


Guidelines for using instructional materials of Vocational Education in Thailand during COVID-19

Kanitta Hinon 

King Mongkut's University of Technology North Bangkok, Thailand, kanitta.h@fte.kmutnb.ac.th

Lanlalit Seubpradit* 

Yalarajabhat University, Thailand, lunlalit.s@yru.ac.th

*Corresponding author E-mail: lunlalit.s@yru.ac.th

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ABSTRACT: *The This information on the guidelines for manipulating of online learning materials of Thai vocational education during school closures due to COVID-19 has been based on document-analysis research techniques. The results showed that during the closure of academic institutions, the learning system continued. It allows vocational schools to maintain a policy of managing learning in the similar direction. Teaching and learning at the Vocational Education Institutes of Thailand use On-Site, On-Air, Online and On-demand learning methods. The Ministry of Education has included on-hand learning methods together with online learning management with various methods including Synchronous, Asynchronous, Hybrid Learning & Blended Learning. While on-site teaching uses Project-based Learning, STEM and STEAM management. As for On-Air teaching and learning, R-radio and TV Thai-com are primarily used. On-demand, it's an informal study via YouTube, R-Channel. On-hand will deliver books for learners to learn by themselves at home. These policies and actions make it possible for vocational education institutions to continuously provide teaching in the Covid-19 situation.*

Keywords: On-site, On-Air, Online, On-demand, Thai Vocational Education

1. Introduction

When Covid-19 is still a crisis that continues for years, vocational colleges must close normal teaching. This has had a profound effect on the education of hundreds of thousands of vocational students in the country. It has both social, economic and lifestyle impacts to the learning age (United Nations Thailand, 2020). In terms of population age, globalization, automation and the impact of the COVID-19 pandemic, Thailand's labor market is changing dramatically. In addition, the demand for the skills required for employing workers is also at higher levels (Vandewayer, Espinoza, Reznikova, Lee, & Herabat, 2021). These impacts will affect the productivity of vocational education entering the labor market. There is a clear trend that there will be a shortage of vocational labor in both quantity and quality (Paweenawat & Liao, 2021). In particular, the development of skilled workers must be continual due to changes in technology and new innovations being introduced into the industrial sector. Therefore, there is a need for constant skill development (International Labor Organization and World Bank, 2021). Learning management cannot be done in an educational institution, requiring policy guidelines to be applied to learning in different way. Therefore, the use of vocational learning materials that are on-site and on-air learning media has been adjusted. ... terms of vocational learning techniques, on-site media will use Project-based Learning: PjBL, STEM Education, STEAM, and Imagineering to implement on-site teaching and learning (Nilsook, Chatwattana & Seechaliao, 2021). As for On-air teaching, it will be about vocational satellite television stations that have both R-radio and R-channel, which are arranged both on-site and on-air. Next, it will be discussed in the Online and On-demand section, and in addition to the On-hand section, we will look at how the learning management process of vocational education is. What are the main techniques used? In terms of online learning management, this has almost been said to have been used for more than 75% of the vocational learning process during the past year. In which educational institutions must set guidelines according to the map that the agency has set to operate (T. Rujira, Nilsook, & Wannapiroon, 2020).

This article will study the teaching and learning approaches of vocational schools that are facing the COVID-19 virus. Covid-19 has forced the Ministry of Education to close all types of educational institutions without allowing teachers and students to attend school as usual. Therefore, it is necessary to find a way to manage the teaching and learning to be able to operate under the idea that although the educational establishment must be temporarily stopped, but learning cannot be stopped. The teaching and learning approach of vocational education therefore has a unique approach that requires a lot of educational technology to help.

2. Literature review

The search for relevant documents and research in this research is divided into Documents and Research sections about media approaches to vocational learning only. Focusing on documents and research during the Covid-19 situation especially. There are documents and research as follows.

2.1 Online Learning

The use of digital media, video, and audio media in an online manner, it must be emphasized that the framework organized in the sections of On-site, Online, On-air and On-hand. It refers to methods, but the actual learning medium, such as the online part, will use digital or electronic media as the main and bring audio-visual media to use. Online management processes that we need to understand is the learning methods used in the techniques that they are using. It is a technique that we must use in the management of vocational education to enhance the professional competence of our learners. It is available in four styles: Synchronous Learning, Asynchronous Learning, Hybrid Learning and Blended Learning (Schleicher & El Iza Mohamedou, 2021), (Khumphai, Chengwatthanaphong, Rattanaudum, Bouaroon, & Somporn Pandam, 2021), (ILO- UNESCO-WBG, 2020).

2.2 Synchronous Learning

The first is a type of learning called time-based learning. Let's solve it. Synchronous learning means learning at the same time or Real Time. This is a tool that we use in online teaching management such as Zoom, which is a real time teaching. The students will study with us at the same time as we teach this is Real Time. However, if the learners must learn at different times with us, it means that the teaching is not arranged on time, the learners must go to study other than this or at other times, but also to study online in this manner. It's called Asynchronous or asynchronous learning. The nature of Real Time, therefore, has the same condition as normal learning. It is the nature of face to face, meaning the learner and we meet at the same time, this is Real Time. On time is Synchronous and the time difference is Asynchronous. This means that students go to learn from other online media that the teacher has set up, such as teachers creating online classrooms, there will be e-learning rooms that are programmed like Moocs or Moodle. These are called Asynchronous (Theeraroungchaisri & Khlaisang, 2019).

Therefore, the two formats are different. However, if the instructor mixes both things, that is, teaching at the same time, then let the learners go through the classroom as well. This is called Blended Learning. Blended Learning is an online teaching method that combines two methods, synchronous and asynchronous. They see each other as Face to face and at different times they must go out to study with external media. However, if the teacher uses it in the manner of Hybrid, which is Hybrid is Synchronous and Asynchronous, mixed throughout the teaching management. It will use digital media as the main and use media such as images and sounds to accompany. This is an online learning medium. In recent years, this method has been almost the main medium of learning management. How are these two methods different? First, Synchronous Learning is when teachers use synchronous or simultaneous teaching, such as synchronous training. Individual colleges may use programs such as Google Meet, Microsoft Team, Cisco Webex, or, where appropriate, Zoom, such as Live Webinars. This one is Synchronous. If a teacher uses LINE to talk to students in a timely manner with LINE video calls, this is called instant messaging. If it's Video Conferencing, it means that the teacher opens it as a video and is directly online for the learners, for example, the teacher uses YouTube in the form of Streaming on YouTube. This is called Real Time teaching in the form of Video conferencing. Another way to use Facebook in teaching online is known as Facebook Live. This is Web Streaming and Web Conferencing. Some people use virtual classroom, which is a virtual teaching by using Google classroom and then open Google Meet to accompany the teaching while presenting the content with teaching materials prepared by teachers such as PowerPoint, images, document files, simulation programs, etc. Therefore, teachers who teach online in this manner are called Synchronous Learning, which means teaching in a timely manner (Wannapiroon, Nilsook, Jitsupa, & Chaiyarak, 2022).

use of digital media, video, and audio media in an online manner, it must be emphasized that the framework organized in the sections of On-site, Online, On-air and On-hand. It refers to methods, but the actual

2.3 Asynchronous Learning

If an instructor has already set up an online classroom such as Google Classroom, Moodle, and Moocs, learning through Moocs is a learning management system (LMS) that teachers use as an Online Discussion. This feature is called Asynchronous Learning. If a teacher manages to teach a mix of 2 methods, Synchronous and Asynchronous, it is called Flip classroom. That is, while studying, students go to study online and learners act or practice for teachers to see when studying On-Site. Therefore, all teachers can manage online teaching in any way. If there is a mix of both techniques, usually called Hybrid, which has different details and methods of teaching and learning, depending on the specific characteristics of the technician field. The design of teaching and learning online courses of vocational education must be set according to the standards of professional competence. Synchronous or Asynchronous teaching techniques can be called the same time, which is Real Time or Same Time or Different Time. As for Different Time, students are allowed to study by themselves outside the classroom or depending on the assignment technique of the instructor. As for any teacher who has already made teaching materials, they can then bring the teaching materials to the learners for self-study, which is called Asynchronous. If the teacher wants to meet the learners, this is called Synchronous, meaning meet face to face. In which teachers can choose methods that are suitable for the nature of their course, for example, some subjects are theoretical, teachers arrange Synchronous, which means that learners can study online from Google Classroom or from other e-Learning (Puriwat & Tripopsakul, 2021).

Currently, there are a lot of e-learning in agriculture or other subjects. Teachers can study, search, and select e-learning that is suitable for students to study. This one will be Asynchronous. However, if the teacher wants to teach by himself, he can schedule the students to meet on time and meet. This is known as Synchronous. A blended teaching technique that teachers after giving students to learn through online channels and then wanting to know if learners can do as specified or not and then come to practice or show them in the classroom. This is called Flip classroom. So, Hybrid is the difference between the two techniques. The nature of this hybrid will look like a live stream. The live broadcast will be Synchronous and then mixed with On-demand. This means we have a lot of e-learning and materials when learning over the internet, games, tools, blogs, wikis, and chats. There are many online media that can be used for hybrid learning (Arpaci, 2019).

2.4 Hybrid Learning

Hybrid Learning will be a feature of Live. In the live broadcast is Synchronous, such as live training. At the same time, once the training is completed, if you want to add more or review it, you can go to do it on-demand. This organized process is called Hybrid. But if it's Blended Learning, it's a face-to-face feature. This means that teachers who teach on-site have face-to-face encounters with learners. The fact that the learner and the teacher do not meet face to face is not yet considered Blended. It means that they haven't met each other in the same place, but if there is a face-to-face encounter, then the learners go to study more online, it is called Online Learning. Unlike blended learning, it is up to each vocational institution how to choose a method of teaching in accordance with the context of the school setting (Thanasam Rujira, Nilsook, & Wannapiroon, 2021).

2.5 Blended Learning

Blended Learning is teaching in a blended way. Therefore, the nature of these teaching management techniques, teachers can use Hybrid or Blended because they are the same combination. If teachers are not good at using online tools, they can use it on-site. The nature of On-site is Face to face by meeting students in groups, but if we find that Face to face is not enough, we need to have students take additional learning which is Online Learning (Zhu & Bonk, 2019). If the teacher organizes it that way, it is called Blended learning. Therefore, these methods are techniques that are used by many. Many college professors choose Hybrid, some use Blended, which depends on the nature of each course. For example, Live or Steaming is Synchronous, also in a situation called Hybrid, which stands out in the fact that it can be used anywhere and is convenient for learning. Therefore, these techniques that teachers can use in every method in an online way. It will be quite open as the teacher arranges face to face in an on-site manner and manages project-based lessons together with teaching content. In vocational education, there will be an e-learning system for professional development according to the royal initiative of Her Royal Highness Princess Maha Chakri Sirindhorn. There will be e-learning of specific subjects mixed with On-air. This can be used as well. However, the nature of Blended in the Online section can be mixed on-air together. That means using a variety of media, especially the Hybrid. It's easy for teachers to choose a mix-on-line or online-only approach, and sometimes they can use the open-camera approach and talk directly. This is Live or Synchronous. If the teacher considers that while he is teaching that he wants

the learner to get the content and wants the student to take the test in the e-Learning system, he can send the student to the e-Learning right away (Chatwattana & Nilsook, 2017).

In the case of On-site and Face to face, it means that if the teacher meets the student at the college and has a lecture at the college, this is Face to face, which has the same meaning as On-site. If a teacher meets with a student at a college and arranges a course and then tells the student to go through e-learning as well, it's called Blended learning combined with face to face. If teachers teach with Zoom or use Google Meet and let students go online, it's called Hybrid. In conclusion, on-site is teaching regular lectures and if after that the learners go to study online as well, it is called Blended learning. Therefore, teachers who teach on-site, face to face, which is to meet the students face to face at the college and then have the students go to further study from the system provided by vocational education, this means that the teacher is using Blended Learning. This method is very good because it is a blended teaching method for modern learners. This method has been used on-site and mixed with online, known as Blended learning (Phraratsutaporn & Klomkul, 2021).

2.6 MOOCs

Thai MOOCs are currently the country's largest online teaching and learning system. There are various courses organized by leading universities in the country. It is under the supervision of the Thailand Cyber University. Students can study for free and access learning resources anytime, anywhere through online teaching. Upon completion of this online course, students will receive a certificate as a certification (Gulatee & Nilsook, 2016). After students have finished learning in Thai MOOCs, they can also bring their certificates from studying to submit to the teacher's course. This will be the nature of online learning in some content. If the teacher wants to know if the learners are really learning or not, try studying at Thai MOOCs. This type of teaching is called Hybrid teaching management, meaning that in addition to meeting learners in an online manner Synchronous, we can also let them go on-demand with Thai MOOCs as well. This is the current teaching style (ILO-UNESCO-WBG, 2020).

2.7 Live Streaming

Live Streaming is another very popular method of teaching and learning. In Live Streaming, the teacher must have a phone with internet connection and then go to the real place to teach. For example, an instructor goes to do vegetable gardens or raise animals. Making it look like this is live. This one is called Live Streaming. The feature of Live Streaming is that teachers can go directly to the area they want to teach because the internet is already accessible to every point in the country. Since students can't get to college, teachers must broadcast themselves. The process of live broadcasting is called Live Streaming. Then when the teacher recorded it and took it back to publish on YouTube, it will become On-demand. This is a technique that any tech-savvy teacher can do on his own. If teachers are not good at it, they can find a student representative to help live broadcast via Facebook, YouTube, or LINE. All channels can be recorded while broadcasting and can then be published or On-air on YouTube or continue to accompany the live broadcast in other formats. This online technique is therefore very popular today (UNESCO-UNEVOC, 2014).

What vocational institutions need to prepare for teaching online is the availability of teachers. It must start with studying the curriculum first because the curriculum has now changed to the Professional Certificate Program, B.E. 2562. Therefore, it is important to analyze the course first, what needs to be taught, what documentation is required, how the instructor prepares the content and determines whether it is suitable for on-air or online. This is because not all content is suitable for On-air or Online, and the instructor himself must be regarded as an expert in that subject. The teacher is therefore a person who has a good understanding of that subject, if lacking knowledge and understanding of these subjects, the teacher can study further. The vocational institute will always provide training for teachers. Therefore, teachers should prepare content, knowledge sheets, worksheets, and practical activities. As a rule, the standard books or textbooks that are currently available for sale by vocational institutions have already set these things in place. If an instructor can choose a textbook that has all these elements in place, he can use it in his course and provide appropriate additional activities (Suksatan, Tungkunan, & Choomnoom, 2018).

Most of the course activities that require adjustments are scheduled to be on-site. That is, when in the classroom, the teacher will try to get students to do activities together in each hour, but now that it's an online system, it must be adjusted to be in line with the current situation. For example, if learners have completed activities, how will they be sent into the system? One important thing is the delivery channel. Students may take a photo of their work and submit it as a file or record it as a video. These activities are where modern learners can deal with technology well. Another important aspect is how each activity is assessed by the instructors. Usually, the learning system has exams for students to take and teachers can measure learning outcomes. But now it is necessary to study online. Learners must either learn

via distance or through the tools described above. For example, if a learner receives a certificate from studying through Thai MOOCs, it can be submitted to the course teacher immediately. If the teacher's subject is not available in Thai MOOCs and is not available in other e-learning systems, the teacher must prepare the test himself, for example in a Google form (Poonsawad & Lawthong, 2021).

To create an online measurement system and allow students to measure results, those tools must be kept as a result of the student's learning. This is a matter of measurement and evaluation. All teachers must develop themselves as measurement and evaluation are subject to individual subjects. Therefore, it is not possible to find content or other media from other sources. Therefore, in the management of online teaching in vocational education, there are 5 steps for teachers: 1) Course analysis 2) Content preparation 3) Preparation of worksheets, knowledge sheets for teaching 4) Determining online activities to suit students and subjects and 5) Preparation of measuring and evaluation tools in accordance with the subjects in which vocational education will focus on professional competence (Wanotayapitak, Saraubon, & Nilsook, 2019).

2.8 Practical teaching with a focus on professional competence

How does teaching in practical courses measure learners' learning outcomes? In online learning, how can we measure students' professional performance? An important technique that is being used a lot right now is when we measure a student's professional competence is to have him show it. Previously, when in the lab, the teacher could see whether the students could do it or not. This is that we are in the classroom with the students. But this time, it's online learning. It can be done by ordering students to make it look at it and take a clip and send it. For example, a teacher assigns a student to show how to make it, then shoots a clip and sends it online and the teacher views it. This is a way of measuring and evaluating the performance of whether he can do it or not. In another case, the teacher made an example of a demonstration system. The teacher wants the students to do something, and the teacher makes it look like an example. The teacher takes a clip and tells the students how to follow it and clearly defines the steps. If there is a process for students to follow clearly, then let learners try to see if they can do the same as we do. This is a professional competency that is set by item according to the course. This is very important; therefore, the instructors must be prepared here clearly. This is because online teaching is not a normal classroom, so teachers must find tools to help and best of all are clips that the students will take and show the results of their practice. This is where it has been used a lot over the past year and has been very successful. That is, the teacher has checked and seen a real picture of the learner whether it can be done or not. This is an actual assessment method. Examine what the learner does while stipulating what the learner must do according to his professional competence. This is to enhance teaching and learning in which we are solving the problem in the covid situation that we cannot study face-to-face in the classroom. If teaching is to be taught online, then there must be online measurement as well. This is the nature of the teacher's preparation (Hinin, n.d.).

Vocational education has fully organized this online learning process. Each educational institution has its own availability. It's been a year since this readiness is not a problem at all. This is because some colleges are already using Microsoft Team to manage their teaching and learning. There will be chat, video conference, whiteboard tools, file sharing, assessment, grading, and a scoring system. If any college is collaborating with Microsoft and is already using Microsoft tools, this is nothing to worry about as teachers probably have already used Microsoft Teams tools. As for any teacher whose college system uses Google, there will be Google Apps for Education, there will be a lot of tools. For example, teachers may use Google classroom to manage teaching in an asynchronous manner, that is, to do online classrooms. Teachers may use it in a real time manner, that is, using Google Meet. So, teachers can use Microsoft or Google. The system of the Ministry of Education has already agreed to be able to use both tools. Instructors may make slides or exams online or put teaching materials online. Instructors can organize interactive activities online. If teachers want to store information or student work, they can use Google Drive or One Drive. Google Drive is owned by Google and One Drive is owned by Microsoft. To assess students, they can use Google Sheet or Google form (Khamkaew, 2021).

All the steps mentioned above are all Digital Transformation. The survey found that over the past year, most teachers have used these tools to manage online teaching and learning. It's all natural and these tools aren't difficult to use. There may still be only some instructors who do not use online tools. Some of the online tools are different. The use of integrated information communication technology in teaching and learning is essential in teaching vocational education (Yeap, Suhaimi, & Nasir, 2021). For example, using Zoom, this will be a VDO Conference. People who use Facebook also have live broadcasts via Facebook. In teaching, this one is also usable, and anyone who uses LINE can use this LINE video calling program. There are many online tools available today, but some colleges order Cisco

to use, and others use Webex. There are many tools available today and accessing them is easy. These tools in the past 1 year have been developed a lot because the reason is a special situation during the covid period, so that various online technologies have been encouraged to develop to have higher potential. Instructors can choose any one because every program can record videos. There may be only Line that cannot be recorded while in use. Zoom can be recorded, teachers can use Zoom, Microsoft Team, Hangout Meet, Facebook Live to record. Each tool has special features and the number of students studying with us is small. Most programs can accommodate almost 100 or more people. Therefore, any program that teachers are good at can be used in teaching and learning management. Only the content is based on the curriculum in accordance with the vocational education practice and these are already in common use.

So, in online learning, teachers can use Moodle as an e-Learning program, use MOOCs or whatever. If it's Real Time, teachers can use Microsoft Team and Google Meet. As for e-mails, the ministry has all done now. There will be a meeting to coordinate information sharing. There will be a specific tool for it. For sharing information, teachers can use Google Drive or Microsoft One Drive. As for the exam, the teacher will use Google form, Microsoft form or Moodle system, e-learning can all be used. Therefore, nowadays, there is no concern about online teaching and learning. Because various tools are already available for teachers to choose from. In the online section, you can see that there are Synchronous, Asynchronous, Hybrid and Blended Learning systems.

2.9 On Demand

On-demand is the integration of everything from print materials, techniques, digital media, audio, and video. On-demand vocational education is when students can learn through various systems at their leisure or call it informal education. It has already been researched by the Education Council that there are currently two types of On-demand learning which are Physical and Digital (Online) learning. What is a physical learning resource? It is a learning resource in the form of learning centers, establishments, materials, equipment, tools and including the real thing. Digital (Online) learning resources are learning resources that we use today. It is everything we use to teach such as online publications, pdf files, images, audio, e-classrooms, and digital books, etc. So, On-demand is the combination of all kinds of media. Teachers can choose according to their needs and students can choose to study as they wish as well. Therefore, the vocational education system can be studied through YouTube, e-Learning or Thai MOOCs, and can be organized bilaterally in the workplace for practical training as needed (Puriwat & Tripopsakul, 2020).

On-demand will be according to the needs of the learners. On-demand, most prominently, of the Office of Vocational Education Supervisory Unit. Instructors can contact and register to use the free e-mail of vocational education. Why is it said that the teacher must enter this? Because it will allow teachers to use the On-Demand system of all vocational education. Why is it said that On-Demand must only be for vocational education? Because it will give teachers space to store various things. Everything that the teacher uses online or on-demand or physical, there will be a system to always support and supervise the teacher. As for the guidelines, the Office of Vocational Education Standards has already implemented the process of On-site, On-demand, Online and others. Rules and guidelines are provided for teachers in a total of 9 books. For example, how to organize vocational education? How to develop competency-based courses? All of this will be in the form of a manual with guidelines. Teachers can come in and check and understand this matter. As for On-Hand vocational education, it is already on-site, meaning that vocational education will have printed materials, textbooks, documents, exercises, and worksheets. Therefore, in each college, teachers can make their own plans or create their own. All teachers tend to create their own learning plans and can use what they create to teach themselves. As for using the On-Hand system that vocational education has set as a standard, teachers can use their own methods or teaching styles as well.

For example, the work of Ajarn Dr. Apichart Anukulvej from Chonburi Technical College. It will be a matter of teaching management in the covid era. There will be steps that teacher prepare for teaching, teaching procedures and evaluation steps. This is a continuous process with On-hand that when teachers must prepare themselves as a standard procedure, how to do it? Examples of Dr. Jiraporn Khummanee's work from Dusit Technical College, where she has set up a method for teaching in practical subjects, she has prepared what needs to be done. First, teachers need to prepare teaching materials about what subjects we are going to teach, which books to use, and what documents to use. Then she created an online classroom as a Google Classroom, then when teaching in the classroom, there will be LINE, Hangout, Google Meet, Microsoft Team, depending on the teacher's aptitude for using various teaching tools. As for teaching in the classroom, there must be Google forms, PowerPoint, Website, subjective exams, multiple choice exams and activities, which is where each person must choose the appropriate method for each subject. The first principle of teaching and learning in vocational education is teachers. Teachers must first analyze how the subjects are taught in theory and practice (Hinin, Nilsook, & Wannapiroon, 2020).

2.10 Competency-based online teaching and learning management

Before organizing a course, the teacher must first look at how the course has set the course objectives. In a competency-based learning management, there must be three components known as K S A. That is, it must be taught to understand, teach to have knowledge, which is Knowledge, then teach to have skills, which is Skill, and then teach to have attributes, which is Attitude, have a good attitude towards that subject. Therefore, the objectives of the competency-based courses will have K, S, A, and, in all subjects, the course competency will be already defined. Teachers will already know in their course how they determine course competence, and that course competence and course description will be consistent. All subjects have competency analysis. Any subject that does not have a textbook, the teacher must analyze the course performance by himself. One additional requirement is what tools each competency will use for the instructor. For example, if the teacher teaches the students to show the methods of harvesting agricultural crops, the teacher must ask the students to take a clip and submit the clip. This is for the teacher to see if the students have the competence as specified in the course or not. Therefore, in each subject, competencies are already defined as to how many competencies the subjects require learners to have. Therefore, teachers must assess their performance based on what students have submitted. This is very important (Vanpetch & Sattayathamrongthian, 2020).

In terms of teaching in a competent manner, if it is a standardized textbook of vocational education that has been reviewed, then a competency analyzer will be provided. Any course in which the instructor does not have a standard textbook, the instructor must analyze the competency himself. This is the point where teachers need to know whether each unit, they teach will achieve the competency required by the course or not. Instructors must be the one to analyze the performance that follows, that is, the instructor must determine the medium whether on-site, online, on-air or on-demand. The teacher must determine what to do to enable the learner to achieve competency in the specified unit. At the same time, in each subject, the instructor must define activities. This is already the standard. For comprehension check activities, there must be an assessment test. In online teaching, how to take the exam? Teachers must do Google classroom, Google form or Microsoft form, or have an online system that can allow students to do it. There are questions and answers, there are practical activities. If an instructor is organized on-site, the learners are divided into groups to do Project Based, or have the students do STEAM, or have the students do Imagineering, how will the instructors measure it? (Kanoknitnunt, Nilsook, & Wannapiroon, 2021).

If teachers go to teach smart farming, how will teachers know that students can use modern technology to manage farms? This must be viewed from the activities in each subject of their own. Those activities will reflect professional competence. The method of measurement is that the teacher asks the student to take a video clip or have the student perform an activity and test him. In a process like this, if the teacher does not have a specific textbook document for his own subject, he must analyze it himself and organize the activities himself. A book that is the standard of vocational education, which has passed the assessment, will see that the process will be like this. What stands out in vocational education is that every vocational course must have a work sheet, meaning that it has something that requires the learner to do it. Now for the worksheets of each subject, it is up to the teacher to determine what must be done by the learners. When the learner has done it, he must conclude. How will the teacher make him concluded? For example, students have already written, how will they send it, or they do activities together for 3-4 people, how will the instructor know if he can do it or not? In this case, the teacher must have the students take a clip or have the students summarize it and send it to Facebook, Blog or LINE. Teachers must collect information about the worksheets that students have made from various activities. Teachers must determine whether this worksheet is On-site, On-air, Online or On-demand. Then the teacher's hard task is to evaluate. Instructors must have a form to assess whether they meet the required competency or not. Therefore, the performance assessment sheet should not forget that any field must be a measure of K S A. This is the nature of professional competency assessment. As for the normal assessment, it depends on the teacher in what 3 ways to measure it. This is just an example (Nilsook, Armstrong, Taechatanasat, & Ranjeet, 2014).

In most of the standard textbooks, there is an assessment form, so teachers can look at the assessment and apply it to their own subjects. Vocational competency is measured using the K S A assessment. The last A will measure Attitude or measure Attribute, it depends on the teacher's course. As for the post-study assessment exams, this is a common practice that teachers will need to measure. There is already a post-study assessment test. This will be a common tool for vocational institutions that require students to have analytical thinking and critical thinking skills. One of the big problems when students take online classes is that they are less likely to meet with teachers. The chances of practicing morality and ethics and the chances of learning etiquette are also less. Today's students get a lot of information from online systems. There is a lot of information online that is not true. How can we practice analytical thinking and critical

thinking skills for students? This is a question for every teacher. Teachers need to understand this issue well. The fact that we don't have the opportunity to meet with the learner, what the learner lacks the most is manners. When we meet online, students' judgments are starting to differ from the past, so what do we do? Therefore, the skill of analytical thinking and critical thinking is another important condition.

For studying in the field of agriculture, this is modern agriculture as a Smart Farmer. The use of technology by agricultural learners will no longer be the same. There were more things he had to learn and understand than in the past. The next world will be Green Technology, a world that must live with the environment, not just online. So, these things will change. The focus of vocational education is Creative Economy. Vocational education focuses on equipping graduates to become innovators. There has been an ongoing contest for inventions and innovations. Students graduating from vocational institutions must live in industries in the era of creative economy. Therefore, vocational institutions try to focus on students learning these things because these are 21st century skills that have changed a lot. As for the professional qualification framework, it is imperative that learners in the modern era will have to measure their competency, not the same knowledge as before. Therefore, what will change in the next generation, professional competence will be an important tool for measuring the characteristics of students whether they work or not. Therefore, children from the College of Agriculture and Technology are not only knowledgeable and skilled, their overall performance and overall characteristics must be consistent with the next generation as well (Taechattanasat, Armstrong, & Nilsook, 2017).

3. Results

There are many different approaches to teaching and learning for vocational education, but the most challenging one is teaching in practical courses. In the practice session, how can there be a way to provide a solution for the learner to learn and gain competence during the prescribed curriculum? In terms of practice, the teacher must define activities and then determine the competencies that students want to do by defining a worksheet or a method that we will allow students to do in accordance with our course. For the assessment, the teacher must measure whether he can do it or not by looking at the performance, such as having him take a clip and send it to him or have him come back on-site at the college. After that, the instructor gives additional lessons to see if he can perform the task. If it seems that he still can't do it, the teacher has him try more or practice until he can practice those things. If still can't do it again, have him come back on-site. If the teacher asks students to come and test at the college and teach them to review, this will allow the learners to have competency according to the course. In the STEM segment, teachers may encounter limitations at the vocational level. The limitations of STEM organized in vocational education are mainly in the integration phase. For the most part, vocational educators are not good at integration and are good at their own subjects (Wannapiroon, Nilsook, Techakosit, & Kamkhuntod, 2021). What is Science, what is Technology, what is Engineering, and what is Mathematic. When it comes to integration, we need to adjust the way we think our subjects can be STEM organized. That is, let him define the problem in teaching science. That is, let him hypothesize that there is a scientific way of solving problems. As for Technology, he can choose any technology. For the word Engineering in vocational education, look at it as a practice that if he has done it and can do it, this is that he has integrated the characteristics of Engineering. The final part is for him to look at it from a mathematical point of view, that is, let him practice calculating whether he can do it or how much it will cost. In this way, looking at Mathematics will help solve a lot of problems. It means to look at STEM in their subjects, but most of them try to use many subjects to do STEM, and therefore think that this one is not complete. Try aligning it with your subject before integrating it with other subjects (Kummanee, Nilsook, & Wannapiroon, 2020).

For the teaching approach is theory and practice, we should use what tools to use in teaching materials to be most effective during this period. Vocational education teaches both theory and practice. The use of the tools depends on the aptitude of each instructor. For example, if teachers are good at going online in real time, they can use Microsoft Team or Google Meet. In the part of studying theory, meet with learners often first. In practice, learners are required to do activities according to the course requirements, what competencies are needed, and then set problems or conditions for students to try to do. Then let him shoot a clip, send it or work in a group and send the clip. This is the method that is commonly used during this time. However, if we see that the learners do not have the competence required by the course, they must have the learners come to study on-site. To meet with the teacher, students come in groups of 3 - 4 students without all of them and alternate. The nature of coming to meet the teacher and demonstrating this will be the characteristics of the Flip classroom. If the student can't do it again, the instructor has the student go online to study using YouTube content at some point and have him try the steps and come back to meet with the teacher again. This is a step that has been done successfully over the past year. If it still doesn't work, then we'll have to come

back and see each other and see how he can't do it and then solve the problems of his performance in each issue (Kittiviriyakarn, Nilsook, & Wannapiroon, 2020).

4. Conclusion

The management of vocational education during the COVID-19 period is a sudden education arrangement that has not been prepared for this situation before. It has rapidly applied existing media and educational technologies. Despite the lack of preparation, they were able to continue teaching and learning continuously and effectively, becoming the New Normal in vocational education. This demonstrates the readiness of administrators, teachers and students who are ready to enter the digital transformation in a timely manner and are ready to adapt to every changing situation of the era.

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