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Using Educational Technology to Reduce Learning Loss During the COVID-19 Pandemic

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ABSTRACT

The purpose of this study is to describe how educational technology was used to minimize learning loss at Senior High School. The COVID-19 pandemic has had a negative impact on education in schools. The ability of students to achieve competence and learning objectives is weaker than before. This phenomenon is termed "learning loss." Therefore, to support the objectives of this study, a descriptive qualitative research method was used. The data was obtained through questionnaires. The data analysis technique uses a data triangulation technique. The research results show that using technology to minimize learning seems successful. This can be seen from the results of a questionnaire on 125 students, namely: 1) 73% of students have a positive perception of learning technology; 2) 45% of students agree that it is not boring; 3) 80% of students increased their motivation to study during the COVID-19 pandemic; 4) 87% of students say learning technology is very useful; 5) And 66% of students think that learning technology was effective during the Covid-19 pandemic. Apart from that, of the five indicators studied, all indicators have a positive correlation with the use of learning technology during the Covid-19 pandemic.

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1. INTRODUCTION

Learning loss is one of the primary effects of the COVID-19 pandemic on the educational system across the world (Donnelly & Patrinos, 2022; Skar et al., 2021). There have been significant interruptions to students' learning experiences as a consequence of physical limitations, school closings, and the move to remote learning. When students suffer severe interruptions in their typical learning settings or when their educational chances are jeopardized, learning loss can result. Learning loss is a decline in learning capacity and educational results. The unpredictability of the epidemic can interfere with students'

capacity to learn as they should by causing them to lose interest in, lose their attention, and stop actively participating in their studies (Angrist et al., 2020; Engzell et al., 2021; Khan & Ahmed, 2021).

The COVID-19 pandemic's effects on learning loss are both immediate and long-term. When there is a disruption in the classroom, students may not be able to complete the information they should have mastered or make the desired progress (Engzell et al., 2021). This may have a long-term impact on their academic growth and cause them to have greater learning gaps. Appropriate mitigation and recovery measures are required to address the learning loss brought on by the COVID-19 pandemic. This calls for creative and inclusive teaching methods, sufficient social and emotional support, and an attempt to spot and help students who need more help (Angrist et al., 2020; Skar et al., 2021).

There has been an extraordinary acceleration in the use of digital technology in the world of education during the pandemic. The COVID-19 pandemic has undeniably ushered in swift and profound transformations across multiple facets of life, including the realm of education. It has compelled individuals to embrace adaptive learning methods, with digital technology instruments emerging as a crucial means of facilitating this transition (Coman et al., 2020). Information technology can be said to be something that can provide convenience and comfort in various aspects (Godber & Atkins, 2021). The benefits of technology in learning are also very influential. The use of technology in online learning is a means of support for students and teachers. That is, to find more complete information. Often, students get assignments and material that is considered difficult, even though it is too late to look for it in their textbooks. But now, with increasingly sophisticated technology, students can search for this information through search engines on gadgets or laptops (Haleem et al., 2022). Students, as well as almost all teachers and educators, take advantage of this convenience when searching for information using this technology. Technology is currently very useful for the world of education because the information on the internet is more updated and always up-to-date (Raja & Nagasubramani, 2018), so students can improve their learning abilities by searching for learning materials on the internet (Nababan et al., 2022).

The benefits of technology in learning can also facilitate access to learning; for example, the teacher can give assignments via email, then students will work on these assignments and can quickly send them to the teacher (Ketut Sudarsana et al., 2019). The use of technology in learning will make students more happy and more interesting. Students will feel comfortable and not bored because using modern technology can make learning material more interesting and varied. Information and knowledge have become easier to obtain thanks to sophisticated technology. This can increase students' interest in learning, because learning materials are easier to access (Aini, 2022; Cahyadi et al., 2022). The existence of sophisticated technology can be used to improve the quality of education (Serdyukov, 2017), and online school learning must run optimally because education is an important aspect of life. In learning activities, most students feel bored with monotonous learning. With today's increasingly sophisticated technology, it is possible to make learning in the world of education more innovative and creative. By using existing technology, learning materials can be delivered more interestingly; for example, learning materials are delivered in the form of videos or power points (Alhumaid, 2019). In this way, it will make students more interested and focused on carrying out learning.

During a pandemic, technology plays a very important role in learning. Students and teachers can learn even without face-to-face contact (Hasudungan et al., 2022). Technology is a limitless learning medium because teachers and students can learn anytime and anywhere (Guze, 2015). The benefits of technology in learning are numerous, so there is no reason for teachers not to provide assignments and materials to students (Ofianto et al., 2022). Likewise, there is no reason for students not to do their work.

Digital technology in education is not only about the physical contribution of technology as a learning tool (learning tools) but rather a multidimensional concept, such as citing one of the definitions of learning technology according to the Association for Educational Communications and Technology, namely: educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (The Association for Educational Communications and Technology, 2023). Educational technology is the study

and ethical practice of facilitating learning and enhancing performance by creating, using, and managing appropriate technological processes and resources.

The interdependence between technology and education renders them inseparable entities. For almost a year, Indonesia has been embracing online learning in the field of education as a result of the Covid-19 pandemic. According to Bashir et al. (2021), online learning emerges as the most favourable option for students in the context of a pandemic. Nevertheless, the online learning process presents numerous problems. One of the challenges is the restricted understanding of how to utilise information and communication technology among educators and students effectively. According to Zheng et al. (2021), educators and instructors are obligated to possess proficiency in information and communication technology. This requirement extends not only to professors and lecturers, but also encompasses students. One of the advantages of incorporating technology into the realm of education is its ability to facilitate online learning activities conducted via digital platforms.

Access, quality, and social justice in education are all issues that are seen to have technological solutions (Waight et al., 2022). This is because the epidemic has contributed to a worsening gap in people's opportunities to receive a good education. What role does it play in the classroom? You may refer to it as "e-learning," which is shorthand for the application of technology in the classroom (Kromydas, 2017). Students and educators can choose from a wide range of learning technology and platforms to meet their individual needs best. Teachers have the option of using ready-made or custom-made digital technology-based instructional tools.

Technology cannot be separated from problems because technology was born and developed to solve problems faced by humans (Thimbleby, 2013). The COVID-19 pandemic is a collective problem for the Indonesian people and even the world, which has brought changes and demands for adaptation to various aspects of life, including education and learning (Lubis, 2022). Technology is a catalyst for extraordinary innovation and change, especially in the current "new normal" era and after the COVID-19 pandemic. Learning how to use learning technology appropriately as needed will help students achieve their learning objectives.

In their capacities as educational facilitators, teachers and professors are free to design the pedagogical structures that will be used in their own classes, both online and off. That's according to a 2020 study (Green et al. A teacher's ability to construct engaging, varied, repetitive, and progressively more difficult learning experiences for their students is essential in the development of effective learning activities (Singh et al., 2021). The degree of student performance is the limiting factor in determining whether or not learning objectives have been met. Instructional technology interventions must be tailored to the specific contexts and needs of individual classrooms, schools, and/or regions. Project-based learning, experiential learning, problem-based learning, flipped-peer learning models, meaningful learning, study-faster methods, an integrated curriculum, and blended learning are just a few of the many options available to educators today.

Several previous studies have addressed learning loss during the COVID-19 pandemic, including Engzell et al. (2021), who measured the extent of learning loss resulting from school closures during the pandemic. In contrast, our study examines the implementation of educational technology to reduce the impact of learning loss caused by the pandemic. Kuhfield and Tarasawa (2020) investigated the relationship between learning loss during the pandemic and students' academic achievement decline. Meanwhile, our research focuses on the role of technology in mitigating learning loss during the pandemic. Conto et al.(2021)Conto et al. (2021) focused on the impact of school closures on basic skills and the mitigation efforts taken by countries to address learning loss, while our study emphasizes the use of educational technology as a solution to reduce the impact of learning loss caused by the pandemic. Based on previous research, this study is important to conduct. Therefore, the aim of this research is to analyze the use of technology as an alternative to reduce learning loss during the COVID-19 pandemic.

2. METHODS

The qualitative descriptive approach was adopted for this study. Descriptive data, such as interviews, focus groups, and field notes, are the end result of qualitative research. The goal of descriptive study is to characterise and explain phenomena in terms of their inherent nature. The goal of qualitative descriptive research is to provide a comprehensive description of the phenomenon under study (Creswell & Creswell, 2018).

The researcher uses this qualitative descriptive research method to describe, describe, and critically and objectively analyze the use of educational technology in minimizing learning loss during the COVID-19 pandemic. The subjects a total of 125 students. while the population amounted to 669 students. The research subject taking technique is a purposive sampling technique that is used in accordance with the considerations of the researcher because the research subject is considered to have represented the expected research data collection.

Table 1. Participant

No	Data Type	Total
1	Teacher	47
2	Male student	297
3	Female student	502

Data collection techniques using a questionnaire instrument The data obtained from the instruments used were analyzed descriptively using the Miles and Huberman models (Miles & Huberman, 1994). The stages of data analysis in this model are: (1) data reduction; (2) presenting data (data models); and (3) drawing or verifying conclusions. Questionnaires are a technique for collecting data in research by submitting written statements or questions to be answered online (via Google Forms) by respondents to the study. The questionnaire used in this study is a closed type. This type of questionnaire is the type in which statement answer choices have been provided in the questionnaire, such as answer choices with a Likert scale, namely "Disagree," "Less Agree," "Agree," or "Strongly Agree".

If the data from the questionnaire has been obtained, then the data from the questionnaire is analyzed using descriptive analysis techniques by describing the data that has been obtained from the research. A questionnaire is a data collection technique that contains statements that will later be answered by informants regarding the aspects or indicators to be analyzed (Sugiyono, 2017). Thus, the results will be obtained from the analyzed data, which is explained clearly. The steps in the data analysis technique in this study, namely processing data from response questionnaires to the use of educational technology in minimizing the impact of learning loss during the COVID-19 pandemic, recording the percentage of sample teacher response questionnaire scores, interpreting the percentage of the questionnaire, and presenting the data in the form of pictures or diagrams of research data results.

3. FINDINGS AND DISCUSSION

3.1. Findings

One area that has been profoundly affected by the COVID-19 pandemic is teaching. The educational system is also suffering the effects. Teachers have a responsibility to provide a learning environment even when their pupils are not physically present. The solution is for teachers to use online media (online) to produce novel forms of instructional media. This is in response to the urgent situation posed by the spread of the Coronavirus disease (COVID-19), as recommended by the Minister of Education and Culture of the Republic of Indonesia in Circular Letter Number 4 of 2020. Whether it's a desktop computer, a laptop, or another device, as long as it can connect to the internet, it can function as part of the learning system. Educators can use social media as a learning medium to facilitate concurrent learning on a variety of platforms. Thus, educators can ensure students take part in learning

at the same time, even if they are in different places. Educators can also give measurable assignments in accordance with the objectives of the material delivered to students.

People can say that the COVID-19 pandemic is a chance for education, both in terms of using technology and in terms of industry 4.0. It seems like people can't live without the fast growth of technology. Almost everyone always has their cell phone with them. In response to this, many places now offer free Internet access. This makes it easier to get information whenever and wherever you want to. In other words, you control the whole world. In the Internet of Things (IoT) age of the Industrial Revolution, gadgets are an important part of every day life. 4.0.Life is now so linked, and we are entering a time when people will use things in more and more complex ways. Society gets a lot of information that is easy to get at the touch of a finger. But if this new technology isn't used well, it can cause problems. So, there is a lot of push to start making good habits about how to use technology in everyday life, especially in school.

Through the use of technology in education, it will give birth to the next generation that is intellectually and emotionally intelligent, skilled, and independent to achieve the development of this nation. However, there was a public polemic about the metamorphosis during the COVID-19 pandemic. This is certainly felt heavily by educators and students. Especially for educators, they are required to be creative in delivering material through online learning media. This must also be adjusted to the level of education in their requirements. The impact will cause physical and psychological pressure. A positive mindset can help you apply online learning media so as to produce quality learning outcomes. Studying at home using online media requires parents to be role models in accompanying children's learning, which requires a change in attitude. Various uses of educational technology using applications or platforms as learning media are available.

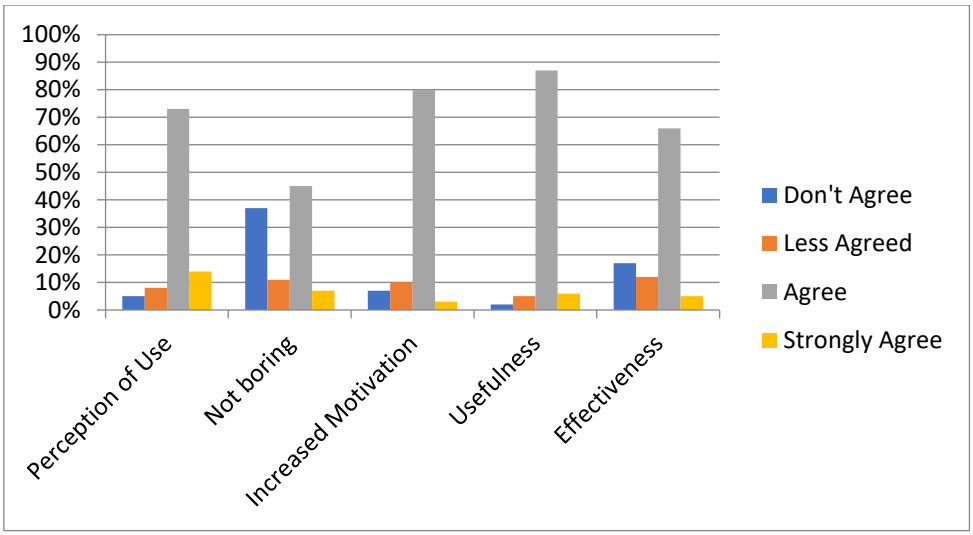

Figure 2. Diagram of Student Questionnaire Results on Utilization of Educational Technology Using Zoom Meetings during the COVID-19 Pandemic

Figure 2 above, it shows that of the five indicators asked, all indicators have a positive correlation with utilizing learning technology during the COVID-19 pandemic.

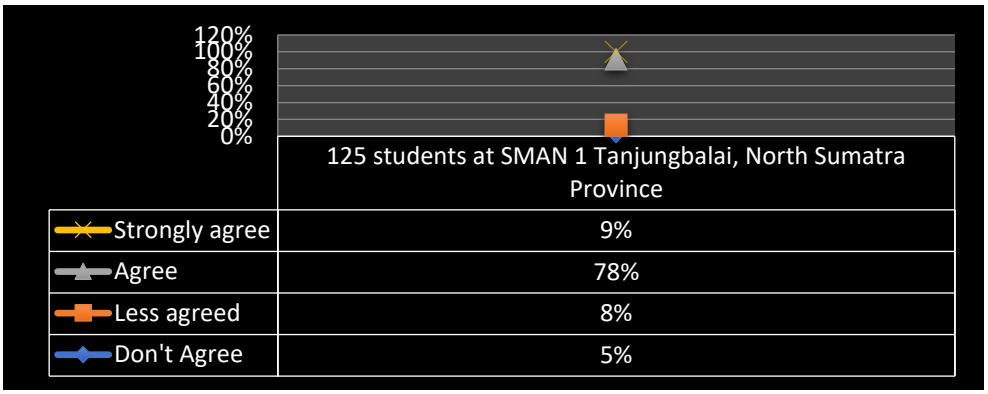

Figure 3. Learning Technology Diagram Helps Achieve Learning Goals

From figure 3 above, it shows that the results of a questionnaire on 125 students are as follows: 1) 73% of students have a positive perception of learning technology; 2) 45% of students agree that it is not boring; (3) 80% of students increased their motivation to study during the COVID-19 pandemic; (4) 87% of students say learning technology is very useful; (5) and 66% of students think that learning technology is effective during the COVID-19 pandemic.

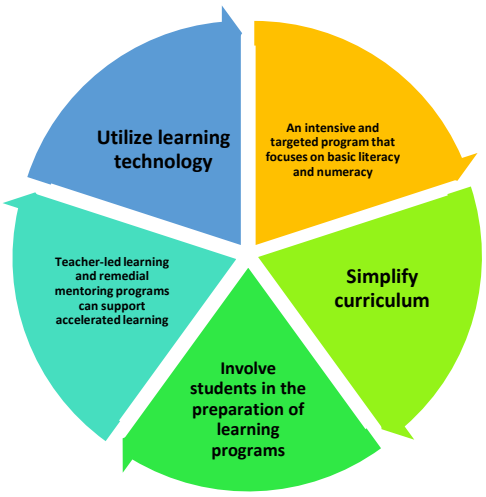

Figure 4. Policies that can be implemented minimize learning loss

Figure 4 explains that, apart from utilizing educational technology in learning in an effort to minimize learning loss, there are still policies that can be carried out at SMAN 1 Tanjungbalai, North Sumatra Province.

Implementation of Learning Technology at SMAN 1 Tanjungbalai

The researcher revealed that at Tanjungbalai 1 Public High School, the teacher employed a communication strategy amidst the COVID-19 pandemic by effectively disseminating online learning to students in grades X, XI, and XII. This was accomplished through an initial meeting conducted during regular class hours.The initiation of online activities will be undertaken by the homeroom teacher, as well as all other teachers and the principal of SMAN 1 Tanjungbalai. The creation of online schedules is delegated to curriculum representatives, who subsequently disseminate the schedules to teachers responsible for organising class schedules and delivering instructional content to students. These classes are conducted online, utilising electronic technology such as smartphones, with teachers instructing from their respective residences.

Through online learning, each teacher or educator uses a WhatsApp group or Zoom meeting to discuss various technical issues in more detail regarding online learning teaching schedules, then to discuss what material will be delivered and also what quiz questions will be raised to class students X, XI, and XII at senior high school from the homes of each student and teacher at school. Through the WhatsApp group or Zoom meeting, learning materials, attendance or absences, assignments, submission of assignments, and evaluation of students from each class are provided. Every teacher who carries out online learning is also monitored by the homeroom teacher of each class, as well as by the online learning coordinators, namely the school's assistant principals, so that teaching and learning activities are created according to what the school and the government want, which has provided a policy to keep learning even if only studying at home.

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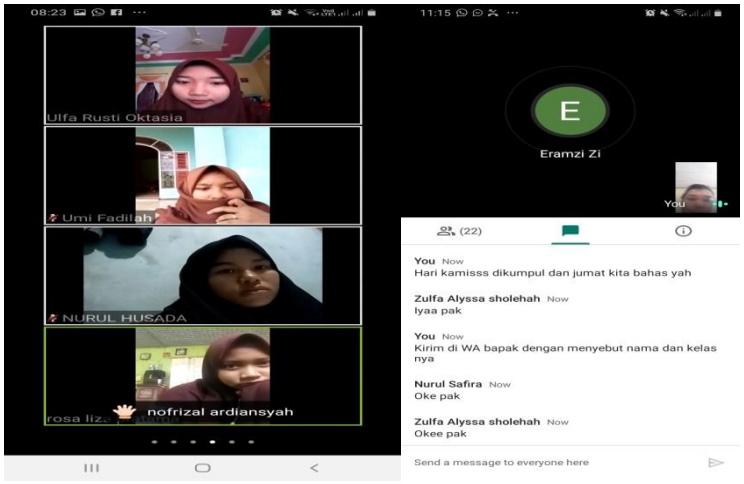

Figure 5. Utilization of Zoom meetings as learning technology during the COVID-19 Pandemic

Communication strategies for teachers of SMAN 1 Tanjungbalai during online learning include mastering the skills of explaining material through PPT (Microsoft PowerPoint) and learning videos; questioning skills strategies by arranging individual students who want to ask questions; strategies using stimulus variations by providing motivation to students; strategies for giving reinforcement or reinforcing by confirming in writing in the WA group or Zoom meeting in the form of praise and justifying the assignments given by students; Opening and closing learning skill strategiesstrategy for individual teaching skills, A strategy for managing class skills is to assign a cleaning picket schedule to students in groups of six people every two days.

Especially for class XII teachers, meetings are held to evaluate the development of online learning, coupled with evaluations and preparation strategies for entering state universities, as well as the mapping of student major choices. In class XII evaluations, school principals, homeroom teachers, and teachers of SMAN 1 Tanjungbalai analyzed graphs of the progress of student achievement in their attempts to enter higher education. This achievement for the Tanjungbalai SMAN 1 teacher was achieved when online learning bore fruit and data on dozens of Class XII students were declared to have passed into state universities through the SNMPTN and SNMPN routes in 2020 and 2021.

3.2. Discussion

Indonesia has become one of the countries affected by the COVID-19 outbreak, to be precise, since President Joko Widodo reported the first case of COVID-19 in 2020 (Penetapan Sebagai Bencana Nasional, 2020). The rapid spread of the COVID-19 virus has made the world, including Indonesia, pause for a moment from the hustle and bustle of daily activities. Various aspects are working hard to find solutions to break the chain of the spread of the COVID-19 virus, one of which is by enacting new policies. Indonesia itself stipulates a Large-Scale Social Restrictions (PSBB) policy that is enforced in every region and then enforces Restrictions on Community Activities (PPKM) in the districts and cities

of Java, Bali, and 15 cities outside Java and Bali (Muhyiddin & Nugroho, 2021). The policies made have resulted in major changes in various aspects, including the educational aspect. Schools and colleges are closed; learning activities are carried out from home (Fikri & Hasudungan, 2021).

The government, through the Ministry of Education and Culture (Kemendikbud), is trying to ensure that educational actors can still carry out learning activities, although in a different way. The Ministry of Education and Culture stipulates that education in Indonesia will still be held, but with a different system, namely Study from Home (SFH). This is in accordance with the Republic of Indonesia Ministry of Education and Culture Circular Letter No. 3 of 2020 concerning the prevention of Corona Virus Disease (COVID-19) in educational units and the Letter of the Secretary General of the Minister of Education and Culture No. 35492/A.A5/HK/2020 on March 12, 2020 concerning the prevention of the spread of Corona Virus Disease (COVID-19) (Indrayanti et al., 2021).

In Indonesia, more than 530,000 schools were closed in an effort to reduce the spread of the coronavirus (COVID-19). This impacts 68 million students from pre-school to tertiary level and makes the need for effective EdTech even more pressing. This situation is forcing a rapid and widespread increase in the use of EdTech in the country, which is expected to have a lasting effect on the market. The implementation of Study from Home (SFH), sometimes referred to as online learning, presents several obstacles for educators, students, educational institutions, and even parents, particularly at lower grade levels (Kadir et al., 2022). The successful adoption of online learning necessitates instructors to employ strategies that effectively communicate learning content, ensuring its seamless assimilation by students. Similarly, it is imperative for pupils to possess the capability to adjust and acclimatise to novel learning circumstances and environments.

The reluctance among some educational institutions, teachers, and parents to adopt technology has changed as a result of the pandemic now that nearly everyone relies on online and remote educational methods (Pronika, 2022). The pandemic has accelerated the adoption of online learning methods and encouraged educational institutions to use distance learning to strengthen resilience against future crises (Saefulmilah & Saway, 2020). The implementation of online learning uses media that can connect educators with students. The media used is, of course, inseparable from the role of technology (Baswara et al., 2020), including educational technology, which is very influential for educational actors (Kühn Hildebrandt, 2019). Educational technology is the most important part of the online learning process. The core part of implementing online learning is figuring out how to choose the right learning method with the help of technology that can convey learning material to students even though they don't meet face-to-face like in conventional learning (Dussel, 2020). In other words, technology acts as a medium for interaction and transfer of information related to learning in the implementation of online learning.

Technology makes it easy for educators and students to do online learning (Hoof & Boell, 2019). Various kinds of platforms are provided with the intention of facilitating the implementation of online learning, including facilitating educators in conducting assessments of students even though they are not carried out face-to-face, by utilizing various platforms such as Google Classroom, Google Meet, Zoom Meeting, and other platforms. Technology can also assist students in obtaining subject matter that may not be obtained during online learning by accessing various websites and applications (Paul & Jefferson, 2019). In addition, technology also plays a role in increasing the creativity of educators and students. Educators can innovate in delivering learning materials by utilizing various social media sites such as Facebook, Instagram, YouTube, and so on. As with educators, students can take advantage of various social media sites to fulfil assigned tasks. In this case, technology can provide benefits in supporting the success of online learning in the midst of a pandemic like today.

In addition to technology, choosing the right learning method can also help the learning process. Hybrid learning is present as a learning solution today, even though it reaps various responses from the community. Hybrid learning is learning with an online system combined with face-to-face meetings for several hours. According to Lestari et al.(2021), hybrid learning has several advantages. Firstly, hybrid learning, which combines face-to-face and online learning, has been proven to enhance students'

problem-solving abilities in physics. This type of learning promotes active engagement, collaborative learning, and access to various resources. Secondly, the integration of technology, such as online simulations and virtual laboratories, into the hybrid learning environment can effectively support students' conceptual understanding and problem-solving skills. Thirdly, the success of hybrid learning in improving problem-solving abilities is influenced by various factors, including teachers' pedagogical practices, student motivation, and the design of learning activities. These findings highlight the potential benefits of the hybrid learning approach for enhancing problem-solving abilities in physics education, providing valuable insights for educators and researchers in this field.

Furthermore, Nashir and Laili's (2022) research shows that the use of hybrid learning, which combines face-to-face and online learning, is effective in enhancing active participation, learning motivation, and students' learning outcomes. Additionally, hybrid learning provides flexibility for students and facilitates social interaction and collaboration among them. The study recommends the implementation of hybrid learning as an effective solution to address the challenges of learning in the new normal. Some people think that this method is the same as blended learning, namely the use of a learning model that is a combination of face-to-face conventional learning and online learning.

4. CONCLUSION

In order to effectively mitigate and tackle the issue of learning loss, it is imperative for the Senior High School in North Sumatra Province to embrace deliberate approaches, recognising that they may not be flawless in their implementation. Initially, it is imperative to enhance educators' and students' physical, structural, and mental preparedness. Furthermore, it is imperative to acknowledge that online learning cannot completely substitute traditional face-to-face instructional approaches due to the inherent necessity of human physical presence. Furthermore, embracing a novel way of life characterised by adaptability is imperative in response to the repercussions of the ongoing epidemic. This is crucial in order to navigate the constraints imposed on our mobility and ensure our survival. The outcome of a modification is the presence of marginalised parties, namely a cohort that exhibits lower levels of adaptability. Undoubtedly, there is a concerted effort to embrace the younger generation to mitigate the potential negative consequences. Aside from that, lifestyle changes can be a learning process for becoming more adaptable to all of the possible outcomes of climate change, weather, and pandemics. The use of technology to minimize learning seems successful. This study only involved 125 students, which may not represent the entire student population. The research findings could be more representative if a larger sample size is involved, encompassing various contexts and student backgrounds. Further research could involve a larger sample size and diversify the student population to obtain more representative results.

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