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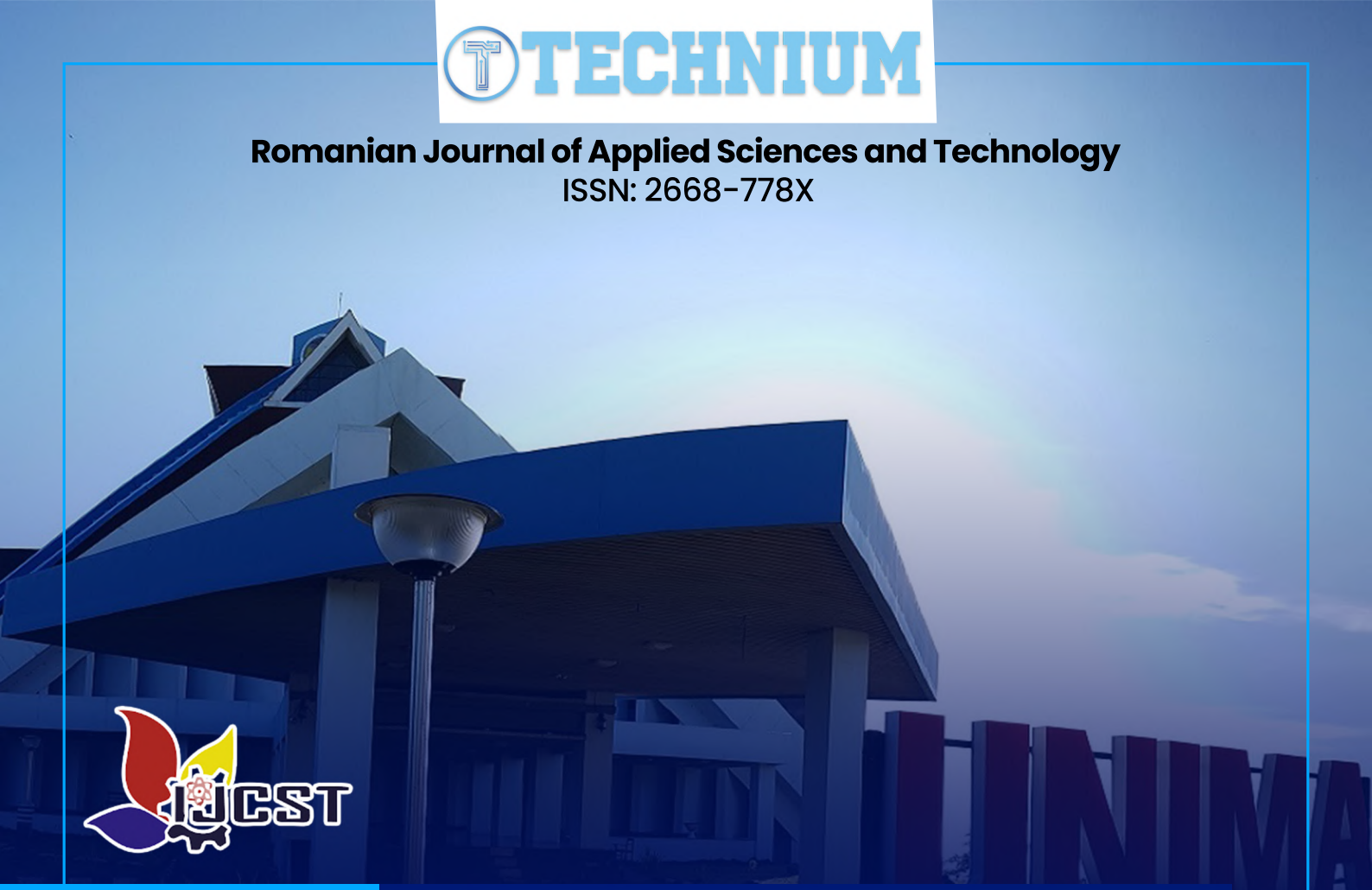

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OPTIMIZATION OF VOCATIONAL EDUCATION LEARNING IN PANDEMIC TIMES WITH A MODIFIED *BLENDED LEARNING SYSTEM* AND APPROPRIATE TECHNOLOGY

Djubir R. E. Kembuan[1 *], Johan R. Batmetan[2], Metsi Daud [3] Billy MH Kilis[4]

[1]Department of Civil Engineering Education, Universitas Negeri Manado, Indonesia, 95618

[2]Department of Information and Communication Technology Education, Universitas Negeri Manado, Indonesia, 95618

[3]Department of Civil Engineering Education, Universitas Negeri Manado, Indonesia, 95618

[4]Department of Electrical Engineering Education, Universitas Negeri Manado, Indonesia, 95618

Corresponding Author: billykilis@unima.ac.id

Abstract

The blended/hybrid learning system is a way that can be done today with adjustments to the conventional side with the application of health protocols. Utilizing and optimizing hybrid learning by modifying and utilizing appropriate technology will provide learning solutions during a pandemic. Hybrid learning does not have to be a monopoly and ignores conventional learning. Conventional learning must also be modified according to the protocol carefully so that it remains effective. The use of appropriate technology also needs to be specifically encouraged for teachers. ICT is a shared hope, although it is undeniable that for vocational training there must be hands-on practice and training. To optimize learning with various approaches, it must still lead to effectiveness, efficiency and relevance to the object of students. Learning in vocational education has characteristics that need to be studied in more detail so that quality is maintained. In this study, the choice of surveys on students for learning options with blended learning, with a comparison of 60% conventional and 40% ICT/Online, Appropriate Technology, and combinations obtained an average result of 22.5%, 17.75%, 13 .5 % and 6.25%, (a survey of students, students, teachers and lecturers for the even semester of 2020/2021) within the scope of Unima and its surroundings. The results of a survey of students, both students, students or teachers and lecturers show that there is no full readiness in choosing various alternatives, software and hardware readiness is still needed for students and teachers in particular so that the implementation of education can be more varied in choosing alternatives and achieving the desired goals. The conclusions of this study are: Online or blended learning cannot be applied optimally in Vocational High Schools / Vocational Schools, besides the reason that it still needs face-to-face practice and training, the infrastructure is still not supported. The results of the survey on student lecturers as a comparison are generally still constrained by many things, including facilities and human resources. On the other hand, in vocational education learning the whole process

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must consider practice or training which means there must be limited face-to-face or group meetings. Optimizing conventional learning according to the process and blended learning must pay attention to the readiness of students including the learning environment, namely external factors and students' mental readiness, internal. For optimization so that the quality of learning is not neglected, it is necessary to consider the existence of practice and training in subjects related to practice or which require training. Some suggestions are: There is a need for the role of the government, and education stakeholders if learning is still in a pandemic period. For students and teachers, it is necessary to have adequate support facilities. Various learnings can be done if there is an equitable fulfilment of educational infrastructure. Practice facilities in SMK need to be expanded so that the groups are getting smaller and reaching more students. The practicum package needs to be made simpler with adjustments according to the process. Keywords: Optimizing Learning during the Pandemic.

INTRODUCTION

Student-centred learning will provide learning experiences that are both challenging and fun, develop thinking skills, encourage students to explore, provide opportunities for success and provide immediate feedback so success and failure can be identified early. The intended learning concept is relevant to the pandemic period. Learning at this time does not necessarily take advantage of information technology applications, because apart from being relatively expensive, access to learning has not been able to reach most students. Therefore, conventional learning is still needed with various modifications, even for vocational education, there is a need for training and practice, as well as a touch of appropriate technology, to complement the use of ICT learning.

Hybrid learning is a way that can be done at this time by adjusting to the conventional side by implementing health protocols. Utilizing and optimizing hybrid learning with modifications and utilizing appropriate technology will provide learning solutions during a pandemic. Hybrid learning does not have to be a monopoly and ignores conventional learning. Conventional learning must also be modified according to the protocol carefully so that it remains effective. To optimize learning with various approaches it must still lead to effectiveness, efficiency and relevance to student objectives. Learning in vocational education has characteristics that need to be studied in more detail both in terms of the needs of students, as well as from the side of teachers and instructors so that quality is maintained.

Learning systems that are carried out from home using laptops, computers, or smartphones are accompanied by various applications that support the learning process as if they had to do it with all its drawbacks. However, online learning that has been implemented since the Covid-19 pandemic has experienced several obstacles faced by students and educators. This has caused the policies of the Minister of Education and Culture of the Republic of Indonesia No. 3 of 2020 and Circular Letter No. 4 of 2020 which are still in effect today. This policy is known as a remote or online learning policy. During unexpected decisions during a pandemic, of course, some things are not ready. Both in terms of facilities and students involved. "The Learning from Home Program is a form of the Ministry of Education and Culture's effort to assist the implementation of education for all people during the Covid-19 emergency, especially helping people who have limited access to the internet, both due to economic challenges and geographical location," said the Minister of Education

and Culture, Nadiem Anwar Makarim, in a teleconference to launch the Learning from Home Program in Jakarta. Now it has been replaced with learning activities through electronic media online and offline so that we can stop the spread of Covid-19 by complying with health protocols and always maintaining the body's defence system. As an effort to prevent the Covid-19 pandemic, the government issued a policy that schools asked their students to study at home. Starting March 16, 2020 schools have implemented online student learning methods. Then, is this online learning effective? Currently, Corona is a hot topic. In any part of the world, corona still dominates public spaces. In just a short time, his name became a trending topic, discussed here and there, and reported massively in print and electronic media. *Severe Acute Respiratory Syndrome Coronavirus* 2 (SARS-COV-2), better known as the coronavirus, is a new type of coronavirus that causes infectious diseases in humans. Covid-19 is an infectious disease caused by a newly discovered coronavirus. This virus spreads very quickly and has spread to almost all countries, including Indonesia, in just a few months. So on March 11, 2020, WHO declared this outbreak a global pandemic. This has made several countries establish policies to impose lockdowns to prevent the spread of the coronavirus. In Indonesia itself, a Large-Scale Social Restrictions (PSBB) policy was implemented to suppress the spread of this virus. Because Indonesia is implementing PSBB, all activities carried out outside the home must be stopped until this pandemic subsides. Some local governments have decided to implement policies to dismiss students and start implementing online learning methods (in the network) or online. This government policy was effectively implemented in several provinces in Indonesia on Monday, March 16, 2020, which was also followed by other provincial areas. However, this does not apply to several schools in each region. These schools are not ready for an online learning system, which requires learning media such as mobile phones, laptops or computers. The online learning system (in the network) is a learning system without face-to-face meetings between teachers and students but is carried out online using the internet network. The teacher must ensure that teaching and learning activities continue, even though students are at home. The solution, teachers are required to be able to design instructional media as innovation by utilizing online media (online). This is following the Minister of Education and Culture of the Republic of Indonesia regarding Circular Letter Number 4 of 2020 concerning the Implementation of Education Policies in the Emergency Period of the Spread of Corona Virus Disease (COVID-19).

The learning system is implemented through a personal computer (PC) or laptop connected to an internet network connection. Teachers can carry out learning together at the same time using groups on social media such as WhatsApp (WA), telegram, Instagram, the zoom application, google classroom or other media as learning media. Thus, the teacher can ensure students take part in learning at the same time, even though in different places. Judging from the events that are happening around them, both students and parents of students who do not have cellphones to support online learning activities feel confused, so the school is looking for solutions to anticipate this. Some students who do not have cellphones do learning in groups, so they do learning activities together. Starting from learning through video calls connected to the teacher concerned, being asked questions one by one, to taking absences via Voice Notes available on WhatsApp. The material is also provided in the form of a video that lasts less than 2 minutes.

The problems that occur are not only found in the learning media system but the availability of quotas which require quite high costs for students and teachers to facilitate online learning needs, especially for remote areas. The quota purchased for internet needs has soared and many parents of students are not ready to increase the budget for providing internet networks. This is also a very important issue for students, what time do they have to study and what data (quota) do they have, while their parents are low-income or from the lower middle class (underprivileged)? Until finally things like this are borne by the parents of students who want their children to continue participating in online learning. Online learning cannot be separated from the internet network. An Internet network connection is one of the obstacles faced by students whose homes find it difficult to access the internet, especially since these students live in rural, remote and underdeveloped areas. Even if someone uses a cellular network, sometimes the network is unstable, because the geographical location is still far from cellular signal coverage. This is also a problem that occurs a lot for students who take online learning so the implementation is not optimal.

Conversations on various social media tell the experiences of parents of students while accompanying their children to study, both positive and negative. For example, it turns out that there are parents who are often angry because they find their children difficult to manage, so they can't stand it and want their children to go back to school. This incident gives awareness parents that educating children is not easy, it requires a lot of knowledge and patience. So with this incident parents must be aware of and know how to guide their children in learning. After getting this experience, it is hoped that parents will learn how to educate their children at home. It should be realized that the unpreparedness of teachers and students for online learning is also a problem. The shift from the conventional learning system to the online system was very sudden, without proper preparation. But all of this must be carried out so that the learning process can run smoothly and students can actively participate even in the conditions of the Covid-19 pandemic. The stuttering of online learning is indeed visible before us, not just in one or two schools but throughout several regions in Indonesia. Very important components of the online learning process need to be improved and improved. First and foremost is a stable internet network, then a capable device or computer, an application with a user-friendly platform, and online socialization that is efficient, effective, continuous and integrative to all educational stakeholders. The solution to this problem is that the government must provide a policy by opening free online application services in collaboration with internet and application providers to assist this online learning process. The government must also prepare an online-based learning curriculum and syllabus. For schools, it is necessary to carry out online technical guidance (bimtek) for the online implementation process and conduct outreach to parents and students through print media and social media regarding procedures for implementing online learning, and its relation to their roles and duties.

In the online learning process, it is important to add educational messages to parents and students about the Covid-19 pandemic outbreak. Thus we find the same learning as face-to-face but online-based. The effect is very good, the program is right on target, and the learning outcomes are achieved. There is a lesson to be learned from the world of education

during the Covid-19 pandemic, namely that face-to-face learning activities with teachers have proven to be more effective than online. This was explained by UB education expert Aulia Luqman Aziz to coincide with National Education Day 2020. "Forever the teaching profession will not be replaced by technology," said Luqman in his statement on UB's official website, Saturday (2/5/2020). According to him, fully online learning has recently caused a lot of complaints from students and parents. Some teachers at school admit that online learning is not as effective as conventional (face-to-face) learning activities, because some materials must be explained directly and more fully. In addition, the material delivered online may not be understood by all students. Based on my experience of teaching online, this system is only effective for giving assignments, and the results of working on these assignments will likely be given when students are about to enter, so the possibilities will pile up.

Observing the experiences of some of these teachers, teachers must also be prepared to use technology following the times. Teachers must be able to create learning models and strategies that are following the character of students in their schools. The use of several applications in online learning is very helpful for teachers in this learning process. Teachers must be accustomed to teaching by utilizing complex online media that must be packaged effectively, easily accessible, and understood by students. Thus teachers are required to be able to design easy and effective online learning, by utilizing appropriate online tools or media following the material being taught. Even though online learning will provide wider opportunities to explore the material to be taught, the teacher must be able to choose and limit the scope of the material and the appropriate application of the material and learning methods used. The simplest thing a teacher can do is by using the WhatsApp Group. The WhatsApp application is suitable for beginner online students because the operation is very simple and easy for students to access. Meanwhile, online teachers who have more enthusiasm can improve their abilities by using various online learning applications. But once again, choose an application that suits the needs of the teacher and the students themselves. Not all online learning applications can be used just like that. However, it must be considered according to the needs of teachers and students, the suitability of the material, and the limitations of device infrastructure such as networks. It is very ineffective if the teacher teaches using the zoom meeting application but the network or signal in the area where the student lives is not good. The success of teachers in carrying out online learning in the Covid-19 pandemic situation is the ability of teachers to innovate in designing and concocting what materials, learning methods, and applications are appropriate to the materials and methods. Creativity is the key to success for a teacher to be able to motivate students to remain enthusiastic about learning online (online) and not become a psychological burden. In addition, the success of online learning during the Covid-19 period depends on the discipline of all parties. Therefore, the school/madrasa here needs to create a scheme by compiling good management in managing the online learning system. This is done by making a systematic, structured and simple schedule to facilitate communication between parents and schools so that their children who study at home can be monitored effectively. Thus, online learning is an effective solution for learning at home to break the chain of transmission of Covid-19, *physical distancing* (maintaining a safe distance) is also

a consideration for choosing this learning. Good cooperation between teachers, students, parents and the school/madrasah is a determining factor in making online learning more effective. Therefore the problems in this study are: first, what are the concepts and characteristics of learning in vocational education, second, how to optimize modified hybrid learning, use appropriate technology, and utilize information and communication technology? Third, what is the quality of learning in vocational education by utilizing these various efforts?

METHOD

The method in this research is a survey conducted on teachers and students, lecturers and students within the Unima Faculty of Engineering and its surroundings. Some teachers and students in Manado. For Lecturers and Students only as a comparison, because Unima already has a *Learning Management System* (LMS), and has been operating for the last 1 year, although it has not been able to run fully due to various obstacles. The survey was carried out after the implementation of the 2020/2021 odd/even semester learning. Because the learning system that is carried out is still free, the survey is directed to choose and with reasons. Student/Student, Teacher/Lecturer Perception Survey Format for the Use of Learning models during a pandemic. So far, we are in a pandemic period, so learning is applied in many ways and choices. Among others :

1. Conventional learning is face-to-face or offline (outside the network).
2. Online or in-network learning, namely learning is carried out through internet facilities and synchronously or at the same time in different places.
3. Blended learning, that is, apart from online learning, there is also offline or face-to-face learning.
4. Learning to use ICT / ICT. (at Unima through the Spada Application on the Learning Management system (LMS).
5. Appropriate Technology: utilizing technology that is more friendly and efficient to use such as YouTube audio/video and via Wattsapp web.

After reading the information, all you have to do is check the options of strongly agree, agree, undecided or disagree.

Respondent Identity: Students/Students, Teachers/Lecturers.

School: Class :

Faculty/Department: Semester :

Table 1. Perceptions of Learning during the Pandemic

No	Alternative Choices Learning model	Perception as a student, student/teacher, lecturer			
		Strongly agree	Agree	Doubtful	Don't agree
1	Conventional Learning				

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2	Online Learning				
3	Hybrid/Blended Learning (modified)				
4	ICT(Information Communication Technology				
5	Appropriate technology				
6	combined				

After selecting, give reasons if you strongly agree, agree, undecided or disagree in the box as well as the suggestions you expect.

Reason :
Suggestion :

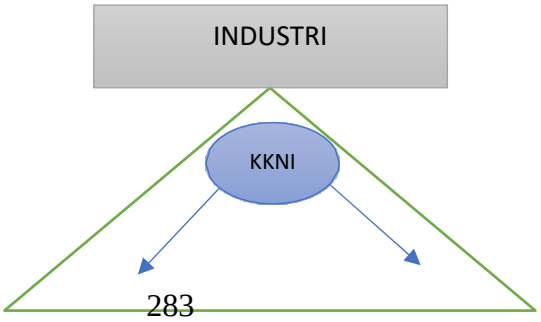
DISCUSSION RESULT

Concepts and characteristics of learning in vocational education. Competency-based vocational education is a vocational/vocational education approach that emphasizes what a person can do at work. A person can be seen as competent when he can demonstrate his ability and performance in carrying out tasks based on established benchmarks (Kuswana 2013:62). One of the basic characteristics of each learner is assessed to find gaps and gaps between the skills described in the core competencies. Rebolledo, J (2008) in Kuswana 2013: 62) suggests the difference between the two groups, namely:

Skills required – current skills = skill gap

Figure 1. Differences between the 2 Skills Groups (Kuswana 2013: 62)

Competency-based learning departs from the principles of job (position in the industrial world), knowledge (knowledge), skills (skills), attitude (attitude) and role (rules as a form of actualization of positions (Kuswana: 2013: 63). The learning that is developed must refer to on some of these principles, BNSP provides a triangular orientation of competency-based human resource development (HR), namely:



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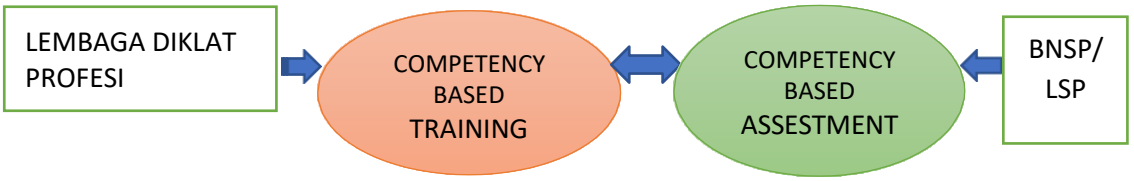

Figure 2. The HR Development Triangle (source, Kuswana: 2013:63)

Learning that supports the HR triangle has the following characteristics:

Referring to competency standards, which emphasize practice/training results (output/outcome and complete learning on a particular competency. Content and practice lead to specific needs to perform tasks, training can be in the form of on-job training or off-job or a combination of both, and there is flexibility in time to achieve competency.Kuswana:2013:64.Learning conducted for Vocational Education during a pandemic must consider these principles. The main supporters of HR development are competencies obtained by the practical training process and the results of competency assessment.

Strengthening Conventional Learning with Health Protocols

Several ways can be applied to conventional learning, by utilizing existing resources such as large courtyards, limited study groups, large/field practice rooms, theoretical and practical scheduling that considers health programs, the presence of several students who can apply STAD learning (Student Team Achievement Division) etc. Some of the conditions that need to be studied by several prokes in general include:

- Maintain health and fitness so that the body's immune system increases.
- Washing hands using soap and running water, or using 70-80% alcohol hand rub, according to the correct hand washing steps.
- When coughing and sneezing, try to keep the surrounding environment from being infected.
- Cover your nose and mouth with a tissue or the inside of your elbow, and use a mask.
- Avoid contact with other people or going to public places.
- Avoid touching eyes, nose and mouth, because hands touch many things and can be contaminated with viruses.
- Use a mouth and nose mask when sick or when in a public place.

Dispose of used tissues and masks in the trash properly, then wash their hand. When at school, of course, avoid direct contact with friends or play together.

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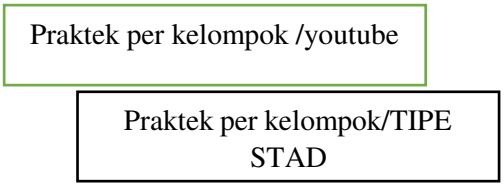

Figure 3. Alternative conventional learning diagram

Conventional and online learning when applied optimally with the format of sharing theory and practice can be described as follows:

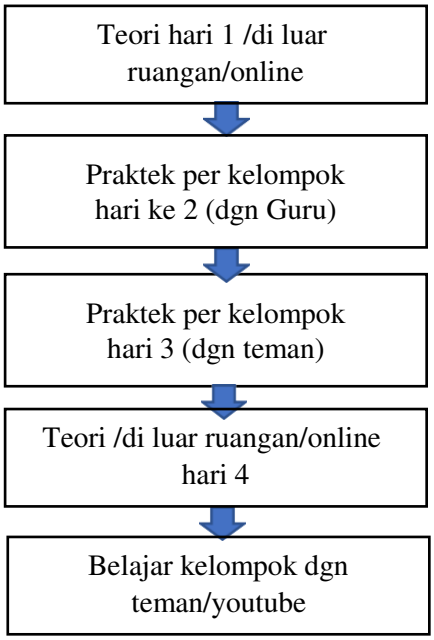

Figure 4. Example of distribution of conventional learning activities for 5 days/week

In the diagram, online learning activities are only carried out for 2 days and are optional, can be done whenever possible or done outdoors. Additional practical learning can take advantage of YouTube. Currently, the Covid-19 virus outbreak has a very broad impact on all aspects of life, including in the field of education. The world of education is feeling the impact of the coronavirus outbreak which is rampant not only in Indonesia but in various parts of the world. With this outbreak, the Ministry of Education and Culture was forced to stop conventional learning to minimize the mutation of the virus. One of the points emphasized by the government is that learning conducted in schools and tertiary institutions is transferred to online learning at home.

Hybrid learning/Blended Learning in Indonesia and its challenges.

So far, the Indonesian Ministry of Education and Culture (Kemendikbud) has responded quickly to the COVID-19 pandemic. For example, dismissing teaching and learning activities (KBM) in schools and reconstructing them into distance learning (PJJ) by utilizing Information and Communication Technology (ICT). According to Nadiem Anwar Makarim as the Minister of Education and Culture (Mendikbud) of Indonesia, this had to be done because it was impossible to sacrifice the health of

students and teachers in teaching and learning activities continued to be carried out in the school environment as long as the pandemic situation had not subsided. The use of ICT as a learning tool which previously served to respond to emergencies due to COVID-19 has now become the discourse of the Ministry of Education and Culture to be implemented through a hybrid / *blended learning model*. This then reaps various responses from the community. However, what exactly is the *hybrid learning model*? Examining the *Hybrid Learning Model / Learning*: Definition, Concepts, Procedures, and Challenges of Its Implementation in Indonesia. Definition of *Blended Learning,* several learning models can be applied in teaching and learning activities in schools. There are at least 3 types of learning models that we know so far, namely *face-to-face learning*, *online learning,* and *hybrid / blended learning*. *Face-to-face* learning is a direct learning model that relies on face-to-face contact between educational instruments, both teachers and students. In this learning model, all teaching and learning activities take place 100% in the classroom so it is often referred to as the conventional method. *Online learning* is a learning model where all activities are carried out *online*. Starting from giving instructions, and interactions, to learning activities. Teaching and learning activities using this model will eliminate the face-to-face elements that exist in conventional methods. *Hybrid learning* is often referred to as *blended learning* because it has the same meaning. *Hybrid learning* is a mixed learning model between *online learning* and *face-to-face learning* or conventional methods that rely on face-to-face activities in class. *Hybrid* Concept *Learning* has 4 concepts which are explained below. The first concept, *blended learning* is a learning method that combines or combines various web-based technologies to achieve educational goals. *Blended learning* will integrate traditional face-to-face learning with distance learning using *online learning resources* and a variety of communication options that can be used by teachers and students. This allows students to have a variety of learning resources to explore deeper knowledge. The second concept, *blended learning* is a combination of various learning approaches to produce an optimal learning achievement with or without learning technology. The learning approach in question is behaviourism, constructivism, and cognitivism. The third concept, *blended learning* is a combination of many forms of learning technology with a combination of face-to-face learning. The intended learning technology formats are *videotapes*, CD-ROMs, *web-based training (WBT)*, films, and others. The fourth concept, *blended learning* is a learning method that combines learning technology with actual work assignment orders. It aims to create a good influence on learning and assignments. According to Rian Iwinsyah (2020), independent learning is one of the initiatives of the Minister of Education and Culture who wants to create a happy learning atmosphere and a happy *atmosphere*. The purpose of independent learning is so that teachers, students, and parents can have a happy atmosphere. "Freedom learns that the educational process must create happy atmospheres." In the *Blended Learning* Learning Model Module, Pustekkom, 2019, according to Garner & Okay (2015), *blended learning* is a learning environment that is designed to integrate face-to-*face* (F2F) learning with *online learning* that aims to improve student learning outcomes. . Meanwhile, according to Harding, Kaczynski and Wood (2005), *blended learning* is a learning approach that integrates traditional face-to-face learning and distance learning that uses *online learning resources* (especially web-based) and a variety of communication options that can be used by teachers and students.

In implementing *blended learning*, especially facilities for online learning, teachers can take advantage of various learning system services that use the *Learning Management System*

(LMS). According to Ellis (2009: 1), LMS is a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs. LMS can be said to be a learning management prepared for students and teachers in conducting learning through software. The LMS software that can be used includes Moodle, Canvas, Google Classroom, Edmodo, Digital Home Learning Classes, Blogs and others. *Hybrid* or *blended learning* procedures refer to the main key to implementing this method. There are five main keys in the *blended learning process*. These five main keys also apply the learning theory of Keller, Gagne`, Bloom, Merrill, Clark and Gray, namely:

1. *Live events* are defined as direct or face-to-face learning that is carried out synchronously at the same time and place or at the same time in different places. 2. *Self-paced learning. Self-paced learning* means combining it with independent learning that allows students to learn anytime and anywhere *online*. *3. Collaboration, Collaboration* means combining collaboration. The collaboration in question is a collaboration between teachers and students, as well as collaboration between fellow students in teaching and learning activities. *4. Assessment, Assessment* means that the teacher must be able to mix a combination of online and *offline assessment types*, both in the form of tests and non-tests such as class projects. *5. Performance support materials, Performance support materials* to ensure learning materials are prepared in digital form. It is intended that these learning materials can be easily accessed by students, both *online* and *offline*. (https://blog.kejarcita.id/edukasi, 21 August 2021).

Hybrid Implementation *Learning,* actually this learning cannot be applied immediately, because this learning is only a combination of face-to-face and online learning. Face-to-face learning must also undergo adjustments according to the Health protocol, while online learning must be supported by various other components which must be distributed evenly for students. We have implemented a *hybrid learning/learning method* during the COVID-19 pandemic. The health urgency of all educational instruments forced the Ministry of Education and Culture to issue rules for distance learning from home with an online system. This is done so that teaching and learning activities are carried out rather than not at all. It is felt that the Ministry of Education and Culture is quite swift in responding to the pandemic situation that has attacked all citizens of the world. Not only quickly changing the learning system to online, the Ministry of Education and Culture is also sensitive to issues that are spreading in society related to the process of implementing distance learning. Of course, we still remember the wave of protests from the public due to wasted costs due to buying internet quota for studying. Shortly after that, the Ministry of Education and Culture immediately proposed cooperation with Indonesian BUMN providers to provide a free internet quota of up to 50 GB per student. The Ministry of Education and Culture has also designed various delivery strategies for teachers and students. Starting from the establishment of the *online* platform "Rumah Belajar" to collaboration with a national television station for broadcasting learning materials. "Learning House" consists of study summaries to practice questions that can be studied or downloaded by teachers and students. While broadcasting learning materials on television is an alternative for those who are less accessible to internet networks. From the things that have been described, the government through the Ministry of Education and Culture has been able to implement a *hybrid learning model learning* in the Indonesian education system

during the COVID-19 pandemic. However, the Ministry of Education and Culture must pay attention to several things that are a challenge if this learning method is to be implemented permanently.

Hybrid Deployment Challenges *Learning* in Indonesia, the biggest challenge in implementing anything related to technology in Indonesia is the limited tools that people have, including the application of *hybrid learning methods learning*. The OECD report (2020) in a journal entitled " *A framework to guide education to respond to the COVID-19 Pandemic 2020* " states that only 34% of Indonesian students have computers at home. Infrastructure limitations such as internet access and the availability of electricity in the 3T area are also stumbling blocks for the development of this learning method in the area concerned. Infrastructure improvements are urgently needed if *hybrid learning* is to be carried out permanently. Improvements regarding infrastructure and material achievement gaps are of course very complex and cannot be carried out by the Ministry of Education and Culture alone. But it also has to go through various ministries and governments; between the central government, local governments and the private sector. In addition, the readiness of the teacher as the first learning resource for students is also very important. The application of the *hybrid learning method* will not run optimally if the teacher is unable to use technology as a learning tool. Therefore, the teacher's ability to deal with this new technological era is also one of the challenges for the government to apply *hybrid / blended learning methods*. The solution to overcome this is to conduct training for teachers. https://blog.kejarcita.id/edukasi.21 August 2021.

Utilization of Appropriate Technology,

Appropriate words are the key to the successful use of technology to solve learning problems. This is important. Because it is not how sophisticated the technology is used, but how effective the technology is in responding to needs, problems and conditions. Wibawa Basuki (2017: 298-299) shares several considerations for using appropriate technology in learning, namely

1. Culture and technology are part of the culture. Technology is amoral and impartial, the morality of technology lies in how it is used.
1. Technology and Equity, there is a tendency for technology to widen the gap between advanced and underdeveloped, between villages and cities, technology should even out opportunities to obtain quality learning as widely as possible.
2. Expectation, Most people think technology is a panacea that can solve all problems. Technology is not always a solution that can guarantee a good learning process.
3. The rate of Adaptation and technology adoption raises its problems, distance learning is relatively faster and more advanced than conventional learning. Learning has not fully answered market needs (Market driven).
4. cost-effectiveness,

The use of technology in learning activities is inevitable, especially during the Covid-19 Pandemic. Distance learning that previously never thought would happen, we do it today.

Teachers in distance learning are still required to be able to present a meaningful learning process that is always process-oriented. So the presence of technology, in this case, is needed. Technology assisting the learning process can act as a learning medium, learning resource or a mainstay in helping teachers to find the best strategy for carrying out learning. Efforts to innovate through the latest strategies in the implementation of learning that can increase learning activity and creativity are needed. Ideas related to new strategies for innovating by utilizing technology are one option to increase activity and creativity. This form of strategy is termed an appropriate method for increasing learning activity and creativity. To help teachers intentions to improve their ability to use technology so that the learning process is more active and creative, several teachers in our school have tried to innovate. One of the media used is learning videos, which are arranged in such a way, and uploaded on the YouTube channel. The benefits of this activity, besides the teacher being able to convey the material appropriately, the teacher also has the opportunity to learn to adapt learning which has always been carried out face-to-face, switching to virtual learning. So that this activity will further mature the teacher's sensitivity in designing learning in this new era.

In addition to adjusting, teachers are also expected to be able to improve their abilities in using technology which is mandatory in this digital era. Indirectly the teacher will recognize and use various supporting applications in the preparation of learning steps based on the latest method. Based on the agreement on this model or method, hereinafter referred to as the "Youtube Video-Based Thematic Learning Method". The role of the principal, in this case, is as a facilitator, mentor and mentoring which is inherent in helping teachers step by step provide a way to perfect their work. This does not mean that the principal is the party who always controls the implementation of activities, but provides another perspective, especially from several aspects that the teacher may have forgotten. In the shooting, drafting, editing and layout of several things that need to get input related to the video in question, the teacher can ask for help from other teachers in perfecting their work besides the principal himself.

The improvement of the learning model using videos which will then be uploaded on Youtube is carried out through a motivating approach. So that every work produced by the teacher is the best work at that time, which deserves an award. However, the process of improvement must still be carried out, because the designer of activities usually forgets certain aspects, especially in presenting learning strategies that can motivate students to improve their learning activities at home. Some tips for making a good video are as follows:

1. The video must be broken down into several continuous video parts, where one video presents only one topic, allowing the teacher to present a different view in each video, and allowing students to study or work on assignments, for example, science, mathematics and PKN content to be made separately, but in the cut of the video a transition is made stating that the video is continuous and becomes one thematic unit
2. At the beginning of the activity, the teacher should show his face briefly to deliver the intended learning material, by asking for news, conveying goals, and providing motivation
3. It is better if the teacher conveys how to save electricity, steps to save electricity must be taken and exemplified by the teacher directly, and students can imitate and carry out these activities directly when doing assignments in their respective homes.

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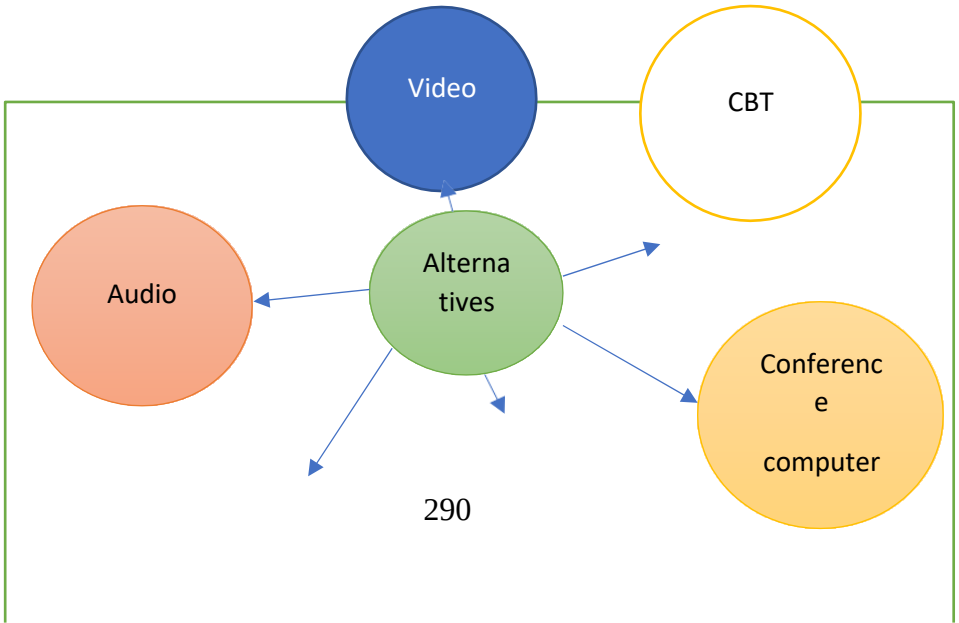
4. The teacher demonstrates directly how to make propellers from paper, and later students can easily imitate what the teacher has done on assignments in their respective homes.
5. The teacher demonstrates directly how to compare a flat shape of paper whereas the learning activity is to compare the area and circumference and determine the circumference and area correctly with mathematical calculations. Students can imitate and demonstrate these activities directly in their homes when doing assignments
6. Teachers can demonstrate several behaviours that reflect the implementation of Pancasila in everyday life through video examples that can be found on the internet.
7. Teachers always motivate students to enjoy learning at every stage
8. At the end of each activity, the teacher gives instructions about carrying out his assignments, including the evaluation activities that are presented through the Google Classroom
9. At the end of each activity, the teacher must also convey conclusions, expectations and follow-up of the learning activities that have been carried out.

To ensure that the suggestions and input can be implemented, the principal carries out assistance in an inherent, consistent and sustainable manner. There are times when the teacher will feel difficulty, complain and have many 14 excuses for not perfecting his work. This is a natural thing, and it is also natural for the principal to have to motivate again for the perfection of a work. True perfection does not exist, but there is always a way to approach it, and it depends on how far our ability is to be determined to finish it. The biggest obstacle in trying to finish a work is our intention. If our intention is big in perfecting our work and work, no matter how big the obstacle can be passed. Appropriate technology, which is now more effective and familiar than in the form of YouTube videos, also utilizes WhatsApp web, which is easy to use and so far has been quite effective, especially for several theoretical subjects. The use of google classroom/zoom meetings has also been considered adequate and can be collaborated with the use of the videos that have been prepared. Application of Information Technology, there are at least two goals for applying technology in learning, namely first academic goals to support the teaching and learning process and secondly administrative goals to support the management of the learning system both formal and non-formal in the general public. (Wibawa Basuki, 2017: 293), in practice this goal was divided into three, namely to deal with learning during a pandemic. Selection of learning technology and the type of learning interaction whether one-way, two-way time delay (asynchronous/delayed interaction or synchronous/real-time interaction). Video technology, Computer Based Training, Computer conferencing, Internet-based learning.



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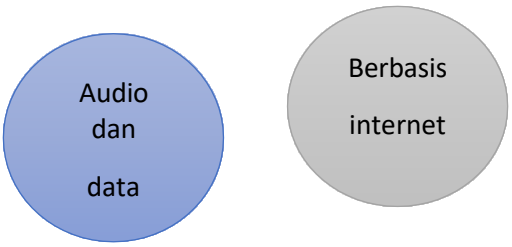

Figure 5. Choice of Information and Communication Technology in Learning

Table 2. Technology choices during a pandemic can be seen in the following table:

No	Information Technology Options	The relevance of implementation during a pandemic
1	Videos	Relevant because it's easy to apply
2	CBT (computer-based training)	Still difficult and limited.
3	Audio and data/WA	Considered
4	Computer conference	Still difficult and limited
5	Internet-based	Still difficult and limited
6	audios	Relevant and easy to implement

This opinion was obtained from interviews with several teachers/lecturers in the even semester of 2021.

In the table, for some of these choices in general it is still difficult to apply to students, except for college students. The location of students who are sometimes still beyond the reach of various communication devices, both software and hardware. Utilization of all resources and efforts for learning during a pandemic must ultimately lead to the quality of learning. Because the use of various methods besides having to be effective, efficient must also be relevant to the student's object, which is a characteristic of vocational education. Technological options can be considered, as well as combining several options with the right reasons, besides being efficient and effective, quality can also be accounted for.

To optimize learning during a pandemic, collaborative learning, both conventionally adapted to health protocols and online (blended), must be paired with appropriate technology. Utilization of ICT is carried out when students and teachers are ready with the infrastructure and even then in the context of achieving quality it must be accompanied by direct practice that complies with health protocols. Learning must also consider the internal and external factors of students. Students must be involved in choosing alternatives because success depends on interaction and mutual understanding or understanding between students and teachers through the form of a joint contract. In this study, the choices from surveys on students for learning choices with blended learning, conventional 60% and ICT/Online 40%, online, Appropriate Technology, ICT and combinations obtained an average result of 22.5%, 17.75%, 13.5% and 6.25%, (survey of students, university students, teachers and lecturers for even semester 2020/2021).

Conventional or off-line use for theory and practice or training. Online only on information and theory only. Blended learning is modified, namely conventional learning that follows health programs and online for theory. Appropriate technology, which utilizes all available technological sources and is easy to implement, process, and evaluate.

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Combined, namely learning that collaborates all models according to the needs and agreements with students.

Table 3. Perception Survey Results Preferred learning model during a pandemic

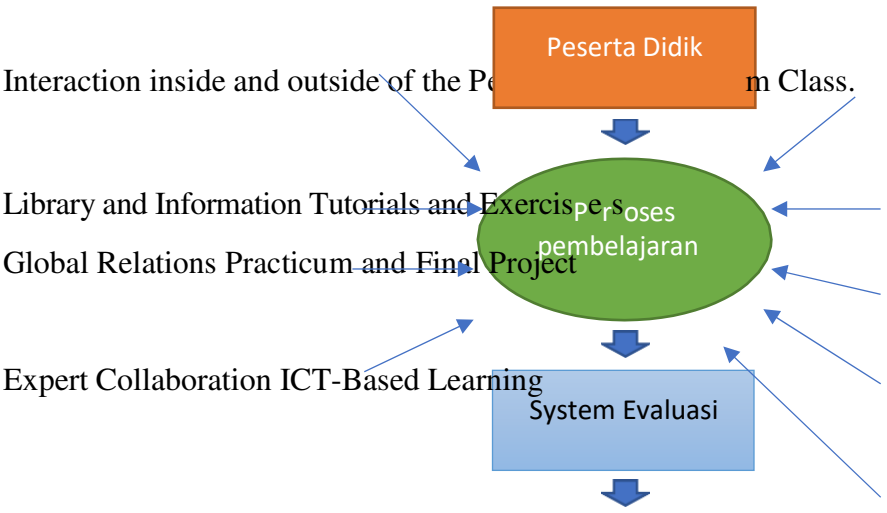
No	Types of alternative learning models offered	Reasons for choosing			
		% Student	%Student	% Lecturer	% Teacher
1	conventional	15	10	5	15
2	Online	20	10	40	20
3	Blended learning/modified hybrid	25	30	30	25
4	Appropriate technology	20	15	10	30
5	ICT	10	20	15	10
6	All together	10	15	-	-

Survey results for Unima and its surroundings: Even semester from January to July 2021.

The choice of reasons is more effective and efficient, easily familiar and affordable to all groups. Not an option because the facilities are not adequate, the costs are not evenly distributed among students

Learning Quality, Vocational Education Process and Alternatives.

Factors that affect learning both internally and externally include external factors: teaching staff, teaching materials, methods, media and technology, learning culture, interactions in class/outside the classroom, libraries, information, laboratories, ICT-based learning and access to global, tutorials, work programs, expertise and learning systems. Internal factors include motivation to learn, initial ability, ability to learn independently, access to information, mastery of English and learning gaps. (Wibawa, Basuki (2017: 300). These factors are very important, but the quality of learning during a pandemic will determine the quality achieved. The following is a diagram of the determinants of the quality of the learning process.



Language laboratory

Figure 6. Determinants of the Quality of the Learning Process (Wibawa, Basuki (2017: 301).

Experience in the field shows that the frequency of intensity for practicums is still limited, especially during a pandemic and there are no appropriate and optimal learning solutions. Learning simulations with computers have not been sufficiently developed. 2. The demand for memorization is still dominant compared to analyzing and solving problems and creating. 3. Management of concepts, facts, and procedures has not been developed intensively. 4. There are difficulties for students to develop due to limited facilities and infrastructure. (Wibawa, Basuki (2017: 301). It is undeniable that Clark in Nana Sudjana (2016), states that 70% of the quality of learning is determined by external factors, while 30% is determined by internal factors. According to Kemp (1994: 138-148), the learning process must pay attention to the conditions and principles of learning, including preparation before learning, learning objectives, arrangement of teaching materials, individual differences, motivation, teaching resources, participation, feedback, reinforcement, practice and repetition of teaching attitudes and presentation, both directly and indirectly. Optimizing learning seen from input, process and output, according to Arikunto, S (2015: 302), is very important. Process choices must be evaluated on an ongoing basis because current choices will be different when the pandemic ends and when it ends.

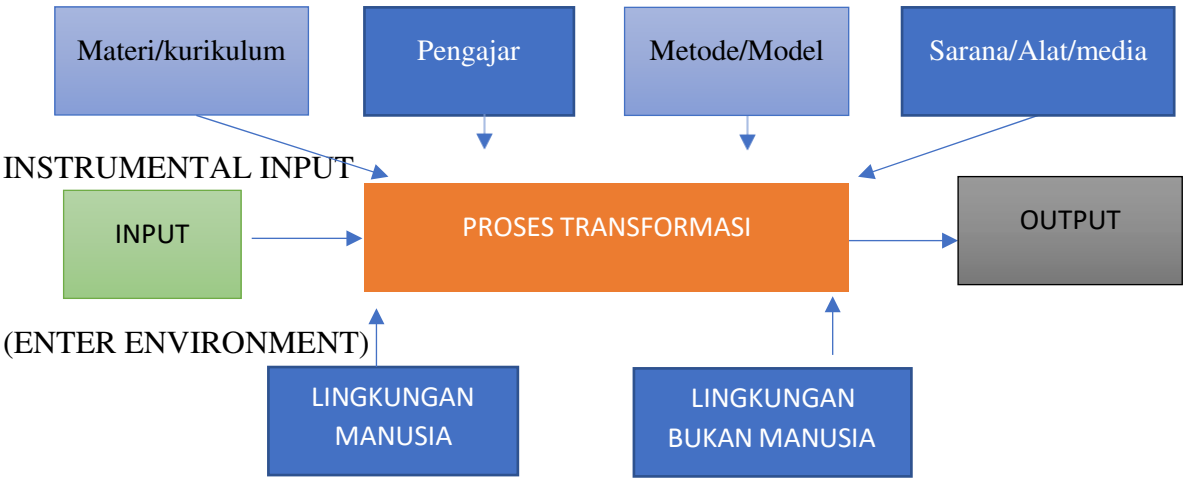


Figure 7. Learning Transformation Process (Suharsimi A, 2015: 302)

How to carry out a program evaluation, the teacher must trace the family background, and then develop an evaluation plan. At least the teacher must make an instrument or obtain student data files so that the evaluation will be right on target. In the learning transformation process, there are at least 4 important elements, namely the first input in which there are elements of students, the second process in which there are teachers, methods/models, tools/media (instrumental input) and environmental input, the three

objectives are the direction and achievement targets the four outputs which include evaluation elements.

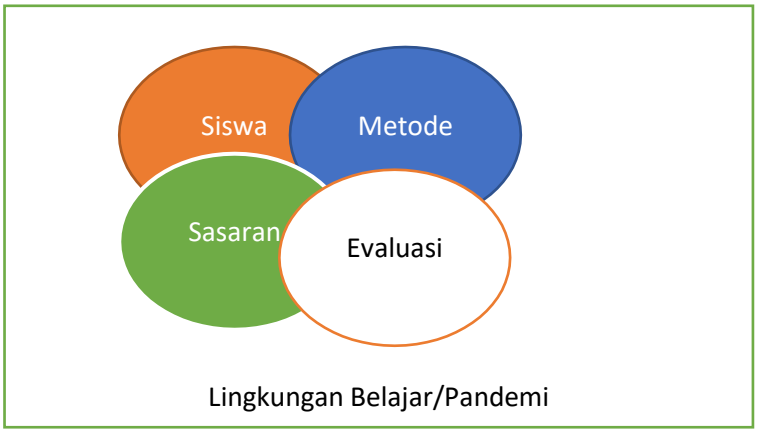


Figure 8. Important elements in the learning design process (Kemp: 1994: 12)

To optimize the learning system, it is necessary to monitor and evaluate, most not in 1 year of learning during a pandemic with various efforts so that alternatives are considered that can be carried out in the future specifically for vocational education. The strengths and weaknesses of the learning system can be evaluated through some of the characteristics encountered. Optimization of the Learning System as an alternative is presented in the following figure:

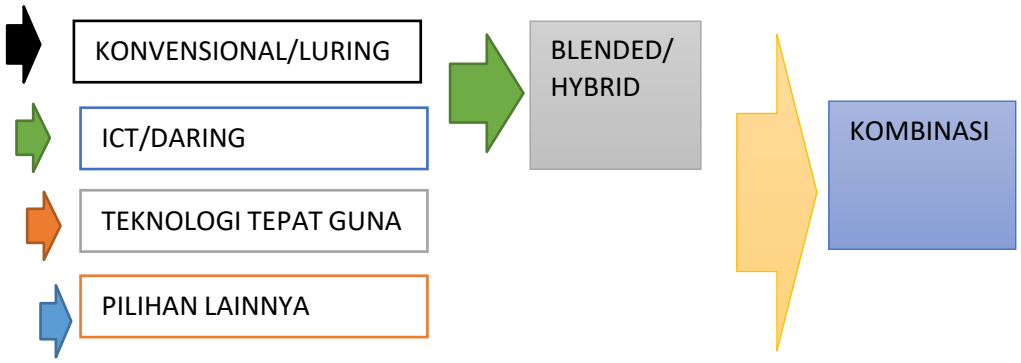


Figure 9. Alternative Learning Systems during the Pandemic

- Conventional, Direct face-to-face learning, can be individual or classical as well as, practice.
  Pros: students are in the same place so the process is up to evaluation younger. There is direct interaction, 2-way communication and many directions. Limited practice.
  Weaknesses: must use health protocol, limited time (according to schedule), difficult during a pandemic
  ICT: Utilization of IT applications, and can be done in two or more directions, at the same time instantly (asynchronous interaction) or simultaneously real-time synchronous interaction. In practice can be in the form of audio, video, CBT, or computer conferencing.

Pros: not gathering suitable for a pandemic, can be anywhere and anytime.
Weaknesses: Not all systems are user-friendly, not all are ready simultaneously between teachers and students, and the infrastructure has not Evenly distributed, the use of IT requires preparation for both the teacher and the participant's students, including relevant material. Limited time. Implementation With the Unima. ac. id/Spada LMS, they are still having problems with even semester 2020/2021
Blended: Mixed/combined learning between online and offline.
Pros: more flexible in implementation, theoretical material can be done online, and practice material is done offline.
Weaknesses: the same as ICT, the infrastructure is inadequate when online. Practice materials and exercises are still difficult to implement. HR Readiness for both teachers and students in the first years. On certain materials are less effective and efficient., additional is needed budget.
Appropriate Technology: Use of technology including IT as needed, so not sophistication but effectiveness and efficiency, like using youtube videos, WhatsApp (WA), telegram, Instagram, zoom app, google classroom.
Pros: User friendly, has been running for at least two semesters
Weaknesses: not all material can be done with this technology because for practice it still has to be tested. Youtube may be a guide in the end face to face is needed. The Faculty of Engineering is also campaigning for health protocols through the *Twibbonize application* regarding 5M, namely: wearing masks, washing hands, keeping distance, staying away from crowds and limiting mobility.

CONCLUSIONS AND RECOMMENDATIONS

The results of a survey of students, both students and students or teachers and lecturers, show that there is no full readiness in choosing various alternatives and that software and hardware (infrastructure) readiness is needed for students and teachers so that the implementation of education can be more varied in choosing alternatives. Particularly in Vocational High School Education, there is still a tendency towards blended learning with a composition of 60% face-to-face (practical exercises, problem-solving) and 40% online for theory.

This study concludes that in learning Vocational Education the entire process must consider practice or training, which means that there must be limited face-to-face or group meetings. Optimizing conventional learning according to health programs and blended learning must pay attention to the readiness of students including the learning environment and external and internal factors. For optimization so that the quality of learning is not neglected, it must pay attention to the existence of practice and training in subjects related to practice or which require direct training. Optimizing learning in this study is only an alternative during a pandemic because all ICT systems cannot replace face-to-face learning, especially concerning Vocational Studies.

Some suggestions are: There needs to be a government role when learning is still in a pandemic. For students, there need to be adequate support facilities. Various lessons can be done if there is an equitable provision of infrastructure, both for ICT and other supporting facilities. Practical facilities, and learning packages are expanded to include project groups (Project Based Learning), in SMKs it is necessary to expand so that the groups are smaller and reach more students. The practicum package needs to be made simpler with adjustments according to the health program and with a smaller number of groups.

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