Utilizing the Delphi Technique to Develop a Self-Regulated Learning Model

Yongmei Li [1], Thosporn Sangsawang [2,*], Kitipoom Vipahasna [3]

[1] Vocational Education Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Thailand
[2,3] Educational Technology and Communications Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Thailand
[1] yongmei_l@mail.rmutt.ac.th; [2] sthosporn@rmutt.ac.th*; [3] kitipoom_v@rmutt.ac.th
* corresponding author

Abstract

This study combines learning process theories within the context of data science education in Sichuan Province, China, and develops a customized instructional model for the self-regulated International Higher Education (IHE) Model. In collaboration with 17 experts, selected through purposive sampling, and involving 100 instructors within Sichuan, China, this research explores an instructional model designed to foster self-regulated learning in the field of data science. The Delphi data collection method is employed to investigate the relevance of various learning theories within international higher education in Sichuan Province, China, with a specific emphasis on the data science discipline. The Self-Regulated Learning in International Higher Education (SLR-IHE) model, informed by survey questionnaires, addresses pertinent challenges encountered in data science education, including issues related to English language proficiency, faculty training, curriculum development, faculty mobility, cross-border regulations, and funding constraints. The findings of this study lead to the development of an International Higher Education (IHE) Model for Sichuan Province, China, using the Delphi Technique, which consists of four distinct instructional modules. Through a linear regression analysis of the SLR-IHE model, it becomes evident that the self-regulated learning process in data science education comprises four essential stages, each contributing to the acquisition of distinct goals. These stages include: (1) activating prior knowledge; (2) fostering idea exchange and iterative improvement; (3) building organizational knowledge through understanding, memorization, analysis, and transfer; and (4) generating innovative ideas through reflexive thinking and initiating creative thought processes. These stages collectively support the achievement of specific goals associated with Self-Managed Learning (SML), Self-Regulated Learning (SRL), Self-Paced Learning (SPL), and Self-Directed Learning (SDL) in the context of data science education. This comprehensive instructional model for data science education within the framework of international higher education development in Sichuan Province, China, emphasizes globalization, collaborative efforts, and economic growth as key drivers for enhancing the quality of education in the field of data science.

1. Introduction

The internationalization of higher education in China has emerged as a pivotal driver of change, shaping not only the global educational landscape but also influencing local communities. This transformative process has engendered a culture of mutual learning and knowledge exchange, contributed to reducing educational disparities, promoted self-directed collaborative learning, and facilitated the development of a universal understanding of living and learning. Over the past three decades, the internationalization of education in China has witnessed remarkable growth, leading to significant enhancements in academic quality, the cultivation of global citizenship, and substantial revenue generation for educational institutions.

With an extensive network comprising more than 3,000 tertiary education institutions, China has transitioned from a centrally planned educational system to one characterized by market-oriented reforms. These reforms have opened doors to foreign academic programs and institutional collaborations, fostering cross-border educational experiences. The engagement of the Chinese government in internationalizing higher education is paramount, given the diverse range of attitudes and methodologies involved in this multifaceted endeavor. The forces of globalization have had a profound impact on higher education, prompting Chinese universities to proactively embrace internationalization as a

strategic priority. This multifaceted process involves optimizing domestic educational resources, capitalizing on global opportunities, and nurturing internationally competitive, high-quality talents.

In this context, the Chinese government has been at the forefront of promoting internationalization through targeted initiatives encompassing teaching, research, and social services. These efforts have been further augmented by a series of reforms and strategic partnerships with renowned international universities. China's higher education policies, initially conceived in the late 20th century, were designed to assimilate successful models from developed nations, with a particular focus on the United States.

In 2018, China recorded a significant milestone with 662,100 Chinese students studying abroad, complemented by 492,200 international students choosing China as their destination for higher education. This exchange of students and academic resources has contributed to the accelerated internationalization of higher education in China.

The realm of data science stands as an exemplar of the transformative power of internationalization within higher education. Data science, spanning various domains, has emerged as a fundamental pillar of modern knowledge-driven societies. Its applications extend across academia, industry, and government, profoundly impacting decision-making processes and innovation across sectors. Consequently, it is imperative to explore how China's internationalization efforts within higher education are influencing the landscape of data science education, research, and practices.

However, within the realm of data science education, there exists a research gap. While there is an increasing body of literature on internationalization in higher education, there is limited comprehensive research specifically addressing the internationalization of data science education in China. This research gap underscores the need for a systematic exploration of the impact of internationalization on data science education in China, including identifying the challenges, opportunities, and best practices in this rapidly evolving field.

The state of the art in international higher education research highlights a growing interest in the internationalization of curricula, faculty and student mobility, and the development of globally competitive educational programs. In the field of data science, global collaborations, joint degree programs, and international research initiatives are becoming increasingly prevalent. Universities around the world are recognizing the importance of equipping their students with a global perspective and the skills required for a data-driven future.

This research endeavors to delve into the multifaceted implications and opportunities presented by China's higher education internationalization in the context of data science. It seeks to identify successful international higher education models that have effectively fostered excellence in data science, providing valuable insights for China's educational institutions and policymakers. By addressing the research gap and building upon the state of the art, this study aims to contribute significantly to our understanding of the internationalization of data science education in the Chinese higher education landscape and its broader implications for global data science advancement.

2. Literature Review

Regions desiring global competitiveness and academic achievement must build an international higher education paradigm. Recently, Sichuan Province, China, has prioritized international higher education. This literature review covers research, trends, and best practices for establishing and implementing an international higher education model in Sichuan Province.

2.1. Globalization and Internationalization of Higher Education in China

Globalization has increased the demand for cross-cultural competence and global mobility among students and academics. Numerous studies [1,2] have emphasized the importance of internationalization in higher education to foster intercultural understanding, attract international students and faculty, and enhance institutional reputation. Internationalization at home (IaH) is an excellent way to internationalize higher education systematically. This study also found that globalization at home in Chinese higher education institutions offered potentials for progress and problems for reform. The conclusion and implication examined China's justification for internationalizing higher education [3]. China's approach to internationalization in higher education focuses on the Confucius Institute program,

international development aid, and student recruitment. The research explores strategic intentions, academic and non-academic material, and challenges in evaluating China's approach objectively [4].

2.2. Challenges and Opportunities for Self-regulated Learning Presented By Sichuan in China

Sichuan Province's rich cultural heritage and rapidly growing economy make it an ideal location for establishing an international higher education model. Extensive research is necessary to address these challenges and capitalize on the opportunities. Has highlighted the need for improving English language proficiency, faculty training, and curriculum development to ensure successful internationalization efforts. Motivated strategies for cross-cultural adaptation and modification were necessary when addressing the transferability of self-regulated learning (SRL) models from Western culture to Eastern culture, particularly in the Chinese educational context [5,6]. The literature has also addressed various challenges faced while implementing an international higher education model. Issues related to curriculum alignment, faculty and student mobility, cross-border regulations, and funding [7] are among the key factors that must be carefully considered and addressed in Sichuan Province's context. Has its strengths and weaknesses. Comparative studies [8,9] have explored different models, such as branch campuses, transnational education, joint degree programs, and international collaborations, offering valuable insights into their effectiveness and suitability for Sichuan Province. Challenges and Strategies: This section identifies potential challenges in implementing the international higher education model and proposes strategies to overcome them. Challenges may include cultural barriers, language differences, financial constraints, and bureaucratic hurdles. Challenges that hindered the change of international students studying in a university using the phenomenological method. The data analysis generated five themes related to the challenges encountered: (1) living away from family and friends, (2) difficulty in expressing, (3) multitasking, (4) difficulty in fitting in, and (5) lack of positive attitude. The findings have implications for universities. Higher educational institutions can be essential in addressing the challenges to facilitate a positive academic experience for international students [10].

2.3. Impact on Regional Development

The impact of international higher education on regional development is significant, and it plays a crucial role in guiding policy and decision-making. It promotes regional innovation, economic growth, and cultural exchange. By examining successful models of international higher education, Sichuan Province can learn valuable lessons [11]. Creating an effective higher education model for Sichuan Province in China is a complex task that requires various factors. Effective internationalization in higher education requires several key components, such as strong leadership, faculty support, strategic partnerships, and a clear vision. This literature review highlights the importance of internationalization, the challenges faced by Sichuan Province, and various models and practices that can be implemented. Policymakers and educational institutions can use this information to make informed decisions and establish a sustainable model that fosters global engagement and academic excellence. To achieve this, forming partnerships with established international universities, providing English-language undergraduate and postgraduate programs, and having a clear vision for internationalization are essential [12]. Developing an international higher education model for Sichuan Province, China, is complex and multifaceted. Key components of the proposed model include strategic partnerships with reputable international universities, English-medium undergraduate and postgraduate programs, and a clear vision for internationalization.

2.4. The Delphi Technique

A systematic and iterative method is used to gather and synthesize expert opinions on complex issues. The Delphi Technique is a methodical and iterative approach that gathers and synthesizes expert opinions on complex issues within a specific context. They provide experts with a questionnaire to address various aspects of the model, and the process aims to reach a consensus. The Delphi Technique may involve multiple rounds to narrow differences and achieve a shared understanding of the challenges, opportunities, and strategies for developing the model [13-15]. The insights gained through consensus serve as a foundation for devising [16]. The Delphi Technique for Developing an International Higher Education Model for Sichuan Province, China. In developing an international higher education model for Sichuan Province, China, the Delphi Technique can serve as a valuable tool to harness the collective wisdom

of experts in the field, identify key challenges and opportunities, and devise effective strategies for implementation [17].

1) Step 1: Selecting a Panel of Experts. The first step in applying the Delphi Technique is to assemble a panel of experts in the field of international higher education and education technology, including scholars, policymakers, administrators, and industry professionals. These experts should possess diverse perspectives and expertise relevant to the specific context of Sichuan Province.

2) Step 2: Round One - Generating Ideas. In the initial round, experts will be provided with a questionnaire that addresses various aspects of the international higher education model. This questionnaire can include questions on challenges, opportunities, best practices, potential models, and successful factors. Experts will be encouraged to provide detailed responses, justifications, and examples based on their experiences and knowledge.

3) Step 3: Round Two - Feedback and Consensus. In the subsequent round, the panel of experts will receive a summary of the collective responses from the first round while keeping their responses anonymous. They will be asked to review the synthesized feedback and may revise or reaffirm their initial opinions based on the insights provided by their peers. The process encourages convergence toward a consensus.

4) Step 4: Round Three and Beyond (if required). The Delphi Technique may involve several rounds, depending on the level of consensus achieved in previous iterations. Each round seeks to narrow down the differences in expert opinions and eventually converge towards a shared understanding of the challenges, opportunities, and strategies for developing an international higher education model for Sichuan Province.

5) Step 5: Reaching Consensus and Recommendations. The Delphi Technique aims to identify areas of agreement among the panel of experts. Once a high level of consensus is achieved, the essential findings and recommendations can be summarized. These consensus-driven insights will serve as a foundation for devising a coherent and evidence-based international higher education model for Sichuan Province. Conclusion: The Delphi Technique offers a structured approach to gather and synthesize expert opinions, providing valuable insights for developing an international higher education model in Sichuan Province, China. By incorporating experts' diverse perspectives and experiences, the region can make well-informed decisions, address potential challenges, and capitalize on opportunities to enhance its global competitiveness and promote academic excellence. The consensus-driven approach ensures that the proposed model is robust, relevant, and tailored to the unique needs and context of Sichuan Province.

3. Methodology

The Sichuan Province of China used the Delphi Technique to create a global higher education model. This technique involved gathering expert opinions to establish practical implementation plans and identify opportunities and obstacles. The process began by assembling experts with varying perspectives and relevant knowledge, including academics, decision-makers, administrators, and businessmen. In the idea generation stage, specialists were asked about different aspects of the global higher education system, and their explanations, arguments, and real-life examples are listened to carefully. Then the panel received a summary of the group's responses from the previous round and was asked for their opinions. The data was collected using the Delphi technique. There were four rounds of data collection [18,19]. First Round: Brainstorming. In this session, 17 specialists from China, USA,Thailand and Pakistan were carefully selected for a study using the purposive sampling technique. These experts were highly qualified in higher education internationalization or educational technology, possessing doctoral degrees or working in the position of Professor, Associate Professor, Lecturer and Researcher for at least five years. Each expert was contacted by phone or in person to obtain their consent to participate in the study. Once they agreed, appointments were scheduled with all 17 qualified experts. The researcher provided semi-structured questionnaire on the instructional design for Sichuan Province, China's self-regulated international higher education model. It was essential to include all 17 experts in this study. The researcher conducted semi-structured interviews and analyzed the results to create Questionnaire I. This questionnaire focuses on designing instruction based on the psychological theories of constructivism and constructionism. To evaluate the data, the researcher used Likert's five rating scales. Second Round: Evaluation. In this session, it utilized a learning process theory-based instructional design for a self-regulated international higher education model in

Sichuan Province, China. The researcher carefully reviewed the open-ended questionnaire responses to determine areas of agreement. Using answers from semi-structured interviews and selecting relevant items produced diagrams highlighting similarities and differences. The researcher conducted interviews and gave surveys with 17 experts to gather more data. The researcher calculated each question item's median, mode, and interquartile range values. Third Round: Re-Evaluation. During the re-evaluation, 17 experts were given Questionnaire III to answer with "yes," "no," or "unsure." The questionnaire included principles, teaching methods, environments, and models related to self-regulated international higher education, drawn from both constructivism (learning by doing) and constructionism (social context). These items were chosen based on the results of Questionnaire I. Most experts agreed on the similarities, while disagreements arose from the differences. Fourth-Round: Solution-Report. This round has identified, resolved, and reported feasible ideas. The experts acknowledged all the group's opinions with the ideas or strategies and details of implementation [20].

4. Data Analysis

The study analyzed an instructional model of learning process theories for a self-regulated international higher education model in Sichuan Province, China. The Delphi method was used, with four data collection phases. First Round: Creative Thinking, Second Round: Evaluation of Experts' Ideas, and Third Round: Re-Evaluation. Fourth Round: Solution-Report. The first round involved ideation with experts using semi-structured questionnaire based on constructivism and constructionism, emphasizing learning by doing and social context. The data was analyzed using Likert's five-point scale, and the results were compared to determine if a consensus existed. The data were synthesized to develop an instructional model of learning process theories for a self-regulated international higher education model in Sichuan Province, China. The framework for an instructional model of learning process theories was established after completing Questionnaire IV. The experts resolved feasible concepts and acknowledged all group's opinions regarding ideas, strategies, and implementation details.

5. Results of the Delphi Technique

The results of the analysis of the Delphi technique in the SLR-IHE model. Demographic characteristics of Delphi participants were 17 Experts who were male *47.2%*, female *52.8%*, and had five years in international higher education or education technology, had a position of Professor, Associate Professor, Lecturer, Researcher, Country of residence were China, USA, Thailand and Pakistan.

First phase: Synthesize learning process theories related to the self-regulated International Higher Education Model for Sichuan Province, China. The results of the analysis of the Delphi technique in the SLR-IHE model by Correlation Coefficient Simple linear regression relates x 1...4 to Y through the equation Y = a + b x 1...4. There are some important similarities between correlation and regression. These statistical methods determine the strength and direction of the relationship between two numeric variables [21,22]. It is worth noting that when the correlation (represented by the letter "r") is negative, this means that the regression slope (represented by the letter "b") will also be negative. Self-Regulated Learning for international higher Education is shown in Figure 1.
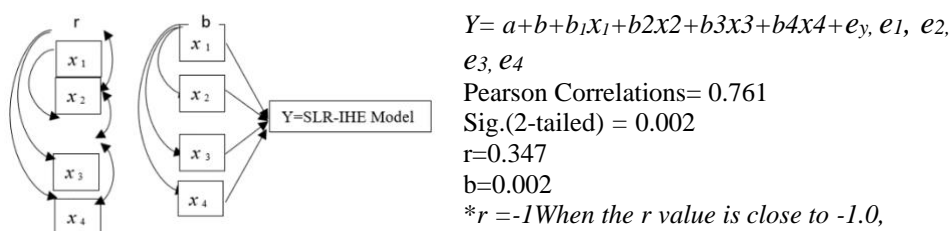

$Y= a+b+b_1x_1+b2x2+b3x3+b4x4+e_y, e_1, e_2, e_3, e_4$
Pearson Correlations= 0.761
Sig.(2-tailed) = 0.002
r=0.347
b=0.002
r =-1When the r value is close to -1.0,

Figure. 1. The analysis of the Correlation Coefficient

Table. 1. The analysis of the Delphi technique in the SLR-IHE model by Correlation Coefficient

Correlation Coefficient (r)		Correlation Coefficient (b)					$r\sum x_1...x4$	$b\sum x_1...x4$
		Y	x_1	x_2	x_3	x_4		
Y	Pearson Correlations	1.000	0.850	0.653	0.695	0.606	0.761	0.002
	Sig.(2-tailed)	.	0.000	0.002	0.001	0.005		
x_1	Pearson Correlations	0.850	1.000	0.456	0.559	0.663	0.706	0.011
	Sig.(2-tailed)	0.000	.	0.043	0.010	0.001		
x_2	Pearson Correlations	0.653	0.456	1.000	0.434	0.417	0.592	0.034
	Sig.(2-tailed)	0.002	0.043	0	0.056	0.068		
x_3	Pearson Correlations	0.695	0.559	0.434	1.000	0.272	0.592	0.063
	Sig.(2-tailed)	0.001	0.010	0.056	0	0.246		
x_4	Pearson Correlations	0.606	0.663	0.417	0.272	1.000	0.592	0.064
	Sig.(2-tailed)	0.005	0.001	0.068	0.246	0		

Figure 1 and Table 1 synthesize learning process theories related to the self-regulated International Higher Education Model for Sichuan Province, China. The analysis results for Sichuan Province, China; Figure 1 combines learning process theories connected to a self-regulated international higher education model. The SLR-IHE model was used to analyze the Delphi approach, and the results showed that x 1=R1, x 2=R2, x 3=R3, x 4=R4, and Y=SLR-IHE Model. Through the equation Y = a + b x 1..4, simple linear regression connects x 1...4 to Y. Both quantify the link between two numerical variables, including their intensity and direction. The regression slope (b) will be negative if the correlation (r) is negative. Pearson Correlations = 0.761, sig. (2-tailed) = 0.002, r = 0.347 was near +1, which means the strong positive correlation between the two variables is confirmed by the r value that is almost equal to +1.0., b=0.002. The result of the analysis of the Delphi technique in the SLR-IHE model from the linear regression of the questionnaire's four cycles of Y on X1, X2, and X3 is the full model, SRL-IHE: International Higher Education Model for Sichuan Province, China. (1) Principles; Instructors; creating situations and organizing knowledge from experience; encouraging learners to originate learning; creating an atmosphere of exchanging opinions, linking learners' ideas; creating an experience of learning new things. (2) Stages of teaching-learning activities; activate pre-knowledge on one's own, exchange ideas and improve mistakes, and build organization knowledge by understanding, memorizing, analyzing, transferring, creating ideas, reflexive thinking, and initiating thinking. (3) Components of teaching-learning management: learners, instructors, stimulations, responding to behaviors, surroundings, tools, or equipment (4) Teaching-learning models; encouraging interests, informing learners of expected learning results, building conditions to arouse interests to give rise to the learning procedure, giving useful advice for learning, finding answers, and altering ideas, (5) finding one's wit, thinking, and abilities to transfer knowledge [23]. The results of the synthesis of similarities and differences.

Table. 2. The result of experts' opinions on the four rounds of questionnaires

SRL-IHE: International Higher Education Model	Classification of similarities (Constuctivist & Constuctionism)	Classification of differences. (Constuctivist & Constuctionism)
Principles	The learning cycle, systems, regulations, and adaptability help	Instructors explore outside influences to improve Learning. They teach,

	teachers teach organizational knowledge. Hands-on, child-centered, and self-controlled Learning gives students self-knowledge. Teachers must help students create particular situations to master learning and choose the best thinking models. Students can learn more and master assignments by working with teachers on problems and doing hands-on activities.	create, reflect, and think critically. Before learning new content, students analyze their past knowledge, create a good learning environment, and organize. They discuss learning methods, fix mistakes, and share ideas.
Teaching - learning activities/strategies	• Promote and manage interests. • Offer valuable learning advice. • Evaluate practice. • Transform learning into a new one. • Transfer. • Enhance Pre-Knowledge. • Discover settled questions.	• Encourage learners to think creatively, inform learning outcomes, manage feedback, create memorization opportunities, motivate Learning, and transfer thinking.
Teaching-learning environments.	• Instructors. • Learners.	• Stimulation. • Response behaviors. • Surroundings. • Knowledge resources.
Teaching-learning models.	• Signal learning. • Chaining. • Verbal association. • Discrimination learning. • Concept learning. • Rule learning. • Problem solving. • Creative thinking, reflective thinking, and thinking initiatives • Self-learning (simulation and games) • Sharing construction. • New knowledge. Presentation. • Learning assessment. • Modify actions.	• Instructors create teaching criteria to suit the learners' external Instructors develop criteria according to step-by-step experience. • Conditions. • Instructors promote learning events. • Instructors create a learning atmosphere. • Learners create organizational knowledge on their own, not from instructors.

Table 2 Most experts were neutral on the learning-by-doing approach in terms of cooperative Learning; project-based Learning; problem-based Learning; group investigation; and inquiry methods. For social context, most experts strongly agreed on cooperative Learning; project-based Learning; problem-based Learning; group investigation; and inquiry methods. Also, the researcher selected the items from the results of Questionnaire I. All four terms on principles, teaching-learning activities/strategies, teaching-learning environments, teaching-learning models of learning-by-doing approach, and social context were pooled together as similarities or differences. The similarities meant that most of the 17 experts agreed, while the differences meant the opposite. The results of synthesizing similarities and differences for identifying and developing an instructional model using learning process theories for a self-regulated International Higher Education Model for Sichuan Province, China, are shown in the second phase.

Second phase: Identify and develop an instructional model using learning process theories for a self-regulated International Higher Education Model for Sichuan Province, China. Development of an International Higher Education Model for Sichuan Province, China. The results from the experts' opinions in identifying and developing an instructional model using learning process theories for Sichuan Province, China's self-regulated international higher

education model were created from psychology theories, namely constructivism (Learning by doing) and constructionism (social context), as shown in Figure 2 [24] .

Figure. 2. Development of an International Higher Education (IHE) Model for Sichuan Province, China by Delphi Technique

IHE Model The stages of the learning process:

1) Signal learning: Instructors guide conditional learning by providing learners with information, objectives, outcomes, benefits, and teaching criteria, activating receptors, setting expectations, and enhancing short-term memory retrieval and activation.
2) Chaining: Instructors guide learners through a step-by-step learning process, enhance encoding, create verification, and provide retrieval and reinforcement for learning. They also evaluate and generalize learned skills for new situations.
3) Verbal association Learners rethink: Learners find questions and perform self-regulation learning in instructional models.
4) Discrimination: Learners learn through testing, feedback, sharing activities, understanding, regulating, and presenting knowledge.
5) Concept learning: Instructors create tasks and conditional learning for learners while learners and instructors share thoughts and knowledge.
6) Rule learning: Learners achieve learning objectives and meet conditional learning while instructors construct self-constructionist structures.
7) Problem-solving: Instructors offer instructions, tutorials, simulations, games, drills, practice, and tests for learners, enabling them to construct knowledge through communities and solve problems.
8) Creative thinking: Encourage learners to understand reflective thinking, discuss knowledge organization, and share information for effective knowledge management.
9) Self-learning: Learners can plan and solve problems independently using simulation and gaming media while instructors and learners collaborate on tasks and experiences.

6. Conclusions and Evaluation

The conclusion outlines the model's essential aspects and emphasizes Sichuan Province's need for international higher education. An international higher education model can improve the province's academic excellence, cultural enrichment, and economic development. Finally, the study urges policymakers, university administrators, and stakeholders to collaborate and adopt a model to improve higher education in Sichuan Province, China.

Enhancing Self-Regulated Learning in an International Higher Education Model for Sichuan Province, China: An Effective Instructional Approach. An ambitious project to create an international higher education model for Sichuan

Province, China, requires a pedagogical method that promotes student self-regulation. Self-regulated Learning (SRL) helps students set goals, track progress, and change their techniques to succeed in school. This paper examines how a learning process-based instructional strategy can improve self-regulated Learning in international higher education in Sichuan Province. First, activate prior knowledge; Second, exchange ideas and improve mistakes; Third, build organization knowledge by comprehending, memorizing, analyzing, and transferring; Fourth, construct SML, SRL, SPL, and SDL goals. International higher education development in Sichuan Province, China, emphasizes globalization, collaboration, and economic expansion to improve education quality.

References

[1] De Wit, Hans. "Globalisation and internationalisation of higher education." *Rev. U. Soc. Conocimiento,* vol. 8, no. 2, p. 241, 2011.

[2] J. Knight, "Internationalization remodeled: Definition, approaches, and rationales," *Journal of Studies in International Education*, vol. 8, no. 1, pp. 5–31, 2004. doi:10.1177/1028315303260832

[3] J. Li and X. Eryong, "New Directions towards internationalization of higher education in China during post-COVID 19: A systematic literature review," *Educational Philosophy and Theory*, vol. 54, no. 6, pp. 812–821, 2021. doi:10.1080/00131857.2021.1941866

[4] H. Wu, "Three dimensions of China's 'outward-oriented' higher education internationalization," *Higher Education*, vol. 77, no. 1, pp. 81–96, 2018. doi:10.1007/s10734-018-0262-1

[5] F. Tong *et al.*, "Examining cross-cultural transferability of self-regulated learning model: An adaptation of the motivated strategies for Learning Questionnaire for Chinese adult learners," *Educational Studies*, vol. 46, no. 4, pp. 422–439, 2019. doi:10.1080/03055698.2019.1590183

[6] D. H. Schunk and C. A. Mullen, "Toward a conceptual model of mentoring research: Integration with self-regulated learning," *Educational Psychology Review*, vol. 25, no. 3, pp. 361–389, 2013. doi:10.1007/s10648-013-9233-3

[7] Hudzik, John K. "Comprehensive internationalization." *Washington, DC: NAFSA, The Association of International Educators*, 2011.

[8] P. G. Altbach and J. Knight, "The internationalization of higher education: Motivations and realities," *Journal of Studies in International Education*, vol. 11, no. 3–4, pp. 290–305, 2007. doi:10.1177/1028315307303542

[9] S. Marginson, "Higher education in the global knowledge economy," *Procedia - Social and Behavioral Sciences*, vol. 2, no. 5, pp. 6962–6980, 2010. doi:10.1016/j.sbspro.2010.05.049

[10] P. Chennamsetti, "Challenges faced by Indian international students in the US," *Journal of Interdisciplinary Studies in Education*, vol. 9, no. 2, pp. 258–272, 2020. doi:10.32674/jise.v9i2.2345

[11] Perry, Elizabeth J. "Higher education and authoritarian resilience: The case of China, past and present." *Harvard-Yenching Institute Working Paper Series,* 2017.

[12] M. Dresel *et al.*, "Competencies for successful self-regulated learning in higher education: Structural model and indications drawn from expert interviews," *Studies in Higher Education*, vol. 40, no. 3, pp. 454–470, 2015. doi:10.1080/03075079.2015.1004236

[13] Sangsawang, T., K. Jitgarun, and P. Kaittikomol. "Students Self Appraisal for online Training." In *ASIA Pacific Educational Research Association International Conference*, vol. 1, no.1, pp. 1-5, 2006.

[14] Sangsawang, T., K. Jitgarun, and P. Kaittikomol. "Comparison of Selected Psychology Theories as in Gagne's, Constructivism, and Constructionism." In *The 4th international conference on developing real-life learning experiences: education reform through Performance-Based Learning*, vol.1, no.1, pp. 327-328. 2006.

[15] Sangsawang, T., K. Jitgarun, and P. Kaittikomol. "A learning strategy suitable for learners' self-discovery." *EDU-COM 2006 Engagement and Empowerment: New Opportunities for Growth in Higher Education, November 22-24*, p. 619, 2006.

[16] T. Sangsawang, "An instructional design for online learning in vocational education according to a self-regulated learning framework for problem solving during the COVID-19 crisis," *Indonesian Journal of Science and Technology*, vol. 5, no. 2, pp. 283–298, 2020. doi:10.17509/ijost.v5i2.24702

[17] Šteh, Barbara, and Marjeta Šarić. "Enhancing self-regulated learning in higher education." *Journal of Elementary Education,* vol. 13, no. Spec. Iss, pp. 129-150, 2020.

[18] Sangsawang, T., K. Jitgarun, and P. Kaittikomol. "A synthesis of Meaningfulness of training theories as in Gagné's, Constructivism, and ConstuctionismTowards Online Training and Instructional Design." In *The ICAST Asian Symposium*, pp. 6-9, 2007.

[19] T. Sangsawang, K. Jitgarun, and P. Kiattikomo, "An internet based Instructional Design Framework for vocational education," *International Journal of Soft Computing*, vol. 6, no. 4, pp. 119–127, 2011. doi:10.3923/ijscomp.2011.119.127

[20] T. Sangsawang, "Instructional Design Framework for Educational Media," *Procedia - Social and Behavioral Sciences*, vol. 176, pp. 65–80, 2015. doi:10.1016/j.sbspro.2015.01.445

[21] A. Azis, B. A. Kusuma, and A. Maselia, "Support system for determination of low-income students scholarship (BSM) with technique for order preference by similarity to Ideal Solution (TOPSIS)," IJIIS: International Journal of Informatics and Information Systems, vol. 3, no. 1, pp. 1–11, 2020. doi:10.47738/ijiis.v3i1.2

[22] T. Hariguna, "An empirical study to understanding students continuance intention use of multimedia online learning," International Journal for Applied Information Management, vol. 1, no. 2, 2021. doi:10.47738/ijaim.v1i2.10

[23] A. O. Qarareh, "The effect of using the constructivist learning model in teaching science on the achievement and scientific thinking of 8th grade students," *International Education Studies*, vol. 9, no. 7, pp. 178–196, 2016. doi:10.5539/ies.v9n7p178

[24] H. Harjali, "Building Constructivist Learning Environment at senior high school in Indonesia," *The Qualitative Report*, vol. 24, no. 9, pp. 2197–2214, 2019. doi:10.46743/2160-3715/2019.4001

[25] B. Zheng, A. Ward, and R. Stanulis, "Self-regulated learning in a competency-based and flipped learning environment: Learning strategies across achievement levels and years," *Medical Education Online*, vol. 25, no. 1, p. 1686949, 2019. doi:10.1080/10872981.2019.1686949