

Development of the Service System for Teaching Laboratories in Teacher Education

Ampai phetwow¹, Pasawut Cheerapakorn²

^{1,2}Faculty of Education, Suan Sunandha Rajabhat University, Bangkok, Thailand

E-Mail: amprai.pe@ssru.ac.th¹, pasawut.ch@ssru.ac.th²

Abstract

The research entitled “Development of the Service System for the Teacher Professional Practice Laboratory, Faculty of Education, Suan Sunandha Rajabhat University” aimed to develop a quality service system for the laboratory and to study student satisfaction with the developed system. The research employed a developmental research methodology conducted in three phases: studying the baseline data and user needs, designing and developing the system, and evaluating the system quality by experts, along with surveying the satisfaction of staff and student users. The sample consisted of 300 participants, including academic personnel and undergraduate students from years 1 to 4. The results showed that the overall service problems were at a very high level (mean = 4.83), with the main issue being the sufficiency of teaching equipment. Satisfaction with the service was at a high level (mean = 4.41), with the completeness and modernity of the equipment rated highest. The study recommends continuous system development to enhance service efficiency and user satisfaction.

Keywords: Laboratory Service System, System Development, Teacher Education

1. Introduction

In the digital era, active learning and the integration of technology have become essential in raising educational quality to international standards. For teacher education, this shift is especially critical, as future teachers must adapt to technological change and design innovative learning environments. The Faculty of Education at Suan Sunandha Rajabhat University has established ten teaching laboratories to develop core competencies such as classroom management, instructional media integration, and assessment practices.

However, challenges remain in their effective use, including unclear service procedures, limited access to information, equipment readiness issues, and the lack of a standardized booking system. To address these problems, this study proposes the development of a comprehensive, user-centered laboratory service system covering reservations, equipment management, scheduling, monitoring, and user satisfaction evaluation. The initiative aims to enhance efficiency, maximize resource utilization, and improve students’ opportunities to develop professional competencies. Furthermore, the model has potential for adaptation in other educational institutions, contributing to the advancement of teacher education in the digital age.

2. Objectives

1. To develop and evaluate the quality of the service process for the teaching laboratory in teacher education.
2. To study students' satisfaction with the service system of the teaching laboratory in teacher education.

3. Methodology

This study, entitled “Development of a Service System for Teacher Professional Laboratories at the Faculty of Education, Suan Sunandha Rajabhat University”, employed a quantitative research approach. The study aimed to develop and evaluate the quality of the service process of the teacher professional laboratories and to examine students' satisfaction with the laboratory service system at the Faculty of Education, Suan Sunandha Rajabhat University. The research methodology consisted of the following sections:

Sub-Section 1 Population and Sample

1.1 Population

The population of this study included faculty staff and students of the Faculty of Education, Suan Sunandha Rajabhat University, who used the teacher professional laboratories. The sample size was determined according to the Krejcie & Morgan table, totaling 300 participants, and Simple Random Sampling was employed to obtain a representative sample.

1.2 Sample

The study sample comprised 300 participants, including academic staff and student representatives, distributed as follows:

1. Academic staff: 54 participants
2. First-year students: 57 participants
3. Second-year students: 61 participants
4. Third-year students: 59 participants
5. Fourth-year students: 69 participants

Table 1 Sample Distribution

Category	Number of Participants
1) Academic staff	54
2) First-year students	57
3) Second-year students	61
4) Third-year students	59
5) Fourth-year students	69
Total	300

Sub-Section 2 Research Instruments

The research instrument was a questionnaire designed to assess the issues in service delivery and the satisfaction of faculty staff and students with the teacher professional

laboratory service system. The questionnaire was developed based on the research framework and objectives and was validated by experts for content accuracy and language appropriateness. The questionnaire consisted of four parts:

Part 1: General information of respondents, including gender, age, education level, and position, using a checklist format.

Part 2: pinions on the service problems of faculty staff and students regarding the laboratory system, covering:

- Adequacy of laboratory teaching equipment
- Availability and readiness of equipment
- Cleanliness and organization of the laboratories
- Accessibility and usability according to schedule
- Guidance and support from staff
- Laboratory booking system
- Maintenance and repair of equipment
- Coordination issues with staff

(Measured using a 5-point rating scale) Responses were measured using a 5-point Likert scale.

Part 3: Satisfaction with the laboratory service, including:

- Completeness and modernity of teaching equipment
- Convenience of access and usage
- Care and support from staff
- Safety of equipment and facilities
- Overall satisfaction with the service system

(Measured using a 5-point rating scale)

Part 4: Open-ended questions for respondents to provide opinions and suggestions regarding service issues and satisfaction with the laboratory system.

The finalized questionnaire was distributed online via Google Form to the 300 participants.

Sub-Section 3 Data Collection

The data collection procedures were as follows:

1. A request letter for research cooperation was sent to academic staff and department heads to inform students in each program about the study.
2. Researchers explained the purpose of the study and the instructions for completing the questionnaire to both academic staff and students.
3. Data were collected from the 300 participants using the online questionnaire via Google Form.
4. Participants completed the questionnaire online.
5. Researchers checked and verified the completeness of the collected data before analysis.

Sub-Section 4 Data Analysis

Quantitative data were analyzed using statistical software. The analysis procedures included:

1. Checking all responses for completeness and analyzing frequency and percentage.

2. Recording validated responses into statistical software to calculate percentages, means ($\bar{x}$), and standard deviations (S.D.) for explanation and comparison. A 5-point rating scale was applied as follows:

The 5-point Likert scale was scored as follows:

5 = Highest

4 = High

3 = Moderate

2 = Low

1 = Lowest

Interpretation of mean scores was based on the following criteria:

4.50 – 5.00 = Highest

3.50 – 4.49 = High

2.50 – 3.49 = Moderate

1.50 – 2.49 = Low

1.00 – 1.49 = Lowest

4. Result

The research on “The Development of the Service System for the Teaching and Learning Laboratory in the Faculty of Education, Suan Sunandha Rajabhat University” collected data using questionnaires to study service problems and user satisfaction among the faculty staff and students regarding the laboratory service system. The analysis of the data is presented as follows:

Sub-Section 1 Analysis of Research Data

Part 1: General Information of Respondents

Data were collected from a total of 300 respondents (100%). The analysis was conducted using percentages. The results are presented in Table 2

Table 2
General Information of Respondents

Variable	Frequency (People)	Percentage (%)
Gender	Male 146	48.66
	Female 154	51.34
Age	Under 20	42
	21–30	204
	31–40	17
	41–50	25
	51 and above	12
Education Level	Year 1	57
	Year 2	61

	Year 3	59
	Year 4	69
	Others	54
Position	Associate Professor	5
	Assistant Professor	23
	Lecturer	26
	Student	246

Summary of Part 1:

- Most respondents were **female** (51.34%), while **male** respondents accounted for 48.66%.
- The majority were aged **21–30 years** (68%), followed by under 20 years (14%), 41–50 years (8.33%), 31–40 years (5.67%), and 51 years and above (4%).
- Most respondents were **Year 4 students** (23%), followed by Year 2 (20.34%), Year 3 (19.66%), Year 1 (19%), and others (18%).
- The largest group by position was **students** (82%), followed by lecturers (8.67%), assistant professors (7.66%), and associate professors (1.67%).

Part 2: Opinions on Service Problems and User Satisfaction

Data were analyzed using mean ($\bar{x}$) and standard deviation (S.D.). The results are presented in Tables 3

Table 3
Opinions on Service Problems

<i>Service Problem</i>	$\bar{x}$	<i>S.D.</i>	<i>Quality Level</i>
Adequacy of teaching equipment	4.98	0.95	Highest
Equipment availability	4.87	0.86	Highest
Cleanliness and orderliness of the laboratory	4.77	0.82	Highest
Accessibility and service usage according to schedule	4.97	0.89	Highest

Guidance and assistance from staff	4.56	0.68	High
Laboratory booking system	4.89	0.69	Highest
Maintenance and repair of equipment	4.78	0.58	Highest
Coordination problems with staff	4.85	0.67	Highest
<i>Overall</i>	4.83	0.13	Highest

Summary of Table 3 :

Overall, respondents rated the **service problems at the laboratory as highest ($\bar{x} = 4.83$)**. The top three issues were:

1. Adequacy of teaching equipment ($\bar{x} = 4.98$)
2. Accessibility and timely use of the laboratory ($\bar{x} = 4.97$)
3. Laboratory booking system ($\bar{x} = 4.89$)

Table 4
Opinions on Satisfaction with Services

<i>Satisfaction Aspect</i>	$\bar{x}$	<i>S.D.</i>	<i>Quality Level</i>
Completeness and modernity of teaching equipment	4.60	0.54	Highest
Convenience in accessing and using services	4.19	1.09	High
Care and assistance from staff	4.41	0.78	High
Safety in using equipment and facilities	4.27	0.75	High

Overall satisfaction with service system	4.56	0.65	High
<i>Overall</i>	4.41	0.18	High

Summary of Table 4 :

Overall, respondents' satisfaction with laboratory services was high ($\bar{x} = 4.41$). The highest-rated aspect was completeness and modernity of equipment ($\bar{x} = 4.60$), followed by overall satisfaction with the service system ($\bar{x} = 4.56$), care and assistance from staff ($\bar{x} = 4.41$), safety ($\bar{x} = 4.27$), and convenience in accessing services ($\bar{x} = 4.19$).

Sub-Section 2 Practical Applications of the Research

1. The research identified problems, obstacles, and factors affecting laboratory services, which can be used to improve work processes and enhance service efficiency and standards.
2. The research supports better laboratory services, enabling users to access information and use the laboratory conveniently and efficiently, promoting practical learning and professional teaching skill development to their full potential.

5. Conclusion And Future Work

The research on the development of the service system for the teaching laboratory in the Faculty of Education, Suan Sunandha Rajabhat University, aimed to design and evaluate the quality of the laboratory service process and to study students' satisfaction with the developed system. The research employed a developmental research methodology, conducted in three phases: (1) studying baseline information and user needs regarding service problems, (2) designing and developing the service system, and (3) evaluating the system quality by experts and surveying user satisfaction among faculty staff and students. Data were collected from a total of 300 respondents, including 54 academic staff and 246 students from years 1–4, using simple random sampling. Data analysis was conducted using descriptive statistics, including percentages, means ($\bar{x}$), and standard deviations (S.D.) with a 5-point rating scale.

The main findings are as follows:

1. **Demographic analysis:** Among the 300 respondents, the majority were female (51.34%) and the remaining were male (48.66%). Most respondents were aged 20–30 years (68%), followed by under 20 years (14%), 41–50 years (8.33%), 31–40 years (5.67%), and over 50 years (4%). Regarding educational level, the majority were fourth-year students (23%), followed by second-year (20.34%), third-year (19.66%), first-year (19%), and others (18%). Most respondents were students (82%), followed by lecturers (8.67%), assistant professors (7.66%), and associate professors (1.67%).
2. **Service problem analysis:** The overall evaluation of service problems was rated at the “highest” level ($\bar{x} = 4.83$, $\bar{x} = 4.83$). Specifically, the adequacy of teaching equipment in the laboratory received the highest score ($\bar{x} = 4.98$, $\bar{x} = 4.98$), indicating that equipment availability is the most critical issue perceived by users.

3. **User satisfaction analysis:** Overall satisfaction with the laboratory service system was rated at a “high” level ($\bar{x}=4.41$, $s=4.41$). Among the aspects evaluated, the completeness and modernity of teaching equipment received the highest score ($\bar{x}=4.60$, $s=4.60$), reflecting that users are satisfied with the quality and adequacy of laboratory equipment.

The research findings indicate a clear alignment between the identified problems and user satisfaction regarding teaching equipment, which is a key factor affecting the effectiveness of the teaching laboratory service system. Continuous development and improvement of the system, particularly in terms of providing and maintaining adequate and up-to-date equipment, are essential to enhance the quality of teaching and increase user satisfaction. This aligns with the concept of Chuchua, K., Srirama, S., & Noijana, N. (2024), which emphasizes the development of pre-service teachers’ digital technology competencies, enabling learners to think critically, creatively, and responsibly in the use of digital technology both inside and outside the classroom. Instructors can utilize modern information technology to foster collaborative learning, stimulate joint learning through online platforms, facilitate the exchange of ideas, and promote interactive learning between teachers and students comprehensively.

The research demonstrates that the majority of the respondents were female and predominantly aged 20–30 years, reflecting an active user group for teaching and learning. Fourth-year students and regular students were the main participants in evaluating the system, which ensures the feedback is representative of the primary users. The high rating for equipment adequacy emphasizes its critical role in facilitating effective learning in the teaching laboratory. Satisfaction ratings confirm that, despite minor issues, the service system is overall well-received and considered effective. These findings suggest that continuous development, especially in terms of maintaining up-to-date equipment and providing efficient support, is vital for improving the system.

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