

Competence of Productive Teachers in Utilizing Learning Media Based on Information Communication Technology

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ABSTRACT

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The ability of teachers to create ICT-based learning media is low, despite ICT's potential to address shortages in practical equipment and facilities. This research aims to analyze vocational high school teachers' competency in utilizing ICT-based learning media and identify obstacles they face. Using a descriptive qualitative method, the study involves productive teachers, school principals, and heads of administration. It focuses on teachers with expertise in broadcasting, film, animation, and machining techniques. The research steps include problem identification, limitation, focus determination, data collection, analysis, and reporting. Findings reveal that the average competency of productive teachers in three vocational schools is good: 35.29% are at a basic level, 47.06% at intermediate, and 17.65% at advanced. Teachers learn to create ICT-based media through lectures (10 teachers), courses (6), workshops (14), training (10), and independently (3), with workshops being the most common. In practical learning, 100% of teachers use PowerPoint, 64.71% use animation, 23.53% use Moodle, and 5.88% each use Debian, Nginx, and PHP. Barriers include lack of facilities (17.65%), ICT mastery (17.65%), time (31.18%), and other reasons (23.53%).



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Introduction

Schools are formal educational institutions, where students learn, teachers educate, and the learning process is carried out. At school, students do not just gain knowledge, but are educated, mature, and have their character formed to improve the quality of graduates. The character education program in Yogyakarta City can increase academic and non-academic achievement by 62.5% (Susatya et al., 2021). Unfortunately, many schools are shackled by a standardization model education system and forget affective or character aspects, so that violence in the school

environment ranks second in cases of child delinquency (Manasikana & Anggraeni, 2018).

The aim of vocational high school (VHS) education is to prepare students to be able to work, either independently or to fill job vacancies. However, in reality, VHS graduates contribute to the open unemployment rate of 9.60%, the highest compared to graduates of other levels of education (BPS, Mei 2023). The quality of VHS teachers is still low, this is proven by 25% of teachers not yet meeting the academic qualification requirements and 52% not having professional certification (Nabila, 2021). Teacher competency test (TCT) scores until 2021 are still below standard. The TCT score of Yogyakarta City VHS teachers has an average of 67.08, the lowest compared to the TCT score of other educational levels (Kemdikbudristek, 2021). Another problem is that the quality of productive teachers does not meet industry standards, many do not match, even though the quality aspect of teacher competence has an impact on increasing students' abilities and expertise (Joko, 2021). Another aspect that determines the success of learning is; Teacher competence has a positive and significant effect on VHS students' learning achievement (Hapsari & Prasetyo, 2017). teachers' ability to meet competency standards determines the competitiveness of graduates of each educational institution (Ekawatiningsih, 2015), and teacher professional competence influences VHS students' learning motivation (Wahyuningsih, 2017).

Apart from that, professional teachers can improve students' self- quality or values so that they are able to compete in the business world and that is one of the characteristics of graduating VHS students (<https://www.edukasinfo.com/2022/01>), teachers are responsible for improving the quality of the learning process, guiding students to learn, developing their character and physique, analyzing difficulties learning, as well as assessing student learning progress (Latif, 2019), and the quality of learning influences student learning outcomes (Azizah, 2020). However, unfortunately many teachers have big problems in computer knowledge and learning media (Suso et al, 2021) and need to increase competence in understanding and applying technology in learning (Maknun, 2022).

Based on the problems above, researchers focused their research on many teachers who had big problems in computer knowledge and learning media. The novelty of the research is that although there have been many studies on teachers' computer knowledge, none of them has focused on teachers' ability to create ICT-based learning media for practical learning. State of the art research is that ICT-based learning media has big challenges in the industrial era 4.0, can be an alternative to long-distance vocational education or during the Covid 09 pandemic, and provides a solution for private VHS that lack infrastructure and practical learning facilities.

Method

Research Design

The research design is descriptive qualitative. Research does not have a standard design, research subjects, data, data sources and data collection tools can change according to needs during the research process. Research site for three VHS in the Special Region of Yogyakarta with samples of superior expertise competencies; broadcasting and film, animation, and machining techniques. The main subjects are productive teachers with superior expertise competencies and administrative informants carried out using snowball sampling, where in certain situations, the number can increase to complete administrative information.

Data Collection

Data collection techniques use natural settings, namely: observation, interviews, and documentation. The interview guide consists of main instruments and supporting instruments. The main instrument is humans, while the supporting instruments are interview guides, observation sheets and documentation checklists, as presented in table 1.

Table 1. Data Collection Techniques

Research problem	Data collection	Instrument	Data source
Educational background, MBE professional competence, and level of training.	Observation, deploymentd instruments, and studies document.	Checklists, questionnaires, and document,	Headmaster, head of administration, and teachers.

The interview guide was prepared based on theoretical studies and relies on the substance of creating ICT-based learning media.

Research Procedure

The research procedures are; (1) identifying the problem, (2) limiting the problem, (3) determining the focus of the problem, (4) conducting research, (5) processing data, and (6) reporting research results. Data analysis uses descriptive analysis techniques and simple mathematical analysis to find conclusions. Data analysis is carried out during data collection and after data collection for a certain period. Qualitative descriptive analysis refers to Miles and Huberman's theory, namely; (1) data collection, (2) data reduction, (3) data presentation, and (4) drawing conclusions. Testing the validity of the data uses source and method triangulation techniques. Three sources of data collection, namely; teachers, school principals and heads of administration. Meanwhile, there are three data collection methods, namely; observations, interviews, and document studies.

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Result and Discussion

The discussion was carried out by analyzing research data to determine the level of utilization of learning media based on the ICT abilities of productive teachers in VHS. The substance of the interview, among others; mastery of ICT, ICT as a means of creating learning media, experience of studying ICT, use of ICT as a learning medium, ability to use and create ICT-based learning media, and obstacles to using ICT as a learning medium.

Results

Research data collection was carried out at three VHS using the initials SMK 1, SMK 2, and SMK 3. After the data was compiled and processed, it was displayed in table 2,

Table 2. VHS 1 Interview Summary

Respondents	Education	Interview Results
Teacher 1	Magister S2)/ mechanical engineering.	ICT makes learning simpler. Master basic level ICT. Study ICT as a learning medium during lectures and workshops. Utilizing ICT to create PPT, you can create a simple PPT. Never used and created animation, moodle, debian OS, PHP, engine and virtualbox applications. Barriers: lack of ability to master ICT.
Teacher 2	Bachelor (S1)/ mechanical engineering.	ICT makes learning easier. Master basic level ICT. Study ICT as a learning medium during workshops. Can use IT for animation operations, moodle, PHP, but not yet able to create. You can make your own PPT, explain the stages of creation, and can make the slides move.
Teacher 3	Bachelor (S1)/ mechanical engineering education.	Mastering ICT for CAD learning. Mastering basic level ICT learning through social media. You can make your own PPT, you can explain the stages of making it, and you can make the slides move. Never used and created animation, moodle, debian OS, PHP, engine and virtualbox applications. Obstacles: schools lack computers so there is less time to practice.
Teacher 4	Bachelor (S1)/ mechanical engineering.	ICT makes learning simpler. Master basic level ICT. Learn about ICT as a learning medium when attending workshops. Utilizing ICT to create PPT, you can create a simple PPT. Never used and created animation, moodle, debian OS, PHP, engine and virtualbox applications. Barrier: not mastering ICT.
Teacher 5	Bachelor (S1)/ mechanical engineering.	Mastering ICT because he likes and is enthusiastic about creating learning media. Mastering intermediate level ICT. Studying ICT as a learning medium during college and self-taught. I teach practice using PPT, animation, and moodle. Make your own PPT, can explain the stages of creation, and can make the slides move. Can make animations but not yet able to make moodles, limited to using. Barriers: none, I really enjoy the ICT-based learning model in practical learning.
Teacher 6	Magister S2)/ mechanical engineering.	Utilize ICT in creating practical learning media because it is easier and more practical. Master basic level ICT. Study ICT as a learning medium during workshops. Create your own PPT, can explain the stages of creation, and can create simple slides. Never used and created animation, moodle, debian OS, PHP, engine and virtualbox applications. Barriers: lack of ICT facilities and means to support learning.
Teacher 7	Bachelor (S1)/ mechanical engineering.	ICT as a learning media makes practical learning easier. Master basic level ICT. Studying ICT as a learning medium during training. Can create simple slides. Never used and created animation, moodle, debian OS, PHP, engine and virtualbox applications.
Teacher 8	Bachelor (S1)/ Informatics engineering education.	ICT is the main tool to support the implementation of practical activities. Mastering advanced level ICT. Study ICT as a learning medium during lectures, workshops, training and when teaching. Utilizing ICT in practical learning; PPT, animation and moodle. Make your own PPT, can explain the stages of creation, and make slides plus films. Create your own animation and can explain the stages of making an animation. Can use moodle but can't create applications yet. Never used debian OS, PHP, engine, and virtualbox. Obstacles: rapid development of ICT, giving rise to new features and techniques in using ICT. Solving: Watch video tutorials or ask friends.
Teacher 9	Bachelor (S1)/ informatics engineering.	I master ICT as a learning medium because the subjects I teach are always related to ICT. Mastering advanced level ICT. Study ICT as a learning medium during lectures and workshops. Utilizing ICT in practical learning; PPT, animation and moodle. Make your own PPT, can explain the stages of making it, and can make slides plus films. Can use animation and moodle but cannot create applications. Never used debian OS, PHP, engine, and virtualbox. Obstacles: none, only sometimes you have to study further because ICT is always developing every year.
Teacher 10	Magister (S2)/ educational research and evaluation/	I master ICT as a learning medium because ICT literacy skills are really needed nowadays and my concentration is related to ICT. Mastering advanced level ICT. Study ICT as a learning medium during workshops and training. Utilizing ICT in practical learning; PPT, moodle, debian OS, PHP, engine, and virtualbox. Make your own PPT, can explain the stages of creation, and make slides plus films. Create your own animation and can explain the stages of making an animation. Create your own moodle, debian OS, PHP, engine and virtualbox and can explain the stages of creation. Obstacles: data management and lack of focus in creating learning media.
Teacher 11	Bachelor (S1)/ informatics engineering.	Yes, explanation; because by using information technology to support student learning activities, I can create my own broadcast media according to needs to make it easier to explain the material to students so that the material can be delivered in a more interesting and enjoyable way. Mastering intermediate level ICT. Study ICT as a learning medium during lectures, courses, workshops and training. Utilizing ICT in practical learning; PPT and animation. Make your own PPT, can explain the stages of creation, and make slides plus films. Create your own animation and can explain the stages of making an animation. Does not use debian OS, PHP, engine, and virtualbox. Barriers to the use of ICT in creating learning media: lack of time due to carrying out full teaching duties, a lot of teacher administration, and many additional tasks outside of teaching hours.
Teacher 12	Bachelor (S1)/ Informatics engineering education.	Because students understand the material more easily if they use learning media Mastering intermediate level ICT. Study ICT as a learning medium during lectures, courses, workshops and training. Utilizing ICT in practical learning; PPT and animation. Make your own PPT, can explain the stages of creation, and make slides plus films. Create your own animation and can explain the stages of making an animation. Never used debian OS, PHP, engine, and virtualbox. Barriers to the use of ICT in creating learning media: time and collecting materials.
Teacher 13	Bachelor (S1)/ informatics engineering.	...because using information technology makes it easier to explain material to students and makes it easier to display examples that are relevant to our teaching material, so that students can easily understand. Mastering intermediate level ICT. Study ICT during lectures, courses, workshops and training. Utilizing ICT in practical learning; PPT and animation. Make your own PPT, can explain the stages of creation, and make slides plus films. Create your own animation and can explain the stages of making an animation. Never used debian OS, PHP, engine, and virtualbox. Barriers to the use of ICT in creating learning media: lack of time due to carrying out full teaching duties, a lot of teacher administration, lots of additional tasks outside of teaching hours, not enough time to collect materials.
Teacher 14	Bachelor (S1)/ informatics engineering.	Because using information technology makes it easier to explain material to students and makes it easier to display examples that are relevant to our teaching material, it is easy for students to understand. Mastering intermediate level ICT. Study ICT during lectures, courses, workshops and training. Utilizing ICT in practical learning; PPT and animation. Make PPT and can explain the stages of creation, and make slides plus films. Create your own animation and can explain the stages of creation. Never used debian OS, PHP, engine, and virtualbox. Barriers to the use of ICT in creating learning media: lack of time due to carrying out full teaching duties, a lot of teacher administration, lots of additional tasks outside of teaching hours, and not enough time to collect materials.
Teacher 15	Bachelor (S1)/ Informatics engineering education.	Using search engines as a medium for finding ways to use practical equipment, so that students, before doing direct practice with the equipment, first look for sources of information on the internet. Or usually we use tutorial videos on youtube, so students can go back to them when they forget. Mastering intermediate level ICT. Study ICT during lectures, courses, workshops and training. Utilizing ICT in practical learning; PPT and animation. Make your own PPT, can explain the stages of creation, and make slides plus films. Create your own animation and can explain the stages of making an animation. Never used moodle, debian OS, PHP, engine, and virtualbox. Barriers to the use of ICT in creating learning media: Limited internet access (wifi for students) so sometimes we are hampered by children who happen to not have an internet quota.
Teacher 16	Bachelor (S1)/ informatics engineering.	By using technology, children can review the material that has been given. Mastering intermediate level ICT. Studying IT as a learning medium during workshops, training and joining ICT groups. Utilizing ICT in practical learning; PPT, animation and moodle. Create your own PPT, can explain the stages of creation, and can create multilevel static. Create your own animation and can explain the stages of making an animation. Make moodle and can explain the stages of making it. Never used debian OS, PHP, engine, and virtualbox. Barriers to the use of ICT in creating learning media: The initial stage of creation requires time and requires introduction to students. Besides that, with the use of ICT we cannot directly monitor whether students are properly using it or not.
Teacher 17	Bachelor (S1)/ physics education.	Yes, information technology supports student learning activities, especially to create media to explain material to students so that it is more interesting and enjoyable. Mastering intermediate level ICT. Study ICT during lectures, courses, workshops and training. Utilizing ICT in practical learning; PPT and animation. Make your own PPT, can explain the stages of creation, and make slides plus films. Create your own animation and can explain the stages of making an animation. Never used debian OS, PHP, engine, and virtualbox. Barriers to the use of ICT in creating learning media: lack of time due to carrying out full teaching duties and a lot of teacher administration.

Discussion

The discussion on the ability of productive teachers in three VHS in utilizing ICT-based learning media was carried out based on research data. The discussion is grouped into; (1) level of ICT mastery, (2) where and when to learn how to make learning media, and (3) use of ICT-based learning media.

The level of ICT mastery is analyzed and determined based on the concept of educational training in the Central Technical Services Unit (TSU) of the Ministry of Education and Culture as the organizer of teacher training. The level of competency training for teachers at Central TSU is grouped into four (4) levels, namely; basic level, intermediate level, advanced level, and master level. The basic level is competency training for beginner teachers with initial abilities. The intermediate level is competency training for young teachers with basic abilities. Advanced level is training for intermediate teachers with medium abilities. The master level is competency training for highly skilled primary teachers. The Central TSU is obliged to prepare teacher competency standards (TCS) as the basis for productive teacher training programs and guidelines for determining teacher competency levels. Competency mastery level data based on respondent recognition is shown in table 3.

Table 3. ICT Mastery Level

No.	Teacher data	ICT Mastery		
		Basic	Intermediate	Advanced
1.	Vocational School 1	0	7	0
2.	Vocational School 2	0	0	3
3.	Vocational School 3	6	1	0
	Total	6	8	3

Table 3 shows that of the 17 productive teachers teaching superior expertise competencies in three vocational schools, there are six (6) elementary level teachers, eight (8) intermediate level teachers, and three (3) advanced level teachers. If the percentage of teachers at basic level is 35.29%, intermediate level is 47.06%, and advanced level is 17.65%, as shown in Figure 1.

VHS 1 has 7 productive teachers who teach superior expertise competencies in broadcasting and film at an intermediate level. Broadcasting and film skills competency is part of the ICT skills program, so in theory all teachers have received ICT material while studying at university. VHS 2 has 3 productive teachers who teach superior animation expertise competencies at an advanced level. Competency in animation skills is based on ICT knowledge.

In theory, all teachers have gained a strong foundation in ICT during college, so it is natural to

have high competency in using ICT-based learning media. VHS 3 has 7 productive teachers teaching superior expertise competencies in machining engineering with 6 basic level teachers and 1 middle level teacher. Competency in machining engineering skills is part of engineering technology and is not ICT-based, so it is normal not to have reliable competence in using ICT- based learning media. The following are some of the teacher interview results regarding the level of competency mastered; I master basic level ICT; I master advanced level ICT; I master intermediate level ICT that shown on fig 1.

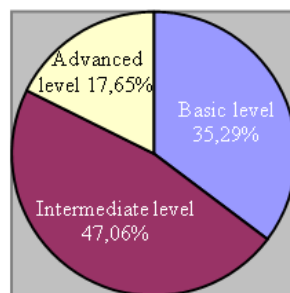


Fig 1: Teacher Level in Mastery of ICT Competencies

Data on where and when productive teachers learn to create ICT-based learning media can be seen in table 4. Table 4 shows that productive teachers learn to create learning media at times; lectures for 10 teachers, courses for 6 teachers, workshops for 14 teachers, training for 10 teachers, and independently for 3 teachers. From this it can be seen that the highest frequency of productive teachers learns to create learning media through workshops.

Table 4. When to Study Learning Media Creation

Initials	Learn to Create Learning Media when				
	Lectures	Course	Workshop	Training	Independent
Teacher 1	V	-	V	-	-
Teacher 2	-	-	V	-	-
Teacher 3	-	-	-	-	V
Teacher 4	-	-	V	-	-
Teacher 5	V	-	-	-	V
Teacher 6	-	-	V	-	-
Teacher 7	-	-	-	V	-
Teacher 8	V	-	V	V	-
Teacher 9	V	-	V	-	-
Teacher 10	-	-	V	V	-
Teacher 11	V	V	V	V	-
Teacher 12	V	V	V	V	-
Teacher 13	V	V	V	V	-
Teacher 14	V	V	V	V	-
Teacher 15	V	V	V	V	-
Teacher 16	-	-	V	V	V
Teacher 17	V	V	V	V	-

Table 4 shows that most undergraduates majoring in non-ICT-based machining engineering (teacher initials 1-7) did not receive material for making ICT-based learning media during college. Meanwhile, undergraduates majoring in broadcasting and film and animation are part of ICT (teacher initials 8-17) and receive material for creating ICT-based learning media during college. This analysis provides a strong argument for why there is a difference in competency between the 7 productive machining engineering teachers (basic level) and the 10 productive broadcasting and film and animation teachers (intermediate and advanced level). The following are some of the teacher's interview results regarding where to learn ICT I studied ICT as a learning medium while attending the workshop; I study ICT as a learning medium during lectures, workshops, training, and when teaching; I studied ICT as a learning medium during workshops, training and joining ICT groups.

Utilization of ICT-based learning media in practical learning based on questions about the use and creation of learning media. Use means that teachers can only use it without being able to create learning media. Meanwhile, making means that the teacher makes his own learning media and uses it in the practical learning process. Pay attention to the data display in tables 5 and 6.

Table 5. Learning Media Used by Teachers during Practical Teaching

Initials	The Learning Media Used					
	PPT	Animated	Moodle	Debian OS	Nginx	PHP
Teacher 1	V	-	-	-	-	-
Teacher 2	V	V	-	-	-	-
Teacher 3	V	-	-	-	-	-
Teacher 4	V	-	-	-	-	-
Teacher 5	V	-	-	-	-	-
Teacher 6	V	-	-	-	-	-
Teacher 7	V	-	-	-	-	-
Teacher 8	V	V	V	-	-	-
Teacher 9	V	V	V	-	-	-
Teacher 10	V	V	V	V	V	V
Teacher 11	V	V	-	-	-	-
Teacher 12	V	V	-	-	-	-
Teacher 13	V	V	-	-	-	-
Teacher 14	V	V	-	-	-	-
Teacher 15	V	V	-	-	-	-
Teacher 16	V	V	V	-	-	-
Teacher 17	V	V	-	-	-	-

Table 5 informs that 100% of productive teachers use power point in practical learning, 64.71% of teachers use animation, 23.53% of teachers use moodle, 5.88% of teachers use debian, 5.88% of teachers use nginx, and 5, 88% of teachers use PHP in the practical learning process. If displayed in an image it will be seen in fig 2.

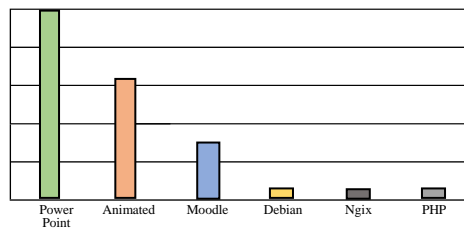


Fig 2: Ability of Productive Teachers to Create Learning Media

Next, pay attention to the data on teachers' abilities in creating learning media in table 6.

Table 6. Teacher's Ability to Create Learning Media

Initials	Create Learning Media					
	PPT	Animated	Moodle	Debian OS	Nginx	PHP
Teacher 1	Create simple PPT	-	-	-	-	-
Teacher 2	Make PPT move	-	-	-	-	-
Teacher 3	Make PPT move	-	-	-	-	-
Teacher 4	Create simple PPT	-	-	-	-	-
Teacher 5	Make PPT move	Make animated	-	-	-	-
Teacher 6	Create simple	-	-	-	-	-
Teacher 7	Create simple PPT	-	-	-	-	-
Teacher 8	Make PPT plus film	Use animated	Use moodle	-	-	-
Teacher 9	Make PPT plus film	Use animated	Use moodle	-	-	-
Teacher 10	Make PPT plus film	Make animated	Make moodle	Make debian OS	Make ngx	Make PHP
Teacher 11	Make PPT plus film	Make animated	-	-	-	-
Teacher 12	Make PPT plus film	Make animated	-	-	-	-
Teacher 13	Make PPT plus film	Make animated	-	-	-	-
Teacher 14	Make PPT plus film	Make animated	-	-	-	-
Teacher 15	Make PPT plus film	Make animated	-	-	-	-
Teacher 16	Make PPT plus film	Make animated	Make moodle	-	-	-
Teacher 17	Make PPT plus film	Make animated	-	-	-	-

Table 6 proves that productive machining engineering teachers (teacher initials 1-7) only rely on power points in teaching practice. With details; four teachers were able to make simple or static power points and three teachers made moving power points. This analysis proves that the competency of productive machining engineering teachers in making learning media is at a basic

level. Other data shows that almost all productive machining engineering teachers do not utilize certain animations and applications in the practical learning process. This is possible because productive machining engineering teachers do not study the creation of ICT-based learning media during lectures.

Productive teachers majoring in animation and broadcasting (teacher initials 8-17) have used power point and animation in practical learning, some teachers even use moodle and debian OS, nginx, and PHP. This fact is natural, because the productive teacher majoring in animation and broadcasting is an ICT-based major and has studied the creation of ICT-based learning media during college. Details of teacher abilities 8-17 are; 100% were able to make power points plus films and animations, 11.76% were able to make moodle, 11.76% were able to operate moodle, 5.88% teachers were able to make debian OS, 5.88% of teachers were able to make nginx, and 5, 88% of teachers are able to create PHP. Based on this analysis, it is proven that there is a difference in ability between productive ICT-based teachers and non-ICT-based productive teachers in creating learning media.

The teacher's ability to utilize learning media is part of pedagogical competence. Minister of National Education Regulation (Permendiknas) Number 16 of 2007 concerning Academic Qualification Standards and Teacher Competencies states that teachers must have; personality competence, social competence, pedagogical competence, and professional competence. It is hoped that by mastering the four competencies the educational process will run well and the quality of graduates will be high quality. The following is a statement from teacher interviews regarding the benefits of ICT-based learning media; ... ICT as a learning media makes practical learning easier...; ...I master ICT as a learning medium because ICT literacy skills are really needed in the current era and it is very coincidental that my concentration is related to ICT...; ... information technology supports student learning activities, especially to create media to explain material to students so that it is more interesting and enjoyable.

Based on the analysis, the pedagogical competence of productive teachers in the three vocational schools is at a good level, so it is hoped that it can improve the quality of learning. Pedagogical competence and professional competence influence VHS students' learning motivation (Wahyuningsih, 2017) and teacher competence has a positive and significant influence on VHS students' learning achievement (Hapsari, 2017).

The benefits of using ICT-based learning media according to productive teachers are; 58.82% make practical learning easier, simpler, practical and fun; 23.53% as the main supporter of practical learning; and 17.65% as a reminder of the material that has been taught.

ICT-based learning media makes practical learning easier, simpler, practical, and fun. Opinion of teachers; using information technology makes it easier to explain the material to students and makes it easier to display examples that are relevant to our teaching material, so that students can easily understand that shown on fig 3.

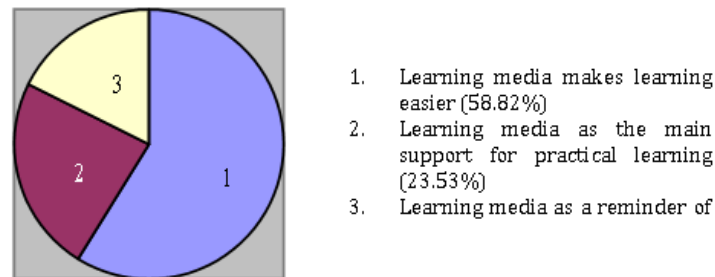


Fig 3: Benefits of Using ICT-Based Learning Media

ICT-based learning media as the main support for practical learning, as the teacher said; IT as the main tool that supports the implementation of practical learning activities. ICT-based learning media as a reminder of the material that has been taught, as the teacher said; By using technology, children can see again the material that has been given.

Obstacles to making ICT-based learning media according to teachers productive, namely; lack of facilities 17.65%, lack of ICT mastery 17.65%, lack of manufacturing time 31.18%, 11.76% considered there were no obstacles, and 11.76% did not give an answer. See figure 4. Here are some of the obstacles felt by teachers; limited internet access (wifi for students) so sometimes we are constrained by children who happen to not have internet quota that shown on fig 4.

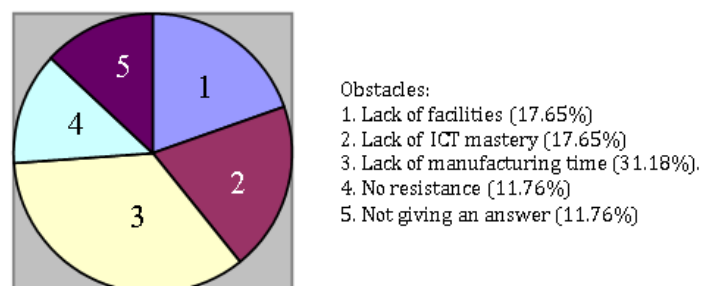


Fig 4: Barriers to Making ICT-Based Learning Media

The findings of research barriers are in line with statements revealing that computer knowledge, internet facilities, and learning media pose the highest problems for teachers (Susanto et al, 2021). Many teachers still need efforts to improve competence in understanding and applying technology in learning (Maknun, 2022).

Conclusion

Audit of productive teachers' abilities, superior expertise competencies in three VHS in utilizing ICT-based learning media are grouped in the discussion; ICT mastery level, where and when to learn learning media making, and the use of ICT-based learning media.

ICT mastery level of productive teachers of superior expertise competencies in three vocational schools; 35.29% are basic level; 47.06% are mid-level; and 17.65% are advanced. Productive teachers learn to create ICT-based learning media at times; lectures totaling 10 teachers, 6 teacher courses, 14 teacher workshops, 10 teacher training, and independently 3 teachers. The results of other analyses showed; 100% of teachers are capable of creating power points; 64.71% of teachers utilize animation; 23.53% of teachers use moodle; 5.88% of teachers make use of debian; 5.88% of teachers utilize nginx; and 5.88% of teachers utilize PHP in practical learning.

The benefits of using ICT-based learning media according to productive teachers, among others; 58.82% make practical learning easier, simpler, practical, and fun. 23.53% as the main supporter of learning the practice of concentration of expertise. 17.65% as a reminder of the material that has been taught. Obstacles to making ICT-based learning media according to teachers productive, among others; 17.65% lack of facilities; 17.65% lack of ICT mastery; 31.18% lack of build time; 11.76% of teachers think there are no obstacles; and 11.76% of teachers gave no answer.

Research implications; Ideally, a valid audit of productive teacher competence should be conducted with theoretical and practical tests (skill audit) and is not perfect if it only relies on audit knowledge. Due to limited time, cost, and ability, this research has only conducted a knowledge audit. However, at least by knowing the level of audit knowledge can be known the quality of ICT knowledge of productive teachers. The results of the study are recommended as consideration in making policies, improving teacher quality, determining teaching tasks and loads, and as a reference for similar research.

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