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Enhancing hybrid learning through effective facilities management in remote settings

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ABSTRACT

In the unpredictable digital age, it is imperative to guarantee the availability and use of learning facilities to maximize the success of hybrid-based learning, particularly for schools located in remote places. This research aims to find in-depth information about the management of learning facilities in assisting remote areas hybrid-based learning success. This study used a qualitative approach and a case study design. While in-depth interview and documentation studies were used in data collection, the study was conducted in three schools in remote areas with participants in this study including principals, teachers, students, and parents. The data obtained were also checked for credibility and data validity. The findings showed that the learning facilities management (LFM) in encouraging the successful application of hybrid learning in schools located in remote areas, showed the adequacy of the management of adequate facilities, but not on the management of facilities at home with some specificities found. This limitation is caused by economic and geographical factors, where many families in remote areas cannot afford the necessary learning devices or do not have stable internet access. This study has contributed to the literature on management of learning facilities in the post-pandemic period which can form the basis for further research in related fields.

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1. INTRODUCTION

Information and communication technology has changed various aspects of human life, including the field of education. One of the innovations that has emerged is hybrid learning, a learning approach that integrates face-to-face and online learning [1]. This model is designed to maximize flexibility and accessibility, providing opportunities for students to learn from anywhere and at any time [2], [3]. Hybrid learning has been proven to be effectively improve student engagement and learning outcomes, especially in environments that have adequate technological infrastructure [4], [5].

However, implementing hybrid learning in remote areas faces various unique challenges. These areas often have inadequate infrastructure, limited internet access, and suboptimal educational facilities [6], [7]. These challenges hinder the effective implementation of hybrid learning, requiring a special approach in learning facility management. One of the main obstacles in implementing hybrid learning in remote areas is

limited infrastructure, many remote areas in Indonesia do not have adequate internet access. According to data from the Central Statistics Agency Republic of Indonesia, until 2021, there are still many villages that have not been reached by a stable internet network. This makes it difficult for students in remote areas to access online learning materials. Apart from that, the availability of hardware such as computers and laptops is also an obstacle. In many schools in remote areas, the number of devices available is very limited and often insufficient to support all students. In addition, limited economic conditions make many families unable to provide these devices for their children [8], [9].

The quality of learning facilities in schools is also a significant challenge, many schools in remote areas have very minimal facilities and infrastructure [10], [11]. School buildings are often inadequate, with cramped classrooms and inadequate basic facilities such as tables and chairs. This condition of course has an impact on the effectiveness of face-to-face learning, which is an integral part of hybrid learning [12], [13]. In addition, technical support and training for teachers is also often inadequate. Teachers in remote areas may not have sufficient skills in using technology for online learning [14]. They need ongoing training to be able to use technology effectively in teaching.

In this context, learning facilities management (LFM) becomes very important. LFM involves managing all facilities that support the learning process, including physical infrastructure, information technology, as well as human resources [15], [16]. The main goal of LFM is to ensure that all elements necessary for learning are available and accessible to all students, so that the learning process can run smoothly and effectively. In remote areas, LFM must be able to answer the specific challenges that exist. Management of learning facilities must be carried out comprehensively, starting from providing adequate technological infrastructure, ensuring stable internet connectivity, to providing sufficient hardware for students and teachers [17], [18]. In addition, ongoing training and technical support for teachers should also be part of LFM [19].

Despite facing many challenges, hybrid learning has great potential to improve the quality of education in remote areas. This learning model could be a solution to overcome limited access to quality education [7], [20]. With hybrid learning, students in remote areas can access learning materials from various sources, including those available online, that may not be available locally. Additionally, hybrid learning allows for flexibility in study time, which can be especially beneficial for students in remote areas who may have to help their parents work or have other responsibilities at home. With effective management of learning facilities, hybrid learning can be a bridge to reduce the educational gap between urban and remote areas [3], [11].

The important thing that must be prepared before implementing hybrid-based learning is that educational institutions need to have a strong learning management [21]. Moreover, all school members starting from the principal, staff, students and teachers must have good digital technology skills and adequate digital technology facilities at home [22]. Learning facilities are a factor that cannot be ignored, their existence and role in supporting learning activities, especially in seeking to provide quality learning during the pandemic, learning facilities need to be managed and so that existing facilities can be utilized effectively [15], [18].

In the current setting of hybrid learning, quality education necessitates joint responsibility from the parents, communities, and goverment [23], [24]. The community's involvement and the school's sound administration are necessary for providing pupils with suitable learning environments [25], [26]. Especially schools located in remote areas, various research results show that schools in remote areas have their own specificities so they cannot be compared to schools in urban areas [27]. Meanwhile, there is still not much research discussing the LFM in maximizing hybrid learning's effectiveness in remote locations. For example, Shamsuddin and Kaur [28], discusses the impact of student learning styles on the success of blended learning. Further research by Bruggeman *et al.* [29], which discusses teacher attributes in maximizing the fulfillment of hybrid-based learning.

Although much research has been conducted on hybrid learning, most of these studies focus on urban contexts or areas with adequate infrastructure [4], [5]. The application of hybrid learning in remote locations has received little attention, despite its unique set of difficulties. Existing research often does not take into account the complexities of managing learning facilities in remote areas, such as how to ensure the availability of adequate hardware, software, and connectivity to support learning. In addition, research on LFM generally focuses on physical facilities management in conventional educational institutions [19]. Studies combining LFM with hybrid learning contexts in remote areas are still very limited. Therefore, comprehensive research is needed to bridge this gap by examining how LFM can be optimized to support hybrid learning in remote areas.

This research is expected to provide a significant contribution in several aspects. Theoretically, this research will enrich the literature regarding hybrid learning and LFM, especially in the context of remote areas. Research findings can be a reference for other researchers who are interested in studying similar topics in various different contexts and locations. Practically, the results of this research can be a guide for policy makers, education managers, and educational institutions in designing and implementing effective hybrid

learning in remote areas. This research aims to answer these challenges by exploring the role of the community and parents, constrains and strategies, and describing forms of LFM that are appropriate to the context of remote areas.

2. METHOD

This research stems from the lack of studies on the LFM in maximizing the accomplishment of hybrid-based learning in remote areas. Researchers were interested, assuming that schools in remote areas have their own specialties and uniqueness, so approached qualitative research with a case study design. Case study designs allow researchers to explore specific contexts and unique situations, schools in remote areas have unique characteristics influenced by geographic, economic, and cultural factors, which need to be understood holistically. This research was conducted in Tana Tidung Regency, North Kalimantan, Indonesia, with a total of twenty-seven people who were informants in this research, namely three school principals, nine teachers, three education staff, six students, and six parents from three schools. The selection of participants is based on the researcher's evaluation of which potential participants are most helpful and have the potential to provide the best and most in-depth information.

Research data collection was carried out over four months, namely July-October 2022. Researchers focused in depth on the management of learning facilities to support the success of hybrid-based learning in remote areas. Meanwhile, in-depth interview techniques and documentation studies were used in data collection. Interview guidelines refer to instruments that have been created and checked by members and experts. Researchers did not conduct direct observations at schools due to pandemic constraints, which may limit in-depth understanding of real conditions in the field. This was overcome by using video conferencing technology to conduct remote observations and in-depth interviews. Apart from that, utilizing various documentation from the school is also used to provide additional insight. Triangulation techniques were used in this study to verify the credibility of the data with key informants, the principal of the school, and supporting informants, the teachers, the education staff, and the school committee. Researchers' discussions and random member checking are two further methods utilized to verify the validity of this research data. To manage conflicting perspectives and interpretations, the researcher adopted a triangulation approach by harmonizing various points of view through comparison and analysis across data. A consistency check is done between the conclusions, interim findings, data presentation, and field notes once data collection and analysis at the location are finished. Data analysis techniques-data reduction, data presentation, and inference/verificatio-that Miles and Huberman [30] recommended were followed.

3. RESULTS AND DISCUSSION

This research aims to identify an effective LFM model in maximizing the implementation of hybrid learning in remote areas in Indonesia. Data was collected through in-depth interviews as well as related documentation studies, the results of data analysis revealed the main findings presented in Figure 1. These findings provide an overview of how LFM can be optimized to support hybrid learning, with a focus on the role of schools, parents and communities, challenges and practical strategies faced by schools in the region.

3.1. Planning

It is undeniable that the planning process is the first step in whether a program is successfully implemented or not. Efforts are no exception in maximizing the success of hybrid learning-based learning in schools in remote areas. Schools in remote areas with all their specificity and uniqueness are important to plan the execution of hybrid learning as well as possible [4], [6]. Research findings show, learning facility planning process involves several parties such as the principal, vice principal of the facilities and infrastructure section, teachers, parents, school committees, education staff, stakeholders, and related agencies. This statement is in accordance with what was conveyed by one of the Principals during an interview as follows:

> *"....., we work closely with the vice principal for facilities and infrastructure to identify urgent needs. We also involve teachers, staff, parents and stakeholders to ensure that the facilities provided support the learning process."*

This statement was also supported by the parents during the group interview:

> *"As parents, we were invited to participate in facility planning discussions. We feel included and can voice our children's needs, especially regarding technology support."*

Of course, in planning, a budgeting process is also carried out, which means planning how much costs will be incurred, in this budgeting process it is prepared based on the process of planning elections/organizing, planned implementation and reporting. Various literature states that the planning process cannot be formulated only by internal schools, but can also invite community leaders, experts, and also education offices in the regions [31], [32]. Considering inputs and by studying good practices that have succeeded in organizing hybrid-based learning will enrich references in the planning process, so that appropriate planning is announced.

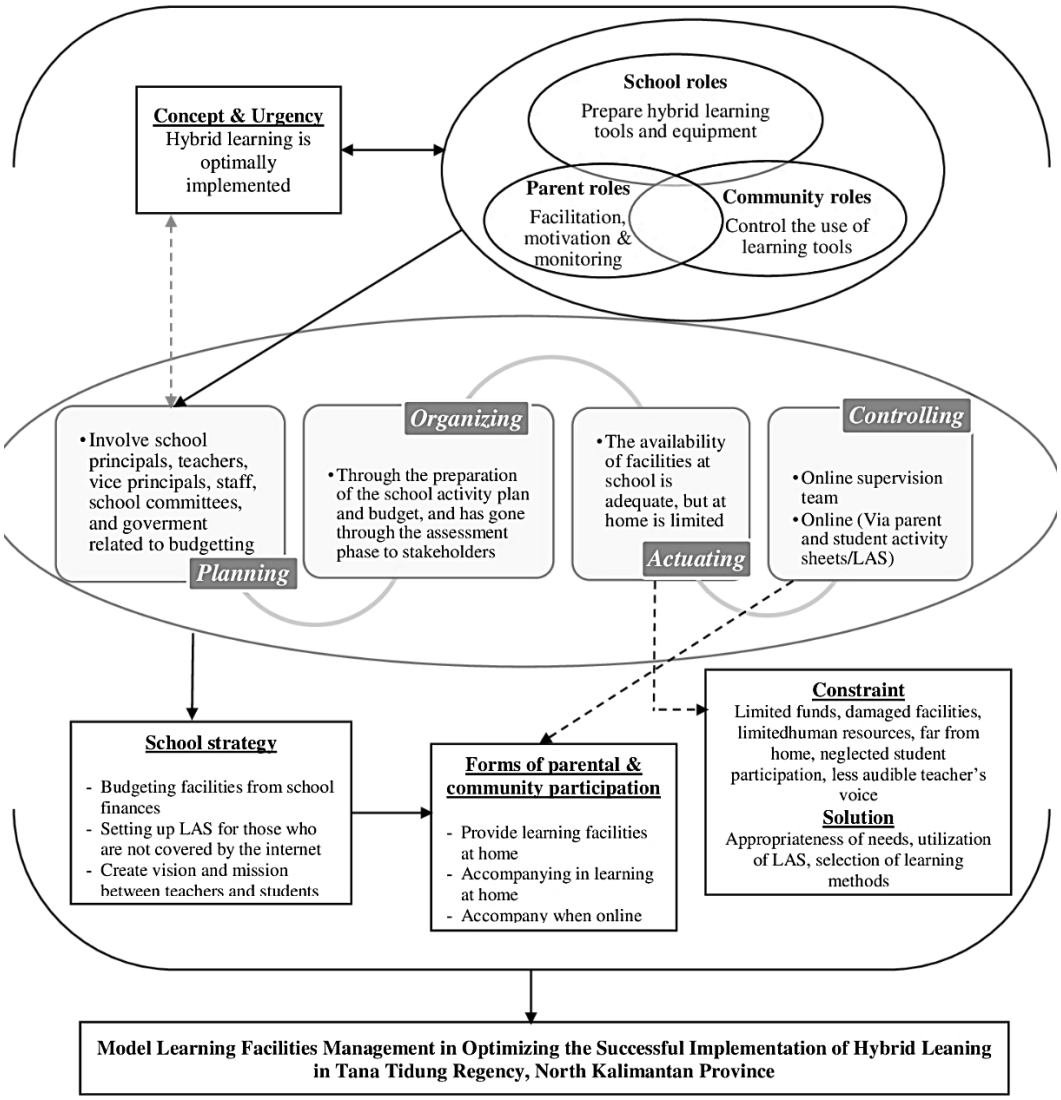

Figure 1. Case findings of LFM model in maximizing the fulfillment of hybrid learning implementation

When preparing to optimize facilities for hybrid learning in schools, a number of factors are taken into consideration, such as i) flexibility, this is achieved by leveraging online platforms and tools for supervision; ii) convenient accessibility, making students easily reachable in distance learning environments; iii) structured learning, utilizing the LMS to establish a welcoming and user-friendly learning environment for students; iv) a customized strategy; hybrid-based learning has to be created with learners' needs in mind, making it simpler for teachers to assess students' knowledge of the material; and v) thorough reports, which can offer broad perspectives to certain stakeholders. This statement is in line with what was expressed by one of the Principals during an interview, as follows:

> *"We prioritize flexibility by using an online platform for supervision, which allows students and teachers to stay connected. Easy accessibility is very important so that students can participate in*

distance learning smoothly. We also rely on the LMS to create a structured and user-friendly learning environment, making it easier for students to access the material. Our approach is tailored to students' needs, so teachers can more easily assess their understanding. Additionally, comprehensive reports help provide important insights to all stakeholders, so we can continually improve the quality of learning."

This is also in line with research conducted by Resmiaty *et al.* [33], and Molenaar [34]. Several knowledgeable parties are involved in this planning process, which results in the design of more effective and targeted learning facilities. The results of the planning process to maximize hybrid learning's effectiveness are organized by compiling school activity plan and budget (RKAS), and has gone through the stage of assistance by stakeholders in this case the school superintendent and the education department. Assistance by school superintendents, relevant agencies, and experts is important for schools located in remote areas, to formulate rational and implementable plans [4], [35].

3.2. The community, parents, and schools' roles

Research shows that the success of hybrid-based learning is supported by the school's efforts to prepare the equipment and facilities needed to carry out the educational process and provide meaningful learning alternatives so that students can participate actively. The provision of education and learning facilities by schools is a crucial role in enabling educational institutions to fulfill their mandates and achieve their goals while maximizing the effectiveness of hybrid learning [18], [36], [37]. Schools have the main responsibility for providing adequate learning facilities and facilities. This includes providing technological devices such as computers, laptops and stable internet access. Additionally, schools ensure that teachers and staff have the necessary skills to use the technology effectively. This statement is in accordance with what was conveyed by one of the Principals during an interview as follows:

"Schools have the primary responsibility to provide adequate learning facilities. This includes providing technological devices such as computers, laptops and stable internet access. In addition, we also ensure that teachers and staff have the necessary skills to use the technology effectively. Regular training is held to improve their abilities, so that the hybrid learning process can run smoothly."

This statement was also supported by the teachers during the group interview session:

"Our school strongly supports the use of technology in learning. We have computers and laptops that students can use, as well as fairly stable internet access. The school also holds regular training for us, the teachers, to ensure we can make maximum use of technology in teaching and learning activities."

This is in line with research by Amrulloh and Galushasti [38], which states that professional development through providing ongoing training for teachers in the use of technology and hybrid learning methodology is very important to support an effective teaching and learning process.

Subsequent research findings show that parents play a role in facilitating, supporting, motivating and monitoring their children's learning process, both directly and indirectly, especially during the learning process from home. This statement was also supported by the parents during the group interview:

"I try to help my child by providing the necessary facilities, such as an internet connection and learning devices. Apart from that, I also accompany children when they do their assignments, provide motivation, and ensure that children follow the determined study schedule. I also try to ensure that children have comfortable study time and space."

Parents also play a role as school partners in providing learning facilities for students. Parental involvement in LFM can be optimized through the provision of learning resources like computers, cellphones, and internet networks, which can be used to support all activities. In the management of educational facilities, parents' involvement as school partners becomes essential [39]. Parents play an active role in ensuring their children have access to the technological devices necessary to participate in online learning [40], [41]. Apart from that, parents also monitor and support the use of these facilities, so that the learning process can take place smoothly even from home [42].

Apart from the role of parents, the community also plays an important role in supporting the success of hybrid learning [6]. The role of the community was expressed by one of the principals during an interview, as follows:

> *"..... the community also functions as an unofficial supervisor in the learning process. They provide input on the use of facilities and provide support when there are problems. This participation is very helpful in ensuring that facilities can be used optimally and support the effectiveness of hybrid learning."*

This statement was also supported by community representatives during the group interview;

> *"As members of community, we feel a responsibility to support children in learning. We often visit schools to see how facilities are used and ensure children have good access. We also help by improving internet access around the school, so that children can learn online smoothly."*

According to research findings, the community's primary responsibility is to keep an eye on how learning facilities are being used in order to maximize the effectiveness of hybrid learning. This means that the community acts as an unstructured supervisor of the learning process. Forms of community participation can also be seen from their efforts in providing networks and monitoring the use of learning facilities used by students. The accomplishment of hybrid learning does not only depend on one party, but requires collaboration and synergy from various parties [43], [44]. Government, the private sector and local communities need to work together to ensure that all learning facility needs are met [45], [46].

3.3. Implementation

Learning facilities are one of the resources that play an important role in achieving a goal to be achieved, the success of hybrid learning by utilizing technology is very important for the continuity of the learning process [47], [48]. Based on research findings, the implementation process of hybrid learning is done by paying attention to several things, namely, i) targets, ii) student convenience, iii) variations of learning media used, for example using videos to help students understand what is conveyed, iv) integrating learning media in an integrated manner through the use of Google Classroom, and virtual classes using Webex, v) archiving activities and student synchronous attendance, vi) combining technology with pedagogical approach, and vii) guidance on the utilization of means with the suitability of functions. The importance of facilities management in hybrid learning requires teachers as educators to be creative [49], [50], and innovative breakthroughs from the principal are needed [14], in addition, the learning environment and learning process must pay attention to the abilities of students [3], [51], where for management it is necessary to carry out instructional design for the integration of the benefits of digitization.

Research findings also show that the adequacy of learning facilities at school is relatively sufficient, unfortunately learning facilities at home are limited. This was conveyed by the teachers during the group interview session.

> *"Based on our experience at school, learning facilities are quite adequate. We have access to a well-stocked library and classrooms equipped with modern technology. However, when students have to study from home, we face many limitations. Many students do not have stable access to the internet, and few have personal computing devices. This greatly impacts their ability to participate in online learning effectively."*

This statement was also supported by the parents during the group interview.

> *".....Unfortunately, at home we have limitations. Even though my son has internet access, sometimes the signal is unstable. He also has to share a computer with his siblings, which sometimes makes it difficult to follow online lessons consistently."*

This is in line with several previous studies, for example, a study by Aruleba and Jere [52], states that schools in remote areas often receive support from government programs and private initiatives that provide technological devices and basic infrastructure. This support helps ensure that students have an adequate learning environment while at school. However, another study by Kaisara and Bwalya [53], revealed that students at home often face limited access to technological devices and the internet. This limitation is caused by economic and geographical factors, where many families in remote areas cannot afford the necessary learning devices or do not have stable internet access. This prevents students from participating in online learning, which is an important component of hybrid learning.

3.4. Constrains and strategies

The use of learning facilities in the optimization of hybrid learning is certainly the main focus, in general, the availability of learning facilities in schools is sufficient, but the availability at home for students

is limited, considering the uneven infrastructure, as well as the conditions of student residences that are far from the school environment [6], [54]. Based on these limitations, an effective strategy is needed to overcome them. Some of the obstacles faced by schools in optimizing hybrid learning are i) limited funds, damage to goods due to use, and limited human resources owned by the school, ii) students who must be visited or visited the distance of their homes must cross rivers and seas, and iii) signal constraints in the virtual learning process, which can cause student participation that can be neglected and also sometimes the voice of the teacher is not heard. This was conveyed by the principals in the interview session, as follows:

> *"We have limited funds which limit our ability to repair facilities and equipment that are often damaged due to intensive use. In addition, we are also limited in human resources, with minimal staff to manage technology and support students in online learning. Most of our students also live in remote areas that are difficult to reach. Some of them have to cross rivers or seas to come to school or access online learning. This forces us to look for creative solutions to ensure every student can access education without geographic barriers. Plus, we often face signal problems that interfere with the virtual learning process. Weak signals cause student participation to be neglected, and sometimes the teacher's voice cannot be heard clearly. This affects the overall learning effectiveness and requires extra effort to ensure a stable connection."*

Hybrid learning-based learning carried out in schools located in remote areas has it is own uniqueness, for example the location of student residences that spread out, where the situation causes various variations of problems such as access to school, signal strength, and the availability of time for parents to accompany their children to study [27], [46]. Based on these obstacles, the solution to the obstacles faced is, i) the principal makes the needs conform to existing sources of funds and utilizes the subject teacher as the manager; ii) coordination between the nearest schools so that the learning activity sheet reaches the student, and iii) chooses the easiest way in online and face-to-face learning. This statement was supported by the teachers during the interview session as follows:

> *"We at this school are managing hybrid learning needs by ensuring that the use of available funds is in line with key priorities, such as improving technology infrastructure to support online learning. In addition, we actively coordinate with nearby schools to ensure that learning activity sheets reach students on time, so that they remain connected to the curriculum. We also choose learning approaches that are most accessible to students, whether through user-friendly online platforms or face-to-face sessions held with strict health protocols, especially for students who have limited internet access."*

Additionally, a number of strategies developed by educational institutions to maximize the benefits of hybrid learning have been developed. These include allocating funds from school budgets for a variety of student learning facilities, putting up activity sheets for students who do not have access to the internet, and developing a shared vision and mission between educators and students. The strategies that have been put into place have the following effects: i) all students receive their right to education, even though some of it is done at home; ii) teachers, students, and parents can all improve their digital literacy skills; and iii) reports from instructors and students about equipment that has to be handled immediately show that there is effective collaboration between infrastructure and facilities personnel, teachers, and students. The integration of the educational process and technology gives birth to a new alternative learning model to overcome emerging problems, this is certainly necessary for the ability of the principal as the leader in the school to be able to formulate the right strategy to overcome the problems that arise [55], [56].

3.5. Evaluation

Evaluation is needed to see the level of achievement of the plan and the goals that have been set [29], [57]. This evaluation process is first carried out by forming a supervision team, the supervision process is carried out directly and online, especially supervision when learning is carried out remotely, namely by contacting parents, to ensure that students are not left behind in the learning process. The form of evaluation applied is with evaluation meetings and discussions, after evaluation, follow-up is carried out given by the principal by providing direction and advice that is right on target according to field conditions, in addition to that appreciation is also carried out to teachers and students who are increasingly proficient in operating technological devices, in order to optimize the success of hybrid-based learning. This was conveyed by the Principals in the interview session, as follows:

> *"..... the evaluation process is carried out in a structured manner by the supervision team. This team carries out direct and online supervision, especially when learning is carried out remotely, by*

involving parents to ensure that students are not left behind in the learning process. Evaluation is carried out through evaluation meetings and discussions, followed by follow-up by the school principal. This follow-up takes the form of directions and suggestions tailored to field conditions, to optimize the use of technology in hybrid learning."

The existence of feedback from the evaluation results makes the evaluation more meaningful [1]. The results of the evaluation become a foothold in formulating improvement efforts and follow-up plans, and with the award, it is a motivation for teachers and students to continue to develop and excel [58], [59].

4. CONCLUSION

Learning facilities are one of the resources that play an important role in driving the success of hybrid learning. The availability of learning facilities in encouraging the successful application of hybrid learning in schools located in remote areas, shows the availability of adequate facilities, but not the availability of facilities at home. This needs to be a concern for schools to formulate appropriate strategies to get around this so that hybrid-based learning continues, for example, developing and distributing learning materials in printed or digital form that can be accessed without an internet connection, such as textbooks, printed modules and flash drives containing videos or study materials. The government also needs to pay more attention to existing conditions, for example by providing subsidies or free internet services for students and families in remote areas. This can be done through collaboration with internet service providers to ensure stable and affordable access. In addition, the government is investing in developing telecommunications infrastructure in remote areas, such as cell towers and fiber optic networks, to ensure adequate internet access. The results of this study, must also look at the limitations of existing research, including this research only carried out in one remote area in North Kalimantan Province, Indonesia, the further research can be carry out research with more coverage area, for example on the island of Papua or Sulawesi, where there are schools that are in remote areas and have their own uniqueness. Another limitation is that this research was conducted using a qualitative approach, further research can be carried out using a quantitative research approach by identifying the extent to which the availability of learning devices influences the effectiveness of hybrid learning in remote areas, as well as what factors can maximize LFM in implementing hybrid learning in remote area.

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