Needs Assessment of Academic Administration Development in Thai Colleges of Agriculture and Technology Based on the Concept of Smart Agripreneurial Skills

Noppawit Chuenbooncu[1*]
Dhirapat Kulophas[2]
Chayapim Usaho[3]
Weerawat Utairat[4]

[1,2,3,4] Department of Educational Policy, Management, and Leadership
Faculty of Education, Chulalongkorn University, Bangkok, Thailand
* Corresponding Author
[1] Email: chnoppawit@gmail.com

Abstract

This research aims to assess the needs for academic administration development in Thai Colleges of Agriculture and Technology based on the concept of smart agripreneurial skills. The participants were 94 persons, including school administrators, faculty members, or deputy directors responsible for academic administration. The research instrument was a questionnaire assessing the needs for academic administration development in the Colleges of Agriculture and Technology based on the concept of smart agripreneurial skills. The overall reliability value was 0.81. The statistical techniques used for data analysis in this study were frequency, percentage, mean, standard deviation, and the modified Priority Needs Index ($PNI_{modified}$). The obtained findings indicated that the overall condition of current and desired conditions of academic administration in the colleges under study were at the high level (Mean=3.89) and the highest level (Mean=4.84), respectively. The analysis of the modified Priority Needs Index revealed the prioritization of needs in a descending order as follows: The educational institution's curriculum development ($PNI_{modified}$ = 0.26) held the highest importance, followed by the utilization of media and learning resources ($PNI_{modified}$ = 0.24), measurement and evaluation ($PNI_{modified}$ = 0.23), and teaching and learning management ($PNI_{modified}$ = 0.22).

Keywords: Needs assessment, academic administration, agripreneurial skills, Thai colleges of agriculture and technology

1. Introduction

Thailand 5.0 as the country's vision and policy for economic development, aims to transform the traditional economic structure into a value-based economy. The primary objective is to transition from commodity production to the development of innovative products. This entails a shift from relying solely on the industrial sector to being driven by technology, creativity, and innovation. Additionally, there is a shift in emphasis from the manufacturing sector to a greater focus on the service sector. One of the pilot target groups that the government prioritizes for development is the agricultural sector, with a specific focus on management and technology enhancement. The objective is to move toward smart

agriculture and smart farming, promoting the shift from low-skilled labor to a highly skilled and knowledgeable workforce (Ministry of Education, 2016).

External factors, particularly the influence of information technology, have led to the increasing adoption of automated systems to replace human labor. In particular, trade regulations, both domestically and for international exports, have become more stringent. This has placed significant pressure on Thailand's agricultural sector, prompting a rapid adaptation to smart agriculture practices and a heightened focus on the production of high-quality agricultural products. Achieving this requires adjusting the production model in alignment with the trends in smart agricultural technology. In response to climate change, the implementation of smart agriculture practices needs to reduce the reliance on traditional fertilizers and chemicals. Furthermore, the global population in a significant aging trend highlights the ongoing importance of food security worldwide. With the growing population, there is an imperative to incorporate technology to enhance production efficiency, ensuring an adequate food supply for the future. The Food and Agriculture Organization of the United Nations (FAO) has projected that by 2050, the world's population will rise from 7.5 billion to 7.9 billion, leading to a 60 percent increase in the demand for food crops compared to the current situation (Office of the National Higher Education, Science, Research and Innovation Policy Council, 2020).

Consequently, Thailand's agricultural sector must undergo a profound transformation toward smart agriculture, involving meticulous analysis of local conditions, efficiency enhancement, and advanced technology utilization. This approach encompasses control over the entire production process, including seed selection, real-time online proactive management through Agri-Map Online, and precise control of volume, light, temperature, and nutrient and water levels. Sensor systems and artificial intelligence (AI) are used for pest control and decision-making, enabling agriculture based on an accurate information database created through a Big Data Platform. This system aims to achieve production precision, cut down costs, minimize losses, and reduce pesticide, fertilizer, water usage, and manual labor. It enhances both the quantity and quality of agricultural output, boosts farmer income, enables precise production predictions, and aids marketing strategies and planning, including futures market determination and price stability maintenance (Pattama, 2020; Office of the Vocational Education Commission, 2021).

2. Research Background

The concept of smart farming, combined with agripreneurship, entails using digital technology throughout the agricultural product supply chain, from farmers to consumers, to enhance efficiency, reduce costs, and elevate standards (Pattama, 2020). Smart agripreneurs primarily focus on advancing agricultural development in four crucial areas: (1) cost reduction in the production process, (2) enhancement of production quality and standards, (3) risk mitigation in the agricultural sector, and (4) knowledge and technology transfer. These areas encompass the application of automation and production control systems to optimize both quantity and quality. Therefore, smart agripreneurs should prioritize producing high-quality agricultural products that are safe for consumers and environmentally friendly. To achieve this, they must possess 10 skills including (1) management, (2) creativity, (3) thought leadership, (4) coordination, (5) trust, (6) information technology, (7) health, (8) responsibility, (9) empowerment, and (10) risk-taking

skills (Dyer, Gregersen & Christensen, 2019). Additionally, smart agripreneurs should integrate information technology, biotechnology, and modern agricultural methods with traditional farming practices. This integration involves gathering information about plants, the agricultural environment and databases, which are interconnected and processed using computer programs to aid decision-making and optimize production factors as well as post-harvest management. Therefore, innovation in information technology is crucial for enhancing and refining agricultural processes, ultimately resulting in higher-quality agricultural products (Sukglun et al., 2018).

The Office of Vocational Education Commission (VEC) is a pivotal agency tasked with producing and developing high-quality, internationally standardized manpower using modern technology to align with the country's national strategic goals. In the fiscal year 2020, its primary focus was on preparing Thai people for the demands of the 21st century (Vocational Education Commission, 2021). Formal education management within the purview of the VEC pertains to the agricultural sector and is delivered through 43 Colleges of Agricultural and Technology, along with 3 Fishery Colleges and 1 Fisheries and Agriculture Technology College, comprising a total of 47 colleges distributed across various provinces throughout Thailand. Their major responsibility is to provide comprehensive and diversified agricultural education, encompassing all aspects of agriculture-related occupations. They work collaboratively with government policies and relevant agencies to enhance the management of vocational educational institutions, including agricultural and fisheries colleges, with the overarching goal of cultivating smart agripreneurship aligned with the demands of the 21st-century global society. This vision is realized through the Digital Agri College concept by integrating science, technology, and innovation into the teaching and learning process. The aim is to elevate vocational educational institutions in agriculture and fisheries to the status of Digital Agri Colleges through a range of processes and activities, including (1) Digital College, (2) Digital Community, (3) New Digital Farmer (Upskill/Reskill), (4) Young Digital Farmer (Vocational Certificate/Bachelor's Degree), (5) Coding for Farm, (6) F.F.T (Future Farmer of Thailand), and (7) STI (Science/Technology/Innovation) (Bureau of Monitoring and Evaluation, Vocational Education Commission, 2020).

Hence, the learning and instructional management of the Colleges of Agriculture and Technology is deemed crucial for producing and nurturing a workforce in vocational education equipped with knowledge, capabilities, attributes, and skills relevant to smart agripreneurship. This endeavor aligns with the national strategy, economic and social development plans, and various policies driving the nation's advancement. To achieve international competitiveness and enhance the country's economic value as well as skills for careers in the 21st century, developing smart agripreneurship skills within the Colleges of Agriculture and Technology is imperative. The development of smart agripreneurship skills within vocational education institutions primarily relies on an internal learning process within these colleges. This encompasses academic administrations, ranging from curriculum development and teaching and learning management to assessment, evaluation, and the effective utilization of media and learning resources. These aspects are essential for facilitating students' learning. Drawing from experiences in real-world learning spaces and hands-on learning spaces within agricultural enterprises, the vocational education curriculum must meet the standards set by the Office of the Vocational Education Commission. It should also embrace project-based learning (PBL), where students gain practical experience and develop

skills and expertise. Thus, academic administration has a crucial mission in promoting and instilling smart agripreneurship skills in students at Colleges of Agriculture and Technology. In this present study, the researchers recognized the necessity of studying and devising strategies to enhance academic administration within these colleges, particularly in the context of smart agripreneurship skills. It was expected that research findings would benefit educational institutions, management practices, and students, ultimately advancing Thailand toward the development of globally competitive and skilled workforce for the country.

Needs assessment is a fundamental and crucial step in the evaluation process, as it provides information regarding identified problems and various needs within an organization. Originally, assessment processes were typically conducted after projects being completed to examine the extent to which objectives were achieved. In practice, the concept of assessment has evolved to emphasize ongoing evaluation during project implementation. This approach yields data that aids in improving the project's effectiveness. Assessment plays a dual role by summarizing results and evaluating progress, thereby leading to clearer organizational goals. Due to its significance, some institutions even require the submission of needs assessment results to support funding requests for various activities or projects. The systematic process of needs assessment gathers information about the current state of the organization or individuals being assessed. Such information is then analyzed to identify discrepancies between the current state and the desired state. These gaps highlight the needs which are unsatisfactory conditions of the organization or individual that are intended to be assessed and should be addressed (Wongwanich, 2020).

Therefore, to develop students with the mindset of smart agripreneurs, it is essential to rely on the academic administration skills of educational leaders, particularly in efficiently managing academic affairs. In the context of managing academic affairs aligned with the concept of smart agripreneurship skills, it is imperative to investigate the necessary requirements for effective management. For this reason, the researchers felt the acute needs to examine academic administration within the Colleges of Agriculture and Technology on the basis of smart agripreneurship skills. The use of need assessment can help identify ways to enhance academic administration within these colleges regarding smart agripreneurship skills development. The study should benefit academic management, educational institutions, and students in vocational education in support of country's economic sustainability via Thailand 5.0 Policy.

3. Research Objective

The study aims to assess the needs for academic administration development in the Thai colleges of agriculture and technology based on the concept of smart agripreneurial skills.

4. Research Methodology

4.1 Participants

Ninety-four voluntary participants were from 47 Colleges of Agriculture and Technology under the Office of the Vocational Education Commission, Ministry of Education. They were educational administrators and teachers or deputy directors with the academic administration duties in their institutions.

4.2 Research Instrument

The researchers used a questionnaire with a 5-point Likert scale and a dual-response format to assess the needs for enhancing academic administration in 47 Thai colleges of agriculture and technology, by the concept of smart agripreneurship skills. The constructed questionnaire consisted of 4 aspects: (1) curriculum development, (2) teaching and learning management, (3) measurement and evaluation, and (4) the utilization of media and learning resources. Content validity was confirmed through content validity index (IOC) by three educational administration experts. The criterion was an IOC value greater than 0.5, indicating that questions with an IOC score above this threshold were considered valid in content (Kamket, 2012). Of all IOC values, each question item was within the range of 0.5 to 1.00. The questionnaire was distributed to 50 educational administrators and vocational college teachers supervised by the Office of the Vocational Education Commission. Subsequently, the data underwent internal consistency analysis using Cronbach's Alpha, with the acceptable criterion set at a Cronbach's Alpha value of 0.70 or higher (Srisathitnarakun, 2007). The questionnaire exhibited strong internal consistency, yielding a Cronbach's Alpha coefficient of 0.81 in this study.

5. Data Collection

The researchers sent a letter requesting the authorities' permission to collect data from the Colleges of Agriculture and Technology and provided a convenient online questionnaire link for the participants to provide needed data back online.

6. Data Analysis

Data analysis involved (1) basic statistical measures including frequency, percentage, mean, and standard deviation; and (2) modified Priority Needs Index using the principle of evaluating differences: $\text{PNI}_{\text{modified}} = (I - D) / D$ (Wongwanich, 2020).

7. Research Results

The data analysis results revealed that more than half of the respondents, classified by gender, were male (52.1%) and the highest educational level was a master's degree (79.8%), as presented in Table 1.

Table 1: Number and Percentage of Respondents

Variables	Number	Percentage
Gender		
Male	49	52.1
Female	45	47.9
Educational level		
Bachelor's degree	14	14.9
Master's degree	75	79.8
Doctoral degree	5	5.3
Total	**94**	**100.0**

The prioritization results of needs for academic administration development in Colleges of Agriculture and Technology based on smart agripreneurial skills revealed that every aspect displayed a critical necessity. The $PNI_{modified}$ values ranged from 0.22 to 0.26. The highest $PNI_{modified}$ value was observed in the curriculum development aligned with the concept of smart agripreneurial skills (0.26), followed by the utilization of media and learning resources in line with the concept of smart agripreneurial skills (0.24), and measurement and evaluation based on the concept of smart agripreneurial skills (0.23). The aspect with the lowest needs was teaching and learning management aligned with the concept of smart agripreneurial skills (0.22). When examined on a per-aspect basis, it was found as follows:

Curriculum development within the colleges: The highest need was the assessment of curriculum implementation, followed by the utilization of the curriculum, curriculum development planning, and curriculum aim setting ($PNI_{modified}$ = 0.0298, 0.280, 0.251, 0.236), respectively.

Teaching and learning management: The highest need was organizing learning activities, followed by the measurement and evaluation of the learning activities, setting learning objectives, and organizing student development activities ($PNI_{modified}$ = 0.237, 0.231, 0.223, 0.223), respectively.

Measurement and evaluation: The highest need was the measurement and evaluation design, followed by using various measurement and evaluation tools and using academic achievement to improve one's teaching and learning ($PNI_{modified}$ = 0.253, 0.229, 0.218), respectively.

Utilization of media and learning resources: The highest need was conducting surveys and analyzing the current state of issues related to the need for media and learning resources, followed by using various media and learning resources, developing media, textbooks, and learning resources to promote learning management, and creating and/or providing teaching media and learning resources ($PNI_{modified}$ = 0.277, 0.234, 0.234, 0.230), respectively.

The results are shown in Table 2.

Table 2: The Prioritization Results of Needs for Academic Administration Development in Colleges of Agriculture and Technology Based on the Concept of Smart Agripreneurial Skills

Academic administration in the colleges	Aspects	The Concept of Smart Agripreneurial Skills										Total average	Prioritization of needs
		1) Management skill	2) Creativity skill	3) Coordination skill	4) Trust skill	5) Thought leadership skill	6) Information technology skill	7) Health skill	8) Responsibility skill	9) Empowerment skill	10) Risk-taking skill		
Curriculum development within the colleges												**0.267**	**1**
1. Curriculum development planning		0.27	0.25	0.30	0.25	0.23	0.28	0.24	0.20	0.24	0.26	0.251	3

Academic administration in the colleges / Aspects	The Concept of Smart Agripreneurial Skills										Total average	Prioritization of needs
	1) Management skill	2) Creativity skill	3) Coordination skill	4) Trust skill	5) Thought leadership skill	6) Information technology skill	7) Health skill	8) Responsibility skill	9) Empowerment skill	10) Risk-taking skill		
2. Curriculum aim setting	0.22	0.25	0.24	0.23	0.23	0.24	0.23	0.22	0.24	0.23	0.236	4
3. Utilization of the curriculum	0.34	0.27	0.30	0.26	0.27	0.30	0.26	0.25	0.30	0.31	0.280	2
4. Assessment of curriculum implementation	0.29	0.27	0.31	0.28	0.28	0.31	0.31	0.28	0.30	0.31	0.298	1
Teaching and learning management											**0.228**	**4**
1. Setting learning objectives	0.25	0.24	0.22	0.22	0.20	0.22	0.20	0.20	0.23	0.23	0.223	3
2. Organizing learning activities	0.20	0.21	0.24	0.24	0.23	0.25	0.23	0.24	0.23	0.25	0.237	1
3. Measurement and evaluation of the learning activities	0.20	0.20	0.20	0.25	0.20	0.23	0.24	0.21	0.25	0.27	0.231	2
4. Organizing student development activities	0.21	0.23	0.21	0.21	0.20	0.22	0.23	0.21	0.23	0.23	0.223	4
Measurement and evaluation											**0.234**	**3**
1. Measurement and evaluation design	0.21	0.23	0.26	0.27	0.25	0.23	0.26	0.26	0.28	0.25	0.253	1
2. Using various measurement and evaluation tools	0.21	0.23	0.22	0.22	0.22	0.22	0.22	0.20	0.25	0.25	0.229	2
3. Using academic achievement to improve one's teaching and learning	0.19	0.22	0.25	0.20	0.21	0.20	0.21	0.20	0.23	0.23	0.218	3
Utilization of media and learning resources											**0.243**	**2**
1. Conducting surveys and analyzing the current state of issues related to the need for media and learning resources	0.26	0.25	0.29	0.29	0.26	0.26	0.26	0.26	0.31	0.29	0.277	1

Academic administration in the colleges	Aspects	The Concept of Smart Agripreneurial Skills										Total average	Prioritization of needs
		1) Management skill	2) Creativity skill	3) Coordination skill	4) Trust skill	5) Thought leadership skill	6) Information technology skill	7) Health skill	8) Responsibility skill	9) Empowerment skill	10) Risk-taking skill		
2. Creating and/or providing teaching media and learning resources		0.20	0.21	0.23	0.23	0.22	0.21	0.24	0.25	0.23	0.24	0.230	4
3. Using various media and learning resources		0.20	0.20	0.22	0.25	0.22	0.22	0.22	0.24	0.24	0.24	0.234	2
4. Developing media, textbooks, and learning resources to promote learning management		0.21	0.20	0.23	0.23	0.23	0.22	0.23	0.23	0.25	0.26	0.234	3
Overall												**0.243**	

8. Discussions

According to the research results, the researchers found important points for discussion as follows:

8.1 Curriculum Development within the Colleges

The research results suggested that educational institutions should prioritize the evaluation of curriculum implementation, followed by curriculum utilization, development planning, and goal setting. This corresponds with the National Education Act, B.E 2542 (1999), Section 27, paragraph 2, which mandated educational institutions to create curriculum content addressing community and local wisdom issues, fostering characteristics of responsible individuals within the family, community, society, and the nation (Ministry of Education, 2002). Additionally, institutions should focus on creating diverse curricula that develop well-rounded individuals in terms of knowledge, critical thinking, abilities, morality, and social responsibility. Curriculum development is crucial for guiding educational management, as emphasized in the Ministry of Education's policies and guidelines (Ministry of Education, 2002; Khaemmanee et al., 2005). Therefore, curriculum development plays a pivotal role in providing effective and enjoyable learning experiences responsive to the diverse needs of individual learners (Ministry of Education, 2016). To achieve these goals, educational institutions need standardized and student-centered curricula. This point is guided by the Department of Environmental Promotion (Ministry of Education, 2016) stating that curriculum development within educational institutions is the primary key to learner development success, entailing direct administrative responsibilities. In this context,

institutions must establish clear policies, visions, curriculum frameworks, and effective college management practices. The curriculum development, goal setting, utilization, and implementation processes should be well-planned and systematically executed. However, it is worth noting that in the current educational landscape, school administrators often lack the authority and control necessary to ensure that teachers align curriculum content, subject matter, and learning activities with the interests and abilities of individual students. Collaborative efforts are necessary to reach a consensus, and develop, and continually improve curricula to ensure desired alignment with expected educational outcomes, as emphasized by Poulton et al. (2010), who highlighted the importance of agricultural promotion agencies setting policies for integrating agricultural knowledge and entrepreneurship training for farmers. These agencies should collaborate with agripreneurs to arrange for training programs to impart knowledge and entrepreneurship skills. Similarly, Kangogo et al. (2021) emphasized that entrepreneurship and agricultural education programs have a significant influence on equipping farmers with characteristics, such as risk-taking, innovation, and creativity.

8.2 Utilization of Media and Learning Resources

The research results revealed that educational institutions should prioritize surveying, analyze needs, and utilize various learning resources. This is in line with the work of Sukglun et al. (2018), which promoted effective learning through material tools and methods, as well as creating a new learning environment for development and the use of educational technology. As known, there is a need for further promotion, support, development, and acquisition of teaching and learning resources from diverse sources. In this context, institutions should establish policies, development plans, information dissemination, monitoring, and evaluation of educational resource management and technology (Bureau of Monitoring and Evaluation, Office of the Vocational Education Commission. (2020). This approach is considered a process of student-centered learning management as guided by the Office of the Vocational Education Commission (2021) to use teaching and learning resources to access course content for students' transformation in daily life and learning behaviors. In other words, teaching resources and learning environments could help transmit knowledge and experiences to learners, leading to desired behavioral outcomes, and thus can independently achieve the curriculum's objectives.

8.3 Measurement and Evaluation

The results indicated that the Colleges have been focusing on the measurement and evaluation design, followed by using various measurement and evaluation tools and using academic achievement to improve one's teaching and learning. This reflects the significance of understanding the measurement and assessment of students' learning achievement in accordance with their aptitudes and abilities, as highlighted by Dyer, Gregersen & Christensen (2019). These previous researchers asserted that effective assessment could improve and foster creativity in learners by using diverse methods. Furthermore, it involves observing behavior in response to questions, active participation in the classroom, and collaborative teamwork.

9. Recommendations

9. 1. Recommendations Based on the Research Results

9.1.1 Educational institutions should establish clear policies, vision, and a curriculum framework that supports the effective implementation of the curriculum. This clarity will facilitate coordinated actions within the college and community, ensuring that all stakeholders are directed toward the common goals.

9.1.2 Teachers should study and analyze curriculum structures that promote the concept of smart agricultural entrepreneurs among students. They should develop a learning management plan that incorporates and integrates the concept of smart agripreneurs, design media and learning resources that are up-to-date, easily accessible, and available for continuous and autonomous learning.

9. 2 Recommendations for Future Research

9.2.1 A study of causal factors influencing curriculum development, in accordance with the concept of smart agripreneurship.

9.2.2 More research and development of subject-specific curricula based on the concept of smart agripreneurs should be initiated and pursued.

10. The Authors

Noppawit Chuenbooncu is master student and three co-authors are lecturers in Educational Management Program, Department of Educational Policy, Management, and Leadership Faculty of Education, Chulalongkorn University, Bangkok, Thailand. Currently, the first author has been working in the position of Academic Administrator in the Office of the Vocational Education Commission, Ministry of Education. The authors share their research interest in the areas of academic administration and agripreneurial skills, needs assessment, and current issues in the utilization of digital media and resources in support of learning autonomy.

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