Active Microlearning to Promote the Digital Competence of Vocational Certificate Students

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ABSTRACT: *To promote the digital competencies of learners at the vocational certificate level, active microlearning management is a learning model that encourages learners to acquire digital competencies that are suitable for future career development and one which means that the students receive practical training in such a way as to achieve sustainable learning. Digital competency skills will help learners adapt appropriately to technological changes. The active microlearning model can be used to promote the digital competency of learners at the vocational certificate level. It is a learning model which has been developed from two learning approaches, namely active learning and micro learning and is a model that emphasizes practical practice and self-learning.*

From the research process, it has been found that the active microlearning management model promotes the digital competency of learners at the vocational certificate level. In the Digital Technology for Career course, it was developed into a learning model incorporating 4 learning elements: 1) Determining learning objectives, 2) Planning and action, 3) Presenting knowledge, 4) Summarizing and evaluating. It can be used to develop learning and effectively promote digital competency skills, both of which are essential skills in the digital era.

Keywords: Digital Competency, Active Learning, Microlearning

1. Introduction

Professional Certificate Program. The 2024 Buddhist Era has focused on integrating digital technology in teaching and learning to prepare learners to work in the industrial era. The curriculum focuses on developing competencies in information technology and digital technology so that learners can adapt to changes in industry. 1)Learning management through digital technology using E-Learning and online platforms to help learners access learning content anytime, anywhere, by integrating the metaverse, VR/AR, and simulation-based learning to achieve hands-on learning, and promoting HyFlex (Hybrid + Flexible Learning) that allows learners to choose classes at their convenience. 2) Competency-based education (CBE) promotes learning through work-based learning (WBL) and interactive programs with the workplace. 3) Open and flexible learning: Provides opportunities for learners to transfer their academic results and experience from actual work to the Micro-Credentials and Digital Badges system design curriculum that allows learners to accumulate knowledge and skills according to market demands. 4) Promoting digital

skills for entrepreneurship. This involves supporting the creation of startups in technology and the digital economy, developing digital marketing, e-commerce, and FinTech skills so that learners can become self-employed. 5) The Lifelong Learning and Upskilling/Reskilling Curriculum is designed to enable continuous upskilling and re-skilling to support changes in the lifelong learning support industry through online learning platforms and AI-driven learning systems (Office of Vocational Education and Professional Standards (2024).
Active learning is a teaching and learning management approach that focuses on the role of students in creating their own knowledge. The instructor acts as a guide and stimulates deep thinking. This process promotes the development of advanced thinking skills (higher order thinking skills) i.e. analysis, evaluation and creativity. This helps learners develop abilities beyond memorization. In addition, it also emphasizes interaction between learners through group work and through discussion and the exchange of ideas to strengthen social skills and problem-solving. Active learning often involves activities that involve real-life situations such as simulations and action (Experiential Learning). This allows students to apply their knowledge in practice and is in line with the needs of the labor market in the 21st century (Office of the Basic Education Commission (OBEC) (2019).

The microlearning management approach emphasizes dividing educational content into small units that are concise and to the point to help learners understand concepts or develop specialized skills quickly. This process often relies on digital platforms such as short videos and online modules or applications to increase the convenience of learning anytime, anywhere. It also provides an opportunity for learners to set their own learning pace in the form of self-paced learning. The content is designed to be easy to understand, with the use of short exercises or quizzes to reinforce understanding and allow for practical application. By relying on the principle of repetition (spaced repetition) it is possible to improve retention. The micro-learning process is therefore ideal for professional skill development, employee training, or training about specialized skills that can be applied in professional and practical contexts (Leela et al., 2019).

Digital competency is an important skill that enables learners and teachers to use digital technology to effectively increase the efficiency of learning and education management. Using e-Learning platforms such as Google Classroom makes learning possible anytime, anywhere, and supports both online and hybrid education. Additionally, cybersecurity skills help protect users against internet threats, allowing data to be stored and accessed securely. Data analysis through AI and Big Data helps teachers to adjust their teaching to make it more suitable for learners. Digital competencies also equip learners with the skills to collaborate through technology to create digital content and develop the ability to use digital tools effectively for educational purposes. This is an important foundation for the modern world of education that is fully connected to technology (Wannapiroon et al., 2022).

Based on the above principles and theories, the researcher is interested in developing active microlearning procedures to promote the digital competency of learners at the vocational certificate level. The program focuses on learners learning on their own from knowledge clips which take the form of videos demonstrating the operating procedures and teaching materials that are contained in the content, so that learners can have operational competence, understand the content, and achieve better academic results.

2. Research Objectives

2.1 To design active microlearning management procedures to promote the digital competency of learners at the vocational certificate level.
2.2 To evaluate the design of the active microlearning management procedures aimed at promoting the digital competency of learners at the vocational certificate level.

3. Literature Review

3.1 Active Learning

Active learning management is a teaching and learning process that emphasizes the full participation of students in the classroom, and promotes interaction between teachers and learners. The focus is on students gaining hands-on experience while the teacher acts as a facilitator and inspires, mentors, supervises, and guides students, acting as both a coach and a mentor. Active learning management requires a variety of teaching techniques and extensive learning resources to enable learners to learn meaningfully. This involves the students building their own knowledge, understand themselves, using their intellect to think, analyze, and develop creative works that reflect key

performances of the 21st Century. This learning process helps learners develop academic, life and professional skills in such a way as to be able to achieve their age-based learning goals effectively (OBEC, 2019).

Active learning is a form of learner-centered learning management, with the main essence being to increase or focus on the role of learners to encourage them to be hands-on, and then to reflect on their ideas regarding what they do to create knowledge. With this approach, learning will be through reading, writing, speaking, and listening as well as the students reflecting on their thoughts. Learners must interact with both their classmates and with their teacher. The approach focuses on the group work process. In terms of classroom discussion in managing active learning the teacher will reduce the role of being the center of learning in the classroom, but will rather become a guide to facilitate the work of the learners so that they can carry out the activities designed by the teacher in order to eventually build their own knowledge (Phoyen, 2021).

3.2 Microlearning

Microlearning is learning in which learners learn the educational content in sub-units are: 1) educational materials in the form of videos that contain content narration, graphics or animations, and 2) exercises and tests, where each learner will learn different sub-units according to his/her characteristics (Viriyasittharod & Piromsombat, 2022).

Microlearning is a learning process that divides the content into small parts, allowing learners to learn on their own through a variety of channels such as videos, mobile applications, and online learning resources. The nature of the content will be concise and to the point, helping learners to quickly understand the material and to be able to apply their knowledge to solve problems. Microlearning has 4 main steps as follows: 1) defining specific objectives 2) presentation of the main content in a short and easy-to-understand format 3) learning through thematic activities 4) evaluation. This form of learning helps learners to memorize material and apply knowledge effectively, especially when used in conjunction with digital learning materials to increase interest and make learning more effective (Leela et al., 2019).

3.3 Digital Competency

Digital competency is an important skill for life today. It allows individuals to search for information, innovate, use technology for learning, work, and communicate effectively, as well as help them better adapt to digital transformation. Digital competency is an important skill that enables individuals to use technology effectively, safely, and responsibly in a digital society (Tangwancharoen et al., 2023).

Digital competency is a key skill of the people in the 21st century. It allows a person to work, communicate, learn and live, especially in an era in which technology plays an important role in all sectors. It covers the knowledge, skills, and attitudes necessary to work and live in the digital era. The components of digital competency can be divided into 4 main aspects**:** digital literacy, digital use**,** digital troubleshooting (Digital Problem-Solving), adapting to digital **t**ransformation (digital adaptability) (Thailand Professional Qualification Institute, 2024).

Based on the study, analysis, synthesis of documents, and research related to the design of an active micro-learning model to promote the digital competency of learners at the vocational certificate level, Figure 1 offers a guide for the conceptual framework for the research.

4. Research Methods

The active microlearning management system to promote the digital competency of learners at the vocational certificate level is a teaching model that emphasizes learners learning from concise content and practicing activities for self-study that will help develop work skills and secure information retrieval. Students can also use technology to promote their own learning activities effectively. The learning format allows learners to study learning material on their own. The system creates knowledge that is consistent with course content and application to match the context they are interested in. The result is the development of digital competency skills which are important in the digital era - the era in which technology is used to carry out activities, medical, business, industry and educational. The data can be divided into 5 parts as shown in the following synthesis table: *Table 1.* Synthesis of the active learning process *Table 2.* Synthesis of microlearning processes *Table 3.* Active microlearning *Table 4.* Digital competency Level 2 Basic Skills for Work (Group 3) and *Table 5*.Synthesis of proactive microlearning processes to promote the digital competency of learners at the vocational certificate level.

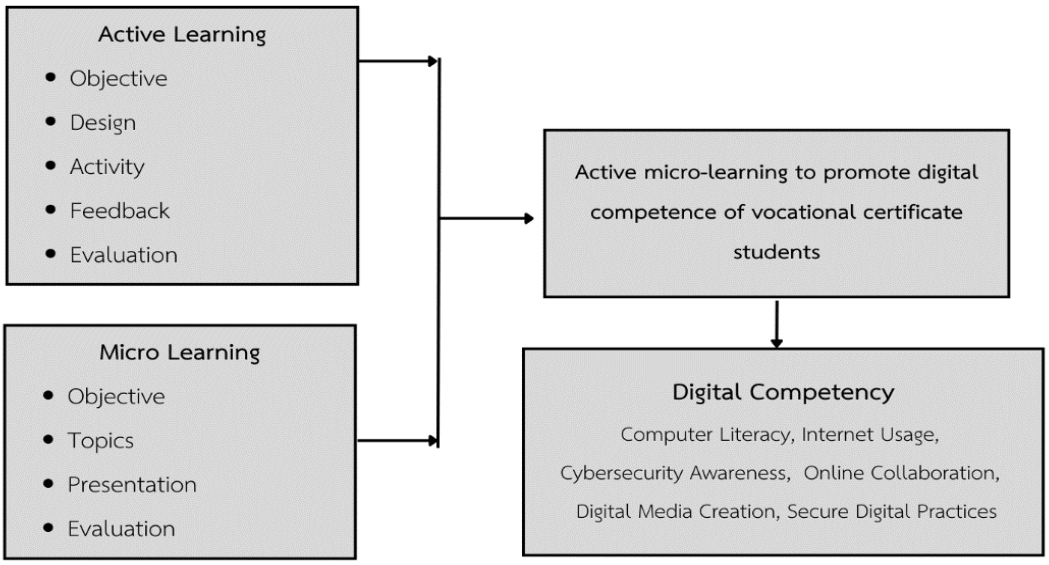

Figure 1. Active Microlearning Framework to Promote Digital Competencies of Vocational Certificate Students

Table 1. Synthesis of the Active Learning Processes

Active Learning	(Office of the Basic Education Commission: OBEC, 2019)	(Pusitrattanavalee & Jinnge, 2017)	(Phoyen, 2021)	(Wichianrat et al., 2016)	(Wongsakuldee et al., 2015)	(lamboonyaryi pattrada et al., 2020)	(Nimkham Sudaporn, 2024)	**Synthesis results**
1. Analyze the course content	✓	✓				✓	✓	
2. Determine learning objectives	✓	✓	✓	✓	✓	✓	✓	✓
3. learning activities design	✓	✓		✓	✓	✓	✓	✓
4. Organize learning activities	✓	✓	✓	✓	✓		✓	✓
5. Supplementing information	✓	✓		✓	✓	✓	✓	✓
6. Summarizing and evaluating	✓	✓	✓		✓	✓	✓	✓

From *Table 1.* we can see that the synthesis of the active learning process is divided into 5 steps. These are as follows: 1) determining learning objectives: The instructor prepares a lesson plan according to the objectives of the course so that learners understand the learning activities, and provide suggestions 2) learning activity design: The instructor designs classroom activities in accordance with the course content 3) Organizing learning activities: organizing activities in the classroom to stimulate the interest of learners 4) Supplementing information during teaching and learning activities: The instructor should observe the results of the learner's performance and help guide and supplement the information so that the learner has a broader idea in the context 5) Summarizing and evaluating: the learners must summarize information relating to the activities they have engaged in during the study. This must

be presented to the instructor and classmates to evaluate whether or not the activities were successful. The instructor must cencourage learners to be assertive and embrace advice to improve their performance.

Table 2. Synthesis of Micro Learning Processes

Micro Learning	(Rokaiphet & Chatwattana, 2024)	(Viriyasitharod & Piromsombat, 2022)	(Seubpradit et al., 2019)	(Pattaravindechopat & Siripipattanakul, 2024)	(leela et al., 2019)	(Suksawang et al., 2025)	(Rodthong Rattanan, 2021)	**Synthesis results**
1. Document and data analysis stage		✓	✓			✓		
2. Determining the purpose of learning objectives	✓	✓	✓	✓	✓	✓	✓	✓
3. Defining the practice topic	✓	✓	✓	✓	✓	✓	✓	✓
4. Presentation	✓		✓		✓	✓	✓	✓
5. Create questions to measure knowledge	✓	✓		✓		✓		
6. Evaluate learning outcomes	✓	✓	✓	✓	✓		✓	✓

From *Table 2.* we can see that the synthesis of the micro-learning processes is divided into 4 steps. These are as follows: 1) determining the learning objectives. This is the process of identifying and determining the objectives or topics that are in line with the course content or teaching and learning activities. In this step that the instructor clarifies the situation so that the learners understand and acknowledge the practice 2) defining the practice topic. This is when the instructor informs the learners about the activities to be carried out during the class so that the learners can carry out the activities according to the objectives of the course and obtain complete and accurate information according to the desired topic or in line with the course. 3) presentation. This presentation of work refers to the stage in which students synthesize and report the outcomes of the learning activities they have undertaken to the instructor and their peers. This stage aims to enhance students' ability to integrate and articulate the knowledge they have acquired, communicate their ideas effectively to others, and reflect on constructive feedback in order to refine and improve their work. 4) evaluate learning outcomes. Learning assessment refers to the stage in which the instructor systematically evaluates students' competencies in carrying out the learning activities, determining whether their performance aligns with the specified learning objectives, course requirements, and the instructional activities planned for the course.

Table 3. Active Microlearning

Active Learning	**Micro Learning**	**Active Micro Learning**
Define learning objectives	Learning Objectives	Defining Learning Objectives
Design learning activities	Define the topic of practice	Planning and Action Planning
Organize learning activities		
Retroactive Data Supplementation	Presentation Stage	Knowledge PresentationPresentation
Summary and Evaluation	Evaluate learning outcomes	Summary and Evaluation Evaluation

From *Table 3.* we can see that the active microlearning management process integrates and combines the concepts of active learning and microlearning to develop knowledge skills and practical action through the learners' learning activities. This involves 4 main steps. These are as follows:
1) objectives are the identification and determination of learning objectives in the course so that learners can understand what is expected of them and are able to clarify the situation for planning the implementation of the various activities that the students must participate in during the class. 2) Planning and implementation refers to the stage in which the instructor designs and organizes learning activities that are aligned with the course objectives. These activities are implemented using a learner-centered approach, enabling students to actively engage in the learning process. This stage emphasizes students' participation in classroom activities and promotes interaction both among students and between students and the instructor, thereby fostering a positive and supportive learning environment. 3)

presentation and exchange of ideas on the part of learners and teachers. This step will help learners develop their communication skills 4) Evaluation. This is the process by which learners summarize knowledge or results, and they evaluate the success of these activities or works. An effect, they analyze their own performances. The instructor will help and provide information to guide improvement.

Table 4. Digital Competency Level 2 Basic Skills for Work (Group 3)

Performance Units Basic	Sub-performance	Performance Description	Citations
Computer use	Hardware Operating System Manipulate Backup and Restore Mobile Device Management	Students can solve problems using computer equipment to match the operating system by using various functions that come with the operating system, such as managing, backing up and restoring data at the same time, or choosing to use network applications to mobile devices, including using cloud computing to share resources effectively.	(Thailand Professional Qualification Institute, 2024)
Internet Usage	Use a Web Browser Search Engine E-mail Calendar Online, Social Media Use Communication Tools Use Electronic Commerce	You can use a web browser, adjust and select a service provider to match the purpose of use in order to access the search engine to meet the search conditions. Use social media by using communication programs to effectively communicate with other people, including the use of electronic transactions in terms of commerce, services, and teaching and learning, which have changed according over time.	(Thailand Professional Qualification Institute, 2024)
Use for security	Use Credential Management Threat Protection Malware Protection Internet Safety Laws, Regulations and Policies on the Use of the Internet	Identity verification can be used to log in to create a roster of people. It can also protect personal information from malware attacks by using software as a protective shield. The use of the internet is legal and ethical, and there are ways to manage the safety of internet use in accordance with the current situation.	(Thailand Professional Qualification Institute, 2024)
Collaborate online	Online Collaboration Use Online Data Sharing Tools Use Screen Sharing Tools Online Conference Tools	Students can choose to use and share applications, share screens, and teleconference via a monitor for online collaboration efficiency.	Thailand Professional Qualification Institute, 2024

Performance Units Basic	Sub-performance	Performance Description	Citations
Use a digital media maker	Use a Web Editing Application Use Digital Media for Working Use Photo Editing Application Use the Screen Capture Application Use Motion Graphic Application	Digital media generators can be used, such as using a web builder to design web pages. Insert objects and publish them to the public using digital media, images, animations, or images from screen capture programs and decorate it using a photo editor. Use animation media editing software to make it more efficient.	(Thailand Professional Qualification Institute, 2024)
Use digital for security	Prevent security threats Security Protection Follow the principles of secure web browsing. Identification and Authorization Model	Students can identify ways to protect against security threats such as how to protect data, web browser usage, and other security threats. Implement secure add-ons for web browsers, including determining the type of authentication using biometric factors.	(Thailand Professional Qualification Institute, 2024)

Table 5. Synthesis of proactive microlearning processes to promote the digital competency of learners at the vocational certificate level.

Proactive learning versus microlearning	Instructor Role	Learner Role	Digital Competency
1. Define learning objectives 1.1 Learning Objectives	- The instructor prepares the learning objectives in accordance with the course content - The instructor prepares teaching guidelines and activities in accordance with course content - The instructor determines the assessment the methodology - The instructor determines the achievement of the implementation of the learning activity - Chat GPT - Google classroom - MOODLE DICT KMUTNB	- Learners study the content and guidelines for learning activities related to the course content based on the instructor's explanation. - Google Classroom - MOODLE DICT KMUTNB	- Computer use - Internet Usage
2. Design learning activities 2.1 Define a topic of practice	- The instructor determines the topic of the learning activity. - The instructor clarifies the guidelines for learning activities to inform the learners. - Google classroom - Google Drive - Chat GPT	- Learners study the details of the topic of learning activities. - Learners study the learning activity practices. - Google classroom - Google Drive - Chat GPT - MOODLE DICT KMUTNB	- Computer use - Internet Usage - Collaborate online

Proactive learning versus microlearning	Instructor Role	Learner Role	Digital Competency
3. Organize learning activities	- The instructor explains in detail the search for information and considers the source of information to make the information accurate and secure. - The instructor assigns students to divide into groups by emphasizing information so that students understand the purpose of the activity. - Google classroom	- Learners divide learning activities into groups by creating a media presentation format that can be shared collaboratively via the Internet. - Learners engage in learning activities in according with the topics they are given. - Chat GPT - Google Drive - Google classroom - MOODLE DICT KMUTNB	- Computer use - Internet Usage - Use for security - Collaborate online - Use a digital media maker - Use digital for security
4. Retroactive Data Enhancement 4.1 Presentation stage	- The instructor provides relevant information to supplement that of the learners. - Google Meet - Google classroom - MOODLE DICT KMUTNB	- Learners summarize the knowledge gained from the learning activities. - Learners present the knowledge gained from learning activities to the instructor and the rest of class. - Google Slide - Chat GPT - Google Meet	- Computer use - Internet Usage - Use for security - Collaborate online - Use a digital media maker - Use digital for security
5. Summary and Evaluation 5.1 Evaluate learning outcomes	- Instructors evaluate performance. - The instructor summarizes achievements with regard to the learning activity. - Google Drive - Google classroom - Google Form - MOODLE DICT KMUTNB	- Learners submit the results of the activity to the instructor. - Learners complete an assessment - Google Drive - Google Slide - Google Form - MOODLE DICT KMUTNB	- Computer use - Internet Usage - Use for security - Collaborate online - Use a digital media maker - Use digital for security

5. Results

The effect of the synthesis of active microlearning management to promote digital competency of learners at the Vocational Diploma level is that it leads to the creation of a learning model for instructional design that consists of a few sections. Inputs, processes, and outcomes are all used to further develop into Active Microlearning to promote the digital competence of vocational certificate students. This is as shown in Figure 2.

Figure 2 shows the Active Microlearning to promote the digital competence of vocational certificate students. This consists of 4 main components as follows:

1. Input factors include 1) Teacher 2) Students 3) Content 4) Objective and 5) Technology.
2. Process of active microlearning.

2.1 The active learning model involves 4 processes: 1) Determining learning objectives 2) Designing learning activities 3) Organizing learning activities 4) Supplementing feedback and 5) Summarizing and evaluating.

2.2 The micro learning model involves 4 processes: 1) Determining learning objectives 2) Determining practical topics 3) Presenting results and 4) Evaluating learning outcomes.

2.3 Active micro learning involves 4 processes: 1) Determining learning objectives 2) Planning and action 3) Presenting knowledge and 4) Summarizing and evaluating.

3. Outcomes.

3.1 Digital Competency Level 2 Basic Skills for Work (Group 3) is a direct product of the Active Microlearning to promote the digital competence of vocational certificate students. It consists of 6 points as follows: 1) Using

a computer, 2) Using the Internet, 3) Use for security, 4) Collaboration online, 5) Using a digital media generator, 6) Use digital for security.

3.2 Results of the feasibility assessment of the design and development in the integrated elements of active microlearning to promote the digital competency of learners at the Professional Diploma Level involving 5 experts.

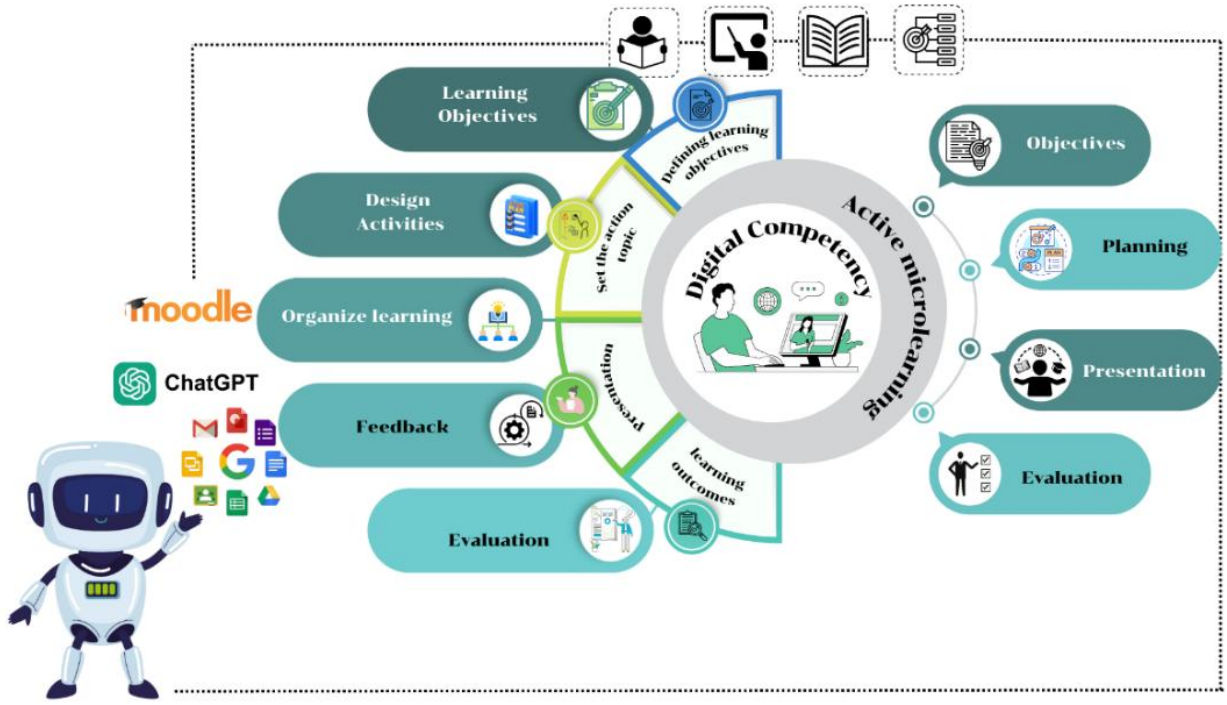

Figure 2. Active Microlearning to promote the digital competence of vocational certificate students

Table 6. Results of the Design Suitability Assessment (Total Elements)

Assessment List	Results of the Assessment Items		Interpretation
	M	*SD*	
1. Active Microlearning to promote the digital competence of vocational certificate students. Suitability for learning to promote the digital competencies of learners at the vocational certificate level.	5.00	0.00	Highest
2. Appropriateness of the development of the learning model of the Active Microlearning to promote the digital competence of vocational certificate students.	5.00	0.00	Highest
3. Overview: Active Microlearning to promote the digital competence of vocational certificate students. There is a possibility to try it out.	4.80	0.40	Highest
Overview	4.93	0.13	Highest

From *Table 6.* we can see that the results of the assessment of the suitability of Active Microlearning to promote the digital competence of vocational certificate students (total component) indicates that there is overall suitability at the highest level (Mean = 4.93, SD = 0.13). This indicates that the Active Microlearning to promote the digital competence of vocational certificate students has the complete number of necessary components. It can be used as a guide for the development of knowledge with regard to an active microlearning management system to promote the digital competency of learners at the higher education level in terms of the Professional Diploma. This is a necessary skill to develop students in the digital era.

6. Discussion

Based on the assessment of the active microlearning management system to promote the digital competency of learners at the vocational certificate level, it was found that it was most appropriate overall because the researcher synthesized the active learning process consisting of the following steps: 1) Determining learning objectives, 2) Designing learning activities, 3) Organizing learning activities, and 4) Feedback. 5) The conclusion and evaluation of the results, which are in line with the research results, (Phoyen, 2021)Learning Model Active Learning This learning management method offers a way to meet the needs of education management to cope with changes in the 21st century in line with modern learning styles. Micro-type consists of 4 processes as follows: 1) determining the learning objectives, 2) determining the topic to be considered, 3) presenting the work, and 4) evaluating the learning outcomes. This is in line with the research by Viriyasittharod and Piromsombat (2022).Each sub-unit consists of 2 parts: 1) learning materials in the form of videos with content lectures, graphics or animations, and 2) different sub-units will be learned but each learner according to their individual characteristics. When the two learning styles are combined, a learning process that permits the use of technology in the teaching and learning process is obtained. This results in both technology skills and digital competency skills.

7. Conclusion

For teaching and learning management to be efficient and in line with the current demand for technology, there is a need to adopt a active microlearning to promote the digital competence of vocational certificate students. Therefore, it is a highly effective teaching method for developing digital competency skills because the teaching model makes use of technology to support education and emphasizes that learners can use technology to support their own education. As a result, learners gain the skills necessary for the use of technology for education, and it promotes the appropriate use of technology. Consequently, it meets the needs of the future labor market. Therefore, the Digital Competency Code has been established to ensure that learners and technology users understand the correct and appropriate use of technology, as well as an awareness of its ethical use. Therefore, it is most appropriate to use it to promote digital competencies.

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