Digital Technology Landscape for Vocational Education: Learning Loss Recovery

Jira Jitsupa¹, Venus Skunhom¹*, Prachyanun Nilsook², Kanitta Hinon², Watcharee Sangboonraung³, Srisuda Daungtod³, Wilawan Phumee⁴, Kitiya Promsron⁵

[1] *Faculty of Education,*
   Suan Dusit University, Bangkok, THAILAND

[2] *Faculty of Technical Education,*
   King Mongkut's University of Technology North Bangkok, Bangkok, THAILAND

[3] *Faculty of Education,*
   Nakhon Phanom University, Nakhon Phanom, THAILAND

[4] *Faculty of Industrial Technology,*
   Nakhon Si Thammarat Rajabhat University, Nakhon Si Thammarat, THAILAND

[5] *Office of the Basic Education Commission, Bangkok, THAILAND*

*Corresponding Author: venus_sku@dusit.ac.th
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Article Info	Abstract
	The research aimed to; 1) study the expectations of teachers on the behavioral conditions of vocational education learners, 2) Study the ability of teachers to achieve the expected behavioral conditions of vocational education, 3) Comparison of the use of digital technology in teaching by teachers to recover the learning loss of vocational learners during the new normal and next normal periods, 4) Study the teachers need to use digital technology in teaching to recover the learning loss of vocational learners during the new normal and next normal periods, and 5) Create digital technology landscape for learning loss recovery on vocational education. Data were collected with an online questionnaire that passed the validity and reliability with 301 vocational teachers. The results of the research showed teachers have higher expectations of learners' behavioral conditions. Teachers can make vocational learners experience the expected behavioral conditions to a greater extent. Teachers use digital technology to organize teaching to recover the learning loss of vocational learners during the new normal rather than during the next normal. However, the demand for digital technology for teaching to recover the learning loss problem of learners during the next normal is increasing more than during the new normal. The study suggests improving the knowledge and ability of teachers to use digital technology for teaching to recover the problem of learning loss among learners.

1. Introduction

The provision of vocational education to students at the undergraduate, upper vocational certificate, and vocational certificate levels is known as vocational education. Currently, there are three different forms of teaching available in Thailand: regular vocational education, dual, and ordinary vocational education. Through vocational education, students may tailor their education to their interests and areas of specialization. to give

education that propels the job market and to possess the expertise that employers want. Additionally, both the public and commercial sectors should fund and promote vocational education. Consequently, 1,028,937 persons have considered a career in vocational education (Office of the Vocational Education Commission, 2021). Industry, commerce, fine arts, home economics, agriculture, fishing, tourism, textiles, information and communication technology, entertainment and music, and marine trade are the eleven disciplines taught in vocational education in Thailand. Vocational education places a strong emphasis on students working hands-on with actual tools, materials, and equipment to gain practical experience and skills that can be applied to their employment. These skilled workers are vital to the nation's economic growth and development. But vocational learners are experiencing a loss of learning because of the COVID-19 epidemic (OECD, 2021). Because of this, a lot of students get less information and experience and miss out on opportunities for hands-on learning and learning from other sources (Office of the Education Council, 2022). Although, the Office of the Vocational Education Commission (2022) has created "Guidelines for organizing teaching and learning in the situation of the outbreak of COVID-19 in educational institutions under the Office of the Vocational Education Commission" to resolve these issues, though.

The primary causes of this include learning loss in aptitude, learner requirements, preparedness, physical materials both offline and online, and a wide range of learning tools (Engzell et al., 2021; GOVET, 2022). Additionally, there are no teachers present to coach or facilitate hands-on learning. The COVID-19 pandemic found students delay graduation, some withdrawal from classes, and change their majors. The pandemic seems to worsen inequality in education (Durongkaveroj, 2023). The only learning option for vocational students both during and after the COVID-19 outbreak is digital technology (Gaba, Bhushan, & Rao, 2021). This is because it is versatile and can be used to educate in both synchronous and asynchronous online learning environments in addition to traditional classroom settings (GOVET, 2022). Students have the freedom to study as suits their needs and a level of preparedness. For example, they can utilize digital technology to supplement traditional classroom learning. It may be used to plan online instruction in place of conventional classroom instruction (Todd, 2020). It may be used to provide students who don't attend in-person online classes as well as traditional classroom education retroactive instruction. Several research studies have demonstrated that digital technology facilitates effective instruction such as (Seyffer et al., 2022; Promsron et al, 2024). Students get real world knowledge and abilities that are equivalent to what they would learn in a regular classroom, and they promote the use of digital technology for online and traditional classroom management (Allen et al., 2016).

Both through additional supplemental media and through mainstream media. Developing self-learning capabilities is necessary for all vocational learners to continue building their own learning competence even after the COVID-19 epidemic has passed. From learning loss to enhanced learner learning, this is the shift (Angrist et al., 2021). Nevertheless, even though digital technology facilitates and serves as an excellent medium for learning, the outcomes of education follow the previously indicated trajectory. However, there has not been any study done on vocational teachers' use of digital technology to make up for the learning losses that students had during and after the COVID-19 epidemic, and this is a distinct situation. This research is interested in studying digital technology for vocational education in the context of learning loss recovery in order to fill in the gaps in this section with the objectives of 1) Study the expectations of teachers on the behavioral conditions of vocational education learners, 2) Study the ability of teachers to achieve the expected behavioral conditions of vocational education, 3) Compare the use of digital technology in teaching by teachers to recover the learning loss of vocational learners during the new normal and next normal periods, 4) Study the teachers need to use digital technology in teaching to recover the learning loss of vocational learners during the new normal and next normal periods, and 5) Create digital technology landscape for learning loss recovery on vocational education. Therefore, this study aims to address the following questions:

1) What are the expectations of teachers on the behavioral conditions of vocational learners?
2) To what extent can teachers achieve the expected behavioral conditions?
3) Is there a difference between digital technology used by teachers for teaching to recover the learning loss of vocational learners during the new normal and next normal periods?
4) Is there an increase in the teachers need to use digital technology for teaching to recover the learning loss of vocational learners during the next normal period?

1.1 Vocational Education

A program called vocational education aims to provide students with the skills and information they will need for their future employment. Because it is a crucial aspect of national education, it offers training at the vocational certificate or certificate level. in a course that doesn't concentrate on fundamental concepts like regular lines. The course lasts for three years. There are two main study options available to graduates: a vocational diploma or a higher vocational certificate. Following graduation, you have the option of continuing your bachelor's degree studies for an additional two years or for an additional four to five years. The chance to study in areas that are primarily focused on practical job is the highlight of vocational education. Students can concentrate on studying the subjects that truly interest them (Dobricki et al., 2020). Gain professional skills, can select from a selection of

additional courses, and make money while you study. Its high school graduation and chance to seek further education make it popular with employers. Consequently, 47.8% of students want to go to a post-secondary institution (Cedefop, 2020). There are three forms of vocational education available to students in Thailand: bilateral vocational education, regular vocational education, and dual vocational education. Nonetheless, the teaching and learning in vocational education have been impacted by the COVID-19 epidemic. Because materials are needed, online operations are not a practical option (Crisis et al., 2020). But given the drawbacks of social isolation, choosing online education at this moment was the proper move.

The challenge faced by teachers in educational institutions in the digital age is no longer the feasibility of applying technology to teaching and learning. But it is more important to recognize and decide when and how to apply technology in education. Therefore, teachers must be prepared to integrate digital technology into their learning management. (Ge et al., 2018). They must develop themselves to be competent in using digital technology for teaching and learning. (Kamsker et al., 2020). This is because digital technology is extremely important to teachers in the teaching and learning process. Teachers, in addition to being experts in subject content, must be proficient in the use of digital technology as well. (Zhang & Wang, 2019). Professional teachers of the future are key to the successful use of digital technology in learning management. (Engen, 2019). Therefore, teachers must continuously increase their teaching skills using digital technology and practice their skills to keep pace with changes to integrate and apply digital technology in teaching and learning management effectively. (Xiao et al., 2020). Public responsibility and skills for the future (Révészová, 2020).

1.2 Learning Loss Recovery

Learning Loss is the deterioration of learners' knowledge or the loss of learning opportunities that should have been acquired including Knowledge, Attitude, and Skill, which can occur during normal and unusual situations, human actions or from the education system itself (Angrist et al., 2021) such as floods, wars, school holidays affect the development of learners, as well as slowing down or hindering academic progress. There is an educational gap or discontinuity in the education of learners, disruption of formal education, dropouts of learners, (Donnelly &; Patrinos, 2021). It affects learners' level of education, job duties and quality of life in the future. In particular, the recent COVID-19 pandemic has caused an unprecedented widespread learning recession worldwide. Learners, teachers, executives at all levels, parents of learners, and those involved in teaching must adapt hard. Due to COVID-19, regular classroom instruction has become 100 percent fully online. In addition to the declining academic performance of the learners. Learning disparities also widen the learning gap. This is because some learners do not have access to online learning arrangements and resources. Due to the limitations of school supplies such as computers, smartphones, and internet signals, etc. (Rahiem, 2020). As a result, some learners are not ready to study and do study activities. Vocational learners, who are large groups of learners, are unable to practice practical skills from educational laboratories and establishments with real materials and equipment (Blaskó et al., 2021). The Office of the Education Secretariat (2022) found that the impact of COVID-19 on Thailand's education system consisted of: 1) The impact on learners who need to adjust their time and new ways of learning by learning online from home. This results in less practical skills training, and inability to engage in activities with peers. Which affects the development of life skills, social skills, and emotions of learners, 2) Impact on teachers who have an increased burden on teaching and learning, nurturing learners and preparing learners for online teaching with digital technology, 3) Impact on curriculum and instruction schools must adjust the management of education, including curriculum, class time, and online teaching styles, 4) Impact on student measurement and evaluation Schools and teachers must adapt their student measurement and evaluation models to the context of student development activities and online practice, 5) Impact on educational media and technology There are many problems such as internet networks and unstable signals. The availability of digital technology among learners is still limited because parents are not able to provide enough for their children who need to study online, and 6) the impact on learners' academic achievement from the impact. It is evident that digital technology is an important factor affecting the effectiveness and success of teaching and evaluation of learners. DiPietro et al. (2020) discussed ways to recover from the learning recession by recommending adequate and thorough provision of equipment and technology to support online learning, adapt teaching styles to online learning, provide television or radio broadcasting classes for learners who do not have access to online technology. Develop teachers to be competent in using digital technology and train them in teaching techniques suitable for online teaching and learning (Kurniawan & Budiyono, 2021). This is in line with the Office of the Education Secretariat (2022) that proposes measures to recover learning loss among learners by emphasizing on systematic and efficient upgrading of learning management using digital technology, e.g. procurement Hardware, Application, and Internet are free for education. In addition, Thailand Development Research Institute or TDRI (2020) proposes ways to recover learning loss such as rehabilitate individual learners' learning loss by assessing learners' academic readiness and using assessment data to design learning with complementary techniques to learning, including adaptation of agencies under the Ministry of Education that require concrete measures. To build

confidence among teachers and educational personnel and to communicate solutions to problems so that schools can apply solutions to problems that arise according to the context of the area and level of education.

1.3 Digital Technology Learning

Digital technology learning is the use of digital technology as a tool for teaching and learning in educational institutions. Digital technology learning plays an important role for education management at all levels (Timotheou, et al., 2023; Alenezi, 2023). Educational institutions around the world are trying to make the most of their digital technology learning capabilities. To be an important tool in the administration and management of teaching to meet the needs of related parties, such as learners and teachers. The role of digital technology learning in educational institutions consists of 4 main roles: 1) the role of digital technology learning as a body of knowledge that has led many educational institutions to open courses and provide instruction on digital technology learning, 2) the role of digital technology learning as a tool for managing educational resources such as research, finance, school public relations, and academic administration, etc., 3) The role of digital technology learning as an academic tool is the use of digital technology learning in the implementation of activities directly related to teaching, such as planning or preparing lessons for teachers and learners, and 4) the role of digital technology learning as an academic service tool for disseminating knowledge and activities of educational institutions that are useful to interested parties, perhaps in the form of training, seminars, and knowledge transfer etc.. Especially during the COVID-19 pandemic, digital technology learning plays an important role in ensuring that teaching and learning is not disrupted. This can be done while maintaining physical distancing for learners and teachers   in two ways: the use of digital technology learning in offline and online teaching.

Digital technology learning or tools for learning have a lot that can be used in identical and different roles. In 2022, TopTools4Learning (2022) conducted a study of digital technology learning from users around the world and used the survey results to create a digital technology landscape of 3 main groups and 7 subgroups as follows: 1) Tools for workplace learning, YouTube, Google workspace, Adobe Photoshop, Zoom, and SurveyMonkey, 2) Tools for education, YouTube, Padlet, Google Classroom, Quizizz, and Moodle, and 3) Tools for personal learning, YouTube, Facebook, Line, Netflix, and Canva etc. The top five most popular digital technology learning in 2022 are YouTube, PowerPoint, Google Search, Microsoft Teams, and Zoom. It shows which digital technology learning is popular and applied to learning related activities. However, some digital technology learning may be popular in one area but may not be popular in others, such as Line is one of the digital technology learning that is very popular in Thailand. However, it was not found to be popular with the results of such studies. Therefore, the digital technology landscape is necessary and must first study which level of education or area is suitable for digital technology learning or which digital tools. There are various variables that can cause different digital technology learning, such as the age of the learner, the level of education, the type of educational institution, ability to access digital technology learning, learning characteristics, teaching styles, budgets, internet signals, and policies of each school, etc.

2. Method

2.1 Research design and participants

The researchers used the quantitative research to answer the four research question; 1) what is the level of teachers' expectations on the behavioral conditions of vocational education learners, 2) To what extent can teachers enable vocational learners to achieve expected behavioral conditions, 3) Is there a difference between the digital technology used by teachers for teaching and learning to recover the learning loss of vocational learners during the new normal and next normal periods, and 4) Does the needs for teachers use digital technology for teaching and learning to recover the learning recession of vocational learners during the next normal period. Of the 17,897 people who are vocational teachers under the Office of the Vocational Education Commission in all regions of Thailand. Based on Taro Yamane's formula, the sample size was 392 people. As a result of simple random sampling, a sample of 301 people who answered the online questionnaire was returned. The study was based on data from a sample of 301 people, including 125 males and 176 females.

2.2 Research Tool and Data Collection

The research tool used to collect the data was an online questionnaire made of Google form. Respondents can choose to rate their experience on five different levels: Very Poor, Poor, Fair, Good, and Excellent. It was divided into five parts: part 1 included 14 questions about basic information of vocational teachers; part 2 included 20 questions about expectations of vocational teachers on the behavioral conditions of vocational learners and the ability of vocational teachers to achieve the expected behavioral conditions; part 3 included 10 questions about the use of digital technology in teaching of vocational teachers to recover the learning loss of vocational learners during the new normal and next normal periods; part 4 included 2 questions about the needs of vocational

teachers to use digital technology to recover the learning loss of vocational learners during the new normal and next normal periods; and part 5 about opinions and suggestions on the use of digital technology to recover the learning loss of vocational learners, including 50 items. It was discovered that all IOC from 3 experts got results that were at 0.82. It put the questionnaire to the test by getting actual information from 30 educators that matched a sample provided by Office of Vocational Education Commission used the Alpha Coefficient calculation to examine the questionnaire's reliability, giving a whole scale of 0.89. The online questionnaire was conducted on close-ended and open-ended survey questions. Distribute the questionnaire to the sample group by making a note to the Director of Vocational Education Institutions under the Office of the Vocational Education Commission asking for the courtesy to help distribute the online questionnaire to affiliated teachers. Investigators have approved research ethics at the Science and Technology Research Institute (STRI), King Mongkut's University of Technology North Bangkok (KMUTNB) and Naresuan University (NU) before the tool will be used and collected.

2.3 Data Analysis

The quantitative data was synthesis by a computer program. The frequency and percentage were used to analysis basic data of vocational teachers. The percentage was used to analyze the expectations and abilities of vocational teachers that cause vocational learners to develop behavioral conditions as expected. The t-Test paired two sample for means was used to compare the average value of digital technology utilization to recover learning loss among vocational learners during the new normal and next normal periods. The average was used to analyze the needs for digital technology of vocational teachers to recover the learning loss of vocational learners during the new normal and next normal periods and to create digital technology learning landscape for learning loss recovery on vocational learners.

3. Result

Basic data of the teachers in the sample consisting of 301 vocational teachers found that they were more female than male, Most teachers are aged between 41-50 years, Most graduated with bachelor's degrees, Experience in teaching vocational learners ranges from 5-10 years, The position of K-2 teacher comes mainly from public educational institutions located in the central region, Most of the teaching disciplines are commercial, most teachers have been trained in digital technology for learning, However, 43 teachers were never trained, representing 14.29 percent as shown in Table 1, Most teachers have moderate knowledge about the use of digital technology for teaching to recover the learning loss of vocational learners of 121 vocational teachers. Good level 107 people, it was found that 7 teachers were not knowledgeable about using digital technology to recover the learning loss of vocational learners, most of them are between 41-50 years old and most of them come from public schools. The results follow by the research questions:

3.1 The Expectations of Teachers on the Behavioral Conditions of Vocational Learners and Teachers Achieve the Expected Behavioral Conditions

Teachers' expectations regarding the behavioral conditions of vocational learners and the ability of teachers to achieve the expected behavioral conditions of vocational learners.

Expectations of teachers in terms of knowledge, skills, processes and morality, ethics and etiquette found that teachers had higher or more expectations of all aspects of learners' behavioral conditions at a level of 60% or more, with expectations of; 1) knowledge and skills in listening, speaking, reading and writing Thai, 2) knowledge and skills in using technology, and 3) morality, ethics and etiquette at the highest expected level or more than 80%. Expectations for knowledge and skills in the use of technology were highest at 85.2 percent, while knowledge and scientific processes had the lowest expectations for learners at 68.6 percent.

The ability of teachers to achieve the expected behavioral conditions in terms of knowledge, skills, processes, and morality, ethics and etiquette found that teachers were able to achieve the most expected behavioral conditions in almost all aspects, at more than 80 percent, except for knowledge and occupational skills, which were at a high level at 78.4 percent.

Comparing the expectations of teachers towards the behavioral conditions of vocational learners with the ability of teachers to achieve the expected behavioral conditions of knowledge, skills, processes, and morality, ethics and etiquette, it was found that the teachers were able to increase the expected behavioral conditions of vocational learners in all aspects, especially knowledge, skills, and scientific processes increased from 68.6 percent to 80.8 percent, and knowledge and skills in initiative, imagination and art creation increased from 71.2 percent to 82.6 percent. The least incremental aspect is the moral aspect, ethics and etiquette increased from 80.6 percent to 81.8 percent, as detailed in Table 1 and Fig. 1, where numbers 1-10 are the behavior of vocational learners. The blue line is the teacher's expectation of the behavior of vocational learners, and the orange line is the ability of the teachers to achieve the expected behavioral conditions of vocational learners.

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Table 1 *Expectations and competencies of teachers that enable vocational learners to develop behavioral conditions as expected.*

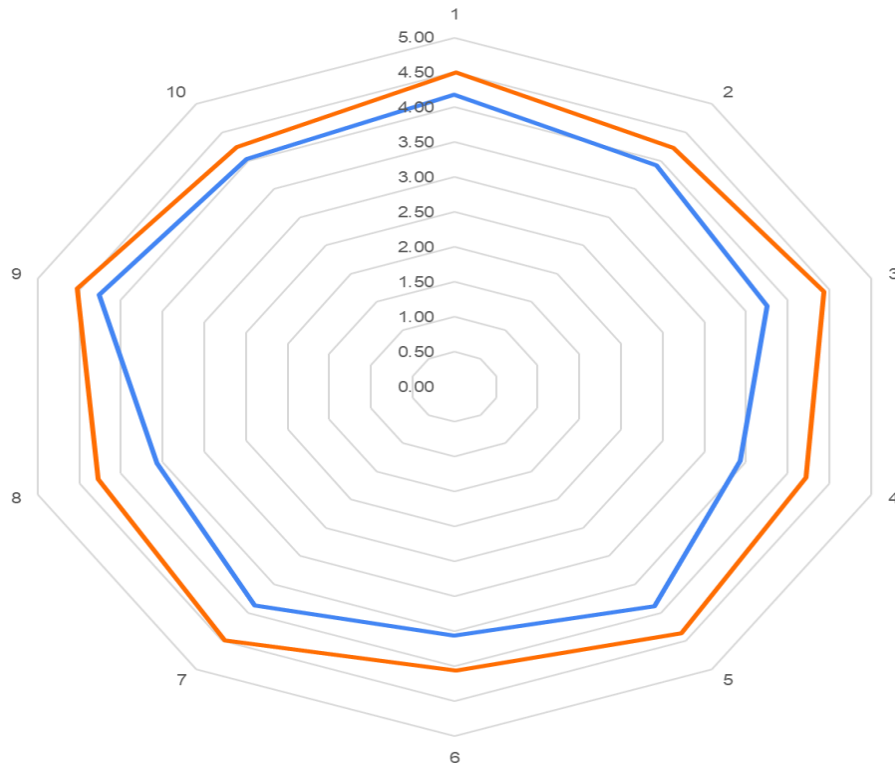| Behavior of vocational learners	Teachers Expectations on behavioral conditions of the learners (%)	Teachers' ability to achieve expected behavioral conditions (%)
1. Knowledge and skills in listening, speaking, reading and writing in Thai.	83.6	86.8
2. Knowledge and skills in listening, speaking, reading and writing in English.	78.2	81.4
3. Knowledge, Skills and Processes mathematically	75.0	85.0
4. Knowledge, Skills and Processes scientific	68.6	80.8
5. Knowledge and skills to be a good citizen	77.8	84.2
6. Knowledge and occupational skills	71.2	78.4
7. Knowledge and skills to promote health and well-being.	77.4	86.6
8. Knowledge and skills in taking initiative, imagining, creating art.	71.2	82.6
9. Knowledge and skills in using technology	85.2	87.6
10. Morality, Ethics and Etiquette	80.6	81.8

Fig. 1 *Expectations of teachers on the behavioral conditions of vocational learners and the ability of teachers to achieve the expected behavioral conditions of vocational learners*

3.2 Difference Between Digital Technology Used by Teachers for Teaching to Recover the Learning Loss of Vocational Learners During the New Normal and Next Normal Periods

Digital technology used by teachers to recover learning loss of vocational learners during the new normal and next normal periods.

The results of total digital technology learning in Table 2 show that the t value for the scale as a whole is 9.90 and the p-value is 0.000, which is a value less than 0.05, indicating that there is a statistically significant difference between the mean ranks of the new normal and next normal of COVID-19, During the new normal period, vocational teachers use digital technology to recover the learning loss for vocational learners on average more than next normal.

From Table 2 when comparing the average aspects of digital technology used by teachers for teaching to recover the learning loss of vocational learners during the new normal and next normal periods in all 5 groups as follows: Communication applications group, Send and receive homework applications group, Learning Management Systems group, Digital media library group, and Online assessment tools group, All groups indicated that there is a statistically significant difference between the mean ranks of the new normal and next normal. During the new normal period, vocational teachers use digital technology to recover the learning loss for vocational learners on average more than next normal.

Table 2 *Compares the average use of digital technology in teaching of teachers to recover the learning loss of vocational learners during the new normal and next normal*

Digital Technology Learning	Mean	SD	t	df	P
Communication applications					
New normal	2.62	0.54	10.07	300	.000**
Next normal	2.39	0.58			
Send and receive homework applications					
New normal	2.24	0.56	4.65	300	.000**
Next normal	2.15	0.53			

Digital Technology Learning	Mean	SD	t	df	P
Learning Management Systems					
New normal	1.87	0.54	3.86	300	.000**
Next normal	1.80	0.56			
Digital media library					
New Normal	2.17	0.67	4.31	300	.000**
Next normal	2.08	0.69			
Online assessment tools					
New Normal	2.17	0.68	3.84	300	.000**
Next normal	2.08	0.67			
Total					
New Normal	2.26	0.52	9.90	300	.000**
Next normal	2.13	0.55			
** p < .01					

3.3 The Teachers Need to Use Digital Technology for Teaching to Recover the Learning Loss of Vocational Learners During the Next Normal Period

Teachers need to use digital technology for teaching to recover the learning loss of vocational learners during the new normal and next normal periods.

The need for digital technology among teachers to provide instruction to recover the learning loss of vocational learners during the new normal and next normal total 21 groups of 92 applications consist of VDO group, Meeting group, Presenting group, File Sharing group, Online Form group, Searching group, Translate group, Blog & Website group, Game & Testing group, Work Together group, Social Media group, Message group, Comment & Participation group, Teaching Media group, Online Course group, Graphic & Animation group, Sound Recording group, Screen Recording group, e-Book & Sound Book group, Writing group, and Virtual group. The findings are as follows:

The need for digital technology among vocational teachers for teaching to recover the learning loss of vocational learners during the new normal found that the Game & Testing group was popular with 7 tools, sorted in descending order of popularity are: Quizizz, Kahoot, LiveWorksheet, Quizlet, Zipgrade, Pickers, and Socrative, and Online course groups are popular with vocational teachers 7 tools sorted in descending order of popularity are: Google Classroom, Canva, MOOC, Moodle, Linked, In Learning, Coursera, and Udemy. Secondary, there are 3 groups: Blog & Website groups are popular with teachers 6 tools sorted in descending order of popularity are: Google Sites, WordPress, True, DLTV, SciMath, and H5P, Comment & Participation groups are popular with teachers 6 tools are: Line, Kahoots, Padlet, Menti, meter, Miro, and Mural, and Screen Recording groups are popular with teachers 6 tools listed in descending order are: Microsoft Teams, Camtasia, Snagit, Loom, Screen cast-O-matic, and Screen castify. The Online Form group is popular with vocational teachers only 2 tools in descending order of popularity: Google Forms, and Microsoft Forms.

The need to use digital technology of vocational teachers to recover the learning loss of vocational learners during the next normal period found: the Game & Testing group was popular with vocational teachers with 7 tools sorted in descending order of popularity are: Kahoot, Quizizz, LiveWorksheet, Quizlet, Pickers, Zipgrade, and Socrative, and Online Course groups are popular with vocational teachers 7 tools listed in descending order are: Google Classroom, Canva, MOOC, Moodle, Linked, In Learning, Coursera, and Udemy. Secondary, there are 3 groups: Blog & Website groups are popular with vocational teachers 6 tools sorted by popular in descending order are: Google Sites, SciMath, True, DLTV, WordPress, and H5P, Comment & Participation groups are popular with vocational teachers 6 tools sorted in descending order of popularity are: Line, Kahoot, Padlet, Mentimeter, Mural, and Miro, and Screen Recording groups are popular with vocational teachers 6 tools sorted in descending order of popularity are: Microsoft Teams, Camtasia, Loom, Snagit, Screen cast-O-matic, and Screen castify. The Online Form group is popular with vocational teachers, only 2 tools sorted in descending order of popularity are: Google Forms, and Microsoft Forms.

The demand for digital technology among vocational instructors in teaching to recover the learning loss among vocational learners during the new normal and next normal period of the 21 groups shown in digital technology landscape in Fig. 2 and Fig. 3. Both Figures show the digital technology landscape that the teachers need of digital technology for teaching to recover the learning loss of learners during the new normal and next normal period. Fig. 2 shows the digital technology landscape that the teacher need of digital technology for teaching to recover the learning loss of learners during the new normal period. Fig. 3 shows the digital technology landscape that the teachers need digital technology for teaching to recover the learning loss of learners during the next normal period, which was found to be different from Fig. 2. That is, there were 10 groups of the digital technology

landscape whose order of need with vocational teachers changed, consisting of: meeting group, translate group, blog & website group, game & testing group, work together group, message group, comment & participation group, screen recording group, writing group, and virtual group.

Fig. 4 compare between the vocational teachers have an increasing demand for digital technology for teaching to recover the learning loss of learners during the next normal period more applications than during the new normal period. That is the numbers 1-92 are the applications from the 21 groups, such as number 1 is YouTube, number 2 is Netflix, etc. The blue line is the use of digital technology (applications) by vocational instructors for teaching to recover the learning loss of learners during the new normal period, and the orange line is the use of digital technology (applications) by vocational teachers for teaching to recover the learning loss of learners during the next normal period, which was found to increase with all application.

Fig. 2 *Digital technology landscape on the use of digital technology for teaching to recover the learning loss of vocational learners during the new normal period*

Fig. 3 *Digital technology landscape on the use of digital technology for teaching to recover the learning loss of vocational learners during the next normal period*
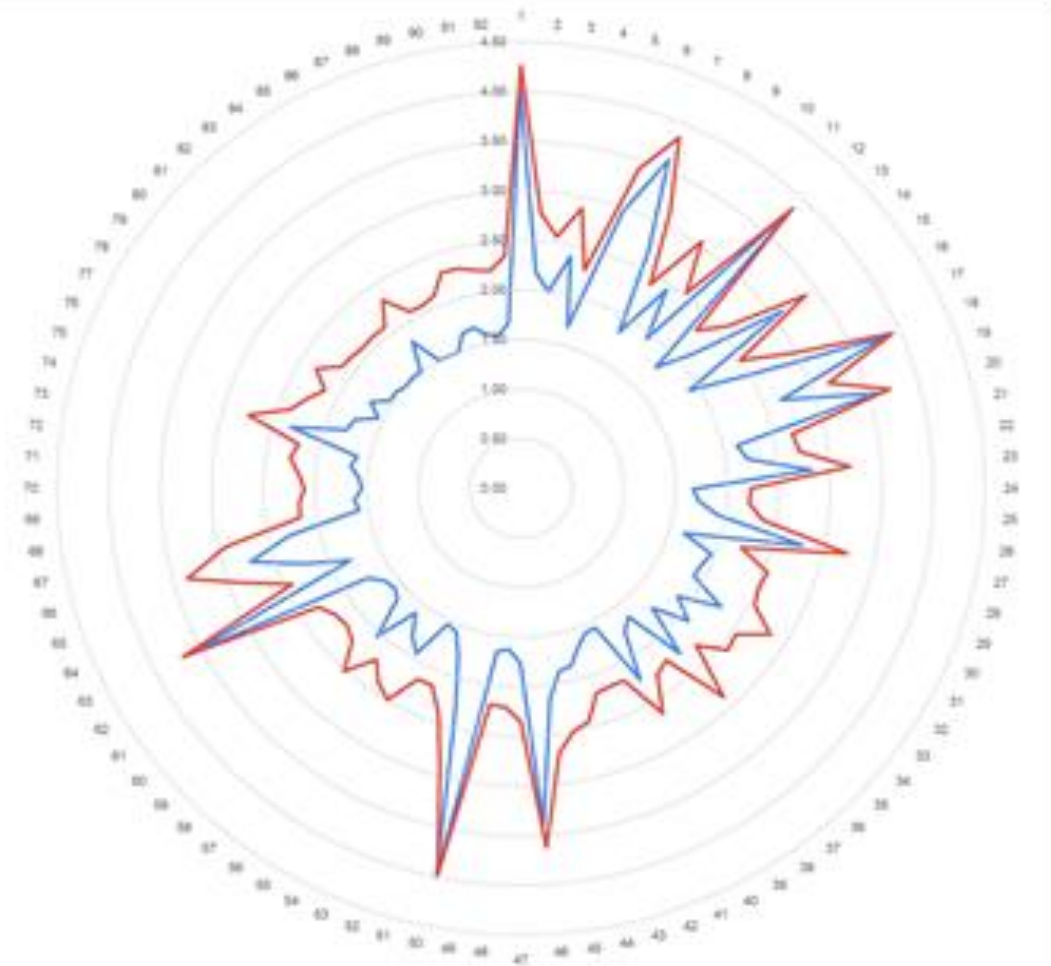
Fig. 4 *Vocational teachers have an increasing demand for digital technology for teaching to recover the learning loss of learners during the next normal period more applications than during the new normal period*

4. Discussion

The learning loss of vocational learners is challenging and requires urgent remedy. This is because vocational education emphasizes hands-on learning from the real thing in educational institutions and workplaces intensively. The COVID-19 pandemic has caused many learners to acquire less knowledge and practical skills training and have lost opportunities to learn from external sources and hands-on learning. It may be caused by a learning loss in aptitude, Learners' needs and readiness, Online and offline physical materials, and a variety of learning resources. The discussion follow by the research objectives follows:

The expectations of teachers on the behavioral conditions of vocational education learners in terms of knowledge, skills, Process and Integrity ethics and etiquette are at a greater level away. Vocational teachers have the highest expectations for the knowledge and technological skills of vocational learners. This may have been due to the recent COVID-19 pandemic until now that the outbreak has already subsided to almost normal. As a result, vocational teachers can conduct workshops and implement them on their own. It shows the importance of digital technology. It is expected that vocational learners will have more knowledge and ability to use digital technology for learning and work as well compliant with Hämäläinen, et al (2021) and Cattaneo, Antonietti, & Rauseo (2022) that sees that technological literacy is essential for every learner and that every learner should have the opportunity to learn and take advantage of digital technology. Teachers expect students to have knowledge and skills in listening, speaking, reading and writing Thai, as Thai language is essential for both verbal communication and written text. Instead, they found that learners' knowledge and skills in listening, speaking, reading and writing Thai were worrisome and should be promoted urgently compliant with Hongthong & Beamukda (2022). Teachers also have expectations of students' morality, ethics, and good manners, perhaps because these have changed and diminished considerably from the learners. Despite this, it should be instilled in the learners, compliant with Pewnil (2022) and Tambak et al. (2021).

The teacher achieves the expected behavioral conditions of vocational education. That is, vocational teachers themselves are confident that they can provide vocational learners with behavioral conditions of knowledge,

skills, processes and morality, ethics and etiquette as expected in all aspects, including listening, speaking, reading, writing Thai and English, mathematical and scientific processes, good citizenship, occupation, health promotion. Initiative, imagination, artistic creation, use of technology, and morality, ethics and etiquette. This may be due to the experience of studying and teaching teachers over a long period of time and instruct vocational learners to pursue careers, continued education until many generations of success (Sereerat, 2017).

The comparing the use of digital technology in teaching by teachers to recover the learning loss of vocational learners during the new normal and next normal periods show the average aspects all of 5 groups digital technology used by teachers for teaching to recover the learning loss of vocational learners are: 1) communication applications group, 2) send and receive homework applications group, 3) Learning Management Systems group, 4) digital media library group, and 5) online assessment tools group. There are different averages in all 5 groups, by average of the new normal rather than the next normal (Dobricki et al., 2020). This may be due to the provision of instruction for vocational learners with an emphasis on hands-on instruction in educational institutions and workplaces (Velde & Cooper, 2000). Once the COVID-19 pandemic subsided so much that it is almost close to normal. The government permits educational institutions and workplaces to provide hands-on instruction to vocational learners in educational institutions and workplaces (Rintala & Nokelainen, 2020; Lisa, 2023). Instead of learning and practicing simulations through digital technology like during the COVID-19 pandemic (Ma, 2023). The adoption of digital technology for teaching to recover of learning loss among vocational learners is decreasing. But that doesn't mean ending the use of digital technology for teaching to recover students' learning loss. Digital technology is still being used for teaching according to the needs and nature of each subject (Méndez et al., 2023).

The teachers need to use digital technology in teaching to recover the learning loss of vocational learners during the new normal and next normal periods (Gulliksen, et al., 2023), vocational teachers have increased the demand for digital technology for teaching to recover the learning loss of vocational learners during the next normal period than during the new normal period in all the 21 groups and the 92 applications consist of: VDO group, Meeting group, Presenting group, File Sharing group, Online Form group, Searching group, Translate group, Blog & Website group, Game & Testing group, Work Together group, Social Media group, Message group, Comment & Participation group, Teaching Media group, Online Course group, Graphic & Animation group, Sound Recording group, Screen Recording group, e-Book & Sound Book group, Writing, and Virtual group. This may be due to the 21 groups of digital technology, which vocational teachers perceive as necessary, appropriate, and able to meet the needs covering teaching, such as teaching planning and preparation, enhancing the teaching atmosphere, measuring, and evaluating and providing feedback to learners. There are some applications that have increased demand order, such as: Microsoft Teams, DeepL, SciMath, Kahoot, and Metaverse. This may be due to the application being adaptable and increasing usability that meets the needs of teachers and is more appropriately used (Balanyà Rebollo & De Oliveira, 2024). And there are some applications that have less demand, such as: Zip grade, Discord, Miro, Snagit, getAbstract, Blinkist, and VR. From this study, even without the COVID-19 pandemic. However, vocational education teachers also need to use digital technology for teaching to recover the learning loss of vocational learners (Dzvapatsva et al., 2024; Promsron et al. 2024). Therefore, the promotion and development of knowledge and skills about digital technology is necessary and always in demand among vocational teachers (Kang, 2024). However, if digital technology is grouped that is suitable for teaching. It reduces the burden of learning to use digital technology. This gives teachers more time to develop their knowledge and abilities (Agélii Genlott, 2023) in vocational education.

5. Conclusion

This study demonstrates the expectations and abilities of teachers that enable vocational learners to behave as expected, the use of digital technology for teaching, and the need for digital technology for teaching and creating of digital technology landscape for learning loss recovery on vocational education clear and concrete. Vocational teachers can apply it for teaching to recover learning loss among vocational learners. In addition, the results of this study are beneficial to stakeholders such as administrators who can plan, promote, and modify teaching policies of teachers. And educational personnel who will have support the teaching of teachers and vocational learners in the effective use of digital technology. This is because often teachers and learners need help for learning and using digital technology from educational personnel. However, digital technology is constantly changing to be up to date. Teachers, learners, and stakeholders need to adjust their concepts, adapt planning, and adapt to changes in digital technology through education, learning and training more according to opportunities and needs from formal education, non-formal education, and informal education.

Conflict of Interest

The authors declare no conflict of interest.

Author Contribution

The authors confirm contribution to the paper as follows: **Study conception and design:** J Jitsupa, P Nilsook; **project supervision:** J Jitsupa; **ethics application and review:** J Jitsupa, V Skunhom; **data collection:** K Hinon, S Daungtod, K Promsron; **analysis and interpretation of results:** J Jitsupa, W Sangboonraung, W Phumee; **draft manuscript preparation and revision:** J Jitsupa, P Nilsook. *All authors reviewed the results and approved the final version of the manuscript.*

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