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The Development of Challenge-Based Learning with Social Media Model to Promote Technology Literacy Skills for Learners

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Abstract

The challenge-based learning with social media model, or CBLS model, to promote technology literacy skills for learners is based on the concepts of challenge-based learning process integrated with the ideas to use social media as a tool for the management of learning activities. The objectives of this research are (1) to synthesize the CBLS model to promote technology literacy skills for learners, (2) to design the CBLS model to promote technology literacy skills for learners, and (3) to study the results of the design of the CBLS model to promote technology literacy skills for learners. The participants in this research are seven experts from different institutions in higher education, including the four males and three females, all of whom are experts in educational technology, which are specialized in design instruction system. These participants were all given confidentiality and anonymity. The results of this research show that (1) the overall suitability of the design of the CBLS model is at the high level (mean = 4.49, SD = 0.32), and (2) the suitability of the elements of the CBLS model is at the highest level (mean = 4.93, SD = 0.19).

Keywords: CBLS model, challenge-based learning, social media platforms, technology literacy skills

1. Introduction

Nowadays, technology plays an important role in the effective instruction management; therefore, the Ministry of Education has defined that technology literacy is considered such an important competency that learners should be well equipped with it. It is necessary that learners possess the ability to make use of technology in order to develop themselves in terms of creative learning and problem solving. With a simplified teaching process, instructors can organize a variety of activities at the same time. This gives instructors plenty of time to prepare for teaching (Ministry of Education, 2022).

The instruction management at present has already entered the digital age, in which the importance is usually placed on the application of technology in learning in such a manner that it is in compliance to the interests of the learners. Meanwhile, the current instruction process is always enhanced and assisted by the use of internet network; as a consequence, there have been information links as well as joint learning activities by means of various electronic media that have been fabricated, leading to learners' interaction and ability to learn all the time (Sungpoom, 2011).

Vocational education is a kind of education management focusing mainly on professional areas so as to produce and develop manpower at skilled level (vocational certificate), technical level (high vocational certificate), and technology level (Bachelor's degree in technology or Operation). Unlike vocational training, which is a short-term education management, vocational education is considered a long-term education management designated to equip students and graduates with competencies that enable them to do self-employment and satisfy the workforce demand in workplaces, communities, and labor market (Office of the Vocational Education Commission, 2019).

In addition, the aforementioned vocational education management must be corresponding to the National Economic and Social Development Plan, the National Education Plan, the National Qualifications Framework, the national educational standards, and the career standards, all of which require learners and graduates to acquire skills, knowledge, and abilities that contribute to the national development. At the meantime, the vocational institutions must facilitate the education management in such a way that it can be easily and widely accessed by everybody. Accordingly, vocational education management must pay more attention to the participation of

enterprises when conducting curriculum development and instruction management focusing on learning to practice (Ministry of Education, 2019).

Challenge-based learning is related to learning through the challenges that learners meet in real life (Castro & Gomez Zermeno, 2020). Learners are encouraged to do activities or work with others in order to generate new ideas that are both interesting and challenging. These new challenges and experiences (Perna, Recke, & Nichols, 2023) are believed to stimulate learners to find out new solutions and gain in-depth bodies of knowledge that can help them further develop the 21st century skills. It is said that challenge-based learning is extended from experiential learning, and it relies on the sharing of methods to achieve the goals, which is the clever methods of progressive education. Besides, learners will receive experiences from new ideas generated from studies and researches that they conduct by using media and technology available in learning environment and learning society.

Figure 1. The Challenge Learning Framework

(The Challenge Institute, 2018)

The Challenge Institute (2018) stated that the challenge learning framework consists of three interconnected stages, i.e., engage, investigate, and action. Each stage contains some activities that are needed for moving to the next stage, as summarized below:

- The stage of engage consists of big idea, essential question, and challenge.
- The stage of investigate contains guiding questions, guiding activities/resources, and analysis.
- The stage of action includes solutions, implementation, and evaluation.

Social media is a tool used for communication in social networks available through websites and applications that are connected to the Internet. Users can express opinions, share information, and exchange experiences with others, which can lead to the creation of useful knowledge.

Technology literacy skills refer to the abilities and knowledge to use technology and digital devices effectively in varied contexts. Generally, these skills consist of 1) access, 2) analyze, 3) evaluate, and 4) create. Technology literacy skills also include the basic computer skills (Chanchusakul, Prasertsin, & Warasunun, 2017).

In reference to the aforementioned concepts and theories, the researchers were interested to apply the challenge-based learning concepts in the design of the CBLS model to promote technology literacy skills for

learners, which is intended to encourage learners to express their opinions or share information with others. It is believed that learners, once using technology and digital devices effectively in a variety of contexts, can enhance their technology literacy skills at the end.

2. Research Objectives and Hypothesis

1) To synthesize the CBLS process to promote technology literacy skills for learners

2) To design the CBLS model to promote technology literacy skills for learners

3) To study the results of the CBLS model to promote technology literacy skills for learners

According to the results of evaluation on the suitability of the development of the CBLS model to promote technology literacy skills for learners is at the high level.

3. Research Methodology

This research is related to the design of the CBLS model to promote technology literacy skills for learners, which is quantitative research and the research methodology is as follows.

3.1 Participants

The participants in this research are seven experts from different institutions in higher education, including the four males and three females, all of whom are experts in educational technology, which are specialized in design instruction system. These participants were all given confidentiality and anonymity.

3.2 Research Instruments & Data Collection

The tools employed in this research consist of (1) the CBLS model to promote technology literacy skills for learners, and (2) the evaluation form on the suitability of the CBLS model to promote technology literacy skills for learners. In reference to data collection, the researchers employed the evaluation forms that had been reviewed with Index of Item – Objective Congruence (IOC) the experts.

3.3 Research Methodology

The research methodology designated to design this model is based on the system approach (Khemmani, 2010; Utranan, 1982), which can be divided into three stages as shown in Figure 2.

Figure 2. Research methodology

Stage 1: Synthesis of the documents and the researches relevant to the CBLS model to promote technology literacy skills for learners. In order to establish the conceptual framework and learning process of this research, the researchers had studied and analyzed the documents and the researches, which are concerning vocational certificate program B.E. 2562, challenge-based learning, social media, and technology literacy skills.

Stage 2: Design of the CBLS model to promote technology literacy skills for learners. In this stage, the researchers based the design and the development of this model on the principles of challenge-based learning and system approach.

Stage 3: Study the results of the CBLS model to promote technology literacy skills for learners. The researchers employed the research tools to find out the results after having the experts use the said model. There are seven experts in this research who were derived by means of purposive sampling. These participants were all given confidentiality and anonymity. The criteria for evaluation and the levels of suitability (Kanasutra, 1995) are shown in Table 1.

Table 1. Mean score range and interpretation of results.

Range of average score	Interpretation of suitability
4.50 – 5.00	Highest
3.50 – 4.49	High
2.50 – 3.49	Moderate
1.50 – 2.49	Low
0.00 – 1.49	Lowest

4. Results

The results of the design of the CBLS model to promote technology literacy skills for learners can be summarized as follows:

4.1 The Synthesis of the Conceptual Framework of the CBLS Model to Promote Technology Literacy Skills for Learners

After the synthesis of the documents and the researches relevant to the CBLS model, especially in terms of vocational certificate program B.E. 2562, challenge-based learning, social media, and technology literacy skills, the conceptual framework of this research as shown in Figure 3.

Figure 3. Conceptual framework of the CBLS model to promote technology literacy skills for learners

4.2 Results of the Design of the CBLS Model to Promote Technology Literacy Skills for Learners

In the design of the CBLS model, the researchers integrated the principles of system approach with the challenge-based learning process, which is related mainly to learning through the challenges that learners meet in real life. These challenges usually occur when they do activities or work with others, and then the said challenges are thought to generate new ideas that are both interesting and challenging. In addition, the researchers employed social media platforms as the tools to promote learning. By this way, users can express their opinions or exchange information through the network system, which shall pave ways to a learning society, as shown in Figure 4.

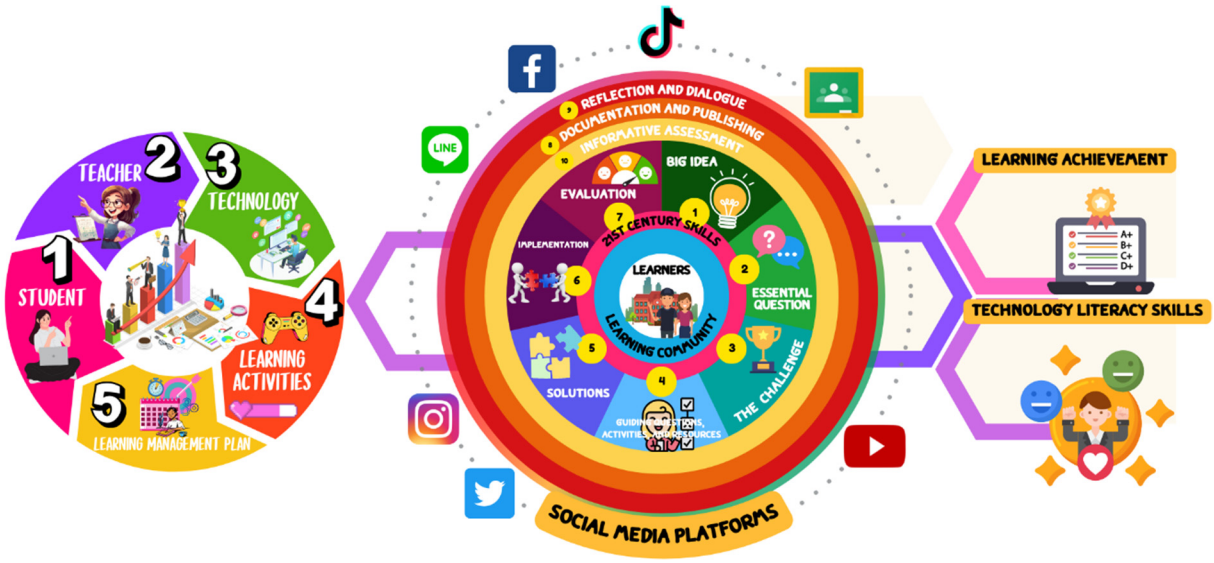

Figure 4. CBLS model to promote technology literacy skills for learners

Figure 4 illustrates the CBLS model to promote technology literacy skills for learners, which consists of four main elements as follows:

1). Input factor: This element refers to the overall environment in the design of CBLS model to promote technology literacy skills for learners, i.e., teacher, student, technology, learning activities, and learning plan.

2). CBLS process: This element is a learning process that results from the integration of challenge-based learning process with the idea of using social media platforms to manage learning activities. The CBLS process can be employed to promote learners' technology literacy skills, which is the abilities and knowledge to use technology and digital devices effectively in different contexts. The CBLS process is divided into two sections as below.

- (2.1) The CBLS process, which includes 10 elements, i.e., big idea, essential question, challenge, guiding questions, activities/resources, solutions, implementation, evaluation, documentation and publishing, reflection and dialogue, and informative assessment.
- (2.2) Social media platforms, which are the tools designated to promote learners' technology literacy skills. Thereby, the social media platforms in this research are Line, Facebook, TikTok, Google Classroom, YouTube, Twitter, and Instagram.

3). Output: This element refers to learning achievement and technology literacy skills.

4). Feedback: This includes the results of learning achievement and the scores of technology literacy skills.

4.3 Results of the Study on the Suitability of the CBLS Model to Promote Technology Literacy Skills for Learners.

The study the results of the CBLS model via social media platforms with seven experts in this research who were derived by means of purposive sampling. The results of the CBLS model are shown in Table 2 and Table 3.

Table 2. Results of evaluation of the CBLS model (overall elements).

Items for evaluation	Assessment results		Interpretation of results
	Mean	SD	
1. What is the level of suitability of the principles and the concepts used to develop the CBLS model?	4.29	0.49	High
2. What is the level of suitability in the elements of the CBLS model.			
2.1 Input factor	4.57	0.53	Highest
2.2 CBLS process	4.71	0.49	Highest
2.3 Output	4.57	0.53	Highest
2.4 Feedback	4.29	0.49	High
Overall average	4.49	0.32	High

According to Table 2, it is found that the overall suitability of the design of the CBLS model is at the high level (mean = 4.49, SD = 0.32). It can be summarized that the CBLS model to promote technology literacy skills for learner herein contains the principles and the concepts that can be used as guidelines to design the CBLS model or the students at vocational level.

Table 3. Results of evaluation on the suitability of the CBLS model.

Items for evaluation	Assessment Results		Interpretation of results
	Mean	SD	
1. Input factor			
1.1 Student	4.71	0.49	Highest
1.2 Teacher	4.71	0.49	Highest
1.3 Technology	4.71	0.49	Highest
1.4 Learning activities	4.43	0.53	High
1.5 Learning plan	4.71	0.49	Highest
2. CBLS process			
2.1 Big idea	4.57	0.53	Highest
2.2 Essential question	4.71	0.49	Highest
2.3 Challenge	4.57	0.53	Highest
2.4 Guiding questions, activities/resources	4.86	0.38	Highest
2.5 Solutions	4.57	0.53	Highest
2.6 Implementation	4.71	0.49	Highest
2.7 Evaluation	4.57	0.53	Highest
2.8 Documentation and publishing	4.71	0.49	Highest
2.9 Reflection and dialogue	4.86	0.38	Highest
2.10 Informative assessment	5.00	0.00	Highest
3. Output			
3.1 Learning achievement	4.86	0.38	Highest
3.2 Technology literacy skills	4.86	0.38	Highest
4. Feedback			
4.1 Learning achievement	4.86	0.38	Highest
4.2 Technology literacy skills	5.00	0.00	Highest
Overall	4.93	0.19	Highest

Referring to Table 3, it is found that the suitability of the elements of the CBLS model is at the highest level (mean = 4.93, SD = 0.19). Therefore, this can be concluded that the CBLS model to promote technology literacy skills for learners consists of the elements that can be employed as guidelines to design the challenge-based learning process. It is expected that this kind of learning process can encourage learners to develop technology literacy skills which are necessary for learning all the time and self-development in terms of creative learning and problem-solving.

5. Conclusion & Discussion

The idea to design the CBLS model is based on the concepts of challenge-based learning process integrated with the ideas to use social media as a tool for learning activity management, in which learners are encouraged and challenged to solve problems by means of learning by doing. The CBLS model is intended to promote learners' technology literacy skills which are helpful for creative learning and problem-solving.

The CBLS model is composed of four main elements, i.e., 1. input factor, which includes of student, teacher, technology, learning activities, and learning plan; 2. the CBLS process via social media platforms, which consists of 10 elements, i.e., big idea, essential question, challenge, guiding questions, activities/resources, solutions, implementation, evaluation, documentation and publishing, reflection and dialogue, and informative assessment; 3. output, which consists of learning achievement, and technology literacy skills; and 4. feedback, which includes learning achievement, and technology literacy skills.

The results of this research show that the overall suitability of the design of the CBLS model to promote technology literacy skills for learners is at the high level, and the suitability of the elements of the CBLS model to promote technology literacy skills for learners is at the highest level. The results above are in line with the research of Chatwattana et al. (2022), who stated that the combination of the New Normal learning styles and the learning through digital technology, which enable modern learners to learn by doing and respond directly to learning experiences and challenges, can bring about a learning organization in the future. The results are also consistent with the research of Soutthaboualy, Chatwattana & Piriyasurawong (2021), who said that the creation of quality and efficient education systems is considered the main mechanism for the development of human potential and competencies. This is because the effective education systems shall support and encourage learners to seek knowledge on their own, take actions, focus on upskilling and creating positive attitudes towards lifelong learning, exchange knowledge and interact with one another via online social networks, and have unlimited access to information based on innovations and digital technology.

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Data Availability Statement

The data that support the findings of this study are available on request.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

References

Castro, M. P., & Gomez Zermeno, M. G. (2020). Challenge Based Learning: Innovative Pedagogy for Sustainability through e-Learning in Higher Education. *Sustainability, 12*, 4063. https://doi.org/10.3390/su12104063

Chanchusakul, S., Prasertsin, A., & Warasunun, P. (2017). Development of Media and Information Literacy Scale for Secondary School Students. *Journal of Educational Measurement Mahasarakham University, 23*(2), 183-198. https://so02.tci-thaijo.org/index.php/jemmsu/article/view/147461/108604

Chatwattana, P., Piriyasurawong, P., Nilsook, P., & Wannapiroon, P. (2022). Total learning experience (TLE) on the cloud with an intellectual repository to enhance digital empathy and literacy skills. *Global Journal of Engineering Education, 24*(3), 193-201.

Office of the Vocational Education Commission. (2019). *Vocational Certificate Program B.E. 2562*. Bangkok: Ministry of Education.

Kanasutra, P. (1995). *Statistics for Research in the Behavioral Sciences*. Bangkok: Chulalongkorn University Press.

Khemmani, T. (2010). *Science of Teaching: Knowledge of Efficient Learning Process Management*. Bangkok: Chulalongkorn University Press.

Ministry of Education. (2022). *MOE Digital Transformation for Education Action Plan 2020−2022*. Ministry of Education. Retrieved from https://bict.moe.go.th/wp-content/uploads/2022/03/digital-63-65.pdf

Ministry of Education. (2019). *Announcement of the Ministry of Education "Regarding the use of Professional Certificate Courses Buddhist Era 2019"*. Bangkok: Ministry of Education.

Office of the Vocational Education Commission. (2019). *Criteria and Guidelines for Vocational Education Management for Professional Certificate Level and Higher Vocational Certificate Level*. Bangkok: Minburi Technical College.

Perna, S., Recke M. P., & Nichols, M.H. (2023). *Challenge Based Learning: A Comprehensive Survey of the Literature*. The Challenge Institute. Retrieved from https://www.challengeinstitute.org/CBL_Literature_Survey.pdf

Soutthaboualy, T., Chatwattana, P., & Piriyasurawong, P. (2021). The Blended Instruction on Cloud via an Interactive Augmented Reality Technology Model to Enhance Digital Literacy. *Higher Education Studies*, 11(3), 144-155. https://doi.org/10.5539/hes.v11n3p144

Sungpoom, V. (2011). Instructional Model based on Connectivism Theory. *Journal of Vocational and Technical Education, 1*(2), 50-56.

The Challenge Institute. (2018). *The Challenge Learning Framework*. https://www.challengebasedlearning.org/framework/

Utranan, S. (1982). *Systematic Instructional Management*. Bangkok: Chulalongkorn University.