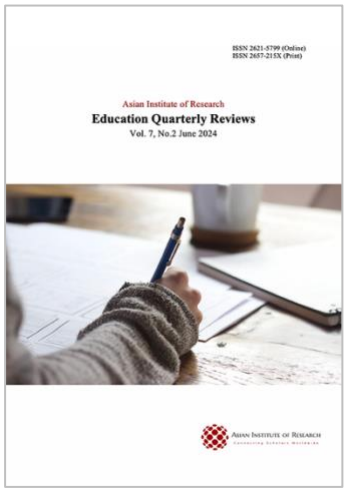

Education Quarterly Reviews

Palasonthi, K., & Piriyasurawong, P. (2024). Creative Challenge-Based Learning Model via Digital Co-Learning Space to Develop Creative Genius Innovator. *Education Quarterly Reviews*, 7(2), 1-13.

ISSN 2621-5799

DOI: 10.31014/aior.1993.07.02.571

The online version of this article can be found at:
https://www.asianinstituteofresearch.org/

Published by:
The Asian Institute of Research

The Asian Institute of Research *Education Quarterly Reviews* is a peer-reviewed International Journal. The journal covers scholarly articles in the fields of education, linguistics, literature, educational theory, research, and methodologies, curriculum, elementary and secondary education, higher education, foreign language education, teaching and learning, teacher education, education of special groups, and other fields of study related to education. As the journal is Open Access, it ensures high visibility and the increase of citations for all research articles published. The *Education Quarterly Reviews* aims to facilitate scholarly work on recent theoretical and practical aspects of education.

ASIAN INSTITUTE OF RESEARCH
Connecting Scholars Worldwide

The Asian Institute of Research
Education Quarterly Reviews
Vol.7, No.2, 2024: 1-13
ISSN 2621-5799

DOI: 10.31014/aior.1993.07.02.571

Creative Challenge-Based Learning Model via Digital Co-Learning Space to Develop Creative Genius Innovator

Kriangkrai Palasonthi[1], Pallop Piriyasurawong[2]

[1,2] Division of Information and Communication Technology for Education, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand

Correspondence: Kriangkrai Palasonthi, Division of Information and Communication Technology for Education, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand. Tel: +669 0994 7182; E-mail: kriangkrai.p@mail.rmutk.ac.th

Abstract

This research was research and development was (1) to develop a creative challenge-based learning model via digital co-learning space to develop creative genius innovator model and (2) study the results and approve the creative challenge-based learning model. The researcher determined the research method into two phases according to the objectives. The first phase was developed a creativity challenge-based learning model via digital co-learning space to develop the creative genius innovator model. The second phase evaluated the appropriateness of the creativity challenge-based learning model. The creative challenge-based learning model was assessed for suitability by eight experts using a suitability assessment form. The creative challenge-based learning model had five components which included 1) the inputs 2) the creative challenge learning process 3) the output and the feedback 4) the outcome and 5) the impact. The creative challenge learning process had five steps: the design and simulating Interest, the understanding problems and finding solutions with wisdom, the creative challenge, the kick off and summary of results and assessment of success. After evaluation of the appropriateness of the creative challenge – based learning model. The results and approve the creative challenge–based learning via digital co-learning space model approve by experts were appropriateness at very high level.

Keywords: Challenge Based Learning, Creativity Based Learning, Co-Learning Space, Creative Genius, Innovator

1. Introduction

Announcement of the Ministry of Higher Education, Science, Research and Innovation of Thailand, methods and conditions for organizing education through information technology systems. Concerning the details of learning management components of the curriculum through information technology systems in 6 areas, consisting of: 1) The aspect of teaching science that is consistent with learning outcomes is the creation of teaching methods. and learning management strategies at curricula, faculties, and universities. Used to create consistent teaching and learning and enhance students' potential. Learning efficiency to be consistent with the information technology chosen for teaching and learning. that results in learning outcomes according to the goals of the teaching

curriculum and courses offered 2) Content design is the presentation of important content through online lecture channels. Create a space to talk and exchange opinions online 3) Designing learning activities is creating active learning activities. and create interaction in learning Providing opportunities for learners to have more interaction during the learning process. The role of the teacher is important in building adherence and building relationships in learning. Providing feedback that can help students develop 4) Measurement and evaluation design is an evaluation that covers both judgment and learning. There are important steps and criteria, including the use of information technology to enhance efficiency in evaluation that is consistent with Learning outcomes In terms of knowledge, skills, ethics, and personal characteristics 5) The readiness of learning support is that higher education institutions should have learning support readiness that is complete, diverse, modern, and efficient. in organizing education to achieve learning outcomes as specified in the curriculum It has comprehensive learning resources and promotes learning outcomes and 6) The readiness aspect of equipment, technology, and learning resources is that higher education institutions should be prepared in terms of technological equipment. to support learning The minimum criteria include a strong technological infrastructure suitable for providing educational services (Ministry of Higher Education, Science, Research and Innovation, 2022).

Learning environment is an important step to support appropriate and effective learning. The learning objectives must be clearly defined. so that the design of the environment can support that objective. Create a space that can support various learning activities, taking into account the placement, arrangement, and compatibility of the space. Use technology to support learning, such as using learning equipment. or using online learning platforms, Managing the resources available in the learning environment. To make it easily accessible and efficient Create a comfortable and creative workspace. Support team collaboration and problem-solving. Support learners to exchange knowledge and promote working with others. Create a creative atmosphere and encourage students to be enthusiastic about learning (Apiya, 2019).

Challenge-based learning is a teaching method that allows students to learn through working with challenges or problems that need to be solved in a creative way. This learning focuses on promoting skills in science, technology, engineering, art, and social responsibility. The characteristics of learning are based on challenges, namely asking questions and researching. Cultivate learners through challenging methods Ask questions about the problem or challenge you want to solve. Researching and learning about a topic promotes collaboration to solve challenging problems. Promote skills in working with others knowledge sharing and learning from each other among students. By applying the knowledge gained from learning to solve problems. Helps promote analytical thinking and presenting reasons to others. Learners will be given the opportunity to develop key skills such as communication, working with teams, problem-solving and adapting to challenging situations. Creating meaningful results and creating value for student's educational institution Society and nation Challenge-based learning is often connected to society. The students are given the opportunity to present their work or ideas to society appropriately (Apple, 2011)

Creativity-based learning is a teaching method that gives students the opportunity to express their creativity and develop problem-solving skills. analytical thinking and presenting reasons This learning focuses on developing creativity. Professional knowledge and abilities and important skills for solving problems in the future Promote students by creating creative works. By choosing a topic or problem that is challenging and interesting. Support learners with creative skills. By providing opportunities for experimentation, doing, and creating things, promoting connections between existing knowledge and creative ideas that can lead to things that create understanding (Suttipong, 2017: 346)

Innovation creates new opportunities for development and growth in the economy, education, and industry. Open opportunities to create new businesses A job that has never been done before. and ways to develop new things endlessly Innovation increases efficiency in work, production, and service. The use of new technology helps reduce costs, increase productivity, and improve processes in business and industry (O'Hara, 2017)

Creative genius has a mental characteristic that helps in creating unique and valuable ideas. Having a variety of knowledge from different fields can be combined to create creative ideas. Have the ability to solve creative

problems There is value in presenting. Have the ability to connect ideas from different situations or fields to create diversity and balance. Have the skills to think and set new directions to develop innovation (A. Cropley, 2006).

The researcher has seen the promotion and support of education in the digital age of the Ministry of Higher Education, Science, Research and Innovation. that focuses on students being innovators to create sustainable innovations Able to respond to the needs of the nation. With a learning format that meets the needs of learners in the digital age. Emphasis is placed on challenging problems that need to be solved in a creative way, Knowledge from various fields can be combined to create new ideas or concepts towards innovation development. Create new opportunities for development and growth in the economy, education, and industry. This learning focuses on and encourages learners to be happy with learning through a learning environment that can stimulate students' creativity and participation. Creating a space that is flexible and can be changed according to student needs with creative challenge-based learning model via digital co-learning space to develop creative genius innovator model

1.1 Research Objectives

1) To develop a Creativity Challenge -based Learning Model via Digital Co - Learning Space to Develop Creative Genius Innovator model.
2) To evaluate the appropriateness of the Creativity Challenge-based Learning Model via Digital Co - Learning Space to Develop Creative Genius Innovator Model.

1.2 Research Hypothesis

Results of the suitability evaluation of the creative challenge-based learning model via digital co-learning spaces to develop creative genius innovators were found to be appropriate at a high level.

1.3 Expected Results

1) Get a creativity challenge-based learning model via digital co-learning space to develop creative genius Innovator model of creative practitioners in the digital media technology and mass communication technology.
2) Develop creative practice abilities in the profession of digital media technology and mass communication technology to meet the needs of the professional industry.
3) The creativity challenge - based learning model via digital co-learning space to develop creative genius Innovator model, be a creative learning model of the education industry in the digital age.
4) Able to promote and develop students' potential to be recognized by professional standards in digital media technology and mass communication.
5) Can promote and encourage students to have morals, ethics, and ethics in the mass communication profession. Promote soft power in developing useful media. To society and the nation

1.4 Scope of the Research

This research is research and development. The population and sample group in this research is a group of people with qualifications of associate professor and professor level with expertise in instructional system design, educational technology, digital technology by purposive sampling. Then, the initial variable is the creativity challenge-based learning model. The dependent variable is the suitability evaluation of creativity challenge-based learning model as assessed by eight experts. The research tools include: creativity challenge-based learning model and the questionnaire about the suitability evaluation of creativity challenge-based learning model. The data was collected from the questionnaire about creativity challenge-based learning model.

2. Literature Review

2.1 Challenge-Based Learning

Challenge-based learning It is a multidisciplinary educational approach that encourages learners to leverage everyday technology to solve real-world problems. By giving students the opportunity to focus on challenges of global importance. and use it to develop local solutions. Challenge-based learning creates student space. Be able to control research and think critically about how to apply what you learn. The results are shown in the pilot project and current study. is increased participation Taking the time to work on additional challenges Creative application of technology and greater student satisfaction with homework Learners are proficient with the course content. and better engagement with content and learning (Johnson, L. and Adams, S., 2011). Challenge-based learning framework There are 5 learning processes, consisting of big idea, essential question, the challenge, solution and taking act, and assessment (Apple Inc, 2009).

2.2 Creativity Based Learning

Improving creative thinking skills is very important these days. Because society and the labor market need people who have the ability to solve problems and create new things. To respond to rapid technological and social changes. Creativity-based learning is the effective ways to develop creative thinking skills and lead to learners with the characteristics that society needs. This is because this method focuses on giving students the opportunity to experiment and create knowledge in various situations that are designed to be relevant to daily life. This can help build creative thinking skills and other life skills. Can promote the development of personality skills such as responsibility, determination, and continuous learning. Honesty Working with others and setting clear goals. CBL also helps create learning that is happy and fun at the same time (Luechaipanit, 2015).

2.3 Co-Learning Space

Co-learning space is a process that focuses on creating an environment that stimulates learning and collaboration among students. which aims to support knowledge creation Teamwork skills and knowledge sharing between students Space should be created that is open and free of physical limits. To support collaboration and student movement Arrange a variety of spaces to provide work options. Allow students to choose to use different areas according to their needs. Work corners create appropriate zones for collaboration and different activities, such as zones suitable for reading. Zones suitable for design or zone used for meetings Using adjustable furniture Can move or can be combined to be able to adjust the space according to needs Appropriate tools for collaborative learning are provided such as whiteboards, electronic boards. or projector Create a space suitable for group work. Can be an adjustable table There are groups of seats. or space for meetings Technology is used to support collaborative learning, such as providing smart boards. Using knowledge-sharing applications or a device that can connect to the internet Seats have been created that can be used in a variety of ways (Kneppell & Riddle, 2012).

2.4 Creative Genius

Creative genius has a mental characteristic that helps in creating unique and valuable ideas. Having a variety of knowledge from different fields can be combined to create creative ideas. Have the ability to solve creative problems. There is value in presenting. Have the ability to connect ideas from different situations or fields to create diversity and balance. Have the skills to think and set new directions to develop innovation (A. Cropley, 2006).

2.5 Innovator

Innovative thinking skills of innovators have been identified, including:
1) Attention It is an assumption of the overall picture that is created in order to aim for evaluation. And find a way to solve it, that is, pay attention, observe and see the situation. Observe to make your perception clear and new patterns emerge. Pay attention and consider what is happening around you and the reality of the situation. by observation
2) Personal characteristics There are individual abilities related to interests. Creativity in working according to individual ideas
3) Thinking with simulations has the feature of using simulations to understand situations. Can describe situations and structure ideas.

4) The play is serious and has the characteristics of having a strict and fun process. Collaborating and negotiating with those who have a stake in the collaboration.
5) Working together diversity of viewpoints is encouraged. Giving everyone the opportunity to express their ideas and solve problems.
6) Expertise means letting go of thoughts and seeing every point as objective. Performing operations skillfully and solving a variety of problems Developing these skills promotes innovation and diverse thinking in organizations. It also increases the potential for effective problem-solving and collaboration (Horth, D, 2014).

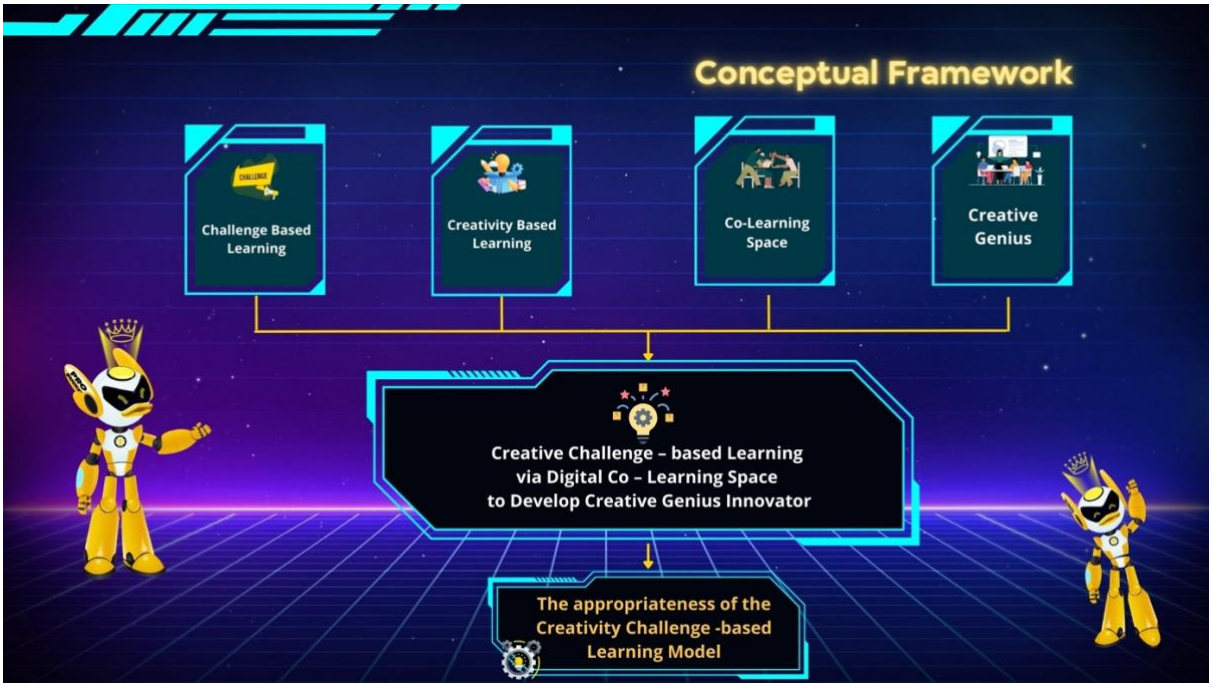

Figure 1: Research conceptual framework

3. Research Methodology

The researcher has determined the research method into two phases according to the following objectives:
First phase: The development of the creative challenge-based learning model by analyzing and synthesizing 17 documents, including articles and research related to challenge-based learning and, the Creativity Based Learning published from 2010 to 2023. This includes the following steps:
Step 1. Synthesizing the elements of Challenge-Based Learning.
Step 2. Synthesizing the elements of Creativity-Based Learning.
Step 3. Developing the creative challenge–based learning model as follows:
1) Use the elements and concepts obtained from steps 1,2 to develop into a conceptual framework for designing elements, processes, steps, integrating system approach for use in designing and developing challenge-based learning, creativity-based learning, co-learning space, creative genius and the innovator.
2) Development of creative challenge-based learning model. The model consists of five main components: the inputs, the creative challenge learning process, output and the feedback, outcomes and impacts
3) Proposal of the model to an advisor recommendation.
Second Phase: The evaluation of the appropriateness of the creative challenge–based learning model as follows:
1) The suitability questionnaire of a 5-point Likert rating scale for the creative challenge–based learning model. The questionnaire about the suitability consists of five main components which include 1) the inputs 2) the creative challenge learning process 3) the output and the feedback 4) the outcome and 5) the impact. Then, the results statistical data analysis by applying average values and standard deviation (SD) and 2) The evaluate of the creative challenge-based learning model with questionnaire about the suitability evaluation by eight experts.

4. Results

First phase: The results of the creative challenge-based learning model as follows:
The synthesis of the challenge-based learning process with content analysis techniques from articles and research papers (A. Santos, A. Sales, P. Fernandes and J. Kroll, 2018, D. Ifenthaler, D. C. Gibson and L. Zheng, 2018, J. Membrillo-Hernández et al,2019, J. L. Hernandez, G. Roman, C. K. Saldaña and C. A. Rios, 2020, D. E. Salinas-Navarro and C. L. Garay-Rondero, 2020, X. Crusat and I. M. Martínez, 2021, R. Rodriguez-Calderon ,2022, V. Robledo-Rella, L. Neri, R. M. G. García-Castelán, A. Gonzalez-Nucamendi and J. Noguez, 2022). This consists of five process as shown in Table 1.

Table 1: Synthesis of the Challenge Based Learning Process

Challenge Based Learning Process	A. Santos, A. Sales, P. Fernandes and J. Kroll (2018)	D. Ifenthaler, D. C. Gibson and L. Zheng (2018)	J. Membrillo-Hernández et al (2019)	J. L. Hernandez, G. Roman, C. K. Saldaña and C. A. Rios (2020)	D. E. Salinas-Navarro and C. L. Garay-Rondero (2020)	X. Crusat and I. M. Martínez (2021)	R. Rodriguez-Calderon (2022)	V. Robledo-Rella, L. Neri, R. M. G. García-Castelán, A. Gonzalez-Nucamendi and J. Noguez (2022)	This Research
Big Idea	✓	✓		✓		✓		✓	✓
Essential Question	✓					✓			✓
The Challenge	✓		✓			✓		✓	✓
Solution and Taking Act	✓		✓	✓		✓	✓		✓
Assessment	✓				✓	✓	✓		✓

Table 1 The challenge-based learning has five process: 1) big idea 2) essential question 3) the challenge 4) solution and taking act and 5) assessment. The details for each process are as follows: 1) The big idea is the Broad and important ideas that are central to learning Most of which are linked to the experience and knowledge of the learner. 2) The essential question are important questions that help students understand the context from a broader perspective and crystallize important ideas. This question will help spark interest and enthusiasm for learning. 3) The challenge is turn essential questions into action. Give students the opportunity to solve problems. and stimulate interest and effort in thinking of solutions to problems. 4) The solution and taking act is finding solutions to problems as determined and making the solution plans come true. 5) The assessment of innovation from innovator.

Table 2: Synthesis of the Creativity-Based Learning Process

Creativity Based Learning Process	J. Dai-you (2011)	S. -M. Wang, J (2014)	H. -C. Shih, Y. -H. Yuan and J. -C. Lee (2014)	P. Lameras (2015)	W. Hu, H. Guo and F. Liu (2018)	D. Baldassini, V. Colombo, S. Mottura, M. Sacco, L. Colautti and A. Antonietti (2017)	L. He, Y. Li, K. Zhuang et al (2020)	M. Martínez-Ávila and D. Guajardo-Flores (2020)	This Research
Inspiration	✓	✓	✓		✓	✓	✓	✓	✓
Problem setting and Groping	✓	✓		✓	✓		✓		✓
Research and Thinking	✓			✓		✓	✓	✓	✓
Presentation	✓	✓	✓		✓	✓	✓	✓	✓
Assessment	✓	✓	✓			✓	✓	✓	✓

Table 2 indicates that the creativity-based learning process consists of five process: inspiration, problem setting and groping, research and thinking, presentation and assessment. The details for each process are as follows: 1) The inspiration: giving attention and making students aware of the topic or issue they want to study. This stimulation helps to initiate the thought process. 2) The problem setting and groping: defining the problem or task that students want to solve. and group them into groups to participate in learning according to their interests. To build teamwork and stimulate creativity 3) The research and thinking: surveying and researching information had the opportunity to experiment and give space for creativity using the concept of parallel thinking allows for multiple perspectives. 4) The presentation: present work or ideas is training in communication skills and information presentation. and 5) The assessment: can be done in many areas, such as evaluating creativity academic and behavioral skills. The assessment will help to know whether the learner has developed skills and knowledge. The synthesis of the creativity-based learning process from articles and research papers.

The synthesis of the creative challenge–based learning process (DUCKS) consists of five process: 1) D: Design and Simulating Interest 2) U: Understanding Problems and Finding Solutions with Wisdom 3) C: Creative Challenge 4) K: Kick-off and 5) S: Summary of Results and Assessment of Success. This consists of five process as shown in Figure 2.

Figure 2: Overview of the creative challenge learning (DUCKS) model

Figure 2 shows the results of the development of creative challenge-based learning model consist of five main elements: 1) The inputs divided into six elements a) The objectives are determined; learning goal, need assessment and details of course. b) Teacher must have knowledge and experience based on the professional ethics of journalism. Must have knowledge and understanding in the creative challenging learning component. Have an understanding of developing digital collaborative learning spaces. Able to design learning activities appropriately, create problems or assign innovative tasks, missions that create challenges for students. And student must have a professional background in digital media and mass communication technology. Have had experience in learning about media production operations. Able to expand knowledge and thought processes. To develop creative innovation, be knowledgeable, enthusiastic and a practitioner. Able to work happily with others. c) The contents relate to the digital media and mass communication technology emphasizes extensive programming within the ethics of journalism, content and the development of innovative media will help promote creative learning. Stimulate those in power practical learning and real work, emphasizing cooperative or group work. d) Instructional media: PowerPoint, digital lesson, digital video production and infographic e) Equipment and technology must have professional equipment digital media and mass communication technology, such as high-definition television cameras, anti-vibration device or tripod, microphone, or recording devices, tablets, smartphones, information technology equipment that can connect to the internet portable mobile devices and equipment used for producing other media, etc. and f) Digital co-learning had eight zone as shown in figure 3.

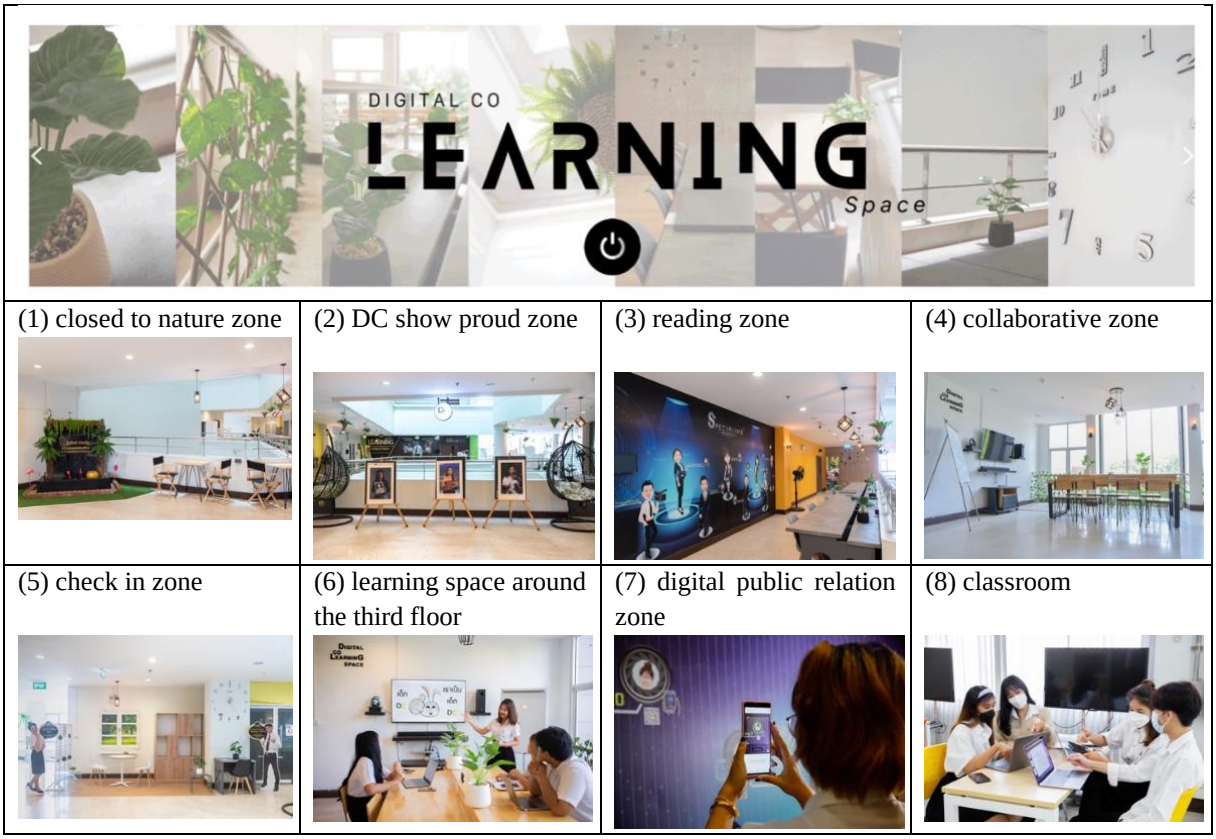

Figure 3: Digital Co-Learning Space

2) the creative challenge–based learning process (DUCKS) consists of five process: 1) D: Design and Simulating Interest 2) U: Understanding Problems and Finding Solutions with Wisdom 3) C: Creative Challenge 4) K: Kick off and 5) S: Summary of Results and Assessment of Success. This consists of five process:

a) D: Design and simulating interest; clarification of details related to the course, including course content, course description, course aims, asking about student needs, persuading the mind and inspiring learning, asking about student expectations, previewing the work of senior students, adjusting the creative classroom model to suit the context of the course and students. Create learning activities that are interesting, exciting, and challenging. Engage students with gamification formats, creating and brainstorming ideas to stimulate students' imagination, exchange knowledge and experiences of each student. Create demonstrations and simulations to synthesize students' ideas (Idea Synthesis). Create discussions in the classroom. And there was a meeting to discuss and find a conclusion.

b) U: Understanding problems and finding solutions with wisdom; setting the problem of developing media innovation in the course by finding the origin and importance of what you want to do, such as experimenting with defining problems and finding solutions (Problems and Solutions), searching for various projects, and surveying necessary needs. Analysis and planning according to 6W2H principles, searching for answers from human resources. or reliable sources of information copyright free Intersperse theory with lectures and supplementary learning with digital lessons. Create activities for students to have discussions and meetings. It is the creation of group activities and teamwork. Assign work in the course and find inspiration in developing media innovations Opening up learning experiences outside the classroom with field trips.

c) C: Creative Challenge; an important step in learning that encourages and challenges learners. By opening up media innovations of successful seniors. Open perspectives for students to big idea. Stimulate the thirst for knowledge and has guidelines for developing innovations. It is important to challenge students with exchanges. Finding reliable information, to create guidelines for developing innovations to achieve goals and be successful. Big assignment let students practice, to prepare for the development of media innovation. Coordinating with external agencies with the instructor closely controlling, receiving the problem and interpreting the meaning of the problem to create work.

d) K: Kick off; clarification of details and conditions related to the development of media innovations, to create guidelines for students, including theory and recommendations for practice. Exchange of knowledge and experience from teachers, students, classmates experienced person Trustworthy source of knowledge and extracting knowledge from things previously studied. Taking action to develop media innovations, by visiting the area in real situations. Media innovation development with the 3P process consisting of: (1) pre-production (2) production and (3) post-production

e) S: Summary of results and assessment of success; clarifying details and summarizing the overall related to the development of media innovations of creative genius innovators. Summary of operating results, exchange knowledge and experiences from students. Dissemination of developed media innovations, forwarding media innovation to create value and benefit to society and the country. Summary and analysis of student success that can follow the course conditions. Finding guidelines and improvements, suggestions for successful groups.

3) Evaluation is where the students using creative challenge-based learning model are evaluated of among creative genius innovator were ten important characteristics, including: a) there was a constant thirst for knowledge b) dared to think outside the box and open mind c) opened your heart and listen, dare to accept knowledge d) dared to take the initiative e) was a creative practitioner f) was able to work together with others and care about those around g) thought analytically and reflected to connect ideas h) create thoughts with discipline i) had a sense of humor and enjoy working and j) was able to solve problems. The evaluated of innovation consists of five components: a) possibility b) objective c) novelty and uniqueness d) cost and e) efficiency. The feedback of creative challenges will be used for further improvement of the system.

4) Outcome of model consists of being accepted by society, the media innovation being published and broadcast on television stations, academic services, receiving awards from contests

5) Impact of model consists of feedback from learning from creative genius innovators, a by-product of the field of study, faculty, and university.

Second phase: The results of suitability evaluation the creative challenge-based learning model by eight experts are shown in Table 4.

Table 4: The suitability of the creative challenge–based learning model in each element.

	Result		*Appropriateness*
Description	*Mean*	*S.D.*	
1. Inputs	4.69	0.06	*Excellent*
1.1 Objectives	4.57	0.53	*Excellent*
1.2 Teacher and Students	4.71	0.49	*Excellent*
1.3 Contents	4.86	0.38	*Excellent*
1.4 Instructional Media	4.57	0.53	*Excellent*
1.5 Equipment and Technology	4.71	0.49	*Excellent*
1.6 Digital Co-Learning Space	4.71	0.49	*Excellent*
2. Creative Challenge Learning Process (DUCKS)	4.92	0.22	*Excellent*
2.1 D: Design and Simulating Interest	4.92	0.22	*Excellent*
2.2 U: Understanding Problems and Finding Solutions with Wisdom	4.95	0.20	*Excellent*
2.3 C: Creative Challenge	4.79	0.38	*Excellent*
2.4 K: Kick off	4.86	0.35	*Excellent*
2.5 S: Summary of Results and Assessment of Success	4.96	0.19	*Excellent*
3. Output and Feedback	4.86	0.38	*Excellent*
4. Outcome	5.00	0.00	*Excellent*
5. Impact	4.86	0.38	*Excellent*
Overall	**4.85**	**0.12**	***Excellent***

Table 4 shows results of suitability evaluation the creative challenge-based learning model; Overall was excellent (Mean= 4.85, S.D.=0.12). When considering each element, the outcome component had the highest appropriateness (Mean=5.00, S.D.=0.00), followed by the creative challenge learning process (Mean= 4.92, S.D.= 0.22), and the impact (Mean= 4.86, S.D.=0.38)

5. Conclusion and Discussion

The creative challenge-based learning model has five components: the first is inputs, the second is creative challenge–based learning process, the third is output and feedback, the fourth is outcome and the fifth is impacts. The details of inputs have six elements: 1) objectives 2) teacher and students 3) contents 4) instructional media 5) equipment and technology and 7) digital co – learning space. The creative challenge–based learning process (DUCKS) consists of five process: 1) D: Design and Simulating Interest 2) U: Understanding Problems and Finding Solutions with Wisdom 3) C: Creative Challenge 4) K: Kick off and 5) S: Summary of results and assessment of success. The evaluation of the creative genius innovators, the experts commented that the appropriateness overall was excellent (Mean= 4.85, S.D.=0.12). When considering each element, the outcome element had the highest (Mean=5.00, S.D.=0.00), followed by the creative challenge learning process (Mean= 4.92, S.D.= 0.22), and the impact element (Mean= 4.86, S.D.=0.38). The results show that this creative challenge–based learning model could be used to develop the creative genius innovator. The researcher developed the creative challenge learning process according to the challenge-based learning process theory. It consists of five process as follows: 1) big idea 2) essential question, 3) the challenge 4) solution and taking act and 5) assessment. The creativity-based learning process consists of five process as follows: 1) inspiration 2) problem setting and groping 3) research and thinking 4) presentation and 5) assessment. This could make it easily accessible and efficient Create a comfortable and creative workspace. Support team collaboration and problem solving. Support learners to exchange knowledge and promote working with others and learning via digital co - learning space. Consistent with the theory of Apiya (2019) has said learning environment is an important step to support appropriate and effective learning. The learning objectives must be clearly defined. so that the design of the environment can support that objective. Create a space that can support various learning activities, taking into account the placement, arrangement, and compatibility of the space. The result of digital co-learning space element is excellent. Therefore, it could be support and develop students' potential to be recognized by professional standards in digital media technology and mass communication. The creative challenge learning process can develop creative genius innovators, it is clearly evident in the results consists of being accepted by society, the media innovation has been published and broadcast on television stations, academic services, receiving awards from contests, consistent with the theory of O'Hara (2017) has said innovation creates new opportunities for development and growth in the economy, education, and industry. Open opportunities to create new businesses, a job that has never been done before. and ways to develop new things endlessly Innovation increases efficiency in work, production, and service. The use of new technology helps reduce costs, increase productivity, and improve processes in business and industry. The result of outcome was excellent. Therefore, could be develop creative genius innovators and encourage students to have morals, ethics, and ethics in the mass communication profession. Promote soft power in developing useful media. To society and the nation. The appropriateness of the creative challenge learning process as excellent.

Acknowledgments: The researchers would like to thank the Office of the Basic Education Commission, Ministry of Education and King Mongkut's University of Technology, North Bangkok, which supported this research. Special thanks to Professor Pallop Piriyasurawong, Division of Information and Communication Technology, Education Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, Thailand for his full support of this research. The researcher would also like to thank, Digital Media and Mass Communication Technology, Rajamangala University of Technology Krungthep, and King Mongkut's University of Technology North Bangkok which supported this research.

Author Contributions: All authors contributed to this research.

Funding: Not applicable.

Conflict of Interest: The authors declare no conflict of interest.

Informed Consent Statement/Ethics Approval: Not applicable.

References

A. Cropley. In praise of convergent thinking. (2006). Creativity Research Journal, 18(3): (391–404)

Apple Inc. (2009). Challenge based learning: A classroom guide. California: Apple, Inc.

Apple Inc. (2011). [Online]. Challenge Based Learning A Classroom Guide. [cited 2023 July 15]. Available from: https://www.apple.com/br/education/docs/CBL_Classroom_Guide_Jan_2011.pdf.

A. Santos, A. Sales, P. Fernandes and J. Kroll. (2018). "Poster: Challenge-Based Learning: A Brazilian Case Study," IEEE/ACM 40th International Conference on Software Engineering: Companion (ICSE-Companion). Gothenburg,

D. Baldassini, V. Colombo, S. Mottura, M. Sacco, L. Colautti and A. Antonietti. (2017). "Design of a ICT-based training system to improve creative thinking in brain-damaged patients. International Conference on Virtual Rehabilitation
(ICVR). Montreal, QC, Canada, (1-2).

D. E. Salinas-Navarro and C. L. Garay-Rondero. (2020). "Requirements of Challenge based Learning for Experiential Learning Spaces, an Industrial Engineering Application Case,". IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE). Takamatsu, Japan. (1-8).

D. Ifenthaler, D. C. Gibson and L. Zheng. (2018). "The Dynamics of Learning Engagement in Challenge-Based Online Learning," IEEE 18th International Conference on Advanced Learning Technologies (ICALT). Mumbai, India,
(178-182).

H. -C. Shih, Y. -H. Yuan and J. -C. Lee,. (2014). "Facilitating the creative performance of mechanical engineering students: The moderating effect of creative experience," IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE), Wellington, New Zealand. (258-262)

Horth, D. (2014). How to use innovation to lead effectively work collaboratively, and drive results. N.P.: Center for Creative Leadership and Dan Buncher, Continum.

J. Dai-you,. (2011) "Classroom teaching strategies creative abilities,". 6th International Conference on Computer Science & Education (ICCSE), Singapore, (808-810).

J. L. Hernandez, G. Roman, C. K. Saldaña and C. A. Rios. (2020). "Application of the Challenge-Based Learning Methodology, as a trigger for motivation and learning in robotics," International Conference on Virtual Campus (JICV). Tetouan, Morocco. (1-4).

J. Membrillo-Hernández et al., (2019). "Student Engagement Outside the Classroom: Analysis of a Challenge - Based Learning Strategy in Biotechnology Engineering," IEEE Global Engineering Education Conference (EDUCON), Dubai, United Arab Emirates. (617-621).

Johnson, L., & Adams, S. (2011). Challenge based learning: The report from the implementation project. Austin, Texas: The New Media Consortium.

Kneppell, M. & Riddle, M. (2012). Distributed learning spaces: Physical, blended and virtual learning spaces in higher education. In M.Keppell, K, Souter, & M. Riddle. Physical and virtual learning spaces in higher education: Concepts for the modern learning environment. (pp.1-21). PA: Information Science Reference.

L. He, Y. Li, K. Zhuang et al., (2020). Network connectivity of the creative brain: current knowledge and future directions. Chinese Science Bulletin, vol.65 no. 1 (25–36).

Luechaipanit, W. (2015). Creativity-based Learning (CBL). Journal of Learning Innovations Walailak University. Vol1 no.2 : 23-38.

Ministry of Higher Education, Science, Research and Innovation (2022). "Details of the learning management components of the curriculum through information technology systems," Bangkok: Royal Gazette.

M. Martínez-Ávila and D. Guajardo-Flores, (2023) "A Comparative Study of Creative Thinking Abilities among Bioengineering Graduates: Assessing the Impact of Traditional and Competency-Based Educational Models,". World Engineering Education Forum - Global Engineering Deans Council (WEEF-GEDC). Monterrey, Mexico, (1-6)

O'Hara, M. (2017). Rising to the occasion: New persons for new times. Estudos de Psicologia (Campinas), 34(4), (454-466).

P. Apiya. (2019). Designing learning spaces for higher education institutions in the 21st century. Dusitthani Journal. Vol 11 no 2 : 379-392.

P. Lameras et al., (2015). "Creative thinking experimentations for entrepreneurship with a disruptive, personalised and mobile game-based learning ecosystem," International Conference on Interactive Mobile Communication Technologies and Learning (IMCL). Thessaloniki, Greece. (348-352)

R. Rodriguez-Calderon. (2022). "Challenge-based learning in a university-industry environment,". XV Technologies Applied to Electronics Teaching Conference. Teruel, Spain. (1-5).

S.-M. Wang. (2014). "A Module-Based Learning Analytics System for Facebook Supported Collaborative Creativity Learning,". IEEE 14th International Conference on Advanced Learning Technologies. Athens, Greece, 495-496.

Suttipong, R. (2017). A new paradigm in education and development of thailand teachers in the digitalage. Journal of Education Naresuan University, 19(2), 344-355.

V. Robledo-Rella, L. Neri, R. M. G. García-Castelán, A. Gonzalez-Nucamendi and J. Noguez. (2022). "Challenge-based learning during the pandemic for engineering courses based on competencies," IEEE Frontiers in Education Conference (FIE). Uppsala, Sweden. (1-8).

X. Crusat and I. M. Martínez. (2021). "Engaging students in COVID times with immersive learning and Self-driven Challenge Based Learning," IEEE Global Engineering Education Conference (EDUCON). Vienna, Austria. (1277-1281).