ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 8.4
IJAR 2022; 8(6): 01-07
www.allresearchjournal.com
Received: 01-03-2022
Accepted: 10-04-2022

Ekoristio Suwandi
Post Graduate Program,
Manado State University,
Indonesia

Shelty DM Sumual
Post Graduate Program,
Manado State University,
Indonesia

Sjeddie R Watung
Post Graduate Program,
Manado State University,
Indonesia

Corresponding Author:
Ekoristio Suwandi
Post Graduate Program,
Manado State University,
Indonesia

Blended learning in vocational subjects at Christian vocational high School 2 Tomohon city (Offline and online comparative studies on vocational subjects)

Ekoristio Suwandi, Shelty DM Sumual and Sjeddie R Watung

Abstract
Information communication technology is the main point of departure for carrying out activities, including the world of education which must carry out teaching and learning activities by utilizing Information Communication Technology so that the teaching and learning process continues. It is undeniable that in an effort to adjust the use of information and communication technology as a medium and means of distance learning, many problems were found, including from teachers as instructors, most of whom are still not proficient in operating devices for distance learning activities, and from students who happen to be in remote areas or rural areas that do not yet have devices such as cell phones or computers. Therefore, this study aims to analyze the 1. Implementation of blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon. 2. Factors that support and hinder the implementation of blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon. 3. The strategy adopted in implementing blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon. 4. The absorption of material by students in the implementation of blended learning subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon. This research was conducted at the Krirten 2 vocational high school in Tomohon City (SMKS Kristen 2). Using qualitative research methods, primary and secondary data, as well as data collection by observation, interviews and documentation. The results showed that: 1. Blended learning is carried out in the department / expertise program of SMKS Kristen 2 Tomohon carried out with good management, namely planning, organizing, implementing and evaluating. 2. The implementation of blended learning is supported by the availability of facilities in schools that are very adequate to support learning such as student practice rooms with practical equipment that are in accordance with standards. 3. The blended learning strategy applied has combined offline and online learning. 4. After analyzing the implementation of blended learning, it was concluded that the expertise project material, both theory and practice, was well absorbed, this was evidenced by the significant increase in student competence.

Keywords: Blended learning, vocational subjects, vocational school

1. Introduction
Various policies were taken and taken to reduce the rate of the spread of covid, one of which was by prohibiting residents from leaving their homes when the frequency of covid infections increased rapidly. This problem is also felt by teaching staff or teachers who teach in vocational high schools, especially those who teach vocational subjects who find it difficult to choose the right teaching method considering that most of these vocational subjects learning is usually carried out with practice in workshops, laboratories or practice rooms school. Vocational practice learning will be memorable, meaningful and understandable by students when they practice directly the media or equipment in the workshop or laboratory.

Conventional practical learning is usually carried out in laboratories and practical workshops in schools. For vocational high schools (SMK), practical learning is a must. Even the structure of the Vocational High School curriculum for group C learning (skill competency) which demands direct practicum, has a very large portion of learning hours. Every week in accordance with the curriculum structure of the C3 SMK group for class XI there are 31

hours of lessons and class XII there are 33 hours of lessons. With that many learning hours in one week, it means that SMK graduates are required to be competent in mastering the material in accordance with their respective expertise competencies.

However, it becomes a very complicated problem for vocational teachers in SMK during a pandemic that requires online learning or distance learning to implement vocational practice learning. If before the pandemic when carrying out practical learning, the teacher and students would enter the workshop or practice room, the teacher would guide students in carrying out the practice directly on the practical tools or media in accordance with the theory learned before practice, but during the practical learning schedule during the pandemic then will be carried out online, of course, practical activities can only be demonstrated by the teacher who is teaching at that time. It is likely that students will listen but here it is clear that there will be no memorable or meaningful practical learning for students or students will not be able to understand well the practical learning activities carried out by online teachers.

SMKS Kristen 2 Tomohon as one of the vocational high schools located in Tomohon City always strives to nurture its students with the hope that graduates from this school are graduates with reliable human resources who are really able to work or create jobs according to the demands and challenges. business, industry and the world of work. This is illustrated by the teaching staff, most of whom are professional educators. In fact, this school also has good learning infrastructure to support theoretical and practical learning activities.

At SMKS Kristen 2 Tomohon, practical learning activities were carried out before the pandemic, namely by guiding students into the workshop or practice room, carrying out practical activities according to the procedures designed by the skill competency teacher, students interacting directly with the tools and materials that had been prepared in the workshop and practical laboratories, but during a pandemic, practical workshops and laboratories are not functioning because students only carry out learning from home.

From the initial observations made by the author by interviewing several teachers of vocational subjects/vocational competencies, it was obtained information that most of these teachers had difficulty in obtaining media or methods to carry out practical learning activities online. Likewise, an initial survey was conducted on several students who stated that they had difficulty understanding well when participating in online vocational learning.

The objectives to be achieved from this research are to obtain the results of the analysis and description of:

1. Implementation of blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon
2. Factors that support and hinder the implementation of blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon
3. The strategy adopted in implementing blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon
4. The absorption of material by students in the implementation of blended learning subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon

2. Literature Review

2.1 Concept of Blended Learning

Thorne (2003: 22) states that blended learning is a form of response to advances in online technology with traditional learning activities. He also mentioned that blended learning is an opportunity in an effort to integrate innovation and technological advances that take place online and traditional learning that takes place in interaction and participation. The potential of blended learning can be said to be almost unlimited and includes the natural process development from traditional forms of learning to patterns of focused and personal development. Blended learning is a form of logical evolution in learning design. Blended learning aims to provide solutions to the challenges of adapting learning and to the development needs of each individual.

Noord stated that in this blended learning system design model, learning settings consist of 4 types as follows:

1. Direct Sync (SL), namely face-to-face learning activities
2. Synchronous Maya (SM), learning activities occur through synchronous technology such as video conference, audio-conference or web-based seminar (webinar)
3. Independent Asynchronous (AM), is online learning which does not occur synchronously or not online at the same time so that students can learn independently.

2.2 Vocational Productive Subjects

The word vocational is often associated with the word education, namely vocational education, so that experts tend to only define vocational education. By defining vocational education, it will be easier for us to understand vocational subjects themselves, vocational subjects are elective subjects that students can choose according to their interests, talents, and abilities as well as regional and development needs.

From these objectives, it can be concluded that productive subjects function to improve skills, knowledge, and attitudes towards the vocational professions that are taught and provide awareness to always improve the quality of education. Productive subjects are groups of subjects that equip students to have work competencies according to the Indonesian National Work Competency Standards (SKKNI). Besides that, the competencies learned must comply with the competency standards agreed by the forum which is considered to represent the business world, industry or professional associations. Productive programs are taught specifically according to the needs of each skill program. Ministry of education and culture, 2000:3 productive subjects are all subjects that can provide basic technical knowledge of vocational skills.

2.3 Online Learning Concept

Online learning can simply be interpreted as a system of learning activities that are carried out without going through face-to-face directly but through the internet network. Kusumawardani called online learning as part of e-learning or electronic learning. According to Bilfaqih & Qomarudin (2015: 1) "Online learning is a program for organizing online learning classes to reach a massive and broad target group". Thorme in Kuntarto (2017: 102) "Online learning is

learning that uses multimedia technology, virtual classes, CD ROMs, video streaming, voice messages, email and telephone conferences, animated online text, and online video streaming". Meanwhile Rosenberg in Alimuddin, Tawany & Nadjib (2015: 338) emphasizes that e-learning refers to the use of internet technology to deliver a series of solutions that can improve knowledge and skills.

According to Ghirardini in Kartika (2018: 27) "Online provides effective learning methods, such as practicing with related feedback, combining collaborative activities with independent learning, personalizing learning based on student needs and using simulations and games". Meanwhile, according to Permendikbud No. 109/2013 distance education is a teaching and learning process that is carried out remotely through the use of various communication media.

2.4 Concept of learning outside the network

According to Sunendar, *et al*. (2020: 87) the stages carried out in the implementation of distance learning with offline mode are as follows.

1. The school through the deputy head of the curriculum compiles the school curriculum by adjusting the Covid-19 emergency conditions. At this stage, distance learning offline mode is designed. Then, make a study schedule at home, group students or create study nodes based on the nearest place of residence to facilitate coordination and provide teaching materials while they are studying at home.
2. Teachers get direction and guidance from school supervisors about offline learning. Including by making teaching materials in the form of modules, learning media, student worksheets and student assessments when studying from home.
   The third stage, each subject teacher designs modules, learning media, and worksheets that will be given to students.
3. In making modules, learning media and worksheets, teachers are given the freedom to be creative in making them, but still pay attention to the correct structure of writing modules and student worksheets. In addition, the teacher also makes daily activity formats for students to hone their life skills and to assess students' character during activities at home.
4. The fourth stage, distributing teaching materials in the form of modules, learning media, worksheets and formats of students' daily activities while at home to the coordinator of each learning node through the homeroom teacher for home learning activities according to a predetermined schedule.
5. The fifth stage, collection of assignment results and assessment of student learning outcomes during learning from home.

2.5 Vocational Productive Learning in a Pandemic Period

The government has not allowed schools to carry out face-to-face learning, making vocational high school students (SMK) constrained in carrying out vocational learning. This condition creates a dilemma for schools, teachers and students as well as parents because the government only allows distance learning or online learning. Vocational teachers seek to find appropriate, effective and efficient methods that can be used to carry out online vocational learning. Even though there are now virtual face-to-face learning platforms such as zoom meetings, google meetings, cisco webex, microsoft terms and so on, it is possible to use these platforms effectively for presentation of learning for theoretical material only, while for presentation of learning for vocational practice it is still not find a good method to carry out the activity.

An alternative that can be used to carry out vocational practice learning is to use learning videos or practical tutorial videos where the video contains guidelines for carrying out practice in accordance with the competencies to be practiced, for example tutorials or guidelines for operating a tool. Although this method only builds concepts, it will at least build students' imaginations so that they have an overview of the practical learning activities carried out at that time.

The next alternative that can be implemented is to lend practical tools and materials to students so that on the schedule of carrying out practical learning activities the teacher demonstrates through face-to-face virtual learning and students follow the practice with the tools and materials that have been given previously. However, this alternative, of course, also has a weakness, namely the availability of practical tools that do not reach students at the same time.

3. Research Method

This type of research is comparatively qualitative. Comparatively qualitative is doing analysis to find and find similarities and differences in phenomena. In this study, researchers will explore the similarities and differences between vocational learning carried out at SMK Kristen 2 Tomohon. This research will be carried out at SMK Kristen 2 Tomohon, Tomohon City, having its address at Jl. Campus (Kuranga), Talete II Village, Central Tomohon District, Tomohon City.

Sources consist of primary data and secondary data:

1) **Primary Data:** Primary data is data obtained directly. This data can be obtained by means of interviews / interviews with parties related to the object of research. In relation to this research, primary data can be obtained from the results of interviews with the principal, teachers who support vocational project subjects, students who receive vocational learning, school committees, parents/guardians of students. The questions asked were related to the implementation of Blended Learning in vocational project subjects at SMK Kristen 2 Tomohon.
2) **Secondary Data:** Secondary data is a source obtained from reading material. Secondary sources consist of various kinds of personal letters, diaries, minutes of association meetings, to official documents from various government agencies.

Data analysis in this study was carried out descriptively, qualitatively and interpretively. Data analysis was carried out by systematically arranging interview guidelines, field notes, library data to obtain knowledge from the data, then formulating it descriptively, then processing the data. The data analysis is divided into three stages, namely the stages of data reduction, presenting data, and concluding or verifying.

Data reduction is a process of selecting, focusing on simplification, abstracting, transforming rough data that emerges from field notes (Matthew Miles and Huberman, A.

Michael, 1992: 16). Operationally, the reduction was carried out continuously during the research. Then, make a summary of field data, codify, and formulate it. The results obtained are interpreted, then presented in a narrative form. Furthermore, the findings from the library and field data analysis were searched for their relationship. Check the validity of the data in the following way:

1. Extended Attendance
2. Triangulation (Triangulation)
3. Data Verification

The next step in the qualitative data analysis process is drawing conclusions based on the findings and conducting verification. The conclusions concluded are still temporary and will change if there is no strong evidence that contains at the next stage of data collection.

After the data is collected, then the writer analyzes it to get a conclusion, while to analyze the data the writer uses an inductive method or a synthesis analysis that starts from specific facts to draw general conclusions. After the data is processed in such a way the steps that have been taken by the author, then the next step is to draw the final conclusion by using the inductive method.

4. Result and Discussion

4.1 Description of the research site

This school was founded in 1967 known as, Tomohon High School of Economics and is located in the Tomohon Zion Church complex. The vision of the Christian Vocational School is "The realization of a vocational center of excellence that is religious, capable, independent and has a global dimension. The mission of SMK Kristen 2 Tomohon is defined as a representation of the elements of the vision and elements of the Pancasila Student Profile. The elements of the vision are moral, competent and responsible.

Self-development is a program carried out by SMK Kristen 2 Tomohon to give students the opportunity to develop and express themselves according to their needs, talents, and interests. For students' self-development, a block system is implemented with the available time allocation, in this case self-development activities in the form of scouting, Fantastic life skills and Great Learning Communities, matriculation, and guidance and counseling services.

4.2 Research Result

Christian Vocational School 2 Tomohon as a Center of Excellent Vocational School in 2022, and becoming a Center of Excellence Vocational School in 2021, currently for learning planning to implement an independent learning curriculum, we continue to strive so that every graduate from this school is truly qualified and ready to work. One of the innovative efforts developed in order to deal with emergency situations is the blended learning method, besides that it is hoped that in the future the use of blended learning can also continue to be implemented. The following describes the research findings based on observations, interviews and documentation studies regarding blended learning at SMK Kristen 2 Tomohon:

1. Implementation of blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon? After conducting observations, interviews and documentation studies, researchers found several things related to blended learning in vocational project subjects as follows:
   a. Blended learning requires preparation, both from schools, teachers of vocational project subjects, students and parents of students.
   b. To support blended learning activities, teachers and parents must prepare facilities that will be used by their children during blended learning activities, such as quotas, cellphones, laptops or computers.
   c. Schools, in this case the principal, vice principal in the curriculum field, the head of expertise programs and subject teachers, design a blended learning method in a management system that is easy to use in the application of blended learning.
   d. The subject teacher designs learning steps according to the lesson plans that have been made by the teacher and implements them using application platforms such as zoom meetings and google meet.
   e. The achievement of the subject matter of the expertise project showed a significant increase, this was due to the high enthusiasm of students in adjusting to the implementation of blended learning.
   f. Teachers of expertise project subjects give assignments to students both independently so that students practice and study at home so that the material presented by the teacher through the implementation of online blended learning will be better understood after doing the assignments given by the teacher. Practical learning is presented when students are present at school and carried out offline according to the schedule that has been prepared.
   g. The evaluation/exam is carried out by utilizing online test applications such as google forms which are then linked to the virtual/virtual google classroom or links from google forms that have been created by the teacher directly forwarded via whatsapp media. It is hoped that the use of this exam platform will allow students to train themselves considering the evaluation activities carried out by the ministry of education also use online exams.
   h. The absorption of the material delivered by the expertise project subject teacher showed a significant increase although for general subjects it was still unsatisfactory.
   i. Expertise project subject teachers continue to strive so that in blended learning activities students can play an active role, therefore before learning activities the teacher has uploaded subject matter that will be discussed as well as practice questions on the google classroom virtual class application and when the learning schedule arrives students can actively convey things related to learning material can even reveal what is not understood from the subject matter.
   j. Schools provide facilities and infrastructure support for online learning activities such as setting up a computer lab connected to the internet so that the implementation of blended learning by teachers goes well as expected.
   k. The types of applications used for distance learning in expertise project subjects are E-Learning, Whatsapp, Telegram, Zoom, Google meet, google form and google classroom and the media for carrying out blended learning are mobile phones and laptops/computers.

2. Factors that support and hinder the implementation of blended learning in the subjects of the Computer and

Network Engineering Vocational Project at SMK Kristen 2 Tomohon? Supporting factors:

a. Application platforms that support blended learning are very easy to obtain or download via the internet. The application is very user friendly making it easier for subject teachers and students.
b. Most of the teacher resources have been able to use learning technology well
c. Facilities and infrastructure in schools are very adequate in supporting blended learning

Obstacle factor

a. A small number of students are constrained in following and adjusting to this blended learning activity because their place of residence is far from the transmission point of the fast internet network.
b. There are students who are constrained in carrying out online learning activities because they do not have supporting devices such as mobile phones or computers and laptops as the main means of carrying out blended learning.
c. Lack of enthusiasm from students in participating in online learning which is influenced by social environmental factors.

3. The strategy adopted in implementing blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon? After observing, interviewing and studying documentation, the researchers found the efforts taken by schools, teachers and students to implement blended learning in vocational project subjects as follows:
   a. The school collects data on students who are constrained in participating in blended learning caused by limited internet quotas and then allocates part of the school operational assistance (BOS) funds to provide free quotas to students and the school also seeks to cooperate with internet providers to provide cheap quotas for students.
   b. For supporting facilities, the school urges parents to as much as possible facilitate their children with facilities such as cellphones or laptops.
   c. For students who live in remote areas where their area is not yet reached by the fast network, it is to provide study modules and guide books and include practice questions so that at certain times students and their parents deliver the answers to the practice questions given so that the teacher can measure the extent to which students' learning achievement at home.
   d. In order to control student activities at home, the teacher assigns students to make journals and documentation of learning activities carried out during asynchronous learning activities where students study independently.
   e. The school, especially the computer and network engineering department, chooses a good learning application platform according to the curriculum used and even develops a system management learning application so that the application of blended learning is more effective and efficient

4. The absorption of material by students in the implementation of blended learning subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon? After observing, interviewing and studying documentation, the researcher found that the achievement of learning skills project with the implementation of blended learning showed a significant increase, this was due to the enthusiasm of students following the blended learning procedure and also the independence of students trying to develop the subject matter that had been presented by the teacher by looking for references. linkage of online materials. In order to fulfill the completeness of the subject matter of the skill project presented to students, the subject teacher of the skill project uploads learning materials through Google Classroom or sends the subject matter directly to students via WhatsApp messages so that at any time students can learn the material that has been uploaded or sent to students. For practical learning activities that are carried out offline according to a predetermined schedule on every week, the subject matter teacher presents the expertise project through student practice at school.

4.3 Discussion

Analysis and description by comparing the relevant theoretical references, it is obtained a description that the implementation of blended learning at SMK Kristen 2 Tomohon is as follows:

1. Implementation of blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon? The application of blended learning at SMKS Kristen 2 Tomohon also adheres to a synchronous and asynchronous learning pattern where the school designs learning for material presented online where the teacher as a facilitator uploads materials and assignments in the form of tutorials and other innovative creative learning by utilizing an online learning platform that supports such as whatsapp, telegram, zoom, google classroom, google form so that students are expected to be able to study independently. For the fulfillment of practical activities, the skill project is carried out asynchronously or offline by compiling a schedule for student attendance at school to carry out practical activities in the student practice room.

Synchronous or online blended learning to make it easier for teachers of subject matter projects to interact with students using the instant messaging application WhatsApp or Telegram, the teacher posts materials that students want to study in class groups created by the teacher on the WhatsApp or Telegram application. The use of whatsapp and telegram media is very massive because this application is already very popular. The weakness of this application is the consideration of memory capacity or file storage on devices used by teachers and students, the more files that are posted on whatsapp or telegram, the more it will burden the memory capacity of teachers' and students' smartphones, this is because the main file media storage for whatsapp and telegram utilize the memory of the smartphone owner. Another weakness is that for conducting virtual meetings or video calls, it is limited to only 4 users so that it cannot accommodate all students in one class.

To carry out evaluations both mid-semester and semester, subject teachers combine face-to-face evaluation with a project presentation exam model and for online exam evaluation by utilizing applications such as google forms.

The use of this google form supports every type of evaluation that will be used by the teacher, both multiple choice, matchmaking, true false, essay and so on. Google forms can also be designed to help teachers get grades directly without having to check the results of students' answers who have answered questions on the google form. So that students can access the questions that have been made, the subject teacher must send a link to the question to students via WhatsApp or can use Google Classroom.

2. Factors that support and hinder the implementation of blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon? The implementation of Blended learning is developed based on internet online and uses a Learning Management System (LMS) platform that has been tested for reliability, so this platform has several advantages that support the implementation of Blended Learning activities, including:

a. Teachers and students can carry out a blended learning-based learning process using the LMS platform by utilizing several features provided in the LMS application to upload and download material to be studied in face-to-face learning and online learning;
b. Learners can take advantage of the chat interaction feature on the LMS platform to be able to communicate with teachers;
c. The LMS platform provides an environment where teaching and learning can generate student enthusiasm, students become more independent, without forgetting the standards for measuring student success;

4.3.1 Some of the weaknesses that can be a factor inhibiting the implementation of blended learning are as follows

a. The blended learning model has a dependence on the internet and electronic media. For students who have limitations in inadequate facilities and infrastructure, of course, it will be difficult to access learning. The learning management system used to support blended learning is highly dependent on a stable internet network. The facts on the ground show that there are still some students who do not have a communication tool or in this case a smartphone as the main support for learning. Students must take turns with their family members when they will carry out the online learning process. Another problem is that there are students who have smartphones but are still not supported, so the obstacle they face is that it is difficult to catch signals during learning.

In addition, for teachers and students, internet network problems are a problem that often occurs when participating in learning. Learning activities will stop when the signal or network is completely lost and this is clearly detrimental to students while studying. Another factor that hinders the implementation of online learning is the internet quota, which often runs out when learning is in progress, the need for quotas is the main thing in online learning.

b. Evaluation of online learning activities allows students to answer questions by getting answers online or help from their friends or also opening books that are not controlled by the subject teacher.

3. The strategy adopted in implementing blended learning in the subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon? The strategy for implementing blended learning at SMK Kristen

2 Tomohon is as follows

a. School Management. The implementation of blended learning management carried out at SMK Kristen 2 Tomohon is going well, this can be seen from the management planning, organizing, implementing and evaluating which is carried out according to the rules that have been designed in accordance with the independent curriculum guidelines that are guided in carrying out learning at SMK Kristen 2 Tomohon.
b. Teacher. Teachers as facilitators in the implementation of blended learning at SMK Kristen 2 Tomohon, in terms of mastery, presentation and learning methods as well as the use of application platforms that support blended learning are very good.
c. Students. Learning activities carried out at SMK Kristen 2 Tomohon online show that all students have good skills in operating the WhatsApp application and other applications as the main support for blended learning activities. Overall, the students of the computer and network engineering expertise program have good abilities, although there are some students who have moderate abilities in terms of absorption and completion of teaching materials provided by the teachers in learning activities.

4. The absorption of material by students in the implementation of blended learning subjects of the Computer and Network Engineering Vocational Project at SMK Kristen 2 Tomohon? The application of blended learning with synchronous and asynchronous models, in the synchronous model is carried out with an online system by utilizing effective learning application platforms such as whatsApp, telegram, Google classroom, zoom, Google meet, Google form and e-learning. The presentation of lesson theory is carried out online or in sync with the way the teacher prepares subject matter in the form of presentations, tutorials and learning videos. As for vocational practice, it is carried out offline or asynchronously by means of students coming to school according to a schedule that has been prepared by the school to hold practice in the student practice room under the direct guidance of skill project teachers. When all subject matter has been presented to students at the specified time, an evaluation is carried out to measure the extent to which the absorption of the material is understood by students.

In the research entitled: Application of Edmodo-Based Blended Learning in Class XI Vocational High School on Wave Material. This study also uses blended learning, but in this study the population of class XI students is used, while the research carried out in this thesis is focused on students of class X computer and network engineering. Another difference is that the blended learning media chosen in the research above is using Edmodo, while the research in this thesis reveals that the media used is a better learning media or platform than Edmodo. Edmodo does not yet support direct interaction learning by displaying video conferences, while the research in this thesis reveals that blended learning also uses application platforms such as zoom and google meet which can conduct video conferences in real time between teachers and students. The results of the study also both showed a more significant increase in learning after using the blended learning method.

5. Conclusion

1. Blended learning is carried out in the department / expertise program of SMKS Kristen 2 Tomohon carried out with good management, namely planning, organizing, implementing and evaluating. In the application of blended learning using a synchronous learning model based on an integration collaboration project between general subjects and productive subjects, while for asynchronous students study independently at home, of course, they are guided first by the teacher where the teacher explains the task or provides modules / learning materials that will be taught to students. learn during the asynchronous learning process. In the implementation of blended learning, subject teachers in expertise programs utilize supporting platforms such as whatsapp, telegram, google classroom, google form and e-learning.
2. The implementation of blended learning is supported by the availability of facilities in schools that are very adequate to support learning such as student practice rooms with practical equipment that are in accordance with IDUKA standards, the availability of fast internet networks from telkom providers. Most of the teachers as facilitators are professional teachers who are able to adapt to the development of learning technology. Students have an interest and enthusiasm for the application of blended learning. However, another obstacle encountered was that as a small number of students did not have supporting facilities such as computers/laptops or smartphones and data pulses as the main support for participating in blended learning.
3. The blended learning strategy applied is to combine offline and online learning. For theoretical lessons, it is carried out online, where currently SMKS Kristen 2 Tomohon has developed an e-learning application as a digital learning medium where the application is devoted to facilitating teachers and students in online learning. As for practical learning, learning is carried out offline (face to face) because the PBL Project Based Learning learning model currently applied at SMK Kristen 2 Tomohon, encourages students to be more involved in real practical learning. In carrying out practical activities, student attendance at school is arranged into 2 to 3 sessions, each session consisting of 10 to 15 students and for the duration of each learning session approximately 3 hours of lessons.
4. After analyzing the implementation of blended learning, it was concluded that the expertise project material, both theory and practice, was well absorbed, this was evidenced by the significant increase in student competence.

6. References

1. Bilfaqih & Qomarudin. Esensi Penyusunan Materi Pembelajaran Daring, Yogyakarta. Deepublish, 2015
2. Chaeruman, Uwes Anis. Ruang Belajar Baru Dan Implikasi Terhadap Pembelajaran Di Era Tatanan Baru. Jurnal Teknologi Pendidikan, 2020;08(01):142-153. https://doi.org/prefix 10.21831
3. Dwiyogo, Wasis D. Pembelajaran Berbasis Blended Learning. Depok: Raja Grafindo, 2018.
4. Gagne RM. The Conditions of Learning, New York: Holt, Renehart and Winston, 1977.
5. Hadisi, dan Muna. Pengelolaan Teknologi Informasi Dalam Menciptakan Model Inovasi Pembelajaran (E-Learning), Jurnal Al-Ta‟dib, 2015;8:127-132.
6. Husamah. Pembelajaran Bauran Blended Learning. Malang: Prestasi Pustakarya, 2014.
7. Kartika AR. Model Pembelajaran Daring. Journal of Early Childhood Care & Education, 2018, 27.
8. Khan B. Web Based Instruction, Educational Technology Publication. New Jersey: Englewood Cliffs, 1997.
9. Kusnayat A, Sumarni N, Mansyur AS, Zaqiah QY, Bandung UT. Pengaruh Teknologi Pembelajaran Kuliah Online Di Era COVID-19 Dan Dampaknya Terhadap Mental Mahasiswa. EduTeach : Jurnal Edukasi Dan Teknologi Pembelajaran, 2020;1(2):153-165.
10. Miles B, Mathew dan Michael Huberman. Analisis Data Kualitatif Buku Sumber Tentang Metode-metode Baru. Jakarta: UIP, 1992.
11. Mustofa, Chodzirin, Sayekti L. Formulasi Model Perkuliahan Daring Sebagai Upaya Menekan Disparitas Kualitas Perguruan Tinggi. Journal of Information Technology, 2019;01:154.
12. Nana Syaodih Sukmadinata. Metode Penelitian Pendidikan. Bandung: Remaja Rosda Karya, 2005.
13. Nasution. Metode Research Penelitian Ilmiah. Jakarta: PT Bumi Aksara, 2011.
14. Permendikbud No 23 Tahun 2016 tentang standar penilaian pendidikan kurikulum, 2013.
15. Poerwandari E. Kristi. Pendekatan Kualitatif dalam Penelitian Psikologi. Jakarta: Lembaga Pengembangan Sarana Pengukuran dan Pendidikan Psikologi Fakultas Psikologi UI, 2005.
16. Risdianto E, Fitria J, Johan H, Macariola JS. Teacher's Perception of Thermodynamic Law Module Developed in Training through Student's Critical Thinking Skills. Journal of Social Work and Science Education. 2020;1(1):78-86.
17. Suharsimi Arikunto. Prosedur Penelitian Suatu Pendekatan Praktik (edisi revisi II, Cetakan Kesembilan). Jakarta: Penerbit Rineka Cipta, 1993.
18. Thorne K. Blended learning: how to integrate online & traditional learning. London Ans Sterling. Kogan Page. Valiathan, Purnima 2002: Blended Learning Models, 2003.
19. Tim Redaksi Pusat Bahasa Depdiknas. Kamus Besar Bahasa Indonesia (Edisi ketiga). Jakarta: Balai Pustaka, 2001.
20. Uwes Anis Chaeruman. Pengembangan Model Desain Sistem Pembelajaran Blended. Desertasi, 2017. https://reserchagete.net/publication/324390089.
21. Littlejohn, Allison, Pegle, Chris. Preparing for blended e-learning, Routledge Taylor & Francis Group, 2007. ISBN10: 0–203–96132–3 (ebk)