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THE EFFECTIVENESS OF ICT UTILIZATION ON COGNITIVE ACHIEVEMENT IN THE VOCATIONAL EDUCATION DURING THE COVID-19 OUTBREAK IN INDONESIA

Efektivitas Pemanfaatan TIK terhadap Hasil Belajar Pendidikan Vokasi dan Kejuruan selama Pandemi Covid-19 di Indonesia

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ABSTRACT:

In the current Covid-19 transition period, it is very necessary to use innovative vocational learning models in digital models. The number of vocational learning models using ICT as the main tool during the pandemic needs to be studied further on how the model is implemented and its effectiveness. The problem that arises is that we do not know whether the use of ICT tools in vocational learning is effectively used. This study aims to empirically verify the effectiveness of ICT in vocational education learning during the Covid-19 transition period. Meta-Analysis is used as a method to conduct this research. There are 30 latest articles reviewed during the year of 2020 to 2021. All articles are classified based on the author, year of publication, the ICT device or application used, and the results of the post-test experimental and control classes. The results are obtained after the calculation using the effect size (ES) formula. The calculation results show that the learning using ICT as a tool during the Covid-19 pandemic has a high effect (1.28) on cognitive achievement in vocational education. The conclusion of this study is that ICT-assisted learning has a high level of effectiveness and is suitable for learning in the vocational field. Then, the dominant multimedia device or application used in the vocational learning in Indonesia is the computer technology network and it is the most widely used for the application of ICT in learning.

INTRODUCTION

Education is important in building the order of human life, especially in terms of improving the quality of human resources (Coombs et al., 2021). Humanity was shocked by the emergence of CoronaVirus Disease (Covid-19) in early 2020 and until now, it is still a global pandemic (WHO, 2019). All governments around the world are making various efforts to prevent or suppress the spread of this epidemic. Especially in Indonesia, the government implements various rules, ranging from implementing strict health protocols, physical distancing, to quarantine in several regions in Indonesia (Thorik, 2020).

The presence of the Covid-19 pandemic has had a major impact on many sectors, especially in the education sector. All schools and colleges in all countries are affected. However, Covid-19 can also be a good opportunity to accelerate the digitalization process in education (Almetwazi et al., 2020; Luyben et al., 2020). This good opportunity is not wasted by many educators.

Many educators are starting to take advantage of the ease use of supporting devices and applications based on the Information and Communication Technology (ICT) in their learning. The objective of utilizing ICT is to overcome the learning barriers, especially those caused by the current Covid-19 (Carolan et al., 2020; Fuller et al., 2020; Madrazo, 2020; Nguyen et al., 2020).

Efforts to apply information and communication technology in the field of education are marked by the presence of ICT-based media in educational institutions (Kozlova & Pikhart, 2021). The utilization of ICT-based media is a must in terms of supporting the era of global competition.

In learning, the media that are often used are audio, audio-visual, and internet media (Fransisca, 2017; Halidi et al., 2015). The greatest hope is that the application of ICT in education will be one alternative solution to improve the quality of education amid the current Covid-19 pandemic. The application of ICT in education is perceived to be very helpful during the current Covid-19 pandemic. ICT can be an alternative solution in implementing physical distancing as a way to prevent the spread of the epidemic (Adisel & Prananosa, 2020; Komalasari, 2020; Pakpahan & Fitriani, 2020).

The use of either online ICT media or other offline media by the internet connectivity that exists in each region in Indonesia is expected to be a way out for the sustainability of educational institution activities during the pandemic.

In the world of education, ICT plays a very important role in supporting the teaching and learning process (Anshori, 2019). Even after this pandemic ends, ICT will continue to be used in education, especially e-learning or blended learning (Mali & Lim, 2021).

Many terms exist to define what ICT is. In 2010 long before the internet became a necessity as it is today, UNESCO has outlined the scope of ICT in learning. Terms that are often used include Communication devices including their applications, radio, and television, cell phones, computers, and networks. The various application services related to these devices are no exception, such as distance learning, and video conferencing. The main function of ICT is the delivery of information in the form of data, video, audio, and so on (Onwuagboke et al., 2015). For more details, see the following Figure 1.

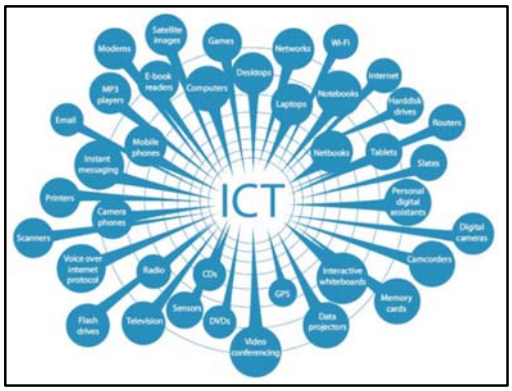

Figure 1. ICT Scopes by UNESCO

In Figure 1, it can be seen that dozens of devices can be classified as ICT-based supporting devices or applications. With the internet and its massive use today, the definition of ICT tools will continue to grow and increase. The world of education will increasingly utilize the invasion of ICT devices; and accordingly, teachers and students in Indonesia must quickly adapt themselves to this condition.

The great hope for the use of ICT in education is to accelerate efforts to develop Indonesian human resources to catch up with other countries. It was noted that Indonesia's Global Competitiveness Index based on the World Economic Forum 2020 was in the rank of 50 out of 141 countries (Schwab & Zahidi, 2020). This indicates that Indonesia is still weak in terms of the use of technology and efficiency of human resources.

Regarding the workforce, the government is currently struggling to overcome the unemployment that exists and keeps on increasing during this pandemic (Indayani & Hartono, 2020). One of the biggest contributors to the open unemployment rate is the level of vocational education, especially Vocational High School (SMK) (Churiyah & Sakdiyyah, 2020; Fiandra et al., 2017; Utama & Sukaswanto, 2020). The quality of

SMK graduates is currently still seen as far from the expected quality of graduates. One of the weaknesses of SMK graduates today is due to the weak digital literacy of students, especially at the SMK level.

In line with the development of ICT, educators are expected to be able to become facilitators as well as collaborators in the teaching and learning process in SMK, so that students can play a more active role (Prajana & Astuti, 2020). In addition, ICT integration is also said to be able to produce new learning experiences because, in the process, educators and students will act as technology users in a Virtual Learning Environment (VLE). VLE is a place for collaborating and interacting to deliver and utilize learning contents needed in the learning process (Wang et al., 2020). For this reason, this study examines and discusses the effectiveness of the use of ICT on cognitive achievement in the vocational education during the Covid-19 pandemic.

METHODS

The research method used in this study is a meta-analysis using secondary data. The secondary data in this study came from the post-test scores of the experimental and control classes in vocational education and some other articles implementing ICT-assisted learning during the Covid-19 pandemic.

The research articles reviewed are from national and international journals from the year of 2020 up to 2021 (Covid-19 started in the early year of 2020 and is still an epidemic when this article was written). There are 30 articles from research that used students' research subjects in the vocational field. The stages in this meta-analysis research can be divided into several stages as shown in the following Figure 2.

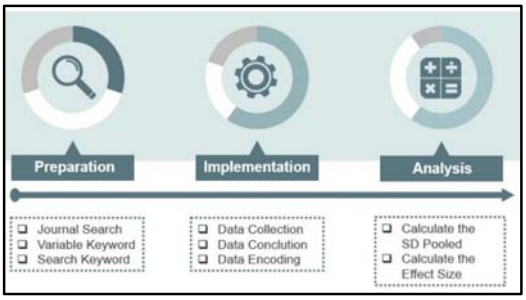

Figure 2. Meta Steps (Akhter et al., 2019)

Preparation

Preparation is the initial stage in meta-analysis. This stage is important because it determines the direction of the search and data collection afterward. At this stage, it will be determined what keywords will be used, what journals will be reviewed, and what variables will be used in collecting data based on keywords.

The following is an explanation of each stage in this preparation stage, namely:

1. Sources of data from Google Scholar on several vocational education journals published in the year of 2020 and 2021.
2. Keyword data based on the use of research variables, namely: independent variable: ICT integration in learning and dependent variable: cognitive achievement or learning outcomes.
3. Use the keywords: "ICT, ICT Integration, Multimedia, Virtual Learning Environment, Virtual Simulation, E-learning, Mobile Learning". Then each of these keywords is combined with the learning achievement keywords: "Learning Outcomes, Cognitive, Learning Ability, Competencies, Achievement".

Implementation

At the implementation stage, several steps will be carried out, namely:

Firstly, data collection. The data collection is based on the initial plan stated at the preparation stage. The data collection is carried out by entering the keywords specified for the analysis. Secondly, the data is collected and coded to make it easier to be read and process.

Analyzing Data

The analyzing data is the last stage as well as an important stage in the meta-analysis. At this stage, the data will be calculated and analyzed so that the data will become useful information. The collected data is calculated using the following effect size formula:

$$ES = \frac{M_e - M_c}{SD}$$

Explanation:

ES = Effect Size Value

Me = The average of the exp. class

Mc = The average of the cont. class

SD = Pooled standard deviation

$$SD = \sqrt{\frac{(N_e - 1){SD_E}^2 + (N_C - 1){SD_C}^2}{N_E + N_C - 2}}$$

After the "SD pooled" value is obtained, then the average value of the experimental class is reduced by the average control value, then divided by the standard deviation.

The calculation results will obtain a value, which is then interpreted with an effect size category table, which will be based on the results of this interpretation, the effect category of treatment is obtained.

In this case, the treatment is the application of ICT in learning in the vocational fields.

Table 1. Effect Size Criteria

Effect Size	Description
0,00 – 0,20	Weak Effect
0,21 – 0,50	Low Effect
0,51 – 1,00	Medium Effect
> 1,00	High Effect

RESULT AND DISCUSSION

After conducting a review of 30 research articles using ICT tools in vocational learning, the post-test results were obtained. Based on the researches conducted during the year 2020-2021 (during the Covid-19 pandemic), the post-test data obtained from each control and experimental class is presented in the following Table 2.

Table 2. Meta-Analysis Data

No.	Author	Year	ICT Tool	Educational Level	Post Test	
					Exp.	Con.
1.	(Rifai et al., 2020)	2020	Multimedia (Elect. Design Automation)	POL – AP	80,60	77,40
2.	(Satria & Basir, 2020)	2020	Multimedia (Macromedia Flash)	SMK - TKJ	85,00	77,40
3.	(Syawaluddin et al., 2020)	2020	Multimedia (Interactive CD)	SMK - TKJ and RPL	87,57	83,70
4.	(Novita & Harahap, 2020)	2020	Multimedia (Adobe Director 11)	SMK - TKJ	87,96	82,42
5.	(Nurdalilah & Desniarti, 2020)	2020	Unknown	SMK - TKJ	88,67	45,76
6.	(Utama & Sukaswanto, 2020)	2020	Unknown	SMK - TKR	80,70	77,45
7.	(Raini, 2020)	2020	Simulation (Virtual Lab. "PhET")	SMK - Farm	74,81	70,60
8.	(Rahayu & Prayitno, 2020)	2020	Multimedia (Video-Audio)	SMK - TKR	88,90	86,10
9.	(Peprizal & Syah, 2020)	2020	Internet (E-learning)	SMK - TITL	86,67	42,86
10.	(Purosad et al., 2020)	2020	Mobile Learning (Android)	SMK - OTKP	84,67	59,17
11.	(Irmayanti et al., 2020)	2020	Simulation (Comp. Aided Design "CAD")	VOK - D3 TB	86,67	76,67
12.	(Churiyah & Sakdiyyah, 2020)	2020	App (P-Cash based on Ms.Access)	SMK - OTKP	91,34	86,00
13.	(Tohadi et al., 2020)	2020	Simulation (4E-FTE Engine Simulator)	SMK - TKR	82,36	80,55
14.	(Hafizza et al., 2020)	2020	Multimedia (3D PageFlip)	SMK - Farm	82,53	71,20
15.	(Wardani & Harwanto, 2020)	2020	Internet (E-learning , Schoology)	SMK - TKJ and MM	75,11	61,51
16.	(Shafira & Akmal, 2020)	2020	Multimedia (Projected Motion)	SMK - JB	88,57	68,57
17.	(Karisoh et al., 2021)	2021	Internet (e-learning)	SMK - MM	89,20	76,70
18.	(Wahyudi et al., 2021)	2021	Mutimedia (Powerpoint)	SMK - TKJ and MM	90,31	88,16

19.	(Wahyudi et al., 2021)	2021	Simulation (Cisco Packet Tracer)	SMK - TKJ	81,25	75,25
20.	(Chandra Asmaradhana & Churiyah, 2021)	2021	Mobile Learning (Ispring Suite 9)	SMK - OTKP	86,00	62,00
21.	(Purnamasari & Kusdiyanti, 2021)	2021	Mobile Learning (Ispring Suite 9)	SMK - Unknown	90,00	77,00
22.	(Zulhelmi, 2021)	2021	Multimedia (Kvisoft Flipbook Maker)	SMK - TAV	73,38	65,00
23.	(Febrinawati & Arief, 2021)	2021	Multimedia (Kvisoft Flipbook Maker)	SMK - OTKP	88,39	79,75
24.	(Nailufar & Susilowibowo, 2021)	2021	Multimedia (Mind Mapping)	SMK - AK	85,00	78,00
25.	(Robbi & Churiyah, 2021)	2021	Mobile Learning (Flip Pdf Pro Maker)	SMK - OTKP	87,00	73,00
26.	(Oktarina et al., 2021)	2021	Multimedia (Flip Book)	SMK - TKJ	76,14	71,34
27.	(Badruttamam & Hadromi, 2021)	2021	Multimedia (Android-Based Int. Job sheet)	SMK - TKR	72,07	71,30
28.	(Fatahillah et al., 2021)	2021	Multimedia (Macromedia Flash)	SMK - TKJ	93,06	51,13
29.	(Pangkerego et al., 2021)	2021	Internet (e-learning)	SMK - TKJ	73,40	65,30
30.	(Meidyanti et al., 2021)	2021	Multimedia (Mobile-Smartphone)	SMK - AK	94,00	89,00
			Average		**84,38**	**72,34**

Description:
POL: Polytechnic; VOK: Vocational College; SMK: Vocational High School; TKJ: Computer and Network Engineering; AP: Aviation Polytechnic; RPL: Software Engineering; MM: Multimedia; OTKP: Office Automation and Governance; TKR: Light Vehicle Engineering; FARM: Pharmacy; TAV: Audio-Video Engineering; TITL: Electrical Power Installation Engineering; AK: Accounting; JB: Catering Service; TB: Fashion.

After the data has been compiled and the average value of the experimental and control classes found, the next step is to look at the general comparison of the post-test scores between the experimental and control classes.

To easier analyze the post-test data, the post-test data collection is presented in the graphical form shown in the following Figure 3 and Figure 4.

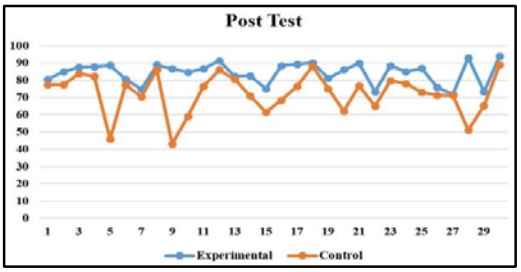

Figure 3. Post Test Score Comparison

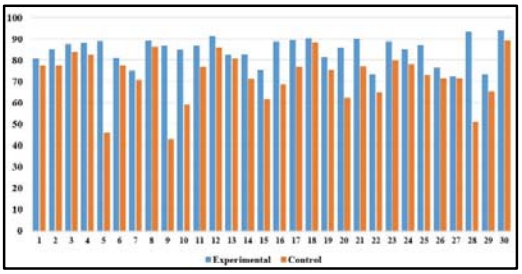

Figure 4. Post Test Score Tabulation

After the posttest value data for the experimental and control classes were collected, the average value for the experimental class was known to be: 84.38, the control class average score: 72.34, and the pooled standard deviation was to be: 9.36. Then, the final value of the effect size is calculated using the effect size formula. The result of the final value was 1.28. The value of 1.28 is interpreted as a high effect (>1.00). The calculation is as follows.

$$SD = \sqrt{\frac{(N_e - 1)SD_E{}^2 + (N_C - 1)SD_C{}^2}{N_E + N_C - 2}}$$

$$SD = \sqrt{\frac{(30 - 1)6.17^2 + (30 - 1)11.71^2}{30 + 30 - 2}}$$

$$SD = \sqrt{87{,}72} = \mathbf{9.36}$$

$$ES = \frac{M_e - M_c}{SD} = \mathbf{1.28}$$

Looking at ICT devices or applications that are often integrated into learning, it can be seen in Figure 5 below.

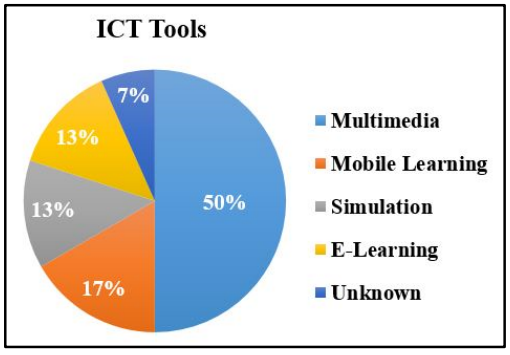

Figure 5. ICT Tools Used in Vocational Education

Figure 5 says that multimedia devices or applications are dominantly used in vocational learning in Indonesia (Kuswanto & Walusfa, 2017). Multimedia is a combination of more than one type of media such as text (alphabetical or numeric), symbols, images, audio, video, and animation usually presented with the help of technology that aims to improve understanding (Abdulrahaman et al., 2020). This was followed by the use of mobile learning to support the use of ICT in the learning stated by almost 17% of the total 30 articles analyzed in this study.

Then, the second largest is the mobile learning which is also widely used in terms of supporting cognitive achievement in vocational education, especially at the SMK level. Learning models utilizing mobile learning is different from the traditional learning models because they provide a great opportunity to make the learning environment more lively, portable, connected, and individualized (Mac Callum et al., 2014).

Taking into consideration the education level and the major use of ICT integration carried out in learning, the data is then generated as shown below. It can be seen that the vocational education level with the most ICT integration based on 30 articles collected and analyzed in this

study is in the vocational education level, in which the Computer and Network Engineering (TKJ) major is in the top position.

According to the researcher's interpretation, the reason for being a lot of ICT-assisted learning in the TKJ department is because TKJ is a cluster of technological expertise, specifically computer engineering and informatics (Untari et al., 2015). ICT-assisted education level data is presented in the following Figure 6.

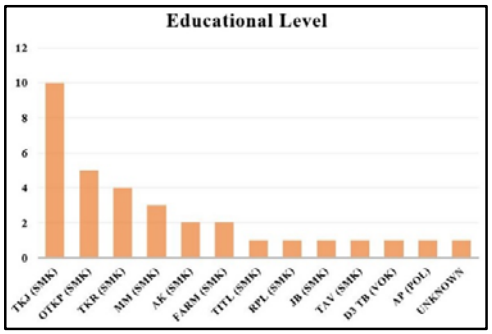

Figure 6. Education Levels Apply ICT

Researchers assume that applying computer-assisted learning in learning in the TKJ department, will be very easy because the students have been familiar and accustomed to the information technology. It means that the students will have no difficulty in understanding the steps of how to interact in a virtual, simulated, or digital environment.

CONCLUSION

The effectiveness of using ICT in learning vocational education has a high effect. This is based on the result of data analysis which comes out with an effect size value of 1.28. If the effect size value is more than 1.00, it is classified to be high. Then, the ICT tools and applications frequently utilized are multimedia-based which of course combined with images, audio, video, and animation.

REFERENCES

Abdulrahaman, M. D., Faruk, N., Oloyede, A. A., Surajudeen-Bakinde, N. T., Olawoyin, L. A., Mejabi, O. V., Imam-Fulani, Y. O., Fahm, A. O., & Azeez, A. L. (2020). Multimedia tools in the teaching and learning processes: A systematic review. *Heliyon*, *6*(11), e05312.

Adisel, A., & Prananosa, A. G. (2020). Penggunaan Teknologi Informasi dan Komunikasi dalam Sistem Manajemen Pembelajaran pada Masa Pandemi Covid 19. *Journal Of Administration and Educational Management*, *3*(1), 1–10.

Akhter, S., Pauyo, T., & Khan, M. (2019). What is the difference between a systematic review and a meta-analysis? *Basic Methods Handbook for Clinical Orthopaedic Research*, 331–342.

Almetwazi, M., Alzoman, N., Al-Massarani, S., & Alshamsan, A. (2020). Covid-19 impact on pharmacy education in Saudi

Arabia: Challenges and opportunities. *Saudi Pharmaceutical Journal*, *28*(11), 1431–1434.

Anshori, S. (2019). Pemanfaatan Teknologi Informasi Dan Komunikasi Sebagai Media Pembelajaran. *Civic-Culture: Jurnal Ilmu Pendidikan PKn Dan Sosial Budaya*, *2*(1), 88–100.

Badruttamam, M., & Hadromi, H. (2021). Development Of Android-Based Interactive Jobsheet On Electrical Measuring Equipment Materials In Vocational School. *Journal of Educational Research and Evaluation*, *10*(1), 46–56.

Carolan, C., Davies, C. L., Crookes, P., McGhee, S., & Roxburgh, M. (2020). COVID 19: Disruptive impacts and transformative opportunities in undergraduate nurse education. *Nurse Education in Practice*, *46*(May), 102807.

Chandra Asmaradhana, G., & Churiyah, M. (2021). Meningkatkan hasil belajar dan kemandirian peserta didik dengan menggunakan media pembelajaran mobile learning berbasis ispring suite 9. *Jurnal Ekonomi, Bisnis Dan Pendidikan*, *1*(3), 251–262.

Churiyah, M., & Sakdiyyah, D. A. (2020). P-Cash App Based on Microsoft Office Access to Improve Learning Outcomes of Vocational High School Students. *Sys Rev Pharm*, *11*(7), 8.

Coombs, C., Stacey, P., Kawalek, P., Simeonova, B., Becker, J., Bergener, K., Carvalho, J. Á., Fantinato, M., Garmann-Johnsen, N. F., Grimme, C., Stein, A., & Trautmann, H. (2021). What is it about humanity that we can't give away to intelligent machines? A European perspective. *International Journal of Information Management*, *58*.

Fatahillah, A. M., Mustamir, & Nurjannah. (2021). Keefektifan Aplikasi Macromedia Flash Terhadap Pembelajaran Pendidikan Agama Islam Pada Kelas X SMKN 1 Sinjai. *Jurnal Kajian Islam & Pendidikan*, *13*(1), 1–6.

Febrinawati, S. I., & Arief, M. (2021). Meningkatkan Hasil Belajar Peserta Didik Dengan Menggunakan E-Modul Berbasis Kvisoft Flipbook Maker. *Prosiding Seminar Nasional Kelompok Bidang Keahlian ADP 2021*, *April*, 205–211.

Fiandra, Y. A., Defit, S., & Yuhandri, Y. (2017). Penerapan Algoritma C4.5 untuk Klasifikasi Data Rekam Medis berdasarkan International Classification Diseases (ICD-10). *Jurnal Rekayasa Sistem Dan Teknologi Informasi*, *1*(2), 82–89.

Fransisca, M. (2017). Pengujian Validitas, Praktikalitas, dan Efektivitas Media E-Learning di Sekolah Menengah Kejuruan. *Jurnal Ilmiah Pendidikan Teknik Elektro*, *2*(1), 17.

Fuller, S., Vaporciyan, A., Dearani, J. A., Stulak, J. M., & Romano, J. C. (2020). Covid-19 Disruption in Cardiothoracic Surgical Training: An Opportunity to Enhance Education. *Annals of Thoracic Surgery*, *110*(5), 1443–1446.

Hafizza, A., Edidas, & Jama, J. (2020). The Development of Learning Modules Based on Electronic Books on the Subject of Analyzing Tablet Formulations Using 3D PageFlip Professional. *Global Conferences Series: Social Sciences, Education and Humanities*, *5*, 76–82.

Halidi, H. M., Husain, S. N., & Saehana, S. (2015). Pengaruh Media Pembelejaran Berbasis TIK Terhadap Motivasi dan Hasil Belajar IPA Siswa Kelas V SDN Model Terpadu Madani Palu. *Jurnal Mitra Sains*, *3*(1), 53–60.

Indayani, S., & Hartono, B. (2020). Analisis Pengangguran dan Pertumbuhan Ekonomi sebagai Akibat Pandemi Covid-19. *Jurnal Ekonomi & Manajemen*, *18*(2), 201–208.

Irmayanti, I., Suryani, H., & Achmadi, T. A. (2020). Pengaruh Penerapan Video Tutorial CAD Pembuatan Pola Blus terhadap Peningkatan Kompetensi Mahasiswa. *Jurnal Teknologi Busana Dan Boga*, *8*(2), 171–178.

Karisoh, B. I., Kaparang, D. R., & Agustinus, T. (2021). Pengaruh Model Pembelajaran Blended Learning Terhadap Hasil Belajar Teknik Animasi 2D Dan 3D Siswa SMK. *Jurnal Pendidikan Teknologi Informasi Dan Komunikasi*, *1*(3), 100–109.

Komalasari, R. (2020). Manfaat Teknologi Informasi Dan Komunikasi Di Masa Pandemi Covid 19. *Tematik*, *7*(1), 38–50.

Kozlova, D., & Pikhart, M. (2021). The use of ICT in higher education from the perspective of the university students. *Procedia Computer Science*, *192*, 2309–2317.

Kuswanto, J., & Walusfa, Y. (2017). Pengembangan Multimedia Pembelajaran pada Mata Pelajaran Teknologi Informasi dan Komunikasi Kelas VIII. *Innovative Journal of Curriculum and Educational Technology*, *6*(2), 58–64.

Luyben, A., Fleming, V., & Vermeulen, J. (2020). Midwifery education in Covid-19- time: Challenges and opportunities. *Midwifery*, *89*, 102776.

Mac Callum, K., Jeffrey, L., & Kinshuk. (2014). Comparing the role of ICT literacy and anxiety in the adoption of mobile learning. *Computers in Human Behavior*, *39*, 8–19.

Madrazo, J. A. (2020). New Challenges and Opportunities for

Echocardiographic Education during the Covid-19 Pandemic: A Call to Focus on Competency and Pathology. *Journal of the American Society of Echocardiography*, *33*(8), 1048–1049.

Mali, D., & Lim, H. (2021). How do students perceive face-to-face/blended learning as a result of the Covid-19 pandemic? *International Journal of Management Education*, *19*(3), 100552.

Meidyanti, W. E., Kantun, S., Hartanto, W., & Sutrisno, B. (2021). Pengembangan Media Pembelajaran Berbasis Teknologi Informasi Dan Komunikasi Pada Materi Pokok Jurnal Khusus Untuk Kelas XI Akuntansi SMK Negeri 1 Jember. *Jurnal Pendidikan Ekonomi*, *15*(1), 123–129.

Nailufar, Z., & Susilowibowo, J. (2021). Studi Penggunaan Lembar Kegiatan Peserta Didik (Lkpd) Berbasis Mind Mapping. *Jurnal Pendidikan Ekonomi*, *15*(1), 50–59.

Nguyen, K. D., Enos, T., Vandergriff, T., Vasquez, R., Cruz, P. D., Jacobe, H. T., & Mauskar, M. M. (2020). Opportunities for education during the Covid-19 pandemic. *JAAD International*, *1*(1), 21–22.

Novita, R., & Harahap, S. Z. (2020). Pengembangan Media Pembelajaran Interaktif Mata Pelajaran Sistem Komputer di SMK. *Jurnal Informatika*, *8*(1), 36–44.

Nurdalilah, N., & Desniarti, D. (2020). Pengaruh Penggunaan Media Belajar TIK Terhadap Hasil Belajar Matematika Siswa. *Prossiding Seminar Hasil Penelitian 2019*, 466–476.

Oktarina, R., Giatman, M., Muskhir, M., & Effendi, H. (2021). The Effect of The Use of Multimedia Flip Book With the Flipped Classroom Approach in Vocational School Rahmi. *Journal of Education Technology*, *3*(1), 159–166.

Onwuagboke, B., Singh, T., & Fook, F. (2015). Need for ICT Integration for Effective Instructional Delivery in Nigerian Colleges of Education. *Journal of Education and Practice*, *6*(3), 51–56.

Pakpahan, R., & Fitriani, Y. (2020). Analisa Pemafaatan Teknologi Informasi Dalam Pemeblajaran Jarak Jauh Di Tengah Pandemi Virus Corona Covid-19. *Journal of Information System, Applied, Management, Accounting and Researh)*, *4*(2), 30–36.

Pangkerego, K. A. J., Sojow, L., & Manggopa, H. K. (2021). Pengaruh Blended Learning Terhadap Hasil Belajar Simulasi dan Komunikasi Digital Siswa kelas X SMK Negeri Tomohon. *Jurnal Pendidikan Teknologi Informasi Dan Komunikasi*, *1*(1), 53–66.

Peprizal, & Syah, N. (2020). Pengembangan Media Pembelajaran

Berbasis Web Pada Mata Kuliah Fisika Modern. *Jurnal Ilmiah Pendidikan Dan Pembelajaran*, *4*(3), 455–467.

Prajana, A., & Astuti, Y. (2020). Pemanfaatan Teknologi Informasi dan Komunikasi Dalam Pembelajaran oleh Guru SMK Di Banda Aceh dalam Upaya Implementasi Kurikulum 2013. *Jurnal Inovasi Teknologi Pembelajaran*, *7*(1), 33–41.

Purnamasari, D. I., & Kusdiyanti, H. (2021). Meningkatkan kemandirian dan hasil belajar peserta didik dengan menggunakan Mobile Learning PERSIKA berbasis Ispring Suite 9. *Jurnal Ekonomi, Bisnis Dan Pendidikan*, *1*(6), 569–578.

Purosad, A., Darmawan, D., & Ratnasafitri, E. (2020). Implementasi Model Pembelajaran Mobile Learning Berbasis Android Dalam Meningkatkan Prestasi Belajar Siswa Pada Pembelajaran Bahasa Inggris. *Jurnal Teknologi Pendidikan Dan Pembelajaran*, *3*(1), 903–914.

Rahayu, D. R., & Prayitno, E. (2020). Minat dan Pemahaman Konsep siswa dalam Pembelajaran Ber-basis Problem Based Learning Berbantuan Media Video. *Jurnal Pendidikan IPA Veteran*, *3*(1), 69–80.

Raini, Y. (2020). Pengaruh Media Laboratorium Virtual (Phet) Terhadap Kemampuan Praktikum Kimia Siswa Smk Taruna Terpadu Bogor. *Jurnal Teknologi Pendidikan*, *5*(2), 77–85.

Rifai, M., Masitoh, S., Bachri, B. S., Setyawan, W. H., Nurdyansyah, & Puspitasari, H. (2020). Using electronic design automation and guided inquiry learning model in higher engineering education. *Universal Journal of Educational Research*, *8*(7), 2946–2953.

Robbi, H. M. F., & Churiyah, M. (2021). Meningkatkan hasil belajar peserta didik dengan menggunakan Mobile Learning berbasis Flip Pdf Pro Maker (myflip). *Jurnal Ekonomi, Bisnis Dan Pendidikan*, *1*(6), 517–525.

Satria, H., & Basir, A. (2020). Implementasi Media Interaktif Berbasis Macro Mediaflash Pada Mata Pelajaran Sistem Pengendali Elektromagnetik. *Jurnal Pendidikan Teknik Elektro*, *05*(02), 16–23.

Schwab, K., & Zahidi, S. (2020). The global competitiveness report: How countries are performing on the road to recovery. In *World Economic Forum*.

Shafira, M., & Akmal, N. (2020). Pengaruh Penggunaan Media Projected Motion Terhadap Hasil Belajar Boga Dasar SMK Negeri 10 Medan. *Jurnal Pendidikan Tata Boga*, *4*(2), 42–47.

Syawaluddin, F. A., Yana, R. F., Siagian, T. N., & Watrianthos, R. (2020). Efektifitas Media ICT dalam Meningkatkan Motivasi Belajar dan Hasil Belajar Pendidikan Agama Islam Kelas X SMK Swasta Siti Banun Rantauprapat Kabupaten Labuhan Batu. *Pena Cendikia*, *02*(01), 18–26.

Thorik, S. H. (2020). Efektivitas Pembatasan Sosial Berskala Besar Di Indonesia Dalam Penanggulangan Pandemi Covid-19. *Adalah : Buletin Hukum Dan Keadilan*, *4*(1), 115–120.

Tohadi, T., Samani, M., & Susila, I. W. (2020). Development of the 4E-FTE Engine Simulator Trainer to Improve Learning Outcomes through Problem Based Learning. *International Journal for Educational and Vocational Studies*, *2*(8), 702–707.

Untari, R. S., Mukhadis, A., & Waras, W. (2015). Kesiapan Guru SMK Program Keahlian Teknik Komputer dan Informatika dalam Pelaksanaan Kurikulum 2013. *Jurnal Teknologi Dan Kejuruan*, *38*(1), 1–14.

Utama, K. O. D., & Sukaswanto, S. (2020). Pengaruh Model Pembelajaran Project Based Learning Terhadap Hasil Belajar Dan Keaktifan Belajar Siswa Di Smk Negeri 1 Ngawen. *Jurnal Pendidikan Vokasi Otomotif*, *2*(2), 79–92.

Wahyudi, S., Astuti, A., & Harahap, Y. (2021). Pengaruh Pemanfaatan Video Pembelajaran Terhadap Hasil Belajar Siswa Smk Negeri 1 Rambah Samo Dalam Mata Pelajaran Sistem Komputer Kelas X Teknik Komputer Dan Jaringan. *Journal of ICT Aplications and System*, *1*(1), 13–22.

Wang, R., Lowe, R., Newton, S., & Kocaturk, T. (2020). Task complexity and learning styles in situated virtual learning environments for construction higher education. *Automation in Construction*, *113*(September 2019), 103148.

Wardani, M. A. P., & Harwanto, R. (2020). Penerapan Strategi Pembelajaran Berbasis ICT terhadap Pencapaian Hasil Belajar Sistem Komputer Siswa. *Jurnal Ilmiah Kependidikan*, *7*(2), 99–106.

WHO. (2019). *Naming the coronavirus disease (Covid-19) and the virus that causes it*.

Zulhelmi, Z. (2021). Pemanfaatan Kvisoft Flipbook Maker dalam Rangka Peningkatan Hasil Belajar Peserta Didik. *Jurnal Imiah Pendidikan Dan Pembelajaran*, *5*(2), 217.