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The Development of a Learning Management System Platform on Historical Buddhist Plant Species in School Botanical Gardens in Thailand

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Abstract

The objectives of this research and development R&D project were: (1) to create, test and use a learning management system platform on historical Buddhist plant species in school botanical gardens in Thailand; (2) to evaluate the learning management system platform prototype; and (3) to deliver the learning management system platform prototype in Thai schools. The voluntary participants were 5 administrators/ teachers, 35 students involved in the School Botanical Garden Project, and 5 ICT developers in Academic Year 2023. The research stages were: (1) design and development of a learning management platform; (2) platform quality assessment and evaluation; (3) students' satisfaction with their use of the system after three months; and (4) platform improvement based on satisfaction data. The research tools were a constructed questionnaire and interview guide. The obtained quantitative data were analyzed for frequency, percentage, mean and standard deviation; and the qualitative data were analyzed by content analysis. The results pointed to: (1) The participants were satisfied with the use of the learning management system platform on historical Buddhist plant species; (2) The structure of the platform consisted of a content website, teachers' and students' database, knowledge evaluation model, knowledge memorandum, web board, knowledge asset, document download and gallery; (3) The process of the platform comprised: (i) knowledge identification; (ii) knowledge acquisition; (iii) knowledge creation and exchange; (iv) knowledge storage and retrieval; and (v) knowledge transfer and utilization. It was expected that the developed learning management platform prototype could equip learners and stakeholders with the skills to learn about historical Buddhist plant species for effective learning integrated with other subjects in the basic education curriculum used by Thai schools with botanical gardens.

Keywords: *Learning management platform, historical Buddhist plant species, school botanical gardens*

1. Introduction

The digital economy is considered an era of humans with a wide range of knowledge and expertise to operate under the circumstances of competition and rapid change. Phakamach et al. (2022) explained that Knowledge Management (KM) is a new type of learning that guides people to create experiences based on knowledge. Such a learning mechanism focuses on the consolidation of scattered knowledge into one place

and creation of an atmosphere for people to innovate. The most important thing is to provide channels and conditions for people to exchange or transfer knowledge between and among them (Oliveira et al., 2016; Kant et al., 2021). Its application is for improving the quality of education at all levels and enhancing skills and learning competencies required of 21st century learners for the country's social and economic development (Ratchavieng et al., 2022).

Rajamangala University of Technology Rattanakosin has participated in the royal initiative on plant genetic conservation under the patronage of HRH Princess Maha Chakri Sirindhorn. Academic operations focus on raising awareness of plant genetic conservation in schools. The initiative aims at awareness of sustainable development and maintenance of a balanced environmental quality in the long run. Ratchavieng & Phakamach (2021) worked on plant genetic resource conservation by campaigning and promoting activities in the form of training projects for youth and local general public. The purpose was to teach and train children to value plant conservation, appreciate natural beauty, and enjoy studying and conserving rare plants. Chen & Sun (2018) cautioned that the use of teaching methods that create a sense of fear, if not conserved, will cause negative consequences in causing stress to children, which will be detrimental to their country in the long run.

The operation of the school botanical garden project has developed students' awareness of plant genetic conservation by allowing them get close to plants, and value benefits and natural beauty in conserving rare plants. A botanical garden on the school's ground is used in teaching integrated subjects in the basic education curriculum. As of 4 July 2022, there have been 3,300 member botanical garden schools. The subtopics on botanical gardens on the basis of five learning elements are put in the normal teaching and learning schedule as prescribed in the policy and standards of the Office of Education Standards. Follow-ups reveal that member schools awarded with royal certificates for a long time changed school administrators and did not actively pursue the botanical project activities as prescribed, and some even withdrew their participation. Follow-ups from the school websites and annual reports on administrative matters could lead to reduction in receiving certificates and badges of royal initiatives, down to membership suspension from the school botanical garden project (Ratchavieng et al., 2022).

Historical Buddhist Plant Species is a book systematically compiled by the author Professor Payao Duangwongkin, an expert in plant taxonomy on herbs of the Royal Plant Genetic Conservation Project. The book is a reference document in support of the operation of the school botanical gardens. Todate, there have been very few documents on classification of the historical Buddhist plants and herbs. The operation of school botanical gardens in Thailand is on a web-based learning model as a a learning management system for teaching and learning processes that link learners with teachers and between learners and their peers by providing supplementary teaching materials or e-coursewares, for self-paced learning in knowledge management. This is a good opportunity for learners to access knowledge on the historical Buddhist plant species via the School Botanical Garden Project.

Based on the ongoing learning management operation of the school botanical gardens, the researchers were interested in developing a learning management system platform on the historical Buddhist plant species as part of the school botanical gardens.

The researchers were to modify the learning process by using an ICT platform to support teaching and learning activities. The design aims at educational innovations with dimensions consisting of (i) electronic learning materials, (ii) knowledge management support systems, such as knowledge libraries, knowledge records and assessments, (iii) databases of the faculty and students, as well as academic services, (iv) online e-bulletin boards for learning exchange, and (v) links with schools (e-schools). The researchers included teachers and learners performance improvements based on expert feedback. The constructed learning management system platform on historical Buddhist plant species was meant to serve students under the school botanical garden project in using effective knowledge management.

2. Research objectives

The objectives of this research and development R&D project were: (1) to create, test and use a learning management system platform on historical Buddhist plant species in school botanical gardens in Thailand; (2) to evaluate the learning management system platform prototype; and (3) to deliver the learning management system platform prototype in Thai schools**.**

3. Literature Background

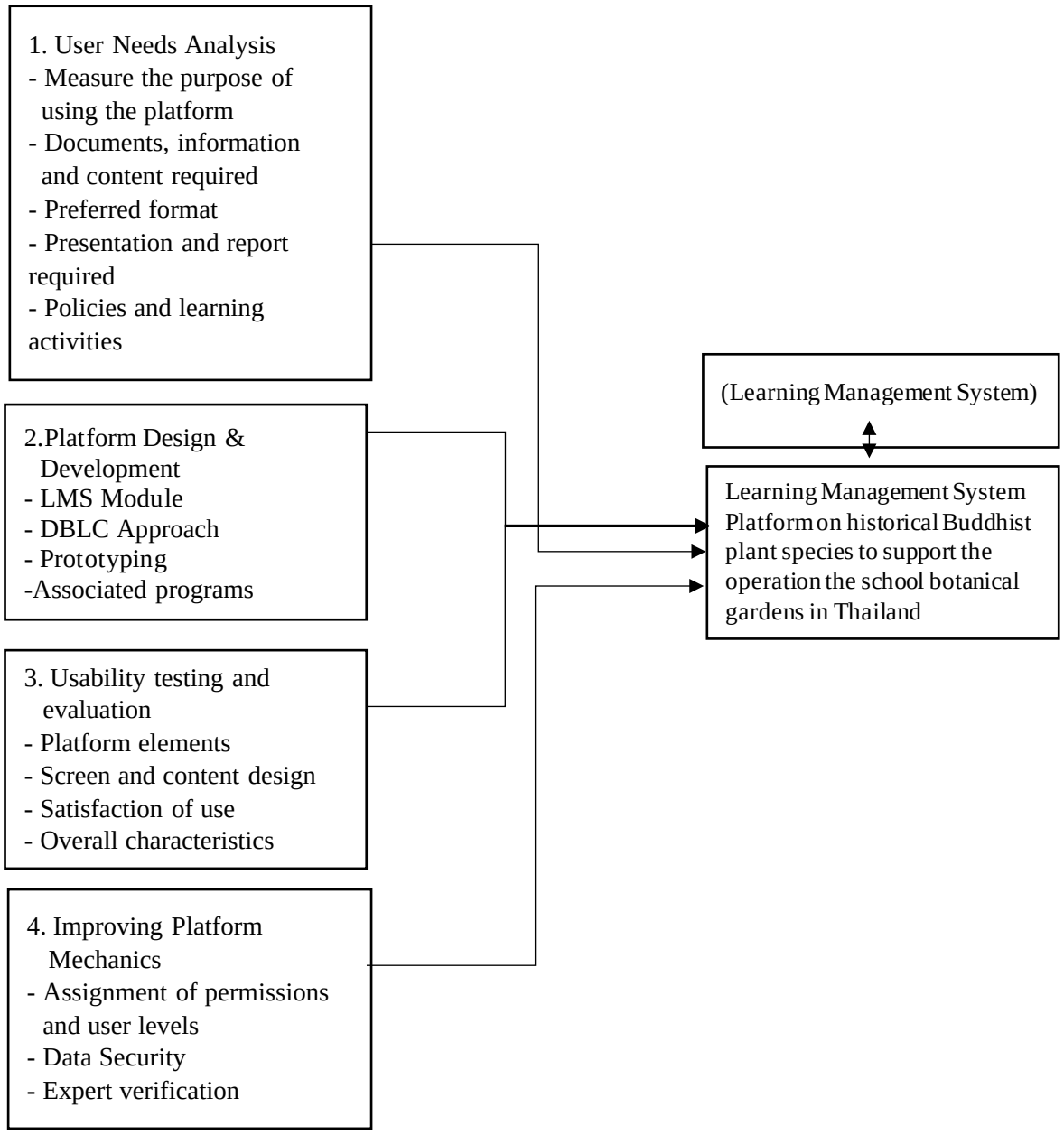
Information communication technology (ICT) is related to the way of life and livelihood of people in modern society. The development of ICT has greatly improved people's quality of life of in society. As known, the world is in the electronic era that has brought about unlimited changes. (Phakamach et al., 2021, 2022). In the education system, ICT has been adopted for better education in bringing in big data of news, knowledge, and all kinds of information sources in depth at a high speed andin high volume. Various media, in graphics, sound, and multimedia, as well as interactive systems are placed on digital platforms for learningand sharing. Modern learning uses a global treasure trove of knowledge. Resources are happening all the time and scattered all over the world. Learning in the modern age requires learning a lot at a high speed. Learners must be able to discern, search, and seek what they need for educational excellence (Sinlarat, 2020).

A learning management system platform refers to the application of ICT system to teaching and learning management by utilizing existing knowledge or learning for maximum benefit (Phakamach, 2023). It is a tool to achieve the goals of learning in many aspects, particularly knowledge development to build a learning organization in which mutual knowledge exchange occurs in support of important digital processes, such as design, creation, collection, exchange, and implementation (Phakamach, 2023) As planned in the present study, the development of a learning management system platform on historical Buddhist plant species for learning in school botanical gardens can demonstrate the process in five steps: Step 1: Identification, Step 2: Acquisition, Step 3: Creation and Exchange, Step 4: Storage and Retrieval, and Step 5: Transfer and Utilization (Phakamach et al., 2022).

4. Research Conceptual Framework

The research team created a conceptual framework as a guideline for constructing a learning management platform on historical Buddhist plant species, as shown in Figure 1.

Figure 1: Research Conceptual Framework



5. Research Methodology

This research uses Research and Development (R&D) methodology with four phases as follows:

5.1 Step 1: User Needs Analysis

Objective: To analyze and synthesize the learning management system about historical Buddhist plant species to support the operation of the school botanical gardens. The sub-operating steps are as follows: Step 1: Study information from documents and formats related to knowledge management. Step 2: Gather the opinions from school botanical garden experts. Step 3: Gather feedback from students and stakeholders from the school botanical gardens. Step 4 Gather feedback from ICT experts and educational innovators. The data gathered from Steps 1 to 4 are analyzed and synthesized into an overview of desirable platform development.

Participants: The participants were divided into 3 groups as follows:

Group 1: Five experts in knowledge management and school botanical gardens.

Group 2: Thirty-five students from nine schools with botanical gardens in Prachuap Khiri Khan province under the royal patronage of HRH Princess Maha Chakri Sirindhorn. These schools are: (1) Wang Klai Kangwon School, (2) Ban Maduea Thong School, (3) Ban Thung Yao School, (4) Ban Tha Kham School, (5) Ban Suan Luang School, (6) Ban Khlong Loi School, (7) Ban Nong Hoi School, (8) Prachuap Witthayalai, School (Muang District), and (9) Ban Khao Zhao Border Patrol Police School.

Group 3: Five ICT system and educational innovation specialists.

Groups 1 and 2 served as end users of the newly developed platform.

Data Collection: The data collection tools for three groups were:

An unstructured interview form was for Groups 1 and 3.

A questionnaire consisting of a check-list and fill-in the blank answers was for Group 2.

The questionnaire was validated for language appropriateness and wording, tried out for precision. Its Cronbach's Alpha Coefficient was at .924.

Data Analysis: The data obtained from Group 1 were on the educational platform and overall structure. Group 2 data were on the user's needs and satisfaction regarding the use of the platform. Group 3 data dealt with the methods, models, and strategies of I CT implementation of platform development. Quantitative data were analyzed for frequency, percentage, mean and standard deviation; qualitative data were analyzed by content analysis.

5.2 Step 2: Platform Design and Development

Objective: To create a model on a management system platform to learn about historical Buddhist plant species in the operation of botanical gardens in schools in Thailand. The data obtained from Step 1 specified periodic usability testing.

Research Method: The application of various standard softwares related to platform design and development using the DBLC database development process includes:

(1) System Analysis: This is the process of user requirements analysis to identify problems and needs in order to solve identified problems and improve the existing work system. The studied issues are the feasibility study and scope of the new work system.

(2) System Design: Database design uses an E-R (Entity-Relationship Model), known as a relational model and a normalized model.

(3) System Implementation is programming as designed, and testing the program by using system development strategies developed by the system owner. There are documents on program use in two types: User documentation and program author's document to explain and teach how to use the program.

4) System Installation is the installation of the system by bringing the validated program to the user and training for understanding of the system operation.

5) System Operation and Evaluation: The implementation and evaluation of the system.

6) System Maintenance and Evolution: The maintenance and enhancement of the system to be stable and safe.

The design and development at this stage are to build the platform from synthetic data from Step 1 according to the defined format.

5.3 Step 3: Usability Testing and Evaluation

Objective: To test the usability and development of the platform in accordance with the platform model obtained in Step 2.

Research Method: The operator adopts research methods to find out the efficiency and satisfaction of system users. The aim is to improve the performance of the system with the following implementation plan: Step 1: Organizing a workshop by introducing stakeholders and testing the use, which will be conducted three times. Step 2: Implementation testing by a user group consisting of teachers and students using a joint meeting in the organization (Workshop Facilitation). Step 3: Evaluation of the use of the system by inquiry and participatory observation (Participant Observation). Step 4: Finalizing the model of the historical Buddhist plant species learning management system platform to support the operation of the school botanical gardens.

Research at this stage can modify the process as seen appropriate. Practical testing is carried out as well as studied according to the prescribed pattern in order to obtain a suitable platform for knowledge management of the school botanical gardens.

Participants: Group 1: Five experts in knowledge management and school botanical gardens. Group 2: Thirty-five students and stakeholders of the school botanical gardens from nine schools in Prachuap Khiri Khan province from Step 1. Group 3: Five experts in ICT system and educational innovation.

Data Collection: The tool was an unstructured interview form on testing its effectiveness. Data collection was by group as follows:

Groups 1 and 3 with workshops and interviews.

Group 2 with workshops and participatory observations. They were asked to respond to a questionnaire on a scale of 1-5: A checklist and fill-in sections. Part 1: Participants' information, Part 2: Comments on the use of the platform regarding the

efficiency and satisfaction of system users, and Part 3: Suggestions and guidelines for platform development.

Very high	given weight value at 5
High	given weight value at 4
Moderate	given weight value at 3
Low	given weight value at 2
Very low	given weight value at 1

The questionnaire was validated by five experts for language appropriateness and tested for precision by Kronbach alpha coefficient formula, as shown in Step 1.

Data Analysis: Group 1 data were analyzed to find ways to improve and develop the platform according to the specified format so that users can use it effectively. Group 2 data were on the participants' information, analyzed by frequency and percentage. Part 2 data on opinions about the platforming were analyzed by mean and standard deviation. Part 3 data on suggestions and guidelines for platform development were analyzed by content analysis for suggestions on development approaches.

Group 2 obtained questionnaire data were interpreted as follows:

4.21-5.00: Very High: Maximum efficiency and satisfaction
3.41-4.20: High: High level efficiency and satisfaction
2.61-3.40: Moderate: Medium efficiency and satisfaction
1.81-2.60: Low: Less efficiency and satisfaction
1.00-1.80: Very low: Minimal efficiency and satisfaction

where the score discrepancy is by the formula = (5-1)/5 = 0.8.

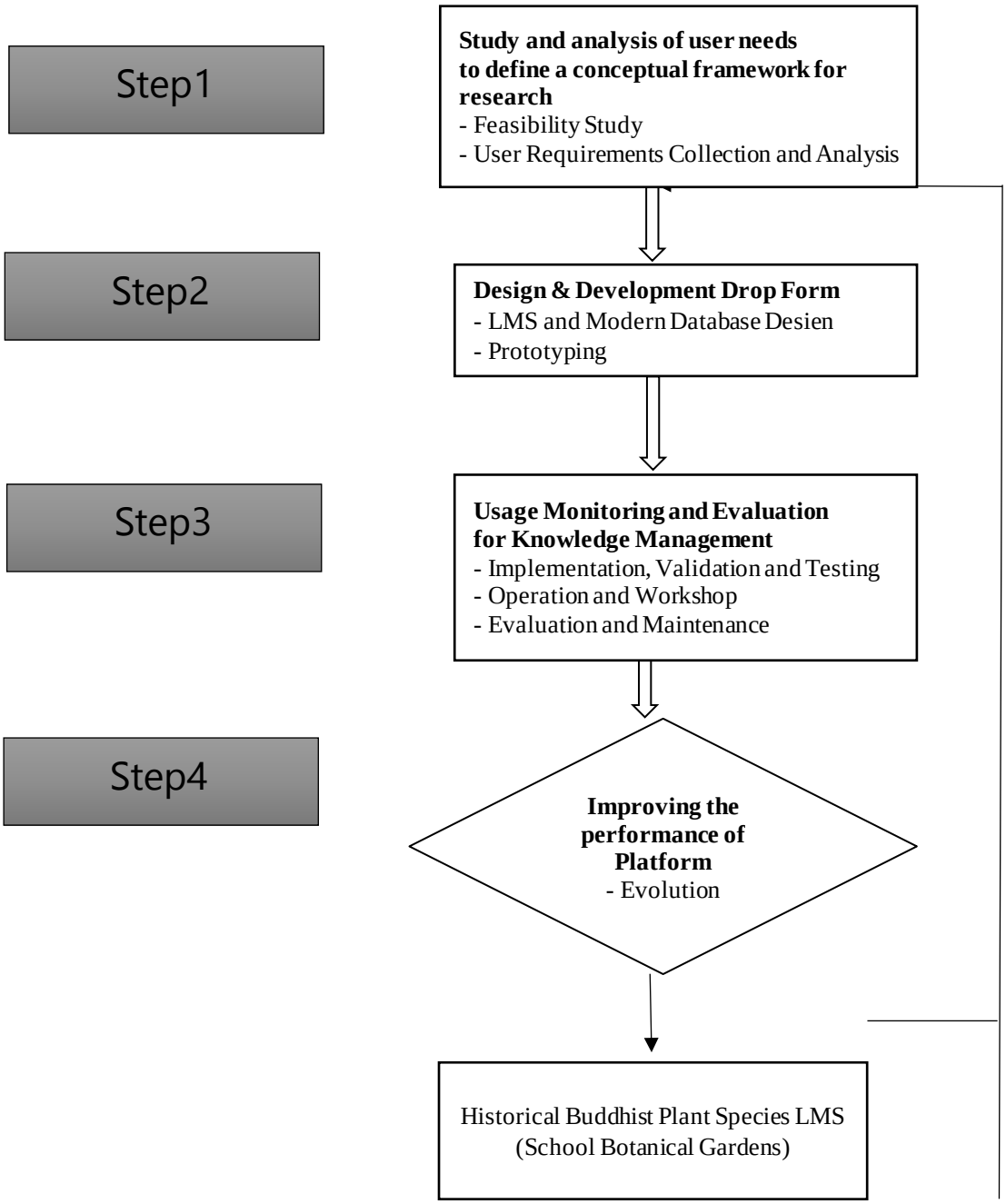
5.4 Step 4: Platform Performance Improvement

Objectives: To determine improvements of the platform from Step 3 regarding its performance to achieve more effective learning functions with the user in mind.

Research Method: The researchers conducted unstructured interviews using focused group discussion of five experts on the school botanical gardens and five experts in ICT systems and educational innovations. They provided opinions and suggestions to improve the platform to be complete in functions to be documented in a research report.

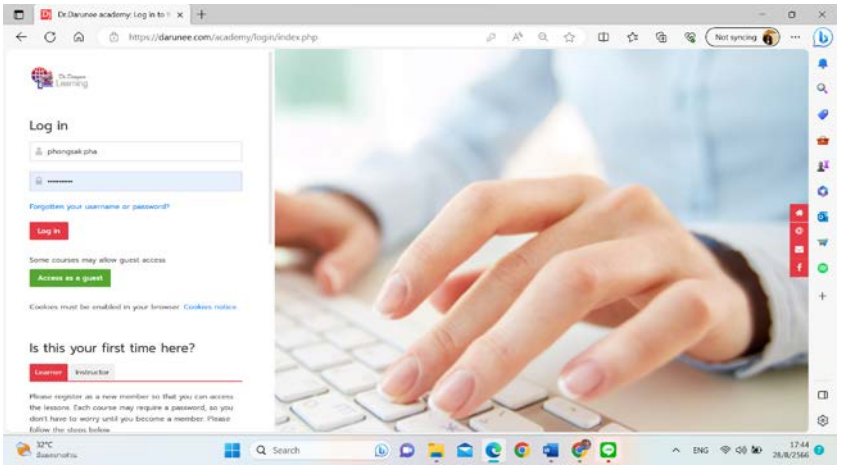
From Research Steps 1 to 4, the researchers summanarized all the process stages in a diagram on platform development, as shown in Figure 2 below.

Figure 2: Process in Research Methods



Two examples of the Historical Buddhist Plant Species Learning Management System Platform to support school botanical gardens are shown in Pictures 1and 2 below.

Picture 1: Main Page of the Learning Management Platform



Picture 2: Historical Buddhist Plant Species on the Learning Management Platform

6. Research Results

The researchers reported the obtained results according to the sequence of the research objectives.

6.1 The Study and Analysis of User Needs

The results on user needs of the historical Buddhist plant species to support the operation of school botanical gardens in Thailand revealed that all users under study were satisfied with the platform in accordance with the requirements and regulations related to

education management at the basic education level. The operational procedures were carried out sequentially: The opening of the course, the organization of teachers, writing instructional requirements, subject studies assessment (as applicable), notification of academic results, and reports to the school

The users under study considered ICT system development guidelines for the platform clearly defining the work structure related to knowledge management tasks at the educational level and in line with the project. The basic guidelines for platform development are listed:

(1) Establish clear and continuous policies, operational plans, and actual operations with emphasis on the standard operating model of the OECD.

(2) Provide powerful tools and programs to support and support effective management of school botanical garden knowledge.

(3) Prepare and plan the budget work to be consistent and appropriate to the preparation of the student service system.

(4) Publicize and campaign with all personnel to recognize the importance and the benefits of using the platform and ICT system for education in the school botanical garden project.

(5) Train personnel to understand and use the platform for the benefit of teaching and learning for academic enhancement.

(6) Appoint a central agency to coordinate, advise/recommend effective use continuously.

(7) Conduct usage evaluation to identify problems and find practical solutions.

6.2 System Design and Development

Platform design and development in this study were based on the DBLC standard system development process: (i) System Analysis: This is the process of user requirements analysis; (ii) System Design: Database design is presented using the E-R (Entity-Relationship Model), also known as the Relational Model; (iii) System Implementation; (iv) System Installation; (v) System Operation and Evaluation; and (6) System Maintenance and Evolution.

An appropriate program for use in platform design and development carried the following features : (i) Flexible in use; (ii) Providing functions to support knowledge management; (iii) Supportive to future functions; and (iv) Taking into account compatibility with normal forms and methods of operation without causing difficulties to users.

6.3 Usage Test Results and Evaluation

Part 1: The Results of the Assessment of the Quality of the Platform Prototype

The participants and experts in school botanical gardens expressed their opinions on a scale of 1-5 regarding platform composition, screen design and content, and usability. They showed their satisfaction at a high level ($\bar{x}$ =3.90, S.D.=0.43), as shown in Table 1.

Table 1: Efficiency in Use of the Historical Buddhist Plant Species on the Learning Management Platform to Support the Operation of School Botanical Gardens in Thailand

Efficiency in use of the historical Buddhist plant species on the learning management platform to support the operation of school botanical gardens in Thailand	$\bar{x}$	**S.D.**	**Percent**	**Efficiency level**
Data Recording/ Editing	3.95	.28	78.40	High
Data search	3.80	.76	76.00	High
Report issuance	3.80	.52	74.40	High
Contact with users, including administrators	3.98	.38	78.00	High
Data Security	3.86	.30	77.20	High
Platform User Manual	3.76	.39	73.00	High
The overall appearance of the platform	4.03	.51	79.00	High
Total	**3.90**	**0.43**	**76.80**	High

Table 1 shows that the participants' opinions on the overall platform usage performance is at a high level. When considering individual aspects, they also rank high in terms of overall appearance of the platform and efficiency in all transactions.

The participants' satisfaction with the use of the platform was also at a high level ($\bar{x}$=3.88, S.D.=0.63), as shown in Table 2.

Table 2: Participants' Satisfaction with the Historical Buddhist Plant Species Learning Management Platform to Support the Operation of the School Botanical Gardens

Participants' satisfaction with the historical Buddhist plant species learning management platform to support the operation of the school botanical gardens	$\bar{x}$	**S.D.**	**Percent**	**Satisfaction level**
Responding to teaching and learning	3.90	.48	76.20	High
Providing fast and convenient information services	4.10	.74	80.00	Very high
Data accuracy	3.50	.58	68.40	Moderate
Completeness of information	3.50	.58	68.00	Moderate
Data update	3.90	.88	76.20	High
Information meets the needs	3.90	.48	76.00	High
Center of information	3.93	.87	76.20	High

Participants' satisfaction with the historical Buddhist plant species learning management platform to support the operation of the school botanical gardens	$\bar{x}$	**S.D.**	**Percent**	**Satisfaction level**
Ease of coordination/command	3.70	.58	72.00	High
Easy to find information	4.30	.87	84.20	High
Convenient access to the system	4.10	.74	80.00	High
The process of use is clear and easy to understand	4.11	.74	80.20	High
Data change made easy	3.90	.48	76.00	High
Conference support	3.52	.58	68.00	Moderate
Clear manuals and procedures	3.90	.48	76.20	High
Issuance of appropriate reports	3.48	.48	64.00	High
Proper information security	4.31	.58	84.20	Very high
Total	**3.88**	**0.63**	**76.40**	High

Part 2: Interview Results of Partcipants' Opinions on the Historical Buddhist Plant Species on the Learning Management Platform to Support the Operation of the School Botanical Gardens

There were five issues worth attention as follows:

(1) *Knowledge and Application:* Students have the right platform to learn about historical Buddhist plant species so that they can apply their knowledge at higher levels in the future.

(2) *Behavior and Response:* The teachers and students use the platform to search knowledge records, practical training, learning exchange boards, as well as knowledge assessment in the knowledge management process to enhance their research experience.

(3) *Participation*: The teachers and students are involved in the use of online media. The platform can create an incentive for users to create an atmosphere for exchanging and transferring knowledge on social media.

(4) *Application:* The users were satisfied with the use of the platform by applying the knowledge to develop competency-based learning skills.

(5) *Problems and Suggestions:* The students want to have a system to customize their screens to be more beautiful and attractive when accessing the system and other social networks.

6.4 System Performance Improvement Effects

Five ICT and educational innovation experts confirmed in the interview session that the platform is useful for managing knowledge about the historical Buddhist plant species to support the operation of the school botanical gardens. They suggested a stand

alone one-stop service that can submit the results of the quality assessment of the platform and report to the public. Decision-makers concerned can choose results for the school's past quality assessment as well as recommend new educational developments as seen relevant to stakeholders' needs.

7. Conclusion and Discussion

The researchers summarized and discussed important issues according to the research objectives and procedures as follows:

7.1 Conclusions

(1) Study and Analysis of User Needs

The users of the historical Buddhist plant species learning management platform to support the operation ofschool were satisfied at a high level. They want this platform to manage knowledge about the historical Buddhist plant species in integration with the basic education curriculum.

As for design and development of the appropriate learning management platform, a standardized system development process should be used to to obtain a system that can fully respond to knowledge management at the basic education level.

The users under study need guidelines for the development of ICT system for a knowledge management skills development. The work structure related to knowledge management tasks at the basic educational level must be clearly defined and in line with the project's specifications. Development of knowledge management models and methods needs to comply with requirements in using appropriate ICT systems and educational innovations.

(2) Platform Design and Development

DBLC can be used to develop such a learning platform as shown in this present study to meet the needs of users, which is determined by the implementation test results and evaluation in Step 3.

(3) Usability Testing and Evaluation

The results of the study pointed to the efficiency in use of the historical Buddhist plant species learning management platform to support the operation of the school botanical gardens as follows:

(i) The overall performance of the platform ($\bar{x}$=3.90, S.D. = 0.43) indicates that the platform is suitable as a tool for teaching and managing knowledge as required.

(ii) The participants' overall satisfaction with the platform at a high level ($\bar{x}$)= 3.88, S.D. = 0.63) indicates that the platform responds well to the knowledge management on historical Buddhist plant species.

The platform provides information services for teaching and managing knowledge about historical Buddhist plant species. It can add some functions and information in accordance with the needs of both teachers and students. It is easy to change the data in the system for improvement or updates. The platform contains up-to-date information and issuance of instructional reports. It can also integrate standard software for more knowledge management tasks on demand in the future.

(4) Platform Performance Improvement

From the results of the study, the historical Buddhist plant species Learning Management Platform contains the following features:

(i) The historical Buddhist plant species platform can store information as required and contact users conveniently, quickly, and easily.

(ii) A platform can perform additional recording, editing, processing, issuance of reports and manual data deletion.

(iii) A platform can search educational information, documents, and data sorts according to the specified conditions correctly in order to effectively implement the project of the Office of theNational Education Commission (Thailand).

(iv) A platform can conveniently issue on-screen and printer-based reports.

(v) A platform has data security platforms by secured-password.

(vi) A platform can constantly move new information and knowledge to keep pace with changes in science and technology.

The platform development process can be summarized in the following steps:

Step 1: *Identification:* Providing an overview of knowledge related to the presented subjects correctly on historical Buddhist plant species to support the school botanical garden project.

Step 2: *Acquisition:* Gathering information and knowledge on related subjects on historical Buddhist plant species to create valuable documents. This stage creates a system on a website; learning materials are put on a database system to link teachers with learners.

Step 3: *Creation and Exchange:* Drawing deep-seated knowledge from experience and work to create explicit knowledge or new body of knowledge in the form of various media, and to support innovative community in practices. At this stage, teaching will be conducted through a prototype system through electronic media. The implementation of specified activities is in the form of question-answer related to course content and tests.

Step 4: *Storage and Retrieval:* Securing an educational database for learners, teachers and interested people. The database system can be stored and searched by creating a membership system for interested parties or used in combination.

Step 5: Transfer and Utilization: Supporting the dissemination of knowledge on a platform for learning exchange. Once the students have passed Steps 1 to 4, they can examine the results of their development of knowledge about historical Buddhist plant species in the operation of the school botanical gardens, and for further dissemination to the public.

7.2 Discussion of the Results

The researchers discussed the obtained finding as follows:

(1) Study and Analysis of User Needs

As reported in the obtained findings, the users of the educational platform need ICT systems for storage in knowledge management to access such a target topic as historical Buddhist plant species in the operation of the school botanical gardens. The research methods in data collection, platform development and project implementation appeared consistent with the studies by Altınay et al. (2019), and Ratchavieng et al. (2022). These previous researchers analyzed how to integrate ICT systems into management and quality

assessment in education to increase evaluation efficiency. Pakamach & Chaisanit (2019) earlier described the process of designing and developing a good platform with current technical qualifications for an appropriate system that can achieve the identified objectives. In addition Ukhov et al. (2021) emphasized that the design and development of a modern platforms require a thorough analysis of user needs in order to create functions that are suitable for real-world work conditions. This is to enable the constructed platform to respond well to users with required functions.

(2) Platform Design and Development

The results of the study showed that overall platform performance and user satisfaction were at a high level. This finding was in line with the studies by Oliveira et al. (2016) who found that good platform or application design must take into account user needs in development and implementation for maximum performance as intended. In addition, Phakamach et al. (2021) asserted that design and development is a major task of ICT because its process involves all users or stakeholders. Therefore, it requires the ability of experts in system analysis to match the objective with design and development. As for the management of the system development process, the developer needs to strictly adhere to the model as specified in the process. Altınay et al. (2019) emphasized that the new work system can achieve real operational development without placing too much burden on users.

(3) Usability Testing and Evaluation

The platform designed and developed with the topic of historical Buddhist plant species can add new functions and information in accordance with the user's usage for both teachers and learners. The development of the website format can support the expansion of knowledge management information by using standard software and basic education management for the future. In addition, five ICT experts in the study said that platforms are to contribute to increased efficiency and flexibility in teaching and learning at the basic education level. The developed platform can serve as an application model to support the current online teaching and learning format. The platform in fact requires flexibility in design to support a wide range of learning conditions as well as to create a new image for the organization (Kant et al., 2021; Ratchavieng et al.,2022).

(4) Platform Performance Improvement

It is important to improve the platform's full functions according to the curriculum benchmarks of the Office of the Basic Education Commission, Thailand. The platform needs to have all functions to create learning that meets the standards of operation by National Education Act as well as the international standards. This is to achieve a more standardized platform and network model consistent with the basic education management guidelines in short and long-term quality assurance operations. This point was highlighted earlier by Phakamach & Chaisanit (2019) and Wachirawongpaisarn et al.(2021). This was also in line with the findings of Supermane & Tahir (2018) and Ratchavieng et al. (2022) in that application performance improvement must be done continuously to respond to users' performance. In addition, Phakamach et al. (2022) and five ICT experts in the study commented on the development of high-performance platforms to be cost-effective. In order for the platform to be able to meet the long-term

use, various standards or regulations must be adapted to ensure that the operation of the school botanical gardens in the project succeed both quantitatively and qualitatively.

In this regard, the research on development of a learning management system platform on historical Buddhist plant species to support the operation of school botanical gardens in Thailand was meant to satisfy the participants under study. With the reported results, the researchers feel confident in the quality as sufficient for the practical implementation of this learning management system in botanical-garden schools under the Office of the Basic Education Commission. The developed platform can benefit teaching and learning in the school botanical garden project as effectively as planned.

8. Suggestions

Based on the obtained findings, the researchers would like to have the following suggestions:

(1) The development of educational systems or platforms requires a qualified and expert development team to achieve an appropriate and effective knowledge management system in accordance with the objectives of learning in the digital age.

(2) In order to make the learning management process fast and cost-effective, the operator needs to provide training so that students can understand the objectives, format, method of use, and can solve problems that arise during self-study.

(3) The operator needs to provide in-depth training to learners and promote wider learning regarding the subject matter, interaction sections, active discussion boards, notification system and hands-on instruction manual on relevant content.

(4) It is important to use text, graphics, sound, and multimedia appropriately and consistently.

(5) Platform performance testing must be carried out with planned periodic test work so that all functions of educational management and learning management can proceed well with expected quality at work.

9. Future Research

The research team would like to see research and development of other platforms to be carried out to cover all subject groups via knowledge management in support of teaching and learning at the basic education level in Thailand. Research should be conducted by putting this platform prototype in other educational institutions in order to evaluate its effectiveness in selected contexts so that its implementation can benefit the target learning management program in the real-world conditions.

10. Acknowledgement

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