Developing and Validating a Competency-Based Graduate Production Model: A Case Study of SSRU

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Abstract

The aim of this study was to design and validate a model of a Competency-Based Graduate Production for Suan Sunandha Rajabhat University (SSRU), which was based on four dimensions, including knowledge, skills, attitudes, and values (K-S-A-V). The data were collected from 453 stakeholders, including students, graduates, lecturers, and employers. CFA and PLS-SEM were employed to examine the measurement and structural models of the CB-GRP model for SSRU. The results showed a good fit of the model (GFI = 0.92, CFI = 0.99, and RMSEA = 0.046) and that attitudes (β = 0.96) and values (β = 0.94) were the most important factors for producing graduates, which were supported by feedback from stakeholders in relation to the consistency between the CB-GRP model and actual needs. The study provided a validated model of competency-based graduate production and supported the alignment between non-cognitive competencies and an outcome-based curriculum design.

Keywords: Competency-based Education, Graduate Employability, K-S-A-V Framework

1.Introduction

The fast changing world economy, driven by both automation and digitalization, has been increasing the demand for graduates who can demonstrate both academic knowledge and competencies (skills and professional values) that match employers' needs. In Thailand, national education policies have promoted the competency-based education (CBE) to improve graduate employability (Office of the Education Council, 2024; Ministry of Education, 2023).

Suan Sunandha Rajabhat University (SSRU), one of the regional public universities, aims to develop and prepare students for the fast-changing workforce. Therefore, the implementation of a validated and theoretical model of preparation for professional life is necessary in order to ensure students' readiness when they graduate from SSRU. Four dimensions of competency—knowledge, skills, attitudes, and values (K-S-A-V)—are commonly used in the related literature. However, most of the previous studies and practice tend to use these competencies to improve curriculum and instructional design without conducting a validation study (Knight & Yorke, 2003; Andrews & Higson, 2008).

This research suggested a Professional Graduate Production Model unique to SSRU and tested its relationships empirically. Applying the Confirmatory Factor Analysis (CFA) and Partial Least Squares Structural Equation Modeling (PLS-SEM), this study also confirmed the relationships between latent competency constructs and graduate readiness contributions. The results would be a support to higher education institutions to develop outcome-based curricula

that would align with industry expectations and contribute to national human capital production.

1.1 Research Objective

The purpose of this study is to develop and validate a graduate production model at SSRU based on four major domains: K-S-A-V (knowledge, skills, attitudes, and values). The model's structure and its impact on the readiness of graduates are analyzed by CFA and PLS-SEM.

Research Questions

1. What are the key components of the model?
2. Does the model reflect stakeholders' expectations?
3. Which factors most influence graduate readiness?

2. Literature review

In order to link this study to prior knowledge in the field, this section briefly reviews theories and models which serve as the foundation for this study in the development of professional graduate competencies. The background review is divided into three distinct topics including the overall concept of competency-based education (CBE), the K-S-A-V framework, and supporting methods for validation of such models.

2.1 Competency-Based Education (CBE) and Graduate Employability

Competency-Based Education (CBE) is centered on learning outcomes and measurable skills over time (Gervais, 2016; Voorhees, 2001). It aligns academic accomplishments with workforce needs and emphasizes skills important in the 21st century, such as adaptability, practical skills, and lifelong learning. In Thailand, universities are encouraged to integrate digital literacy, problem-solving, and ethics into their programs to equip students for the digital economy (Ministry of Education, 2023).

Graduate employability is now seen as a combination of academic knowledge, soft skills, and personal values. Knight and Yorke (2003) see it as an ongoing developmental process, not a fixed set of skills. Andrews and Higson (2008) found that communication, teamwork, and professionalism are the top three attributes that employers look for in graduates.

2.2 The K-S-A-V Framework

Graduate development is nowadays contextualized and compared in four dimensions: K-S-A-V, where K represents Knowledge (academic, technical), S stands for Skills (applied skills, such as teamwork, communication abilities; Jackson, 2013), A stands for Attitudes (self-development, leadership; Healy et al., 2020) and V stands for Values (ethics, social responsibility; Billett, 2011). This model is proposed to serve as a framework for holistic education approaches in which the development of competency and character is sought.

2.3 Model Validation Using CFA and PLS-SEM

To confirm the validity of such models, Confirmatory Factor Analysis (CFA) and Partial Least Squares Structural Equation Modeling (PLS-SEM) can be used. CFA aims to test a set of latent variables and PLS-SEM, the relationships and path strength (Hair et al., 2011). In this way, it can be ensured that the models are statistically verified and may be used in practice for curriculum reform.

3. Methodology

The quantitative methodological design was adopted, using Partial Least Squares Structural Equation Modeling (PLS-SEM) and Confirmatory Factor Analysis (CFA), to test the hypothesized graduate production model. The model is based on four latent variables, including knowledge, skills, attitudes, and values.

Population and Sample

The target population is the four stakeholder groups at Suan Sunandha Rajabhat University (SSRU): students, alumni, employers, and faculty/administrators. Multi-stage sampling was conducted with 453 participants from July to September 2024.

Research Instrument

A 50-item instrument based on the K-S-A-V dimensions was created using a 5-point Likert format. The instrument's validity was established by using the Index of Item-Objective Congruence (IOC $\geq$ 0.50) (Rovinelli & Hambleton, 1976). The instrument's reliability was determined by using Cronbach's alpha ($\alpha > 0.70$) (Cronbach, 1951).

Data Analysis

For the initial analysis, descriptive statistics were reported. CFA was used to provide evidence for the construct validity of the study, and PLS-SEM was used to analyze the relationships among latent variables as well as evaluating the model's fitness. GFI, CFI, RMSEA, and standardized regression weights (β-values) were used to measure the model fitness (Hair et al., 2011).

4. Results

The findings address each of the research questions by validating the structure and impact of the K-S-A-V framework in SSRU's professional graduate model.

RQ1: What are the key components of SSRU's professional graduate model?

Confirmatory Factor Analysis (CFA) identified **four latent variables**—Knowledge, Skills, Attitudes, and Values (K-S-A-V)—each with five measurable indicators as exhibited in Table 1.

Table 1: Key Components of the SSRU Professional Graduate Production Model

Component	Definition	Key Attributes
Knowledge	Academic and technical expertise relevant to professional fields.	Professional Knowledge, Technology Proficiency, Foreign Language, Licensing, Legal Knowledge
Skills	Practical abilities required for effective job performance.	Communication, Teamwork, Problem-Solving, Creativity, Data Analysis
Attitudes	Professional mindset and motivation toward career success.	Self-Development, Lifelong Learning, Competitiveness, Leadership, Service-Mindedness
Values	Ethical and moral principles guiding professional behavior.	Honesty & Integrity, Public-Mindedness, Organizational Commitment, Rule Compliance, Environmental Awareness

A. Knowledge

Graduates should have the knowledge required for the practice of their professions which include professional theoretical knowledge, foreign language, workplace laws and regulations, and professional certificates like professional licenses.

B. Skills

Graduates should be able to use their knowledge to carry out actions in order to solve problems. This can be reflected in their communication, cooperation, problem solving, creativity, and data analysis skills, which are required for successful team building and efficient problem-solving and decision-making processes.

C. Attitudes

Graduates should have the mindset and state of mind needed for job advancement. The main factors include the attitude towards self-development and self-improvement, the ability to self-study, competitiveness, and leadership skills as well as the sense of service.

D. Values

Graduates should show the best behavior that reflects professional and ethical values. The significant aspects of professional and ethical values that students should know and abide by are honesty, public-mindedness, compliance with rules and regulations, environmental protection, and organizational commitment.

RQ2: Does the model meet stakeholder expectations?

The degree to which the recommended professional graduate model (PGM) meets stakeholder's needs was assessed by surveying students, graduates, employers, and faculty (n = 453). The findings indicate a strong consensus across stakeholders on the prioritization of key K-S-A-V competencies as presented in Table 2.

Table 2: Top-Rated Attributes by Stakeholder Group

Stakeholder	Top-Rated Attributes
Students	Communication (M = 4.31), Teamwork (M = 4.36)
Graduates	Self-development (M = 4.71), Lifelong learning (M = 4.68)
Employers	Integrity (M = 4.56), Problem-solving (M = 4.52), Teamwork (M = 4.45)
Faculty	Critical thinking, Leadership, Mentorship (qualitative)

According to Table 2, stakeholder groups prioritized unique, but overlapping, graduate attributes. Students focused on communication (M = 4.31) and teamwork (M = 4.36), graduates on self-development (M = 4.71) and lifelong learning (M = 4.68), and employers on integrity (M = 4.56), problem-solving (M = 4.52), and teamwork (M = 4.45). Faculty prioritized critical thinking, leadership, and mentorship, through qualitative responses.

This finding that stakeholders prioritized both cognitive skills and non-cognitive characteristics such as collaboration, ethics, and lifelong learning was consistent with the literature.

Confirmatory Factor Analysis (CFA) was conducted to test the structural validity of the proposed graduate competency model. Table 3 shows the fit indices for the model.

Table 3 Model Fit Indices from Confirmatory Factor Analysis (CFA)

Fit Index	Value	Interpretation
GFI	0.92	Good model fit
CFI	0.99	Excellent comparative fit
RMSEA	0.046	Excellent (under 0.05)

As demonstrated by the fit indices in Table 3, all of the recommended cutoffs were met, indicating a good fit and strong structural validity.

In conclusion, the model not only reflects theoretical competency structures but is also validated through empirical data and real-world stakeholder input—demonstrating its applicability for curriculum and policy development.

RQ3: Which elements most influence graduate readiness?

The relative contribution of each component of the model to graduate development was evaluated by Partial Least Squares Structural Equation Modeling (PLS-SEM). The standardized regression weights (β-values) are reflective of the contribution of each of the latent variables-Knowledge, Skills, Attitudes and Values (K-S-A-V) to graduates' readiness.

Table 4. Path Coefficients from PLS-SEM Analysis

Component	β-value	Interpretation
Attitudes	0.96	Highest influence on professional readiness
Values	0.94	Strong moral and ethical impact
Skills	0.94	Supports job performance and adaptability
Knowledge	0.91	Foundational but slightly less predictive

These findings indicated that all four components of university graduate competence have a significant effect on their readiness for work; however, the strongest effect (highest path coefficients) was from attitudes (self-development, competitiveness, leadership) and values (integrity, public-mindedness).

Based on the detailed results you've provided, here is a polished and academically appropriate **Discussion** and **Conclusion** section that aligns closely with your research findings and research questions (RQ1–RQ3), integrating theory and references:

5. Conclusion

SSRU's verified K-S-A-V model is theoretically logical and empirically robust, capable of producing the required graduates in competency terms. Structural Confirmation Factor Analysis (CFA) of the model also ascertained a good fit (GFI = 0.92, CFI = 0.99, RMSEA = 0.046), as PLS-SEM path coefficients revealed attitudes (β = 0.96) and values (β = 0.94) have a significant positive effect on graduates' preparedness more than knowledge (β = 0.91).

This validates Gervais's (2016) view that CBE must be more focused on evidence of learning outcomes other than the content and Andrews & Higson (2008) who mentioned that employers are demanding non-cognitive qualities such as ethical judgment, adaptability, and leadership in their workforce along with technical skills.

Moreover, the past literature on early childhood education also endorses these results. Chongcharoen and Weerpiput (2021) found that students who were exposed to contemplative education, coaching system, and research-based learning performed well in terms of the

students' demonstrated understanding of learning management, core teacher characteristics, and excellent classroom management performance. These findings echoed the current study's position that competency frameworks that are rooted on values, reflection, and professional dispositions can be successfully leveraged to yield the expected caliber of graduates in the sector.

Analyses of the stakeholder perceptions validate the framework's content practicality. Although there was a higher emphasis by students and employers on cognitive and interpersonal competencies such as communication and teamwork, graduates responded more on attitudinal characteristics such as self-development and life-long learning. Additionally, faculties introduced another dimension to the capabilities through their emphasis on leadership and critical thinking, suggesting that university students must be more than workers but leaders. This commonality and complementary nature of views mirror a steady requirement of ethically upright, socially responsible, and professionally flexible graduates.

Findings indicate that the SSRU Professional Graduate Model, rooted in the K-S-A-V construct, is timely, validated, and robust for driving competency development and higher education readiness in graduates. The inclusion of the four aspects of graduate development and the structuring of these in a hierarchical, logically incremental and integrated model of the K-S-A-V construct, not only affirms the learning aspects of academic achievement in university graduates, but also their human dimensions and characteristics which are as critical in employability and work readiness in the 21st century.

The results of the study have also statistically demonstrated that the aspects of attitudes (such as the demonstration of a love for learning, leadership) and values (such as integrity, service to the public) are in fact core to graduate development, and not in anyway peripheral. This therefore positions the Professional Graduate Model of SSRU against the traditional content-driven paradigms of graduate development, as it offers and endorses a future-aligned, stakeholder-consistent, and competency-based paradigm in graduate development or talent development in higher education.

The SSRU Professional Graduate Model is therefore not only theoretically defensible as a model of competency structure and development in higher education, but it is also meaningfully responsive to the needs of students, employers, and other key stakeholders. The model is thus foundational to the curricular, quality assurance and policy directions of the university, which places the university to drive national and global human capital development through higher education.

Recommendations for Future Study

1. Longitudinal Study

Performing a longitudinal study that monitors graduates over a long period to understand the influence of K-S-A-V on their career trajectories and achievements.

2. Cross-Institutional Validation

Replicating the model in various universities or regions to assess its generalizability and cultural adaptability.

3. Program-Specific Application

The research must investigate the K-S-A-V model's adaptability to particular disciplines, aiming to improve curriculum alignment.

The article must be divided into chapters. Introduction and conclusion are obligatory. It is recommended to adjust body of the paper to the common organization structure of scientific papers – IMRaD (Introduction, Methods, Results and Discussion).

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