
Developing Model for Enhancing New Skill Competencies of Building Auditor and Energy Management Auditor

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Abstract: This study aims to develop a model for enhancing new skill competencies building auditors' and new energy management auditors. The researcher reviewed current laws and regulations regarding acquiring professionals for building auditor competencies and new energy management auditors and also analyzed the T-Shape model. The study emphasized the importance of key professional skills indicators, identifying the top five most crucial components as follows: 1) Personality, 2) Adaptability to new environments, 3) Ethics, 4) Lifelong learning, and 5) Complex problem-solving skills, which represent the horizontal skills in the T-Shape model. The analysis revealed the current new skill competencies for building auditors and energy management auditors. The data from legally mandated training focused only on technical skills, represented as the vertical skills in the T-Shape model. However, synthesizing the professional soft skills competencies would produce a comprehensive T-Shape model for building auditors and energy management auditors. This includes both vertical and horizontal competencies. The horizontal or professional skills would comprise five main components and 35 sub-components. The suitable approach for developing professional new skill competencies for building auditors and new energy management auditors is through role-playing activities, starting with personality and adaptability to new environments. These role-playing activities should allow participants to engage in real-life scenarios, using tools for organizing activities, a curriculum plan, and assessments of professional skills development before and after participating in the activities, as well as evaluating learner satisfaction.

Keywords: Building Auditor competence, Energy management Auditor competence, Role Playing

Introduction

In 2007, Thailand established the profession of building inspectors through a ministerial regulation that specified the qualifications, registration criteria, deregistration criteria, and building inspection standards according to the Building Control Act of 1992 [1]. As of March 30, 2024, there are over 1,300 individuals in this profession (data from the Department of Public Works and Town & Country Planning). However, less than 50 individuals, or approximately 3.8% of registered professionals, have successfully pursued this career. Similarly, the profession of energy management auditors, as specified in the Department of Alternative Energy Development and Efficiency's announcement on training criteria and methods for energy management auditors in 2007 [2], currently includes 522 certified auditors (data from the Department of Energy Business and Alternative Energy on March 30, 2024). However, only 70 individuals, or 13.4% of registered professionals, have consistently performed annual audits, despite meeting the qualifications outlined in the Council of Engineers' regulations on controlled engineering practice standards [3]. The data highlights a relatively low success rate among professionals in these fields. This reflects that engineers who have undergone training and possess legally mandated qualifications have varying levels of quality and ability to meet the diverse needs of service recipients.

While the article on developing for enhancement soft skills competencies engineering auditor in Thailand [4] (Wasawat Kitsiriteeraphak, Lerdlekha Sriratana, 2024) derived from quality research using Delphi technique and statistical analysis, it was found that the most significant components are as follows: personality, adaptability skills in new environments, ethics, lifelong learning, and complex problem-solving skills. These five skills are crucial for engineering auditors to succeed in their profession and are skills needed for the future. These five skills focus on the T-shaped framework [5] (Kokoc & Ersoz, 2020).

Due to personal soft skills development or interpersonal skills, instructors must employ hypothetical role-playing and situational simulations to enhance learners' knowledge and understanding, helping them practice skills in contexts that resemble real-life situations that are highly challenging and complex. Learners are assigned roles in situations closely resembling reality, expressing their thoughts and feelings, using their knowledge and behaviors observed as data for discussion, enabling them to learn according to the objectives of 14 teaching methods for professional teachers [6] (Tisnaka Kammanee, 2551, p. 70). Learning based on real situations integrates

experiences and learning, linking learned content with the real world to empower learners to create meaningful knowledge. Learners use systematic inquiry, analysis, synthesis, evaluation, and decision-making independently through systematic inquiry methods, with objectives demonstrating the success of their work. Learners can apply what they have learned to real-life situations via new learning management methods [7] (Chaiwat Sutthirat, 2553, p. 64).

The differences in the competence model for engineering auditors' soft skills in Thailand, arising from training processes under the auspices of state agencies, and enhancing new skill competencies based on current requirements and future trends, have not yet been analyzed or synthesized by any individual or organization. Therefore, the researchers intend to conduct comparative analyses of competence models for building auditors and energy management auditors. This aims to develop a prototype for new skill competencies for building auditors and energy management auditors in the future.

Objectives

To develop a prototype program model for new skill competencies for engineering auditors in Thailand.

Theory and Related Research

Definition of Terms

The model for new skill competencies for engineering auditors in Thailand means a prototype model synthesized by the researcher. As for a study of new skill competencies for engineering auditors in a country, they must change according to the needs of service recipients, both present and future trends.

Building auditor refers to licensed professionals in engineering or architecture, whose responsibilities are governed by the Building Control Act B.E. 2522. They are tasked with inspecting buildings, including structural integrity, safety during usage, alterations and renovations, fire alarm systems, firefighting systems, fire exit signs, electrical systems, and building security management plans, among others.

Energy Management Auditor refers to individuals who inspect and certify energy management practices under the Energy Conservation Promotion Act B.E. 2535 (revised B.E. 2550) [8]. These individuals have the authority to inspect and certify energy management practices according to laws promoting energy conservation, referencing ministerial regulations that establish standards, criteria, and methods for managing energy in controlled factories and buildings under the Energy Conservation Promotion Act B.E. 2552.

There are two regulations related to the qualifications of building inspectors:

1. Ministerial Regulation on Specific Qualifications of Inspectors, Criteria for Registration and Revocation of Registration as Inspectors, and Building Inspection Criteria, B.E. 2548 (2005).
2. The Council of Engineers' Regulation on Standards for the Practice of Controlled Engineering Professions, B.E. 2561 (2018).

For the profession of energy management auditors and certifiers, the relevant regulations specifying qualifications include:

1. Ministerial Regulation on Specific Qualifications of Inspectors, Announcement of the Department of Alternative Energy Development and Efficiency, Criteria for Registration and Revocation of Registration as Inspectors, and Building Inspection Criteria, B.E. 2556 (2013).
2. The Council of Engineers' Regulation on Standards for the Practice of Controlled Engineering Professions, B.E. 2561 (2018).

The researcher brought research articles on "The Development of a Model for Measuring in New Skill Competencies Engineering Auditor in Thailand" (Wasawat Kitsiriteeraphak, Lerdlekha Sriratana, 2024) and "A Conceptual Framework for Developing Soft Skills As the Required Competencies for Engineering Inspectors" (Wasawat K., Lerdlekha S., 2023) and summarized the top 5 most important components. Additionally, the article "T-Shaped Engineer: Horizontal Component Comprising of Soft Skills" (Kokoc & Ersoz, 2020) was included. The necessary skills for engineering auditors in a T-Shape format were illustrated, where the vertical axis represents professional or technical skills (Hard Skills) in that specific field, and the horizontal axis represents personal or soft skills (Soft Skills), as shown in Figure 1.

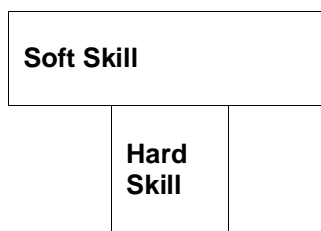


Figure 1: T-Shape Skill Model

The technical or professional skills (Hard Skills) in the vertical component of the T-shaped diagram shown in Figure 1 represent the skills or abilities used in each occupational field. These include technical knowledge that can be objectively assessed or measured through learning and practical experience. In this study, the researcher has defined sub-components, symbolized by Y for technical aspects related to building auditors and Z for technical aspects related to energy management auditors.

The horizontal axis of the T-shape representing personal or soft skills, as shown in Figure 1, includes skills that are inherent or unique to individuals. These are abstract and relatively difficult to measure, such as personality, optimism, and emotional control. The researcher has designated the main components with the symbol X and the sub-components with the symbol C.

Research Methodology

1. Utilize relevant regulations and laws about the qualifications of building and energy management auditors to create a T-Shape model.

2. Compare the indicator model for measuring new engineering inspection skills derived from the article "Development of an Indicator Model for Measuring Competencies in New Engineering Auditors' Skills in Thailand" (Wasawat Kitsiriteeraphak, Lerdlekha Sriratana, 2024), which includes 5 main components (X1, X2, X3, X4, and X5) and 35 sub-components (C).

	X4	X2	X1	X3	X5
C19	C17	C3	C24	C10	
					C20
C33	C32	C8	C28	C21	
					C36
C34	C37	C12	C41	C26	
					C45
C53	C46	C22	C42	C35	
					C48
C54	C47	C29	C48	C49	
					C52

Figure 2: A Model for Enhancing New Skill Competencies Engineering Auditor with 5 Key Components [4]

3. Conduct a synthesis data of the enhancing new skill competencies of new building auditors and new energy management auditors in Thailand.

Summary of Findings

1. From the analysis using the new skill competencies for building auditors based on the Ministerial Regulations stipulating the specific qualifications of auditors and the regulations of the Council of Engineers, only technical skills Y1 and Y2 are identified. Y1 refers to the principles and guidelines for building audition, and Y2 refers to the guidelines for building audition and associated equipment. These can be represented on the vertical axis of the T-Shape model, as shown in Figure 3.

Y1
Y2

Figure 3: Technical Skills of Building Auditors in the T-Shape Model

Meanwhile, the new skill competencies for energy management auditors specified in the Department of Alternative Energy Development and Efficiency announcement and the Council of Engineers regulations include only Z1, Z2, Z3, Z4, and Z5. Z1 refers to the principles of energy management, Z2 refers to the guidelines for auditing and certifying energy management, Z3 refers to the criteria for auditing and certifying energy management, Z4 refers to the laws on energy management and conservation, and Z5 refers to the guidelines for energy conservation. These can be represented on the vertical axis of the T-Shape model, as shown in Figure 4

Z1
Z2
Z3
Z4
Z5

Figure 4: Technical Skills of Energy Management Auditors in the T-Shape Model

From the analysis of the regulations and laws related to the qualifications of building auditors and energy management auditors in the T-Shape model, it was found that there are only vertical skills. There is no development in horizontal skills; there are only some ethical requirements as sub-components. On the other hand, these are not clearly defined as horizontal or soft skills.

2. The results of the comparison of the enhancing new skill competencies engineering audition in the T-Shape model, by considering the top 5 most important components and synthesizing them with the Ministerial Regulations stipulating the specific qualifications of inspectors and the regulations of the Council of Engineers, can represent the competency indicators for new building auditors as shown in Figure 5. The new skill competencies for building auditors are derived from the Ministerial Regulations stipulating the specific qualifications of auditors and the regulations of the Council of Engineers as well as the regulations of the Council of Engineers including only sub-components C7, C8, Y1, and Y2. Y1 refers to the principles and guidelines for building inspection, and Y2 refers to the guidelines for building audition and equipment for building.

	X4	X2	X1	X3	X5
C19		C17	C3	C24	C10
		C20	C7		
C33		C32	C8	C28	C21
C34		C36	C11	C41	C26
		C37	C12		
C53		C45	C14	C42	C35
C54		C46	C22	C48	C49
			C29		
C63		C47	C52	C59	C51
			Y1		
			Y2		

Figure 5: Model for Enhancing Competencies of Building Auditors in the T-Shape

In the case of the professional field of energy management auditors, considering the top 5 most important components and synthesizing them with the announcement of the Department of Alternative Energy Development and Efficiency on criteria and methods for training auditors and certifying energy management, as well as the regulations of the Council of Engineers, the competency model in the T-Shape format can be created. The model of competency for new energy management auditors is shown in Figure 6. The competency model for energy management auditors refers to the announcement of the Department of Alternative Energy Development and Efficiency and the regulations of the Council of Engineers and includes only sub-components C7, C8, Y1, Y2, Y3, Y4, Z1, Z2, Z3, Z4, and Z5. Z1 refers to the principles of energy management, Z2 refers to the guidelines for auditing and certifying energy management, Z3 refers to the criteria for auditing and certifying energy management, Z4 refers to the laws on energy management and conservation, and Z5 refers to the guidelines for energy conservation.

	x4	x2	x1	x3	x5
C19		C17	C3	C24	C10
		C20	C7		
C33		C32	C8	C28	C21
C34		C36	C11	C41	C26
		C37	C12		
C53		C45	C14	C42	C35
C54		C46	C22	C48	C49
			C29		
C63		C47	C52	C59	C51
			Z1		
			Z2		
			Z3		
			Z4		
			Z5		

Figure 6: Model for Enhancing New Skill Competencies of Energy Management Auditors in the T-Shape

From the synthesis of the model for new skill enhancing competencies of energy management auditors based on the T-Shape model, the performance indicators will consist of two dimensions as follows:

1. Horizontal Competencies (Soft Skills): These include the core components X1, X2, X3, X4, and X5, with 35 sub-components C.

2. Vertical Competencies (Technical or Professional Skills): These include the core components Y (sub-components Y1 and Y2) for building auditors, and Z (sub-components Z1, Z2, Z3, Z4, and Z5) for energy management auditors.

Conceptual Framework for Developing Soft Skills of Building Auditor and Energy Management Auditor

The model of enhancing new skill competencies for building auditors and professional energy management auditors, based on performance indicators, should involve role-playing activities. This teaching method not only helps learners understand the feelings and behaviors and fosters empathy, leading to deeper learning, but it also helps learners understand. That's why they change their own attitudes and behaviors. Simulating scenarios that closely resemble real-life situations enables learners to understand and adapt more quickly.

Gradually, the role-playing teaching method should include four steps (1) Preparation/Introduction (2) Role Performance (3) Analysis and Discussion (4) Experience Sharing and Summarizing Principles. The role-playing learning approach emphasizes hands-on practice, and understanding different situations, and provides opportunities for problem-solving and decision-making in various scenarios. This ensures high-quality learning and allows learners to apply the knowledge gained to change attitudes and behaviors. For initial development activities, focus should be placed on personality development and skills in adapting to new environments, as these are considered most essential. The activity format includes the following details:

-Activity Name: Role-Playing for Developing Interpersonal Skills and Adaptation Skills in New Environments

-Objectives of the Activity: To develop interpersonal skills and adaptation skills in new environments. Additionally, studying participant satisfaction aims to help learners understand and empathize with others, gain insight into their feelings and behaviors, and understand various aspects related to the roles they simulate.

- Pre-Experimental Research participants using the One-group Pretest-Posttest Design.

-The sample group will consist of building auditors and energy management auditors who meet the legal qualifications, with no more than 30 participants per course. This ensures that all learners have the opportunity to actively participate.

The variables to be studied include

- Independent Variables namely, role-playing activities designed to develop personality traits and skills for adapting to new environments, including role-playing scenarios involving disputes and mitigating the impact of disputes during engineering auditions.
- Dependent Variables namely, the effects of using role-playing activities on the development of personality traits, adaptability to new environments, and the satisfaction of the participants.

Tools for the Activities

1. Learning Management Plan: Utilizing role-playing activities to develop personality traits and adaptability skills for new environments. This conducted within an appropriate timeframe, not exceeding one month.

2. Role-Playing Scenarios. The examples develop personality traits and adaptability skills, such as scenarios portraying a respected and credible auditor or working in different environments.

3. Personality and Adaptability Skills Test: One set of tests assess personality development and adaptability skills before and after the learning activities.

4. Personality and Adaptability Skills Evaluation Form used to evaluate the development of personality traits and adaptability skills.

5. Satisfaction Questionnaire: This assess participants' satisfaction with the teaching and learning process. Also, using role-playing activities develop personality traits and adaptability skills.

The researchers synthesized a conceptual framework for developing the auditing skills of third-party auditors, which can be illustrated in Figure 7. It consists of the following three steps:

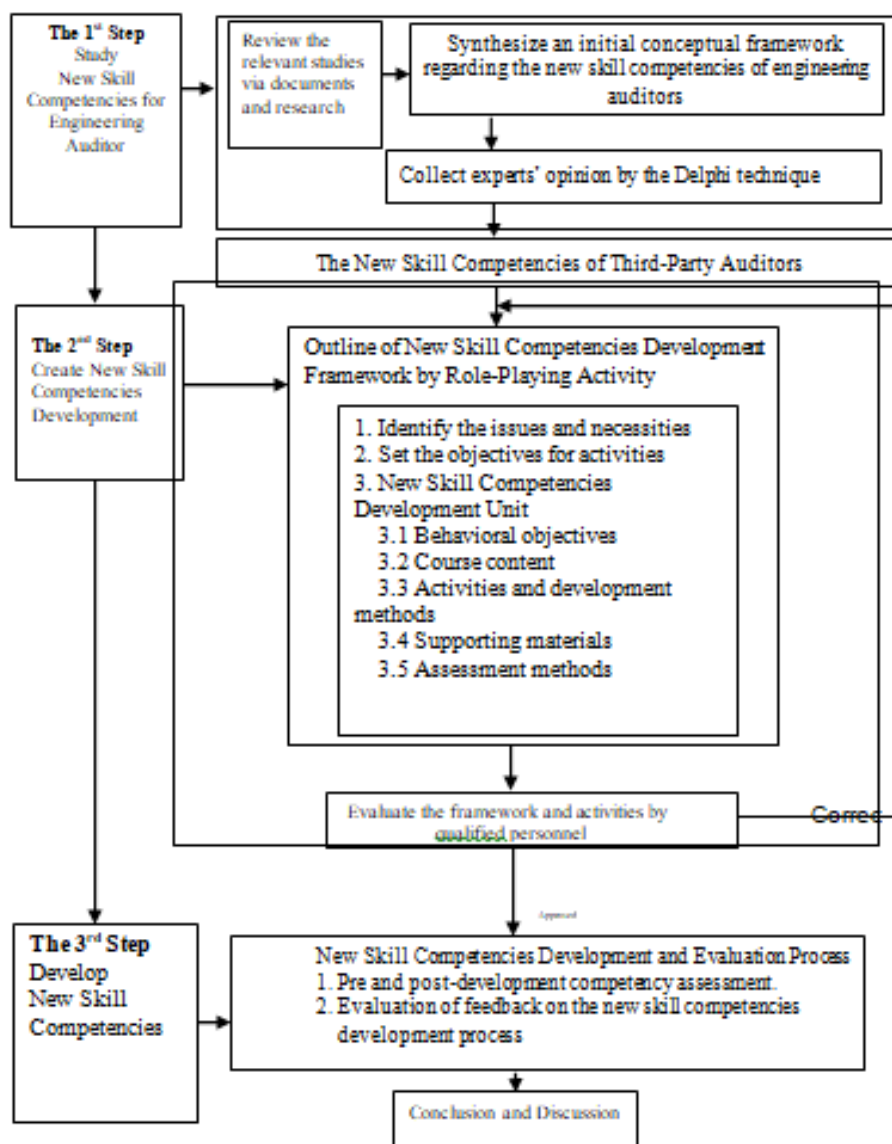


Figure 7 shows the conceptual framework for developing the new skills competencies of third-party auditors. The framework consists of three steps as follows:

The first step is to study “the new skill competencies for engineering auditors”. This step references the article on developing and enhancing new skill competencies for engineering auditors in Thailand [4] (Wasawat Kitsiriteeraphak, Lerdlekha Sriratana, 2024). Secondly, “to create the skill development process”. This step involves deriving the development process from competency indicators of building auditor and energy management auditor. Thirdly, “to implement the skill development process”. This step includes pre- and post-development assessments and evaluation of learners' opinions on the skill development process, as relevant in the referenced article.

Suggestions for Future Research

1. Conduct a competency development program for building auditors and energy management auditors based on the model new skill competencies. Auditors engagement who meet legal qualifications have worked for at least 2-3 sessions or a specific duration. They have not yet achieved success in their work, aiming to benefit from personal development in their profession.
2. Benefits of refining curricula for governmental and private organizations. These are responsible for or involved in developing auditing skills to meet future service recipient needs and achieve professional success.

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