

Digital Learning Ecosystem Model for Local Innovators to Enhance Lifelong Learning

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Abstract -The objectives of this study were 1) to study the condition and the need for a digital learning ecosystem model for local innovators to enhance lifelong learning and 2) to DLEM for local innovators to enhance lifelong learning. The research process is divided into two phases: Phase 1 is focused to studying the conditions and needs of a DLEM for local innovators to enhance lifelong learning and Phase 2 is focused to developing a DLEM for innovators. The sample in phase 1 consisted of 30 entrepreneurs in Nonthaburi province and 5 experts. The sample in phase 2 consisted of 5 experts. The findings revealed that 1) the condition and the need for a DLEM for local innovators to enhance lifelong learning consisted of 4 main components: Personnel, Infrastructure, Technology, and Learning resources where Personal and Learning Resources components are equally important, followed by technology and infrastructure, which averaged 4.50, 4.23, and 3.90. 2) The DLEM for local innovators to enhance lifelong learning consists of 5 elements: People, Infrastructure, Technology, Learning Resources, and Collaboration Space. Additionally, a DLEM for local innovators to enhance lifelong learning is being developed, which will include three systems: user, learning resource, and group connection.

Index Terms — Digital Learning Ecosystem, Local Innovators, Lifelong Learning

Introduction

The 12th Economic Development Plan (2017-2021) of Thailand has addressed the country's development through innovation. As for development guidelines according to Strategy 1, it focuses on promoting and developing human capital potential. Let Thai people be kind, disciplined, create innovations. sustainable self-reliance able to develop themselves to have skills, knowledge, and ability to live a valuable life Promote lifelong learning have economic and social stability The underprivileged will be able to develop their potential as well as strengthen the community [1].

Nowadays, one of the factors that can affect the country's propulsion must be focused on innovation. Production "Innovator" is therefore something that every sector should focus on. Cultivation of new innovators in different localities is important due to the problem of concentration of large cities. For example, Bangkok is the center of every area in the country, causing people from different localities to come to the big city for education and earning money. As a result, the local community lacks personnel to drive the community because there are only the elderly and children [2].

To create quality innovators, academics have suggested guidelines for creating quality innovators, such as the concept of Design Thinking, which is the

foundation for innovation [3]. There is an important principle that is human-centered design (Human - Centered Design) with an emphasis on the process of deep understanding of the target audience and innovators should have 3 characteristics: 1) learning and exploration attributes, 2) management attributes, and 3) creation attributes by learning and exploration attributes [4]. The survey will be a guideline to deeply understand the problems that occur with the target group, leading to the creation of innovations that are truly important and valuable to people and society.

Maneehad and Wanpirun (2019) have studied the digital learning ecosystem with artificial intelligence for intelligent learning. They proposed the idea that the digital learning ecosystem is a learning space. And learn various content through artificial intelligence or AI. In the teaching process, artificial intelligence will be used to support teachers. support learners Meet the needs of many different learners simultaneously personal assistance automatic scoring and identify weaknesses in the classroom [5]. Jeladze, Pata and Quaicoe (2017) found three distinctive digital learning ecosystem types that described some possible developmental stages in the ecosystem. The top-down external provision of digital resources and ICT incentives were the most significant compound factors in the

first function. The second function is characterized by the schools' bottom-up proactiveness. Path modeling between compound variables demonstrated an increase in the complexity of connection among the mediating, transformational, and flow components, which defines the smartness of the learning environment [6].

Furthermore, Kummanee, Nilsook, and Wannapiroon (2020) have found the digital learning ecosystem had three elements in the form of a digital learning ecosystem, a STEAM Education Approach, and gamification elements [7]. The goals of education will fail without innovative learnings. One of the innovative learnings in Madrasah Ibtidaiyah is the local wisdom-based learning [8].

For these reasons, the researcher is interested in developing a digital learning ecosystem model for local innovators to promote lifelong learning. To understand the condition and the need for a digital learning ecosystem for local innovators to promote lifelong learning. This will lead to the development of a digital learning system for local innovators to promote lifelong learning. To assist local people in having fair and equitable educational opportunities throughout all stages of life, have knowledge and skills necessary for work improve their own quality of life and help create a learning society that meets the needs of the country.

I.

METHODOLOGY

This research was divided into 2 phases, in which each phase Details are as follows:

Phase 1 is focused on studying the conditions and needs of a DLEM for local innovators to enhance lifelong learning.

1.1 Literature Review Synthesize the basic information of the relevant components, namely the digital learning ecosystem. digital platform learner analysis local innovators and lifelong learning

1.2 Compose guidelines and issues for conducting group discussions. and create a questionnaire on the needs of the digital learning ecosystem Then take the questionnaire to verify the validity (IOC) with the experts.

1.3 Study the opinions of local operators on basic information. and the need for a digital learning ecosystem for local innovators to foster lifelong learning.

The population used in this research were local entrepreneurs, 87,468 groups/persons. By selecting a purposive sample group of 30 people and 2 experts in educational technology, 2 experts in

lifelong learning and 1 expert in innovation.

Tools used and methods of data collection

1) Tools: Guidelines and issues for focus groups on the need for a digital learning ecosystem to foster future creative and innovation skills for local innovators. and a questionnaire on the need for a digital learning ecosystem to foster future skills in creativity and innovation for local innovators.

2) Data collection by means of group discussions and collecting data from questionnaires with local people.

3) Data analysis Analyze qualitative data for literature review. Synthesize basic information of an element. and information obtained from group discussions and analyzing quantitative data from questionnaires. by finding the mean and standard deviation

Phase 2 is focused to developing a DLEM for innovators.

2.1 Develop a digital learning ecosystem model for local innovators to promote lifelong learning.

2.2 Experts examine the digital learning ecosystem model for local innovators to promote lifelong learning. By using the quality check form of the digital learning ecosystem and the researcher summarizes the results and improves according to the advice of experts.

2.3 Develop a digital learning ecosystem model for local innovators to promote lifelong learning as advised by 5 experts, consisting of 3 information technology experts and 2 innovation experts.

Tools used and methods of data collection

1) The tools used were the quality check form of the digital learning ecosystem for local innovators to promote lifelong learning with rating scale.

2) Data Collection How to assess the digital learning ecosystem model for local innovators to promote lifelong learning with rating scale.

3) Data analysis the qualitative data were analyzed by content analysis. Quantitative data were analyzed by descriptive statistics, including mean and standard deviation.

RESULT

The research results are divided into 2 parts as follows:

Part 1 The study of conditions and needs for a digital learning ecosystem for local innovators to promote lifelong learning.

The study found that community-based producers need a digital learning ecosystem for local innovators to promote lifelong learning with the following characteristics:

- There is a common area for organizing a discussion

to share knowledge with each other.

- There is support from government officials to promote careers.
- There is an area for contacting personnel or knowledgeable people to give advice or consultants in various fields.
- Manufacturers can import products into OTOP and sell products. I want the product to be certified by the FDA. I want the product to have a chance to receive a patent.
- There is a system or medium to help achieve learning. Share knowledge and experiences together and search for knowledge to lead to creating a group of online community makers.
- Entrepreneurs want to have space to develop knowledge and skills that can be studied by themselves, such as creating creative products. handmade products product development Food

processing, food preservation, advertising and marketing tie-dye production, salted egg production, as well as the development of various community products planting herbs making processed herbs processed balm online product selling strategy Opening an online store on different platforms Knowledge and photography skills and produce video media using smartphone techniques to shoot advertisements. Product reviews or media to promote products product design for packaging, etc.

An essential component of a digital learning ecosystem for local innovators to foster lifelong learning. Consists of 4 main components: 1) Person 2) Infrastructure 3) Technology and 4) Learning Resources, each with details. As can be summarized as follows.

Table 1 Components of a digital learning ecosystem for local innovators to foster lifelong learning

component	description
1. Person	
1.1 Mentor and learning support for local innovators	Being a knowledge provider and supporting activities on the system such as speakers, community representatives, agency representatives' activity coordinator, etc.
1.2 Technical support	is a system manager in digital technology as well as assisting with the non-learning process of using the system, such as system developers, system administrators and assistants, etc.
1.3 Users	Are those who want to develop themselves or receive support through the system In this research, the target group is a group of people with the potential to develop into local innovators.
1.4 Other sponsors	Representatives of people who influence users of the learning system, such as family members, friends, seniors, juniors, supervisors. Provider of funding support, etc.
2. Infrastructure	
2.1 Devices	
	2.1.1 Laptop, Notebook
	2.1.2 Tablet
	2.1.3 Smartphone
	2.1.4 Webcam
	2.1.5 Microphone
	2.1.6 Speaker, Headphone
	2.1.7 Powerbank
2.2 Digital Platforms	

component	description
	2.2.1 Website
	2.2.2 Learning Management Digital Platform
	2.2.3 Mobile Application
	2.2.4 Social media platform
2.3 Network Systems	
	2.3.1 Internet
	2.3.2 Intranet
	2.3.3 Extranet
3. Technology	
3.1 Technology for Presentation	
	3.1.1 Static page
	3.1.2 Blog
	3.1.3 Wiki
3.2 Interaction Technologies	
	3.2.1 Chatroom
	3.2.2 Forum
	3.2.3 Social Media
	3.2.4 Image Video sound Interaction Media
4. Learning Resources	
4.1 Open Educational Resource Center	Image archives, video clips, diagrams, concept maps, quizzes, educational games, animation media for educational purposes. that all teachers can access, bring to improve and take to use without violating copyright law from the web https://oer.learn.in.th
4.2. Knowledge Courses	The subject of knowledge consists of lessons on various knowledge content, short details. Documents, text, images, pdf documents, quizzes, forums, chat rooms with facilitators, instructor information etc.

After that, the researcher brought the key components of the digital learning ecosystem for local innovators to promote lifelong learning to the experts to evaluate the results as shown in Table.

Table 2 Result of evaluate key components of the digital learning ecosystem for local innovators to promote lifelong learning

components	statistics		priority
	Mean	SD	
1. Person			
1.1 Mentor and learning support for local innovators	4.80	0.45	most important
1.2 Technical support	4.60	0.55	most important
1.3 Users	4.60	0.55	most important
1.4 Other sponsors	4.00	1.00	very important
personal average	4.50	0.64	most

components	statistics		priority
	Mean	SD	
			important
2. Infrastructure			
2.1 Device			
2.1.1 Laptop, Notebook	3.80	0.84	very important
2.1.2 Tablet	4.20	0.45	very important
2.1.3 Smartphone	4.60	0.55	most important
2.1.4 Webcam	3.80	1.10	very important
2.1.5 Microphone	3.80	1.10	very important
2.1.6 Speaker, Headphone	3.80	1.10	very important
2.1.7 Powerbank	4.20	0.84	very important
Device average	4.03	0.85	very important
2.2 Digital Platforms			
2.2.1 Website	3.40	1.52	moderate
2.2.2 Learning Management Digital Platform	4.20	0.84	very important
2.2.3 Mobile Application	4.20	0.84	very important
2.2.4 Social media platform	4.20	0.45	very important
Digital Platforms average	4.00	0.91	very important
2.3 Network Systems			
2.3.1 Internet	4.60	0.55	most important
2.3.2 Intranet	3.20*	1.30	moderate
2.3.3 Extranet	2.60	1.52	moderate
Network Systems average	3.47	1.12	moderate
Infrastructure average	3.90	0.93	very important
3. Technology			
3.1 Technology for Presentation			
3.1.1 Static page	4.00	0.71	very important
3.1.2 Blog	4.00	0.71	very important
3.1.3 Wiki	3.80	1.10	very important
Technology for Presentation average	3.93	0.84	very important

components	statistics		priority
	Mean	SD	
3.2 Interaction Technologies			
3.2.1 Chatroom	4.20	0.45	very important
3.2.2 Forum	4.00	1.22	very important
3.2.3 Social Media	4.80	0.45	most important
3.2.4 Image Video sound Interaction Media	4.80	0.45	most important
Interaction Technologies average	4.45	0.64	very important
Technology average	4.23	0.73	very important
4. Learning Resources			
4.1 Open Educational Resource Center	4.60	0.55	most important
4.2. Knowledge Courses	4.40	0.55	very important
Learning Resources average	4.50	0.55	most important

From Table 2, the results of asking opinions from experts There is an opinion that the Person component and the Learning Resources aspect are equally important, followed by technology aspect and infrastructure aspect. Infrastructure respectively, representing an average of 4.50, 4.23, and 3.90 respectively.

When considering the person, it was found that the promoters of learning were the most important, followed by the technical supporters and users of the learning system were equal, with an average of 4.80 and 4.60, respectively. As for the equipment to access the equipment system that should be, the smartphone is the most important. Followed by a tablet device and a power source for the same device. Representing an average of 4.60 and 4.20, respectively, for the software to access the system. It should be formatted as Digital Platform for Learning Management mobile application and social networking platforms were equally important, followed by the website, with an average of 4.20 and 3.40, respectively. The network should be a type of Internet network. most important with an average of 4.60 in technology to support learning

technology to deliver content It's equal parts static and block content. Very important, followed by Wiki, with an average of 4.00 and 3.80 respectively and technology to interact social networking technologies and interactive visual, video, audio or multimedia media. Equal is the most important, followed by chat rooms and forums. Representing an average of 4.80 4.20 and 4.00, respectively, and learning resources It was found that the library of open education resources is the most important, followed by the knowledge course The mean was 4.60 and 4.40 respectively.

Part 2 Results of developing a digital learning ecosystem model for local innovators to promote lifelong learning.

After collecting data from questioning experts and focus group meetings with producers in the community, it was found that the digital learning ecosystem model for local innovators to promote lifelong learning includes elements of a digital learning ecosystem for local innovators to promote lifelong learning and a digital platform for Local innovators to promote lifelong learning are shown in Fig. 1.

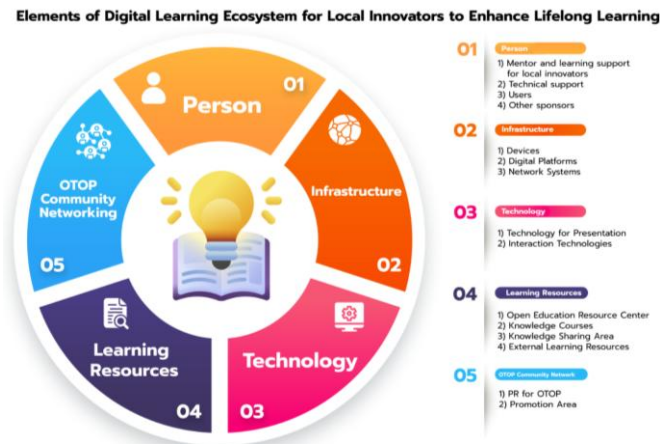


Fig. 1 Components of a digital learning ecosystem for local innovators to foster lifelong learning

Components of a digital learning ecosystem for local innovators to foster lifelong learning. Consists of 5 components: 1) Person (Person) 2) Infrastructure (Infrastructure) 3) Technology (Technology) 4) Learning Resources (Learning Resources) and 5) OTOP Community Network (OTOP Community Network) connecting producers and entrepreneurs, each of which has the following information as follow:

1. Person is a stakeholder who plays a key role in the digital learning ecosystem for local innovators to promote lifelong learning, consisting of:

1.1 Mentor and learning support for local innovators provide information, knowledge, ideas, practices through various processes such as online training, online discussion, online consultation or production as a self-learning lesson and stored as a body of knowledge in the learning ecosystem so that users can use it to study at any time to develop themselves.

1.2 Technical support is someone who encourages users to use the learning ecosystem, to go smoothly. Always give advice and help fix when users have problems with usage, as well as taking care of the maintenance of the system so that it can work efficiently.

1.3 Users who are interested in using the learning ecosystem, such as searching for useful information, interested in online training, publicize the product, as well as being used to promote their own lifelong learning.

1.4 Other sponsors are people who contribute to other areas that can make the learning ecosystem work, can operate smoothly, such as budget funding, supporters, networking, sponsor, Collaboration from various agencies, sponsors of the location, etc.

2. Infrastructure is essential to develop and operate

a digital learning ecosystem for local innovators to foster lifelong learning. If it is absent, it will not be able to make the learning ecosystem, able to work or have access to use.

2.1 Devices for accessing the system and building knowledge are necessary devices for accessing the learning ecosystem. To use or create knowledge stored in the learning ecosystem, such as desktop or portable computers, tablets, smartphones, cameras, microphones, speakers, or headphones, etc.

2.2 Digital Platforms The Digital Learning Platform is a user-content interface of a digital learning ecosystem for local innovators to foster lifelong learning, which has gathered various tools necessary for lifelong learning on the learning ecosystem consisting of

- Websites to present content on the Internet.
- UX/UI design in line with the target audience
- Mobile application for convenience for users via mobile devices
- Online social networking system for connecting the network of users of the system

2.3 Network Systems internet network The learning ecosystem needs an internet network for access. Cannot be used offline.

3. Technology is the technology that is necessary for development, support work and the use of digital learning ecosystems for local innovators to foster effective lifelong learning.

3.1 Technology for Presentation is a technology used for presenting information, and knowledge of the learning ecosystem. Both in the form of text, images, audio, video or multimedia media such as content management systems (CMS), streaming systems or podcast systems, etc.

3.2 Interaction Technologies is a technology used for users of the learning ecosystem. Create

interactions with each other to support lifelong learning, such as a conversational system for communicating. Forum for exchanging opinions Online social network for networking amongst each other. Online training system or online discussion system to open opportunities to develop knowledge and learn together, etc.

4. Learning Resources is a space for collecting and storing knowledge needed to promote lifelong learning for local innovators, consisting of

4.1 Open Educational Resource Center is a collection of knowledge needed for local innovators in various forms of text, images, sounds, videos and multimedia. that users can come to study Research the information you need at any time. for the benefit of lifelong learning

4.2 Knowledge Courses is a resource that promotes learning through a course-based study where lesson content is studied. and activities This can be a form of self-learning at any time. and learning styles from trainers through scheduled training.

4.3 Knowledge sharing area It is a space for users to share and exchange useful knowledge among themselves. This can be done in many ways such as blogs, wikis, forums, or creating groups to exchange knowledge together on various online social networks, etc.

4.4 The Knowledge Sharing Area is a collection of additional learning resources for selected local innovators. Allowing users to use it as a guideline for further study and research in addition to studying in the learning ecosystem more conveniently without having to waste time searching by yourself.

According to interviews with manufacturers, OTOP entrepreneurs, it was found that the knowledge bodies that are in high demand are:

- A body of knowledge that requires specialist support, such as marketing, coordinating those who can provide support. Or a consultant, sales techniques, thinking techniques, customer contact techniques, etc.

- Knowledge that can be learned by oneself in order to develop their own products, such as food preservation so that it can be stored for a long time Packaging and product design, substance design, digital tools for product development public relations or communication, etc.

5. OTOP Community Network is a space for gathering groups of producers and entrepreneurs who participate in the digital learning ecosystem for local innovators to promote lifelong learning. To be used to provide information to people outside the

group. This space is not for local innovators to study information among themselves. But the main objective is to allow the public to know more about the products of manufacturers and entrepreneurs and to facilitate the search for information about products and services that they are interested in. This space doesn't have to be a sales floor itself. But it is a medium to connect to channels to purchase goods and services of community enterprises in the future.

5.1 PR for OTOP is a platform to gather detailed information of producer groups. Entrepreneurs who are on the learning ecosystem that third parties can contact to request information and purchase products Interested third parties can link to the group's ordering channels from this area without having to search elsewhere.

5.2 Promotion Area is an area for OTOP producers and entrepreneurs to use advertisements to promote their interesting products and services. as well as organizing various promotional activities to encourage outsiders to visit Search for information about the products and services that you are interested in and can link to the ordering channels for products and services of manufacturers, OTOP entrepreneurs from this area directly.

RECOMMENDATION

1. Promotion Area is an area for OTOP producers and entrepreneurs to use advertisements to promote their interesting products and services. as well as organizing various promotional activities to encourage outsiders to visit Search for information about the products and services that you are interested in and can link to the ordering channels for products and services of manufacturers, OTOP entrepreneurs from this area directly.

2. OTOP entrepreneurs or individuals can use the digital learning ecosystem model to recommend their relatives, friends, or acquaintances to develop a digital learning platform for local innovators to promote lifelong learning. can

3. From the current situation, artificial intelligence technology is very advanced and advanced, making me think that the next study Artificial intelligence technology should be used to enhance and develop the system model to be more capable and efficient in the future.

"This project is funded by National Research Council of Thailand (NRCT)"

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