Developing an Electronic Logbook to Monitor Progress for International Doctoral Students in Thailand: A Pilot Study

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Abstract

Monitoring the progress of doctoral students is an important contributor to successful graduation within the curriculum timeline. Usage of an electronic logbook is needed to improve the quality and efficiency of education. The objective of this developmental research study was to develop an electronic logbook to monitor the progress of international doctoral students. The steps for creating the electronic logbook are described. Twenty-seven international doctoral students at the Faculty of Nursing of one university in Thailand used the electronic logbook for 3 months and provided feedback to the developers. Quantitative findings reported high to very high levels of satisfaction with the electronic logbook, regarding usefulness, convenience, speed, and ease of access. Qualitative findings also documented the electronic logbook's strengths and benefits, as well as problems and obstacles. In conclusion, students found the electronic logbook useful and were satisfied with it. Widespread use of this innovative electronic logbook should be used to monitor student study progress.

Keywords: Electronic logbook, progress monitoring, international doctoral students

Introduction

Information technology can serve a significant educational purpose by supporting academic instruction and management in the 21st century, which is an era of education free from the boundaries of time and location. Usage of information technology can increase the effectiveness of work, with applications of computer software and hardware to manage information. This is coupled with the internet, which expedites informational access and availability, connecting the globe while eliminating knowledge boundaries. Online information systems allow information to be conveniently stored, edited, and searched [1-7]. A huge investment in information technology contributes to the improvement of education quality at every level with proper usage [8-10] and provides creative ways to be identified to provide global access to information [11]. Thailand has developed strategies to apply information technology to the education industry, such as utilizing satellite communications, fiber optics, CD-ROMs, multimedia, the internet, computers, and e-learning to support education [12]. The electronic logbook is a secure online database which offers many advantages, including the convenience of recording information online and quick data input [13-15], accessibility of information at any place and time [16], and continuous monitoring and evaluation of student performance [17,18].

Therefore, a study was conducted to develop, and to allow the pilot testing of, an electronic logbook to monitor the progress of doctoral students in an international program. The electronic logbook was beneficial in allowing the reporting of the students' academic progress anywhere and anytime. The electronic logbook also allowed faculty to monitor their students' progress through an online system.

Materials and methods

Developmental research was designed to develop an online electronic logbook to monitor the progress of doctoral students and explore their satisfaction with the electronic logbook. Purposive sampling was used to recruit twenty-seven participants, who were international doctoral students at the Faculty of Nursing at one university in Thailand (first-year to third-year).

Measures

Electronic Logbook Development. The researcher developed the electronic logbook based on the following procedures (**Figure 1**): 1) analyzing and identifying components of the electronic logbook; 2) creating a pilot design for the electronic logbook; 3) developing the electronic logbook; 4) creating the supporting materials, and 5) evaluating and revising the electronic logbook. The electronic logbook used in the research consisted of the following menus: student profile, course work report, dissertation planning and timeline, academic activity record, dissertation meeting record, and program requirements for graduation record. The electronic logbook was designed as a web-based application (**Figure 2**). An entirely electronic logbook system was developed from MySQL database using PHP script. The logbook could be accessed anywhere and anytime.
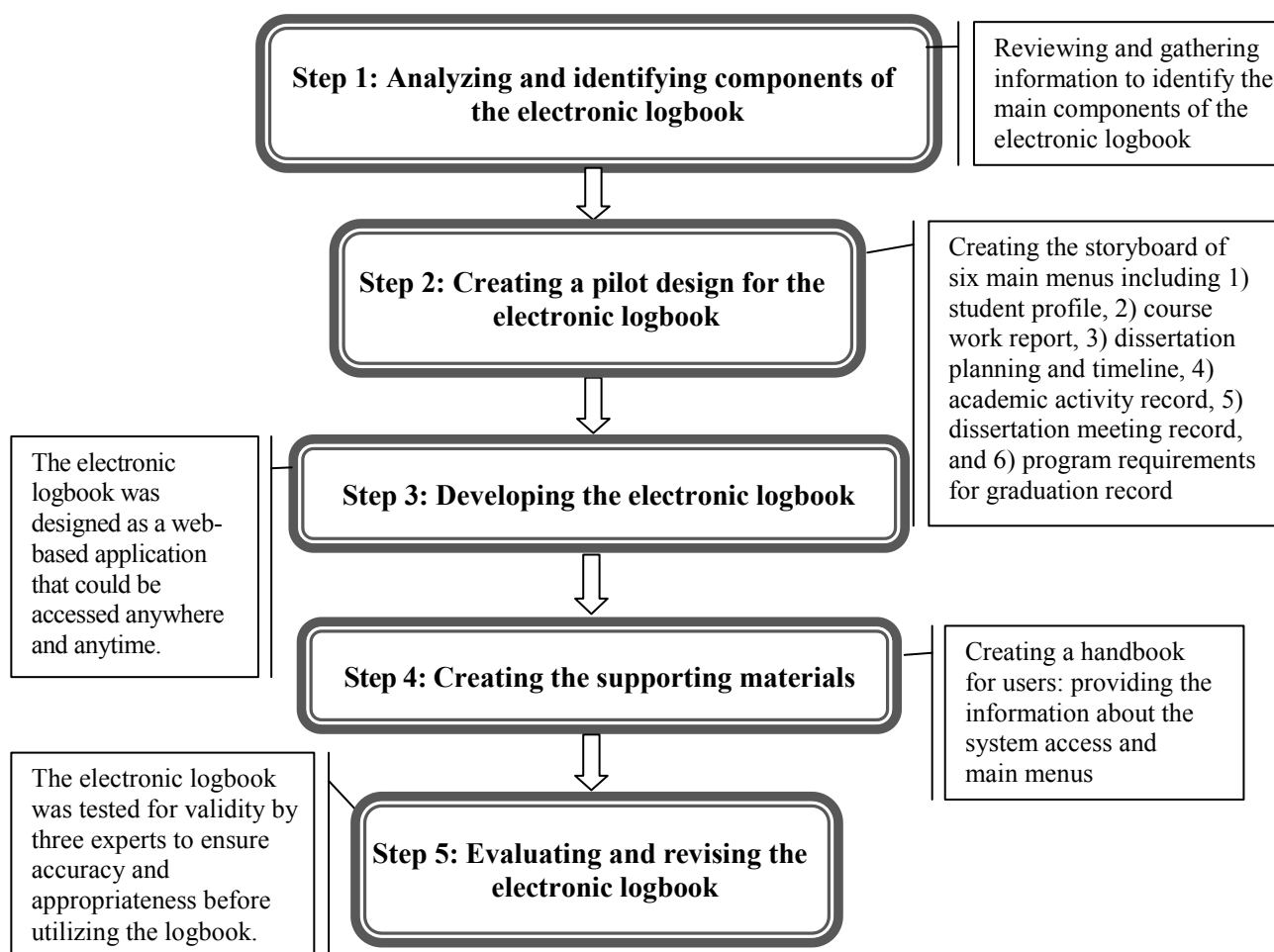
Step 1: Analyzing and identifying components of the electronic logbook

Reviewing and gathering information to identify the main components of the electronic logbook

Step 2: Creating a pilot design for the electronic logbook

Creating the storyboard of six main menus including 1) student profile, 2) course work report, 3) dissertation planning and timeline, 4) academic activity record, 5) dissertation meeting record, and 6) program requirements for graduation record

Step 3: Developing the electronic logbook

The electronic logbook was designed as a web-based application that could be accessed anywhere and anytime.

Step 4: Creating the supporting materials

Creating a handbook for users: providing the information about the system access and main menus

Step 5: Evaluating and revising the electronic logbook

The electronic logbook was tested for validity by three experts to ensure accuracy and appropriateness before utilizing the logbook.

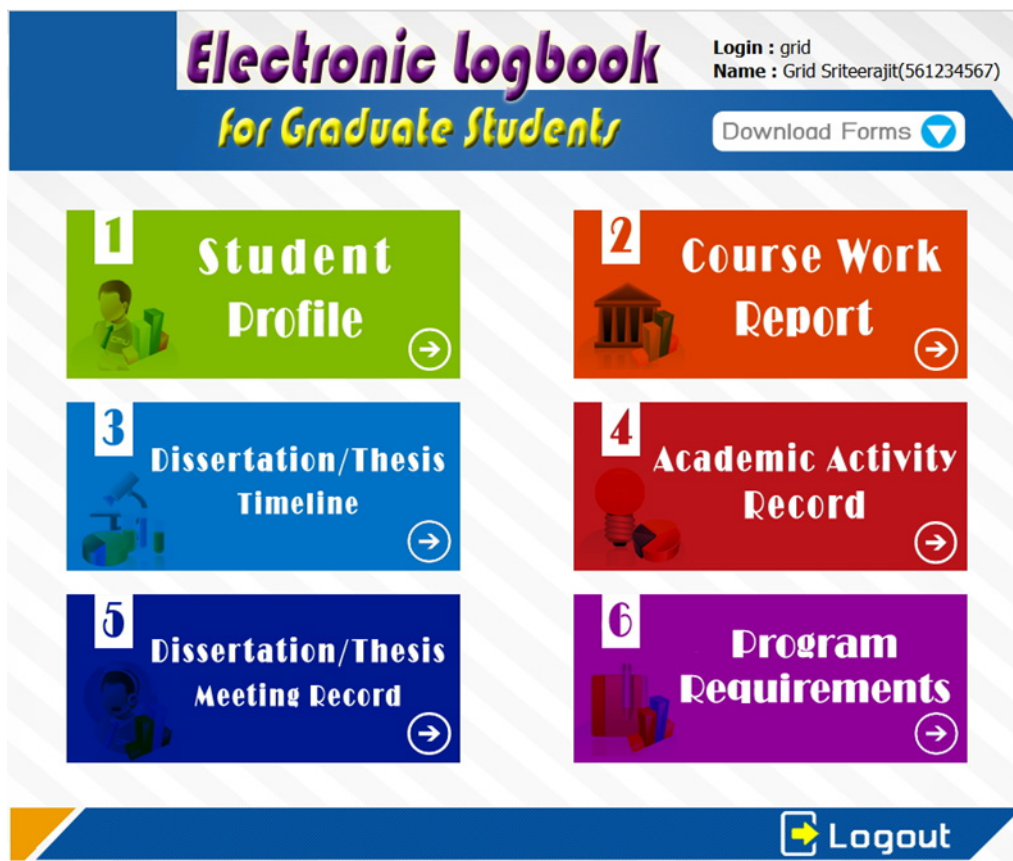**Figure 1** Diagram of the electronic logbook development.

Figure 2 Example of electronic logbook screenshot.

Satisfaction Questionnaire. A 10-item questionnaire developed by the researchers assessed usage, appropriateness, and problems/obstacles pertaining to the electronic logbook. All items were answered on a five-point scale, from 1 (least satisfied) to 5 (most satisfied). The questionnaire received a content validity index (CVI) of 0.93. The evaluation criteria for measuring student satisfaction with the electronic logbook was defined based on the average total score. Levels of satisfaction were defined as highly satisfied (4.51 - 5.00), very satisfied (3.51 - 4.50), moderately satisfied (2.51 - 3.50), not very satisfied (1.51 - 2.50), and minimally satisfied (1.00 - 1.50) [19].

Focus Group Interview Guide. This instrument was designed to evaluate the strengths/benefits and problems/obstacles of the electronic logbook. The interview guide was also designed to gather the respondents' feedback of how to improve the electronic logbook's effectiveness and to meet the demands of all users.

The research tool was initially assessed by 3 experts who had expertise in nursing education and information technology to ensure accuracy, comprehensiveness, and appropriateness. The researchers then applied the recommendations of the experts before utilizing the instruments for research purposes.

Data collection

After obtaining approval from the Institutional Review Board at the Faculty of Nursing of one university in Thailand, study participants were identified and asked to participate. After giving consent, twenty-seven participants attended group meetings to learn how to use the electronic logbook. Following the meetings, the participants were given a login ID and a password. Therefore, security was in place to

protect their data. The participants were informed that they would be asked to input personal information, such as student profiles, course work reports, dissertation planning, and timelines into the electronic logbook system, updating their database as often as they liked during the study period, which lasted for 3 months. At the end of the 3 months, participants completed a questionnaire measuring their satisfaction levels. Focus group discussions were used to evaluate the benefits and obstacles of using the electronic logbook. Each discussion took 60 to 85 min. The qualitative data were analyzed using content analysis.

Data analysis

Demographic data and student satisfaction scores were analyzed using descriptive statistics, including frequencies, percentages, averages, and standard deviations. Qualitative data were analyzed using content analysis.

Results and discussion

Results
Part 1: Demographic data

The sample consisted of twenty-seven nursing doctoral students studying in the international program. The sample included 11 first-year students, 10 second-year students, and 6 third-year students. The majority of the participants were female (81.48 %) with an age range between 29 - 47 years. The average age was 39.41 years (**Table 1**).

Table 1 Doctoral student demographics.

Data	Number (n = 27)	Percentage
Doctoral students		
Year 1	11	40.74
Year 2	10	37.04
Year 3	6	22.22
Age (Years)		
25-30	1	3.70
31-35	4	14.81
36-40	8	29.64
41-45	13	48.15
46-50	1	3.70
$\overline{X}$ = 39.41 SD = 4.37 Range = 29-47		
Gender		
Female	22	81.48
Male	5	18.52

Part 2: User satisfaction with the electronic logbook

The electronic logbook contained the following sections: student profile, course work report, dissertation planning and timeline, academic activity record, dissertation meeting record, and program requirements for graduation. Participants' overall satisfaction with the logbook was very high (mean = 4.56, SD = 0.58). Participants had very high satisfaction with the logbook's convenience and speed (mean = 4.52, SD = 0.70) and the ease of access (mean = 4.56, SD = 0.58). In terms of usefulness, participants rated the student profile, course work report, academic activity record, dissertation meeting record, program requirement, and download forms section all as "highly satisfied". The average scores ranged from 4.41 to 4.56 (**Table 2**).

Table 2 User satisfaction with the electronic logbook.

Evaluation items	Satisfaction Level		
	Mean	**SD**	**Level**
1) Convenience and speed	4.52	0.70	Highly satisfied
2) Ease of access	4.56	0.58	Highly satisfied
3) Usefulness of the student profile section	4.56	0.64	Highly satisfied
4) Usefulness of the course work report section	4.56	0.58	Highly satisfied
5) Usefulness of the dissertation timeline section	4.41	0.69	Very satisfied
6) Usefulness of the academic activity record section	4.56	0.64	Highly satisfied
7) Usefulness of the dissertation meeting record section	4.41	0.64	Very satisfied
8) Usefulness of the program requirement section	4.56	0.58	Highly satisfied
9) Usefulness of the download forms section	4.52	0.58	Highly satisfied
10) Overall satisfaction towards the electronic logbook for progress monitoring	4.56	0.58	Highly satisfied

The qualitative findings from the focus group discussions are presented below.
Category 1: Strengths and benefits of the electronic logbook
Most participants noted the following strengths and benefits: 1) convenient and fast, and 2) allows for continuous progress assessment.

Convenient and fast
Participants found the logbook very convenient and highly accessible, allowing them to monitor their own progress from any location and at any time. Students, advisors, and staff could access the logbook from the Faculty of Nursing or at another convenient location. The menus and interface were user-friendly, while the login system was easy and swift.

"I experienced no issues in accessing the system. It is convenient and fast, both via internet access at home and at the faculty." (1st year student)

"I logged in to the system twice at home, without experiencing any problems. I was able to login to the system right away, including when I was using it at home." (2nd year student)

"The links and menus are easy to find and access, including the Download Forms section that has all documents pertaining to doctoral degree students of the international program." (3rd year student)

Allows for continuous progress assessment
The students perceived that the electronic logbook allowed them to effectively assess their personal academic progress, while also benefiting the curriculum management committee and advisors by allowing them to continuously monitor all relevant academic progress. The online information system also provided for the reliable storage of information that was readily accessible. The students recommended that the online electronic logbook should be applied to students from their freshmen year onwards.

"The key benefit of the electronic logbook is that when we consistently update the system with relevant information...we can accurately assess our effectiveness in academic advancement." (1st year student)

"The electronic logbook enhances the curriculum and academic advisors in their efforts to monitor and motivate the students…students can conveniently access the Program Requirements section to see where they stand." (3rd year student)

"The electronic logbook is especially useful as a backup database. When information is lost or damaged, students can always retrieve the information online…the system is useful and should be implemented by students since their first academic year." (2nd year student)

Category 2: Problems and obstacles of using the electronic logbook

The problems and obstacles identified with the electronic logbook use were: 1) internet connections, and 2) the workload involved in data entry.

Internet connections

Students experienced issues of not being able to log in to the electronic logbook, or only being able to do so at a sluggish rate, due to unstable internet connections. The connection problems may have been due to high internet traffic at the time, leading to delayed logins or database inaccessibility.

"I experienced problems with logging in to the system. It took 4 - 5 attempts for a successful login. I also experienced problems with the internet, which frequently disconnects. Successful logins depend on the internet connection quality." (3rd year student)

"It was very difficult for me to log in to the system. It frequently notified that my Username was invalid. Accessing the program also took a long time …especially during poor internet connection." (1st year student)

Workload involved in data entry

Students also complained that the information system had an excessive quantity of required fields, consuming a significant amount of time to complete all the informational requirements. They recommended that a more concise and simpler version should be used, and that the logbook should be available to students from their first academic year onwards to reduce later workload involved in data entry.

"There were so many required fields in the system, especially under the topics of Research Residency…Dissertation Meeting Record. The system should only requires the main information to be recorded, not requiring the meticulous details. An easy and concise approach is the key - now it takes a long time to fill in all the information." (2nd year student)

"I was not sure which activity to fill in the field of Academic Activity Record, since I have been involved with many activities…For our benefit, students should be required to enter information since their first year to avoid a huge workload in data entry and difficulty in recalling experiences later on." (3rd year student)

Discussion

Overall, students had very high levels of overall satisfaction with the electronic logbook, its convenience and speed, and the ease of accessing it. Students rated the usefulness of the student profile, course work report, academic activity record, dissertation meeting record, program requirement, and download forms section as high to very high. This corresponded to the findings obtained from the focus group discussions. The students perceived that the electronic logbook allowed them to effectively assess and continuously monitor their academic progress. The online information system also provided for the reliable storage of information that was readily accessible. This corresponded to prior research which explained that electronic logbooks could enhance the convenience of recording information online, pertaining to the training progress of an organization in Australia, allowing the information to be accessed at any place and time [16]. Logbooks have been used as a means of continuous assessment [17] and of evaluating students' clinical performances [18,20]. The electronic logbook therefore served as an online tool to allow for ease of use, convenience, and fast data entry [13,15]. The research, however, also revealed limitations and obstacles of the electronic logbook. Unstable internet connections led to inability to access the information system. This corresponded to studies of Anukul [21] that identified delays in connection sending/receiving as a key factor contributing to internet problems that hinder academic

progress [21]. The study sample also mentioned excessive required fields as an obstacle, consuming a lot of time for students accessing the information system. This corresponded to the research of Fatemeh and Alavinia [20], which documented students'complaints that using a logbook required significant amounts of time to record information [20]. The students also recommended a more concise and simpler information filling system for efficiency and encouraged the system to be available to students from their first academic year onwards. Therefore, developing and testing the electronic logbook can serve as a foundation for improving the system and further expanding it to other educational institutions.

Conclusions

The findings indicated that the online electronic logbook, developed to monitor the progress of doctoral students in the international program, was beneficial, and that students were satisfied with using it. The online information was convenient for the students to access and to fill in their information. The students were able to access the online electronic logbook at any place and at any time. However, the problems and obstacles of using the electronic logbook, in terms of unstable internet connections and the workload involved in data entry, should be improved. The study findings suggest that the online information system should be continuously implemented to monitor students' academic progress.

Study limitations

Students, particularly second and third year students, may have had difficulty in recalling their past academic achievements and activities to add to the online electronic logbook, leading to incomplete records of information. Thus, students should be required to access the electronic logbook from their first academic year onwards, consistently updating their online profile throughout the study program.

Acknowledgements

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