Needs and necessity assessment on the develop a cloud-based learning by using design thinking process and gamification concepts to promote the ability to create service innovation in libraries of information studies students.[1]

Thiti Atichartchayakorn[2] Pornsuk Trantrarungroj[3] Praweenya Suwannatchote[4]

Abstract

The purpose of this study was to study the conditions and needs on the develop a cloud-based learning by using design thinking process and gamification concepts to promote the ability to create service innovation in libraries of information studies students. Undergraduate students studying in the fields of Library Science, Information Science and Information Studies in public higher education institutions in the central region were drawn to be the sample of the study. The research instrument, a questionnaire, was used to collect the data. The results showed that the process and concept were applied to most undergraduate students.

Keywords: Needs and necessity, Cloud-based learning, Design thinking process, Gamification, Service innovation

[2] Ph.D. student in Educational Technology and Communications, Faculty of Education, Chulalongkorn University. Email: thiti.kh@gmail.com

[3] Assist. Prof. Dr. Pornsook Trantrarungroj. Department of Educational Technology and Communications, Faculty of Education, Chulalongkorn University.

[4] Assoc. Prof .Dr. Praweenya Suwannatchote. Department of Education technology and Communications, Faculty of Education, Chulalongkorn University.

Introduction

Today's cloud-based learning environment plays a huge role in distance learning, especially COVID -19 epidemic situation. Cloud-based learning environments facilitate student-teacher interaction through cloud-based software (Kolgatin et al., 2020) that has been adapted to benefit in terms of efficiency and a variety of resources that students will have access to and expanding the scope of e-learning.

The concept of studying in a cloud learning environment is bringing the good qualities of cloud technology into online classroom tools. Literature review found that teaching and learning using cloud tools has become increasingly popular. In addition, during the outbreak of COVID -19, it was found that teaching and learning using cloud-based tools began to be widely used due to the flexible nature of cloud technology that will help the learning of students is convenient to work together. Students can share information resources together by interacting through synchronized communication tools. The cloud-based teaching and learning feature is a model of using conceptual features of platform services such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service. (SaaS)

In the form of learning with design thinking process, bringing problems arising from the experiences of library service providers and service users create concepts to continue the results in innovative solutions in which the learners rely on cooperation among group members in communicating and discussing as well as completing assignments. The design thinking process consists of Empathy: listening to problems with empathy through the process of interviewing, Define: bringing problems that learners identify into different issues, Ideate: bringing issues that brainstorming to select the best ideas to solve problems, Prototype: creating works based on the brainstorming ideas to create innovative prototypes that can be used to solve problems and Test: innovative testing after designing a prototype of the innovative work, then testing and evaluating the use of the innovation from service providers or library users. This method of teaching encourages learners to develop the ability to solve creative problems through a collaborative design thinking process using cloud technology as a learning tool throughout the process.

For the reasons mentioned above, the purpose of this study was to study the conditions and needs on the develop a cloud-based learning by using design thinking process and gamification concepts to promote the ability to create service innovation in libraries of information studies students. Quantitative data were collected on undergraduate students in both practical and what should be done. Needs and necessity assessment will show the real information to lead to the development the cloud-based learning that meets

the needs and reality of information studies students. The results of this research will be useful in developing a cloud-based learning environment suitable for students in the future.

Research Objectives

To study the needs and necessity assessment on the develop a cloud-based learning by using design process and gamification concepts to promote the ability to create service innovation of information studies Students.

Research Conceptual Framework

| Personal Information

1. Gender
2. Year Level
3. Cloud Learning Experience | → | Needs and Necessity Assessment on the Develop a Cloud-Based Learning by Using Design Thinking Process and Gamification Concepts to Promote the Ability to Create Service Innovation in Libraries of Information Studies Students.

1. Information about conditions and needs
2. Online tools for classroom activities
3. Courses with design thinking components
4. Characteristics of learning needs in a cloud learning environment |

Research methods

This research was quantitative research by collecting data of undergraduate students.

The researcher had steps as follows:

1. The sample in the study were 388 students who studied in the field of information studies, library science and information science at the undergraduate level of universities in the central, eastern, southern, northern and northeastern regions that derived from purposive sampling.

2. The researcher used a questionnaire to collect data from the following population groups as follows:

1) information about the conditions and needs of teaching and learning on the cloud learning environment.

2) information about the needs of using cloud tools and the requirements of game-based learning.

3) Information about learning experiences in courses that have elements of design thinking.

4) Information about the nature of learning needs in a cloud learning environment.

3．The researcher collected data with a sample group from 10 universities in library science and information science, information studies and information science total 388 people.

4. The researchers analyzed the data with a software program for social science research by defining the difference between the actual condition and the supposed condition by using Modified Priority Needs Index (PNI$_{modified}$), and the results were analyzed in tabular form.

$$PNImodified = (I-D)/D$$

PNI$_{modified}$ means   need priority index.

I（Importance)   means   level of expectation

D (Degree of success)   means   level of the current reality

Conclusion

1. The results of the study of the conditions and needs of respondents who were students in the field of library science and information science, the field of information education. and information science found as follows:

1.1 The total number of respondents was 388 people - Females: 244 people (68.2%) and males: 144 people (31.8%) – they were classified by year of study, the highest number was 150 people (41.9%) studying in the second year, followed by 110 people studying in the fourth year (30.7%) and the least number of 12 people (3.4%) studying in the first year respectively.

1.2 Respondents' data on learning experiences with cloud learning management, it was found that most of the 261 respondents (72.9%) had experience learning with cloud learning environments.

1.3 Respondents' data on devices, they used for learning with a cloud learning environment found that most of the respondents, 346 people (54.0%), use smart phone devices to learn, followed by 211 people (32.9%) use notebook computers to learn and the smallest number, 82 people (12.8%), use tablet devices to learn.

2．Needs and necessity of using cloud-based tools, the results showed that students had needs and necessity in learning with the first search tool: Duck Duck Go (PNImodified =0.42), followed by a tool for

recording knowledge, experience and a tool: Storylog.co (PNImodified = 0.38) and search tool: CC search as in Table 1.

Table 1: Needs and necessity of using cloud-based tools

Issues for consideration	realistic condition		expected condition		Needs and necessity	
	Mean	S.D.	Mean	S.D.	$PNI_{modified}$	Rank
Facebook	3.35	1.11	3.72	1.23	0.10	15
Twitter	2.56	1.37	2.81	1.57	0.09	16
Linked in	2.27	1.35	2.59	1.28	0.14	13
Google Drive	4.22	0.99	4.31	0.83	0.02	18
One Drive	2.68	1.34	3.13	1.32	0.17	12
Dropbox	2.20	1.20	2.72	1.28	0.24	11
LINE	4.01	1.04	4.25	0.97	0.06	17
Facebook Messenger	3.47	1.40	3.54	1.62	0.02	19
Whats app	1.50	0.92	1.94	1.09	0.29	7
Google Hangouts	1.53	0.97	1.97	1.13	0.29	7
We Chat	1.47	0.92	1.87	1.07	0.27	8
Skype	1.59	1.01	2.07	1.16	0.30	6
Google Search	4.46	1.00	4.44	0.84	0.00	21
Bing	1.75	1.02	2.35	1.22	0.34	5
Duck Duck Go	1.44	0.87	2.04	1.19*	0.42	1
Gibiru	1.44	0.87	1.94	1.13	0.35	4
CC Search	1.46	0.87	1.97	1.16*	0.36	3
Start Page	1.51	0.89	2.03	1.17	0.34	5
Storylog.co	1.73	1.04	2.39	1.24*	0.38	2
Wordpress	2.32	1.31	2.91	1.30	0.25	10
Bloggang.com	1.87	1.17	2.51	1.27	0.34	5
Blogger	2.20	1.29	2.77	1.29	0.26	9

3. According to the respondents about gaming preferences, the most of students: 344 people (87.7%) liked playing games, 215 people (16.7%) liked adventure, followed by 200 people (15.5%) liked

role-playing games, and the least number 108 people (15.5%). 8.4) liked to play games that used logic to solve problems.

4. According to the respondents about the game style that students were interested in, the research found that the majority of 257 people (14.9%) liked the game style that was challenging, mission‑critical and questionnaire, followed by 253 people (14.7%) were interested in a game with interesting graphics and sounds, and the least number 116 people (6.7%) were interested in the effect that fed back immediately.

5. According to the respondents about the learning experience with elements of design thinking, the research results were as follows:

5.1 According to the questionnaire in the context of learning in a course in which the context of the design thinking process was applied in learning, it was found that most of the respondents had studied in the aforementioned courses, 202 people (56.4%) and never studied in courses with the context of design thinking.

5.2 From the questionnaire in the context of learning in the course that includes interviewing, talking, interacting with users, observing service users to inquire about problems that occur in daily life, the results found that most of the respondents, 236 people (65.9%) had studied in a subject with this intervention, and 122 people (34.1%) had not studied this subject in any subject before.

5.3 From the questionnaire in the context of learning in the subject that analyzed the problems by brainstorming and classifying the problems that arise into issues to narrow the problem frame, it was found that most of the respondents were 229 people (64.0%).) had studied in the subjects that included this method, and 129 people (36.0%) had never studied the contents that were included in the subjects.

5.4 From the questionnaire in the context of learning in a course that included areas related to the use of methods to present a variety of different concepts and then synthesizing or brainstorming to create new ideas, it was found that most of the respondents were 208 people (58.1%) had studied in the subjects with this intervention, and 150 people (41.9%) had never studied in the subjects with this intervention.

5.5 From the questionnaire in the context of learning in a course where concepts are conveyed through the use of various devices to develop those ideas as prototypes, it was found that there were 190 people (53.1%) had never studied the subjects with this intervention, and 168 people (46.9%) had attended the subjects with this intervention.

5.6 From the questionnaire in the context of learning in the course, testing items in the context of real users, simulations, or near-reality environments, including observations of the results of using prototypes innovation found that 235 people (65.6%) had never taken a course that included instruction in this method, and 123 (34.4%) had taken a course that included this method.
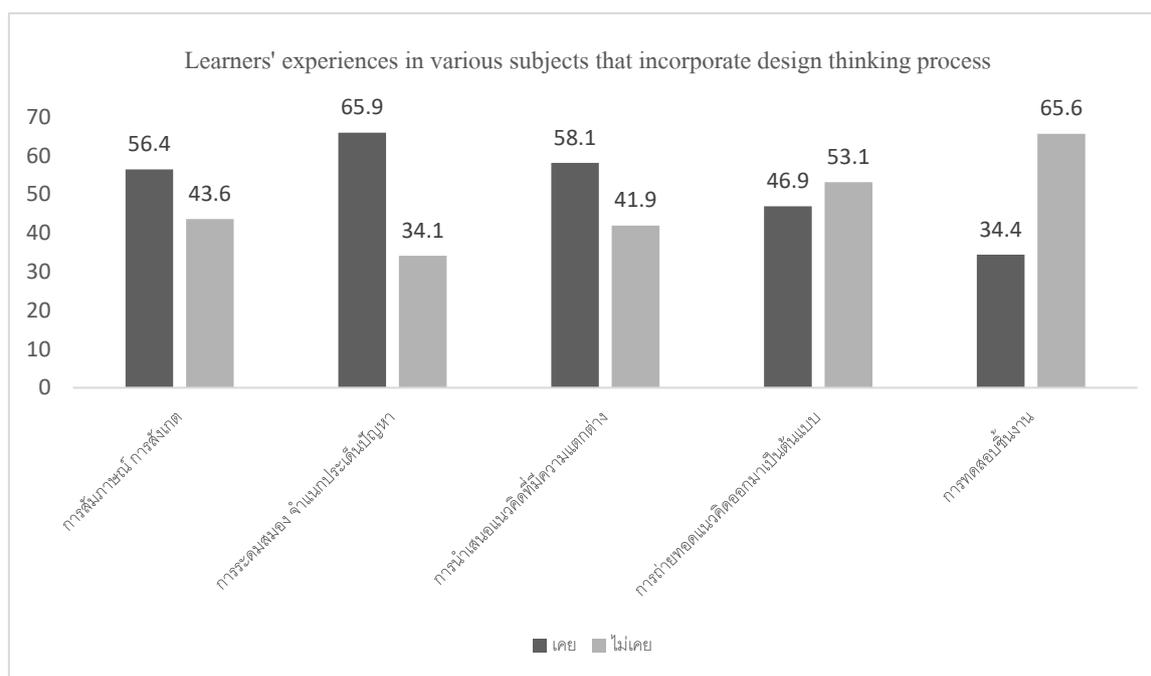
6. The study of the characteristics of the environment suitable for the learners found that learners needed space to communicate, announce, clarify news in teaching and learning in the largest number of 292 people (23.4%), secondary was the complete sequence of teaching and learning steps by allowing learners to study from the sequence of content from the menu of 257 people (20.6%), participating in learning evaluation according to the submission of workpieces each week 253 people (20.2%), 226 people (18.1%) had complete learning activities tools, and there were clearly weekly worksheets and to-dos in the number of 221 people (17.1 %) respectively.

The study of the nature of learning in a cloud learning environment found that the largest number of studies were integrated with individual and group work 264 people (64.5%), followed by a study with group friends 82 people (20.0%) and individual classes 63 (15.4%).

A study of communication characteristics in a cloud learning environment found that the largest number of instant communications via instant messenger program was 212 people (40.5%), followed by

questions for teachers to answer questions 117 people (22.4%), 110 people (21.0%) were in-class consultations, and the least number of 83 people (15.9%) were inquiries via e-mail.

A study of assessment characteristics in cloud learning environments found that the largest number reported scoring of individual tasks was 196 (33.2%), followed by reported scoring criteria of tasks in the cloud learning environment in each piece of learner, and the smallest number was 66 people (11.2%) who reported the rank of each group of learners.

A study of the login characteristics of cloud learning environments found that the largest number of 262 people (67.0%) were logged in with Facebook or Google accounts and logged in with an account created by users from the classroom system 129 people (33.0%).

The study of the nature of orientation characteristic of teaching and learning in a cloud-based learning environment, it was found that the highest number was equal: orientation in the classroom for the first period before starting the teaching and learning activities and having an equal number of environment manuals with 184 people (36.6%) and having video tutorials, 135 people (26.8%), as in Table 2

List	Number	Percentage
Characteristics of a learning environment		
There is an area for communication, announcements, clarifications in teaching and learning completely.	292	23.4
There is a complete sequence of learning steps for students to be able to study in order of content from the menu.	257	20.6
There is a section to notify the evaluation of learning and follow up on the submission of work each week.	253	20.2
There are tools to do activities for learning are completely arranged.	226	18.1
There are clear worksheets and things to do each week.	221	17.7
Other	1	0.1
Characteristics of cloud learning		
Study alone	63	15.4
Study with friends as a group	82	20.0
Study alone and study with friends as a group in a mixed way	264	64.5
Other	0	0.0

List	Number	Percentage
The nature of communication in a cloud learning environment		
Instant chatting via Instant Messenger	212	40.5
Face-to-face conversation	110	21.0
Leave a question and wait for the teacher to answer	117	22.4
Ask questions via e-mail.	83	15.9
Other	1	0.2
Characteristics of Assessment in a Cloud Learning Environment		
Weekly submission report	163	27.6
Score report for each assignment.	196	33.2
Score ranking report for each group of learners	66	11.2
Scoring evaluation criteria	166	28.1
Other	0	0.0
Cloud Learning Environment Login Characteristics		
Log in with your Facebook or Google account.	262	67.0
Log in with a custom user account from the classroom system.	129	33.0
Other	0	0.0
Characteristics of orientation		
There is a classroom orientation in the first period before the start of teaching and learning activities.	184	36.6
There is a video tutorial on how to use it.	135	26.8
There is a user manual for the system.	184	36.6
Other	0	0.0

Discussion

The finding of the conditions and needs on the develop a cloud-based learning by using design thinking process and gamification concepts to promote the ability to create service innovation in libraries of information studies students have important issues that should be discussed as follows:

1. The study of the condition of learners found that the experience of 261 learners in teaching and learning in a cloud-based learning environment was consistent with (Suthilak Supalak, 2018) He found that

the cloud-based learning system contributes to communication, announcements, news in learning and can provide tools to facilitate learning and coordination between groups of students in joint activities. In addition, cloud-based learning systems have also helped research to discuss the appropriateness of using cloud-based teaching and learning as it facilitates the learning process with ease and speed a cloud tool for communicating between students, teachers and between students without time and place constraints (Suthilak Supalak, 2018) by teaching and learning, students had mainly used cloud learning environments from home due to the COVID-19 pandemic situation, students were accustomed to learning using cloud learning environments more from home in line with the new normal.

2. The study on the demand for cloud tools found that the tool with the greatest demand was the search engine, Duck Duck Go, since search tools were an important learning enhancement in document search, Information used in learning (Jaitip Na Songkla, 2018). The tool: storylog.co was a blog tool for recording information from reflections on learning and was a tool for creating content because students were easy to use fast and it was a tool that students were familiar with and can be applied to teaching and learning quickly and easily (Jitlada Kumnuansin, 2017).

3. The study of styles of playing games found that the games that the respondents liked the most was an adventure game because the adventure game used the concept of the game for teaching and learning, allowing students to be interested and fun in the competition in increasing work (Rattama Rattanawongsa, 2016)

4. The study of the form of the game found that the use of rewards plays an important role in stimulating learners' interest in learning and building pride in their work and the psychological needs of learners (Kuo & Chuang, 2016), and this model helped to understand and influence human behavior in an enjoyable and challenging way.

5. The study of learning context in content with design thinking interventions found that the course context was related to the design thinking process. The research results showed that the use of design thinking was a thinking process that focuses on creative problem solving. There was a search for suitable solutions by Patchara Wongtapha's research that studied the blended learning model with creative thinking designed in conjunction with Triz Principle to promote engineering solutions where students can express their opinions, reflect and review lessons at any time (Patchara Wongtapha, 2018). In addition, developing an integrated teaching model with collaborative problem-solving and Synectic techniques to foster creative problem-solving abilities of student-teachers also helped learners to solve problems and finding together to

criticize and find creative solutions to problems (Paitoon Kantanyalak, 2014). Teaching that uses the design thinking process would help learners understand the target group, user context, insights and determine the need by Patchara Wongtapha's research that mentioned the organization of learning activities, setting up problems in innovative design and the results of the study found that students used this process to express, discuss, solve problems together and demonstrating understanding of the target audience was an activity that was both in the classroom and online. The idea generation stage was the development of concepts for classroom activities.

6. The study of the needs of the learning environment on the cloud can be classified into individual items as follows:

6.1 Characteristics of the cloud learning environment suitable for learners, most of the learners had a need for space to communicate, had announced information about learning and working in accordance with Research by Pichsinee Saiyasit that discussed the way to organize classroom learning activities on the cloud. The factor that helped to promote effective teaching and learning was to create a space for learners to contact, communicate between students and students and students and teachers. In addition, it would allow to teachers see evidence of learners' learning in order to observe the development of learners in another way (Pitchinee Saiyasit, 2018).

6.2 Characteristics of cloud learning, with most learners interested in integrated learning with peers and individual work as well, which was in line with the research of Al Kawas and Hamdy on peer-to-peer learning and friends helped friends. It was a strategy to help learners develop themselves. This type of peer learning was based on the theory of constructivism that allowed learners to create their own learning. In addition, group learning or peer support could increase effectiveness and interest in a given subject, with 94 percent of them saying it was fun learning, 82 percent of them increasing their teaching skills, and 82 percent of them increasing communication skills for learners.

6.3 The nature of assessment in a cloud-based learning environment, reporting each item's score was in line with the research of Rattama Rattanawongsa who studied the development of instructional styles in a gamification environment by using the design-based design together with visual tools to promote knowledge of skills and achievement motivation for graduate students, it was found that in scoring, it helped learners to achieve achievement motivation and increase the challenge and evaluate during class (Formative Evaluation) of learners in another way (Rattama Rattanawongsa, 2016).

6.4 Characteristics of logging in with Facebook and Google were appropriate methods for logging in. This was in line with the research of Suthiwat Suphaluk who studied the effect of using cloud-based teaching and learning tools. The most appropriate way to log in to the classroom was with the highest number of Google accounts, 85.5 percent, because Google was a public cloud service at the service level (Software as a Service: SaaS); therefore, it was convenient to use cloud-based add-ons such as Google Drive, Google suite, and students did not need to re-register in the learning system (Sutiwat Suphaluk, 2018).

6.5 Characteristics of orientation, most of the learners needed to organize an orientation in the classroom in the first period before starting the teaching and learning activities, which was consistent with the research of Phisinee Saisit that mentioned the orientation to clarify the learning style, rules, learning methods, process steps and implementation of cloud-based learning support tools used in the system and weekly learning progress checks and learning assessments because it would help for learners to understand and be able to study effectively (Pitchinee Saisit, 2018).

Suggestions

1. Faculty of teachers who teach in the field of information studies can use the results of the research to develop teaching and learning with a cloud-based learning environment using design thinking combined with gamification concepts to enhance their ability to learn and creation of innovation in library services for information technology students.

2.To be a guideline for teaching and learning activities, design thinking to create service innovation in the library.

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