Optimizing the Digital Education Technology in Learning Management System Design During and Post-Covid-19 Pandemic in Society 5.0

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Abstract. The use of digital devices has increased since the global pandemic was officially declared by the world health agency on March 11, 2020. The increase in the use of digital devices is marked by an increase in internet use by up to 40% where virtual services and activities are urgently needed during the Covid-19 pandemic. The community's economic is also affected by the pandemic, but on the other hand all needs must be fulfill including the use of digital devices, smartphones which have become ubiquitios in the current digital era. Basic knowledge of the use of digital devices is needed to maximize the use of digital devices in daily use. Digital devices such as mobile phones, tablets, laptops, personal computers became ubiqutos in a short time which also became part of the technology driven force. As ubiquitos in life, the current digital device of society must be optimized than change with new one while the impact of pandemic affect the economic's society. In this case, the society 5.0 define that human and technolgy will live side by side to improve the human life quality on sustainable based. The specifications of the processor, memory, input and output devices, data transmission technology in terms of hardware, software updates used need to be understood including developments and updates of devices that needed, so all digital activities can run well. This digital interaction occurs in almost all human life activities, include the essensial sector like education, health, work, business, banking, shopping and many more.To fulfill the need for using digital devices in the pandemic era, analyzes the needs and specifications for usage requirements, including interactions the using of icon on digital devices, especially in education interaction. Learning management need to apply at all level of education during the complex obstacles such as digital devides, human resources that related to computer and internet literacy. The optimization use of digital device could give many advantages to community, especially in education as one of priority target. During and post covid-19 pandemic, education could be one of the best way to recover the community health and prepare entering the new normal which many field dominated by digitalization.

Keywords: Ubiquitos · Digital native · Compuional thinking · SST · Digitalization

1 Introduction

Digital technology in learning could help accelerate learning with the ability to adapt to the needs of learners in addition to facilitating learning administration such as learning process control, evaluation process and learning outcomes. In wholeistic learning, other important notes need to be documented, such as individual academic abilities that require special attention. The application of digital learning requires preparation in terms of content and non-content, such as understanding the use of digital aids, interaction with the equipment used so that learning activities can run well. "to date, those wo have gainned the most from it have bee consumers able to afford and access the digital world; technology has made possible new product and services that increase the efficiency and pleasure of our personal lives." (The Fourth Industrial Revolution, art. 2016). Before pandemic, digital application have been precedented to be applied in almost all aspect of human life.

World Economic Forum in 2015 made a survey of 800 high tech expert and executives determined a series of dates by which tipping points would be reached [1] "A survey of 800 high tech experts and executives determined a series of dates by which tipping points would be reached. Examples include implantable cell phones by 2025, 80% of people with a digital presence by 2023, 10% of reading glasses connected to the internet by 2023, 10% of people wearing internet connected clothes by 2022, 90% of the world population with access to the internet by 2024, 90% of the population using smartphones by 2023, 1 trillion sensors connected to the internet by 2022, over 50% of internet traffic directed to homes and appliances by 2024, driverless cars making 10% of all cars in the US by 2026, and many other outcomes such as AI members of the board of directors, Ai auditors and robotic pharmacists, proliferation of bitcoin in the economy, 3D printed cars by 2022, transplants of 3D printed organs such as livers by 2024, and several others" (*World Economic Forum, 2015*, n.d.). These number researches serve before pandemic, and we are sure that number of internet and digital connection was increased as report by Kompas, in June 2022, the internet user in Indonesia reach 210 million [2]) and according to general head of APJII (Asosiasi Penyelenggara Jasa Internet Indonesia) Mr. Muhammad Arif internet user in Indonesia reach 77,02% in August 2022 (Liputan6.com, 2022). In this situation, the digital literacy need to undertand for majority people in Indonesia.

Observations in North Halmahera district, especially in the city of Tobelo, the number of teaching staff with an Information and Communication Technology Education background varies greatly, we found there are even schools that have more than 1000 students, and do not have any teachers with information technology education backgrounds. Digital literacy is needed in the era of society 5.0 in the rapid development of more complex information and communication technology advances which are spurred by the increasing use of information technology in the era of the new normal order caused by covid-19. This pandemic has become a signifiicant global obstacle as it has impacted people's lives in various sectors, includeing social, economic and education [3].

Digitalization occurs in almost all areas of human life, including essential fields such as Education, Health, Government, Employment, and Economy including Banking and even in life itself. The complexity of digital development and its use requires proper

analysis so that its use can be optimal. Adjustments to local conditions are adjusted to the level of education and regional needs, so that program targets in the field of education can be achieved, including the use of regional languages and cultures that have the potential to become extinct. The use of digital technology in learning by emphasizing the ease and quantity of learning targets can provide maximum results in its achievement, not only in learning regional languages in local contexts, but other foreign languages in a global context and Indonesian as a unifying language.

The role of digital technology in learning can help targets in education management including accelerating the dissemination of learning materials and objectives as well as administration in essential learning activities such as good local language and indigenous learning. This research focus on digital education with the case of language and indigenous culture. Halmahera Utara, Capital Tobelo, consist of 197 village with 197.638 population live in 3.891,62 km2 which located $1^057'$ North Latitude – $3^000'$ South Latitude and $127^017'$ East Longitude – $129^008'$ East Longitude (Pemkab Halut, 2022). Said to say that this area was experiencing mass riot in 1999–2000, with the atmosphere of research need to adjust with the situation of interviewee that have conflict several decade ago. In this research, we face with the situation both academic and management also the social condition which very challenges. In academic side, educational background of the teacher, computer and internet lliteracy, and ages of the teacher could be the factors that obstruct in digital learning. The using of sofware used could need time and efford to adaptate. The teacher with the academic side that less support with ITC literacy and computional thinking, need more efford to run the digital learning as mention. Related to education management to run the digital learning, the system design need to adjust with the culture and habit which has occurs for many years. Learning activities, evaluation, curriculum/sillaby target, need to transfer from conventional way, to digital way which is realized very chalangging. Human computer interaction need step by step change the culture to adaptate the conventional teacher to be familiar machine/screen interaction. Teacher that born on digital native, normally could easy to adaptate compare with the teacher that born earlier. But we have to realize that not all teacher come from that generation was difficult to adaptate with the new digital interface, because it also depend on the teacher it self. In my experience to train the teacher with application office at the one of good high scool in Manado, we found 2 teacher from 20 teacher in 2003 that could adaptate well with the computer interaction using office application. The teacher ages at that time arround 55 years old.

Digital interaction need to train to the teacher that still need time to adaptate. Besides the new way to inteact, the tool that used, they have any vorious of platform, like smart phone, tablet, laptop, personal computer and any other more. Besides the various of platform in type, the various platform of softwares used to inteact also exist in many platform. There are still upgrade and update software version that need to follow in order to make the digital tools run well. This update is a must and this features also need the good internet connection to finish complete download so the digital toll will be "up to date" condition both hardware and software. This problem need to fix with the human resource that understand well the hardware and software used and usually graduated from proper education background and uptodate with the current ICT issues. As we

know that update is almost every day and the tools need to be always connected to the internet.

In Tobelo, Halmahera Utara, consist of 197 villages that there are school in every village; elementary and junior high school. According to head of Telkom in Tobelo, almost all villages in Tobelo have coverage with mobile signal, even in various strength of mobile signal. Almost all school in Tobelo city have connected with cable internet connection (called Indihome and some ASTInet for commercial sale). But in fact, the Indihome capacity still reach 50% of maximum 8000 (eight thousand) satuan sambungan telepon (sst). There are still 4000 (four thousand) that still not used. Discussed with the head of Telkom company in Tobelo, the people in this area still think that they still not realize the benefits of internet. Besides the price was to expensive for some society, but there are people with economics side seems able to subsribe, but they didn't. This happened to the area near mining company Nusa Halmahera Minerals (NHM). There are arround 2000 telephone connected from 4000 (four thousand) capacity near that mining area. Thera are Telkom connection (ASTInet and Indihome) and broadband connection from Kominfo (Komunikasi dan Informatika) Department. So the connection established was well prepared, but in implemetation there are some difficulties related to technical, management and human resources.

The threat that we face related to government regulation, such as the changes of education from National Education, Education and culture, Tourism and Culture that implicate was quite difficult to find the archieves. For example, to find the Tobelo dictionary, we have to search for the people that ever involved in that program. Also the difficulties that related to the conflict area, which in 1999 and 2000 there were rush conflict in this area which thousands of victim. In interview, there was any atmosphere that could be feeling as interviewer that we are going to interogate them. Lucky for us there are several teacher and worker graduated from researcher universities, but the atmosphere impact as ex conflict area still affect during the interaction. Government of Halmahera Utara initiated Hibualamo in 2015, mean the big house, the indigenous community of north Halmahera by the decision letter of Bupati Halmahera Utara, in his exelency, Ir.HeinNamotemo, M. SP nomor: 189/133/HU/2015 tentang Pengakuan dan Perlindungan Masyarakat Hukum Adat Hibualamo sebagai Kesatuan Masyarakat Hukum Adat Kabupaten Halmahera Utara. The former regency of Halmahera Utara, Hein Namotemo said: "In that forum I was threatened with death. After the break for Friday, the person who made bad word of me advised me. I did say what war is for, education is gone, teachers are no longer there, there is no use for war, we make peace and we build our country. A week later, friends who refused to reconcile apparently changed. Apparently they thought". According to United Nation:" the Covid-19 pandemic has created the largest of education system in history, affecting nearly 1.6 billion learner in more than 190 countries and all continents" (UN: Covid-19 and Education August 2020.Pdf, n.d.) The role of government in this area ought to be significant expecially to develop the community from all aspect of life, which our believe, could be start from education.

2   Research Method

There are numerous platform have been used to understand the application of technology in education include e-learning and online learning. Technological Acceptance Model is one of widely used and reported that benefits in social sciences context model. The used of Web 2.0 was in exponential growth of exploration arround the pegagogical use in recent years, especially in China [4]. Another methodology, called Methodology Survey Database Index via Web 2.0 could be a powerful lure for an organization while the interactively promises to bring more employees into daily contact at lower cost [5]. Web based searching and the digital education interaction could be adjustable way to reach the purpose in adequate way. In epidemic era, it could be one of most effective way to run learning activities. We could adjust the mode of synchronus and asynchronous depend on the situation needed for learning activities.

The classic method also being used, such as a field observation, interview, literature study. We did interview with head of education authorities, Planning department, curricullum section, several school headmaster and teacher, head of communication and informatics department, head of Telkom in Halmahera Utara. Interview at Sekolah Menengah Pertama (SMP) Negeri I Tobelo was done with headmaster and head of curricullum section. Recapitulation at 10 September 2022, there are 1107 students [6, 7] with 3 (three) teacher with information and communication technolgy (ICT) background. This school are lucky while they have three teachers with ICT background, two of them graduated from my institution, Universitas Negeri Manado. Student in this school was various, while they came from variety background. The situation was different with Sekolah Menengah Atas (SMA) Kristen I Tobelo, with students also more than one thousand (1000) and do not have teacher with ICT background. Teacher with religion education background teach at ICT subjek, for the learning application like google classroom, Whatsapp application run well, but said difficult to explain core in ICT subject like programming, network and computer system. Sekolah Dasar (SD) Gereja Masehi Injili Halmahera (GMIH) 4 Tobelo, have experienced with digital learning used application, only 2 students from 30 students could interact well.

3   Result and Discussion

Regarding the use of information and communication technology in learning, the readiness to use technology during the covid period can be said to start from the beginning in SMP Negeri I Tobelo, especially for senior teacher in the use of digital technology. Teachers are encouraged to learn to use digital information technology in teaching. The need for online learning begins March 18, 2020, with 3 teachers with educational backgrounds in information and communication technology, coincidentally 2 teachers who come from research alumni, Unima. The training on the use of information technology for teachers is carried out for 3 weeks, in the third week of training it is on demand, taking into account the service period of teachers who will retire in the near future, which is less than 2 years who generally experience difficulties in using digital technology. Changing habits in interacting with new media requires extra effort, so with the efforts made, the results achieved are quite encouraging with an achievement rate of more than 90 percent according to the principal.

The case at SD GMIH 4 with less than one percent could use the digital/smart phone technology, school ask parents to pick the content/learning material at school with health protocol. The same way also happened in SMP Kristen and SMA Kristen but the way just give solution about 50 percent that pick the leraning material. This one still better than case at SD GMIH 4 with digital learning with just less thean 1 percent at the earlier pandemic. And what are the causes? Based on information from interviewee, some could be mention:

a. Digital literacy still need to be improved
b. Infrastructure for the internet connection still not distributed well.
c. Lack of data pulse for internet connection, and also theunfairdistribution ofgovern-mentpulse management cause bad academic atmosphere.
d. Devices used was own by parents that used for work, so the student do not have the equipment.

Digital literacy could be understood that still need process to understand the use of new equipment for learning. The others condition that mention above could be undertand as the situation to be receive and find the solution. For example, the addition of the base transmision system was improved, and the distribution of data pulse for internet connection would be better. The devices that own by parents need to be improved, well management so it could be used and function better. As we analyzed, the most problem that happened which the memory management was not good. The capacity was almost full and most did not realized. This could be understood that social media consist of many interesting image and video and it being saved many time caused memory full, especially many of the user still not well mastering the digital literacy. This memory of course could impact the digital equipment not run well. Storage and cache memory could help erase temporary file with clear cache could help solve memory problem. As digital equipmenet used, the bugs, crashes and other issues are inevitable, especially as your phone gets older (Nield, 2021). It is could be understood about the dog year, that every six months the capacity of the processor could be double. On the other side, the user are still in learning adapt with new technology, the next generation available already. This cycle are not constant, execpt changes. Digital literacy is the key to face this currently and happening at present.

The infrastructure also important in learning management in order to connect one another. Interview with Mr. Irianto, head of Telkom company in Tobelo, almost all school in Tobelo area have connected with internet, both from two commercial offered, Indihome and AstiNet. Besides Telkom, the broadband line from Komunikasi dan Informatika Department also established in Tobelo. This is a wired system that could be complete solution for network from infrastucture side. Even it still not covers all area, but with this condition, the learning process could be run with asynchronous mode as needed. The learning management system in this research still not being applied well while the condition of the human resources was still need to be improved. As the basic of learning management consist of material, control and evaluation was available in digital feature. In Tobelo, we found two international school that prepare well education. Yayasan Manggala Perkasa that serve school from kindergarden untuk vocational

school and Hohidiai serve the preparation school until junior high school [8] Hohidiai is a Tobelo language that means the improvement continously.

4   Conclusion

Human resource as educator need to prepare well as the lack of teacher with ICT background in this area. Teacher with this background could be the peer multiplication for the problem to fix the digital literacy. As we know that the develompent and rapid development in digital technology bring the complex problem in applying this digital technology. As there are several international company in this area, the human resource with information technology background tend to work at company compare to be a teacher. Wealth reason becomes the main factor in this case even need to do more research for this case. The government role needs to consider as education in important for every country. More over, the education tends to frequently use the digital technology post covid-19 pandemic especially in society 5.0.

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