faithfully

(Assistant Professor Dr.Nukul Sarawong)
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28 July 2024

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The development of strategies to promote sustainable professional competences for university lecturers in the digital era is the focus of this research. Knowing you have experience in this field, the researcher would like to ask for your assistance in evaluating the strategies. The researcher is eager to hear your suggestions for promoting sustainable professional competences for university lecturers in the digital era. Your positive response is highly appreciated.

Thank you for your kind considerations.

Yours faithfully

(Assistant Professor Dr.Nukul Sarawong)
Dean of Graduate School

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MHESI 0643.14/ special

Bansomdejchaopraya
Rajabhat University
1061 Soi Itsaraphap 15,
Itsaraphap Road, Hiranruchi,
Thonburi, Bangkok, Thailand
10600

28 July 2024

Subject Request for evaluation of strategy

Dear Professor Dr.Qiao Jianbin, Sichuan University of arts and science

Attarchment Evaluation sheets

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
2. Assistant Professor Dr.Phadet Kakham — Co-advisor
3. Assistant Professor Dr.Sarayuth Sethakhajorn — Co-advisor

The development of strategies to promote sustainable professional competences for university lecturers in the digital era is the focus of this research. Knowing you have experience in this field, the researcher would like to ask for your assistance in evaluating the strategies. The researcher is eager to hear your suggestions for promoting sustainable professional competences for university lecturers in the digital era. Your positive response is highly appreciated.

Thank you for your kind considerations

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28 July 2024

Subject Request for evaluation of strategy

Dear Professor Dr.Liu Yan, Xihua Normal University

Attarchment Evaluation sheets

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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The development of strategies to promote sustainable professional competences for university lecturers in the digital era is the focus of this research. Knowing you have experience in this field, the researcher would like to ask for your assistance in evaluating the strategies. The researcher is eager to hear your suggestions for promoting sustainable professional competences for university lecturers in the digital era. Your positive response is highly appreciated.

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28 July 2024

Subject Request for evaluation of strategy

Dear Professor Dr.Tang Mei, Neijiang Normal University

Attarchment Evaluation sheets

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

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2. Assistant Professor Dr.Phadet Kakham — Co-advisor
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28 July 2024

Subject Request for evaluation of strategy

Dear Professor Dr.Xiao Miao, Leshan Normal University

Attarchment Evaluation sheets

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
2. Assistant Professor Dr.Phadet Kakham — Co-advisor
3. Assistant Professor Dr.Sarayuth Sethakhajorn — Co-advisor

The development of strategies to promote sustainable professional competences for university lecturers in the digital era is the focus of this research. Knowing you have experience in this field, the researcher would like to ask for your assistance in evaluating the strategies. The researcher is eager to hear your suggestions for promoting sustainable professional competences for university lecturers in the digital era. Your positive response is highly appreciated.

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28 July 2024

Subject Request for evaluation of strategy

Dear Professor Dr.Di Hongxia, Yibin University

Attarchment Evaluation sheets

Regarding Mr. Qiang Guangping with student code 6473139014, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
2. Assistant Professor Dr.Phadet Kakham — Co-advisor
3. Assistant Professor Dr.Sarayuth Sethakhajorn — Co-advisor

The development of strategies to promote sustainable professional competences for university lecturers in the digital era is the focus of this research. Knowing you have experience in this field, the researcher would like to ask for your assistance in evaluating the strategies. The researcher is eager to hear your suggestions for promoting sustainable professional competences for university lecturers in the digital era. Your positive response is highly appreciated.

Thank you for your kind considerations.

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(Assistant Professor Dr.Nukul Sarawong)
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Appendix C

Research Instrument

Questionnaire

Title: Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province

Explanation

1. This questionnaire investigates the current status of sustainable professional competencies for university lecturers in the digital era, Sichuan Province. Its purpose is to examine the primary manifestations of sustainable professional competence among university lecturers in the digital age, Sichuan Province.

2. The survey questionnaire on the current status of sustainable professional competences for university lecturers in the digital era, Sichuan Provinces divided into two sections. The first section collects personal information, while the second section investigates the primary manifestations of sustainable professional competences for university lecturers in the digital age, Sichuan Province, comprising 36 questions.

3. Please click √ on the column that represents your opinion on the current status of sustainable professional competences for university lecturers in the digital era, Sichuan Province.

Thankyou

Mr. Qiang Guangping
A doctoral student in Sustainable Development Education
Bansomdejchaopraya Rajabhat University

Part 1: Personal Information of respondents

1 Gender: ☐☐Male ☐☐ Female

2 Years of teaching experience :

☐0-10 years

☐10-20 years

☐20-30 years

☐Over 30 years

3 Professional Title :

☐Junior

☐Intermediate

☐Associate Professor

☐Full Professor

4 Highest educational attainment :

☐less than a bachelor's degree

☐Bachelor's degree

☐Master's degree

☐Doctor's degree

Part 2: The current state of sustainable professional competence for university lecturers at your university

5 = Always, it expresses that the level of sustainable professional competence among university lecturers was at the highest level

4= Often, it expresses that the level of sustainable professional competence among university lecturers was at a high level

3 =Sometimes, it expresses that the level of sustainable professional competence among university lecturers was at a middle level

2 = Rarely, it expresses that the level of sustainable professional competence among university lecturers was at a low level

1 = Never, it expresses that the level of sustainable professional competence among university lecturers was at the lowest level

No.	Development of sustainable professional competences for university lecturers , sichuan province	Level				
		5	4	3	2	1
Subject knowledge						
1	Engage in regular study to update disciplinary knowledge					
2	Possess professional competitiveness within the disciplinary domain					
3	Participate in research activities relevant to the discipline					
4	Review the latest literature pertaining to the discipline					
5	Attend academic conferences relevant to the discipline					
6	Utilize online resources to enhance disciplinary knowledge					
7	Exchange ideas with peers to advance disciplinary knowledge					
8	Encourage students to pose discipline-related inquiries					
9	Periodically assess one's level of disciplinary knowledge					

No.	Development of sustainable professional competences for university lecturers , sichuan province	Level				
		5	4	3	2	1
Teaching ability						
1	Engage in regular reflection on one's teaching methods					
2	Utilize diverse teaching approaches					
3	Adapt teaching strategies based on student feedback					
4	Employ case studies to facilitate student comprehension					
5	Encourage students to engage in critical thinking					
6	Attend regular workshops or training sessions on teaching methodologies					
7	Utilize teaching feedback to enhance teaching quality					
8	Provide personalized learning support for students					
9	Conduct periodic evaluations of one's teaching effectiveness					

No.	Development of sustainable professional competences for university lecturers , sichuan province	Level				
		5	4	3	2	1
Sustainable learning						
1	Have a continuous learning plan					
2	Is continuous learning crucial for professional development					
3	Seek opportunities to enhance one's professional skills					
4	Encourage colleagues and students to engage in continuous learning					
5	Adapt to rapid changes in the field of education					
6	Utilize online resources for self-directed learning					
7	Set regular personal and professional development goals					
8	Engage in interdisciplinary learning activities					
9	Maintain an open attitude towards new knowledge					

No.	Development of sustainable professional competences for university lecturers , sichuan province	Level				
		5	4	3	2	1
Digital skills						
7	Stay abreast of the latest educational technology tools					
2	Employ digital tools to enhance teaching interactivity					
3	Engage in regular learning of digital skills					
4	Integrate digital resources into teaching					
5	Encourage students to utilize digital tools for learning					
6	Participate in training related to digital skills					
7	Keep track of the latest trends in educational technology					
8	Utilize social media to facilitate learning					
9	Use online platforms to share course materials					

Recommendation

.....

.....

.....

Thank you for your kind cooperation in completing the questionnaire!

Researcher

Mr. Qiang Guangping

Structured Interview

Development of strategies to promote sustainable professional competences for university lecturers in the digital era, Sichuan province

This Interview is divided into two parts:

Part 1: Personal Information

Part 2: The current status of lecturers' sustainable professional competences in the digital era, Sichuan province

.....

Part 1: Personal Information

Interview Date & Interview Time:

Interviewer:

Interviewee:

Education background:

Identity:

From university:

Part 2: The current status of lecturers' sustainable professional competences in the digital era, Sichuan province.

Instruction: Please provide your opinion on the following statement

What is the current state of sustainable professional competence in subject knowledge for university lecturers in the digital era, Sichuan province? How can the lecturers' subject knowledge be promoted?

What is the current state of sustainable professional competence in teaching ability for university lecturers in the digital era, Sichuan province? How can the lecturers' teaching ability be promoted?

What is the current state of sustainable professional competence in digital skills for university lecturers in the digital era, Sichuan province? How can the lecturers' digital skills be promoted?

What is the current state of sustainable professional competence in sustainable learning for university lecturers in the digital era, Sichuan province? How can the lecturers' sustainable learning be promoted?

Evaluation Form

Development of strategies to promote sustainable professional competences for university lecturers in the digital era, Sichuan province

No.	Promote sustainable professional competences for university lecturers in digital era	Adaptability					Feasibility				
		5	4	3	2	1	5	4	3	2	1
Subject knowledge											
1	Engage in regular study to update disciplinary knowledge										
2	Participate in research activities relevant to the discipline										
3	Review the latest literature pertaining to the discipline										
4	Attend academic conferences relevant to the discipline										
5	Utilize online resources to enhance disciplinary knowledge										
6	Exchange ideas with peers to advance disciplinary knowledge										
7	Periodically assess one's level of disciplinary knowledge										

No.	Promote sustainable professional competences for university lecturers in digital era	Adaptability					Feasibility				
		5	4	3	2	1	5	4	3	2	1
Teaching ability											
1	Engage in regular reflection on one's teaching methods										
2	Utilize diverse teaching approaches										
3	Adapt teaching strategies based on student feedback										
4	Attend regular workshops or training sessions on teaching methodologies										
5	Utilize teaching feedback to enhance teaching quality										

No.	Promote sustainable professional competences for university lecturers in digital era	Adaptability					Feasibility				
		5	4	3	2	1	5	4	3	2	1
Digital skills											
1	Stay abreast of the latest educational technology tools										
2	Employ digital tools to enhance teaching interactivity										
3	Engage in regular learning of digital skills										
4	Integrate digital resources into teaching										
5	Participate in training related to digital skills										
6	Keep track of the latest trends in educational technology										
7	Utilize social media to facilitate learning										
8	Use online platforms to share course materials										

No.	Promote sustainable professional competences for university lecturers in digital era	Adaptability					Feasibility				
		5	4	3	2	1	5	4	3	2	1
Sustainable learning											
1	Have a continuous learning plan										
2	Seek opportunities to enhance one's professional skills										
3	Adapt to rapid changes in the field of education										
4	Utilize online resources for self-directed learning										
5	Set regular personal and professional development goals										
6	Engage in interdisciplinary learning activities										

Appendix D

The Results of the Quality Analysis of Research Instruments

The index of objective congruence (IOC)

Development of strategies to promote sustainable professional competences for university lecturers in the digital era, Sichuan province

No.	Development of sustainable professional competences for university lecturers , sichuan province	experts						
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	IOC	Validlity
Subject knowledge								
1	Engage in regular study to update disciplinary knowledge?	1	1	1	1	1	1	valid
2	Possess professional competitiveness within the disciplinary domain?	1	1	1	0	1	0.8	valid
3	Participate in research activities relevant to the discipline?	1	1	1	1	0	0.8	valid
4	Review the latest literature pertaining to the discipline?	1	1	1	1	1	1	valid
5	Attend academic conferences relevant to the discipline?	1	1	0	1	1	0.8	valid
6	Utilize online resources to enhance disciplinary knowledge?	1	1	1	1	1	1	valid
7	Exchange ideas with peers to advance disciplinary knowledge?	1	1	0	1	1	0.8	valid
8	Encourage students to pose discipline-related inquiries?	1	1	0	1	1	0.8	valid
9	Periodically assess one's level of disciplinary knowledge?	1	1	1	1	1	1	valid

No.	Development of sustainable professional competences for university lecturers , sichuan province	experts						
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	IOC	Validlity
Teaching ability								
1	Engage in regular reflection on one's teaching methods?	1	1	1	1	1	1	valid
2	Utilize diverse teaching approaches?	1	0	1	1	1	0.8	valid
3	Adapt teaching strategies based on student feedback?	1	1	1	1	1	1	valid
4	Employ case studies to facilitate student comprehension?	1	1	0	1	1	0.8	valid
5	Encourage students to engage in critical thinking?	1	1	1	1	1	1	valid
6	Attend regular workshops or training sessions on teaching methodologies?	1	1	1	0	1	0.8	valid
7	Utilize teaching feedback to enhance teaching quality?	1	1	1	0	1	0.8	valid
8	Provide personalized learning support for students?	1	1	0	1	1	0.8	valid
9	Conduct periodic evaluations of one's teaching effectiveness?	1	1	1	1	1	1	valid

No.	Development of sustainable professional competences for university lecturers , sichuan province	experts						
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	IOC	Validlity
Digital skills								
1	Stay abreast of the latest educational technology tools?	1	1	1	1	1	1	valid
2	Employ digital tools to enhance teaching interactivity?	1	1	1	1	1	1	valid
3	Engage in regular learning of digital skills?	1	1	1	1	1	1	valid
4	Integrate digital resources into teaching?	1	1	0	1	1	0.8	valid
5	Encourage students to utilize digital tools for learning?	1	1	1	1	1	1	valid
6	Participate in training related to digital skills?	1	1	0	1	1	0.8	valid
7	Keep track of the latest trends in educational technology?	1	1	0	1	1	0.8	valid
8	Utilize social media to facilitate learning?	1	1	1	0	1	0.8	valid
9	Use online platforms to share course materials?	1	1	1	1	1	1	valid

No.	Development of sustainable professional competences for university lecturers , sichuan province	experts						
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	IOC	Validlity
Sustainable learning								
1	Have a continuous learning plan?	1	1	1	1	1	1	valid
2	Is continuous learning crucial for professional development?	1	1	1	1	1	1	valid
3	Seek opportunities to enhance one's professional skills?	1	1	1	1	1	1	valid
4	Encourage colleagues and students to engage in continuous learning?	1	1	0	1	1	0.8	valid
5	Adapt to rapid changes in the field of education?	1	1	1	1	1	1	valid
6	Utilize online resources for self-directed learning?	1	1	1	1	1	1	valid
7	Set regular personal and professional development goals?	1	0	1	1	1	0.8	valid
8	Engage in interdisciplinary learning activities?	1	1	1	1	1	1	valid
9	Maintain an open attitude towards new knowledge?	1	1	1	1	1	1	valid

Appendix E

Certificate of English

BANSOMDEJCHAOPRAYA
RAJABHAT UNIVERSITY

This is to certify that

Mr.Qiang Guangping

Achieved BSRU English Proficiency Test (BSRU-TEP) level

C1

Given on 9th August 2022

(Assistant Professor Dr Kulsirin Aphiratvoradej)

Director

Appendix F

The Document for Acceptance Research

SCIEDU™
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Website: www.sciedupress.com

August 20, 2024

Graduate School
Bansomdejchaopraya Rajabhat University
Bangkok, Thailand

Dear Luxana Keyuraphan,

Thanks for your submission to *World Journal of Education*.

We have the pleasure to inform you that your manuscript has been accepted for publication. It will be published on the Vol. 14, No. 3, in September 2024.

Title: Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province

Authors: Qiang Guangping, Luxana Keyuraphan, Phadet Kakham, Sarayuth Sethakhajorn & Chawalit Jujia

If you have any questions, please do not hesitate to contact with us.

Sincerely,

SCIEDU PRESS
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Sara M. Lee

On behalf of,
The Editorial Board of *World Journal of Education*
Sciedu Press

Researcher Profile

Name-Surname: Mr. Qiang Guangping

Birthday: August 1, 1992

Place of Birth: Wuhu, Anhui, China

Educational background:

- Doctor of Philosophy Program in Educational Management for Sustainable Development, Bansomdejchaopraya Rajabhat University, Thailand, 2024
- Master of Agriculture (Agricultural Engineering and Information Engineering), Sichuan Agricultural University, China, 2021
- Bachelor of Computer Science and Technology, Leshan Normal University, China, 2014

Work experience:

- served as a faculty member in the Student Affairs Office at Leshan Normal University, from 2014 to 2021
- served as a faculty member in the School of Electronic Information and Artificial Intelligence at Leshan Normal University, from 2021 to present

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