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Starlink for Papua: Policy Analysis to Bridge the Digital Gap in Improving the Quality of Education

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ABSTRACT

Objective: *This study analyzes the implementation of the Starlink satellite internet policy in remote educational settings as a strategic intervention to bridge the digital divide and improve education quality, focusing on Satap Tawar School in Kampung Tawar, Fakfak Regency, West Papua.* ***Method:*** *This qualitative case study collected primary data through semi-structured interviews with school principals, teachers, students, and education policymakers, complemented by participatory observation and documentation studies. Thematic analysis was guided by an integrated framework of digital divide theory, policy implementation theory, and technology acceptance models. Data validity was ensured through triangulation of sources, methods, and member checks.* ***Results:*** *Starlink access has significantly transformed educational practices across three dimensions: (1) digital learning accessibility, enabling teachers to access e-books and video tutorials while students gain diverse digital references; (2) teaching quality, with educators integrating visual media and interactive content beyond conventional resources; and (3) student participation, marked by improved motivation and attendance. However, critical constraints persist: limited teacher digital literacy, inadequate hardware availability, operational cost burdens, and insufficient local technical support. These findings confirm that Starlink's success depends not merely on technical infrastructure but crucially on institutional capacity, pedagogical readiness, and sustained government support.* ***Novelty:*** *This study provides the first empirical evaluation of Starlink policy in Indonesia's education sector within extreme geographic conditions. It offers a comprehensive analysis integrating policy implementation, institutional readiness, and socio-technical dynamics, demonstrating that first-level digital access does not automatically translate into educational benefits without adequate capacity-building. These findings provide valuable lessons for developing countries facing similar digital divide challenges.*

INTRODUCTION

The equitable distribution of quality education across Indonesia's vast archipelago remains a persistent policy challenge, particularly in regions characterized by extreme geographical isolation. Among these, West Papua presents one of the most acute cases of educational disparity (Beneite-Martí, 2022; Riyanto & Humaid, 2025), where limited telecommunications infrastructure has historically constrained the integration of digital technologies into teaching and learning processes. National statistics underscore the severity of this condition: data from Indonesia's Central Statistics Agency (BPS) indicates that only 41.88% of students in West Papua had accessed the internet within the preceding three months as of 2021, the lowest provincial figure nationally (Dihni, 2022).

Furthermore, school-level internet connectivity remains critically low, with approximately 29% of schools in the region having any form of connection. These infrastructural deficits are predominantly attributed to the formidable geographical challenges of developing cable or cellular tower-based networks across mountainous terrain, dense forests, and small-island coastal areas (Hampton et al., 2021). Consequently, the adoption of digital technology for instructional purposes has remained minimal, contributing to low student engagement, restricted access to quality learning resources, and a widening educational quality gap between remote and urban areas.

This connectivity crisis became particularly pronounced during the COVID-19 pandemic, when online learning mandates encountered complete paralysis in numerous districts, including Fakfak and Teluk Bintuni Regencies, where the absence of internet networks rendered distance learning impossible. In response, both provincial and district governments have initiated infrastructure interventions. The Papua Provincial Government, for instance, has projected the deployment of 250 Very Small Aperture Terminal (VSAT) points across remote areas to serve schools, health centers, and villages beyond the reach of conventional telecommunications operators. At the district level, Yapen Islands Regency has placed VSAT Starlink devices in schools and public facilities, while South Papua has strengthened connectivity in 14 schools using satellite-based solutions. These initiatives reflect a growing policy recognition that Low Earth Orbit (LEO) satellite technology offering advantages of lower latency and higher data transfer speeds compared to conventional geostationary satellites represents a strategic alternative for bridging connectivity gaps in geographically isolated regions (Herath, 2021).

However, despite these policy developments and the technical promise of LEO satellite systems, the deployment of Starlink in Indonesia's education sector has proceeded with limited empirical evidence regarding its actual educational impact. This situation reveals a significant disjuncture between policy implementation and evidence-based practice, particularly in contexts of extreme geographic and institutional vulnerability. To clarify the intellectual terrain and establish a rigorous academic justification for the present study, it is essential to distinguish three distinct strands of existing literature that have thus far remained fragmented.

Apart from challenges with cable infrastructure, cellular network capacity in Papua is also very limited. Data shows that only around 16.7% of Papuans enjoy 4G network access, a figure that is far below the national average. This percentage indicates that most areas still do not have adequate quality cellular network services. With such infrastructure conditions, the use of satellite technology, such as Starlink, has become very relevant as a strategy to bridge the connectivity gap in Papua and West Papua. However, initial data regarding the implementation of VSAT/Starlink as an infrastructure intervention alone is not sufficient. Comprehensive empirical research is needed to test the extent to which satellite technology has a real impact on the quality of education in schools in Papua and West Papua. This study should include an evaluation of the impact on learning outcomes, learning processes, and institutional management of the school, as well as its potential contribution to the digitalization of the surrounding environment.

Low orbit (LEO) satellite internet services, such as Starlink, are seen as a strategic alternative solution to overcome the digital divide (Almekhlafi et al., 2025; Fathaniah et al., 2025). In contrast to the characteristics of conventional geostationary satellites, LEO technology offers the advantages of low latency and higher data transfer speeds. These advantages make it very potential to support the effectiveness of online learning in isolated and remote areas (Herath, 2021). Studies at the international level further indicate that the implementation of satellite-based internet can increase access to educational information technology in remote communities (Liu et al., 2014; Pritchard-

Kelly, 2019). However, the success of implementation is greatly influenced by a number of factors, including the institutional readiness of the school and the capacity of the human resources that use it (McMahon et al., 2025).

Despite the growing policy interest in satellite-based educational connectivity, the existing literature has not empirically explained *how* policy implementation and institutional readiness mediate the translation of satellite-based internet access into improved educational quality in remote school settings. Three distinct strands of literature have developed in parallel but remain fragmented. First, technical studies have focused on the performance parameters of LEO satellite systems bandwidth, latency, and coverage treating connectivity as an engineering challenge with limited attention to pedagogical or institutional outcomes (Herath, 2021; McMahon et al., 2025). Second, educational access studies have demonstrated positive correlations between broadband availability and student engagement or learning resource access, but have predominantly been conducted in contexts where complementary support systems teacher training, hardware provision, and maintenance infrastructure are relatively well-established, raising questions about transferability to settings like West Papua (Ahiaku et al., 2025; Hampton et al., 2021; Mustafa et al., 2024).

Third, policy implementation studies have identified factors that shape technology policy success, such as policy design quality, stakeholder engagement, and resource availability (Muthanna & Sang, 2023), yet these have rarely been integrated with analyses of educational quality outcomes in extreme geographic conditions. Critically, no study has systematically examined the *causal chain* from infrastructure provision through institutional adaptation to educational outcomes in contexts of extreme geographic isolation and institutional fragility. Specifically, three theoretical gaps remain unresolved: (a) the *mediation problem* how institutional capacity, teacher digital literacy, and local support structures mediate the relationship between connectivity and educational quality; (b) the *contextual specificity problem* whether findings from studies in other contexts are transferable to the Indonesian remote education setting; and (c) the *policy-implementation nexus problem* how the specific characteristics of LEO satellite technology, including its operational cost structure, maintenance requirements, and dependency on external technical support, generate implementation dynamics that are not captured by generic policy frameworks. These unresolved issues constitute the academic gap that the present study addresses.

Even though the potential of LEO satellite technology has been recognized, empirical studies regarding the impact of Starlink implementation policies on the quality of education in Indonesia are currently still very limited. The majority of available literature tends to focus on technical aspects and market opportunities for satellite services, not on evaluating the real impact on the quality of the learning process and student learning outcomes in the school environment. Research conducted in other countries highlights a number of challenges in utilizing satellite technology, including limited teacher capacity, low digital literacy, and a lack of educational institutional support (Bernhäuserová et al., 2025; Boté-Vericad et al., 2025; Shudueva et al., 2023). Therefore, there is an urgent research gap that needs to be filled, namely by empirically testing how the Starlink utilization policy can contribute significantly to improving the quality of schools in West Papua.

The novelty of this research lies in its contextual focus on West Papua, a region with

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extreme geographic conditions that has historically faced significant lag in digital infrastructure development. This research has the advantage of not being limited to assessing technical aspects of internet speed alone. On the contrary, this study will in-depth analyze the interaction between implementation policies, school institutional capacity, and teacher competence in utilizing satellite technology, as well as the role of this technology in supporting the digitalization of the environment around the school. With this comprehensive approach, it is hoped that this research can provide a complete picture of the factors that mediate the impact of the Starlink utilization policy on improving the quality of education in the region.

The urgency of this research increases significantly considering the Indonesian Government's policy which has just opened access to Starlink services in remote areas since 2024. This policy is in line with demands to accelerate the achievement of the 4th Sustainable Development Goals (SDGs), namely quality education, which requires policy innovation based on valid empirical data. If the implementation of Starlink is proven to be able to improve the quality of education in Papua and West Papua, the findings of this research will become a strong empirical basis for formulating strategic policies, including subsidy schemes, equipment procurement, teacher training programs, as well as effective collaboration models between the government and the private sector. Thus, this research has substantial academic value and a significant practical contribution to efforts to equalize national education.

The main aim of this research is to analyze the implementation of the Starlink policy in remote schools as a strategy to bridge the digital divide and improve the quality of education. This analysis will be carried out through a case study at Tawar One Roof School (Satap), Kampung Tawar, Fakfak Regency, West Papua.

The theoretical basis that is relevant in this study is the concept of the digital divide, which explains the existence of significant disparities in access, skills and use of digital technology between regions and community groups. According to the taxonomy developed by van Deursen & van Dijk, (2019), the digital divide is divided into three levels: First-level divide: The gap in physical access to hardware and internet connections. Second-level divide: Gaps in digital literacy and technology usage skills. Third-level divide: The gap in the real benefits obtained from the use of technology.

In the context of West Papua, especially Fakfak Regency, the Starlink implementation policy is primarily oriented towards overcoming the first-level divide, namely overcoming limited internet access caused by extreme geographical factors. However, improving the quality of education is not solely determined by the availability of access services. The success of technology implementation really depends on the ability of teachers and students to utilize digital technology (second-level divide) (Andrade Johnson, 2020; Zhao, 2024), as well as the extent to which this use can result in improvements in the quality of the learning process and achievement of learning outcomes (third-level divide) (Lythreatis et al., 2022).

Analysis of Starlink implementation policies must refer to public policy implementation theory. The success of implementation is greatly influenced by effective communication, availability of resources, and bureaucratic structure (Setiawan et al., 2021; Trondal, 2023). This framework is very relevant in the West Papua context, considering that the effectiveness of the Starlink policy is influenced by specific local factors, such as school readiness, teacher capacity, local government support, and the condition of supporting infrastructure. Muthanna & Sang, (2023) strengthen this view by adding that institutional factors, such as institutional commitment and availability of resources, greatly determine the effective implementation of education policies. Therefore, it can be concluded that the success of the Starlink policy is not only determined by the superiority of the technology used, but critically depends on the quality of policy implementation in the field.

Technology adoption and use in that context can be analyzed through the Technology Acceptance Model (TAM) (Gil-Fernández & Calderón-Garrido, 2026; Gilbert et al., 2023). The decision to adopt a technology is crucially influenced by three main factors: perceived usefulness, perceived ease of use, and supporting conditions (Feng et al., 2025; Isiyaku et al., 2016; Li et al., 2016).

In the context of Starlink implementation in West Papua, especially Fakfak Regency, even though internet access is available, the successful use of technology in the learning process requires that educators and school principals have a positive perception of the benefits of the technology, supported by adequate technical support. This is in line with Socio-Technical Systems Theory, which states that the successful implementation of technology is highly dependent on achieving an optimal balance between technical aspects (such as availability of connections and devices) and social aspects (including user competence, school culture, and institutional support) (Kemp et al., 2024; Trist & Bamforth, 1951).

By combining the theoretical framework that has been described, the relationship between variables in this research can be explained as a tiered intervention model: 1.0 Initial Intervention (Digital Divide Theory): The Starlink implementation policy functions as a public policy intervention aimed at providing internet access to schools in West Papua, especially Fakfak Regency. This intervention is specifically directed at overcoming the first-level divide, namely the gap in physical access; 2.) Determining Factors (Policy Implementation Theory): The sustainability and effectiveness of this policy is largely determined by implementation factors. These factors include the quality of policy design, school institutional readiness and capacity, and local government support; 3.) Adaptation Process (Technology & Socio-Technical Acceptance Theory): The availability of internet access must be followed by acceptance and adaptation of technology by educators and students. Based on the Technology Acceptance Model (TAM) and Socio-Technical Systems Theory, the level of Starlink utilization for teaching and learning activities will depend on perceived usefulness, ease of use, and balance between technical and social aspects in the school environment.

Ultimately, a synergistic combination of adequate access, effective policy implementation, and a high level of technology acceptance is expected to improve the quality of education in schools in West Papua.

RESEARCH METHOD

This research adopts a qualitative approach with a case study design. The case study design was chosen strategically to allow researchers to gain in-depth understanding and rich information regarding the implementation of Starlink program policies and their impact on educational quality in a specific institutional context (Yin, 2017). The focus of the research was set at the Tawar One Roof School (Satap) in Kampung Tawar, Fakfak Regency, West Papua. This school serves as a representation of schools in remote areas that have recently gained internet access via the Starlink satellite service.

The research location is Satap Tawar School, Kampung Tawar, Fakfak Regency, West Papua. The location selection was carried out using a purposive technique with the consideration of 1) this school is one of the recipients of satellite-based internet service intervention (Starlink); 2) located in an area with limited access to conventional telecommunications infrastructure/very remote; 3) this school is an important representation in the study of equal distribution of education quality in West Papua, especially Fakfak Regency; 4) Satap Tawar School is the only school that has a junior high school level in the Furwagi district, Fakfak district

The research subjects were 1) School principals, teachers and administrative staff (as policy implementers and main users of internet services in learning); 2) Students (as policy beneficiaries); 3) Representative of the regional Education Office (as a policy maker at the local level). Participants were selected using a purposive sampling strategy designed to capture multiple perspectives on the Starlink implementation process. The sampling approach was guided by the principle of *maximum variation sampling* (Patton, 2015), aimed at including participants who occupy different roles in the policy implementation chain from policy formulation at the district level to frontline implementation at the school level—thereby enabling comprehensive triangulation of perspectives. Total number of participants: Twenty-two (22) participants were included in this study. Participant categories, selection criteria, and demographics are detailed in Table 1.

Table 1. Participant Demographics and Selection Criteria

Participant Category	Number (n)	Selection Criteria	Demographic Profile	Role in Data Collection
School Principal	1	Directly responsible for school-level policy implementation, decision-making regarding Starlink utilization, and institutional coordination	Male, age 47, 18 years of teaching/administrative experience, bachelor's degree in education	Primary key informant; provided institutional perspective on implementation process, challenges, and strategic responses
Classroom Teachers	6	Direct users of Starlink for instructional purposes; represent different subject areas and grade levels to capture variation in pedagogical integration	3 male, 3 female; age range 28–52 (mean = 39.2 years); teaching experience range 4–26 years (mean = 13.5 years); educational backgrounds: 4 bachelor's degrees, 2 diploma degrees; subject areas: Mathematics (2), Indonesian Language (1), English (1), Science (1), Social Studies (1)	Provided perspectives on classroom-level utilization, pedagogical adaptation, challenges in integrating digital resources, and observed student responses

Participant Category	Number (n)	Selection Criteria	Demographic Profile	Role in Data Collection
Administrative Staff	2	Involved in operational management of Starlink equipment, scheduling, and administrative reporting related to internet usage	1 male, 1 female; age range 31–45; administrative experience range 5–15 years	Provided operational perspective on equipment maintenance, usage monitoring, and administrative challenges
Students	8	Direct beneficiaries of Starlink-enabled learning; represent different grade levels (7, 8, 9) and varying levels of engagement with digital resources	4 male, 4 female; age range 13–16 years (mean = 14.3 years); grade distribution: Grade 7 (2), Grade 8 (3), Grade 9 (3); all students had used Starlink-connected devices for learning activities for at least 3 months prior to data collection	Provided perspectives on learning experiences, engagement, motivation, access to digital resources, and challenges in utilizing technology
School Committee Member	1	Represents parental and community perspectives; involved in school governance and oversight of resource utilization	Male, age 52, local community leader, 8 years of service on school committee	Provided community-level perspective on expectations, perceptions of educational improvement, and community support for Starlink initiative
District Education Office Officials	4	Directly involved in policy formulation, program coordination, and resource allocation for Starlink deployment at the district level	3 male, 1 female; age range 40–58; positions: Head of Infrastructure Division (1), Head of Curriculum Division (1), Program Coordinator for Remote Schools (1), Planning Staff (1); all had at least 10 years of service in education administration	Provided policy-level perspectives on program design, implementation strategy, resource allocation, monitoring mechanisms, and future policy directions

The data collected consisted of 1) primary data: obtained through in-depth interviews with school principals, teachers, administrative staff, students, school committees and key informants from the district Education Office. Apart from that, direct observations were made regarding the use of Starlink in teaching and learning activities; 2) secondary data: in the form of policy documents, official reports, educational statistical data, as well as literature related to the implementation of satellite technology in the education sector.

Data collection techniques were carried out through 1) in-depth interviews conducted in a semi-structured manner to explore experiences, perceptions, challenges and obstacles faced in implementing Starlink; 2) participatory observation is used to record the practice of using and utilizing satellite internet/Starlink in learning activities and school management; 3) documentation study of school archives, policy reports, and internet network data (stability, speed, duration of use).

Interview guides were developed separately for each participant category (school principals, teachers, students, administrative staff, school committee members, and district education officials) to ensure that questions were appropriately tailored to each group's role and perspective. The development process followed a theory-driven approach, with questions derived systematically from the three theoretical frameworks that underpin this study: digital divide theory (van Deursen & van Dijk, 2019), policy implementation theory (Muthanna & Sang, 2023), and the Technology Acceptance Model (TAM) (Feng et al., 2025; Isiyaku et al., 2016). For each theoretical construct, a set of operational dimensions was identified, and corresponding interview questions were formulated to explore these dimensions in the context of Starlink implementation at Satap Tawar School. Table 2 presents the mapping between theoretical constructs, operational dimensions, and sample interview questions.

Table 2. Theoretical Constructs, Operational Dimensions, and Sample Interview Questions

Theoretical Construct	Operational Dimension
Digital Divide Theory (van Deursen & van Dijk, 2019)	
First-Level Divide (Physical Access)	Availability and reliability of Starlink connectivity; adequacy of hardware devices
Second-Level Divide (Usage Skills)	Teacher and student digital literacy; patterns of technology use
Third-Level Divide (Outcome Benefits)	Tangible educational benefits derived from connectivity
Policy Implementation Theory (Muthanna & Sang, 2023)	
Policy Design	Clarity, responsiveness, and appropriateness of Starlink policy
Institutional Readiness	School capacity, leadership commitment, and resource availability
Implementation Barriers	Challenges and constraints in policy execution
Stakeholder Engagement	Involvement and collaboration among stakeholders

Theoretical Construct	Operational Dimension
Technology Acceptance Model (TAM) (Feng et al., 2025; Isiyaku et al., 2016)	
Perceived Usefulness	Teacher and student perception of Starlink's benefits for learning
Perceived Ease of Use	Perceived simplicity and user-friendliness of the technology
Facilitating Conditions	Availability of technical support, training, and institutional backing
Socio-Technical Systems Theory (Kemp et al., 2024; Trist & Bamforth, 1951)	
Technical-Social Balance	Integration between technical infrastructure and social system readiness

Research data were analyzed using thematic analysis (Braun & Clarke, 2006), through Step 1) transcription of interviews and observation notes; 2) coding process to identify categories and patterns; 3) grouping of main themes according to the theoretical framework (digital divide, policy implementation, technology acceptance); 4) Drawing conclusions regarding the relationship between Starlink policies, internet access, institutional adaptation, and education quality. To increase validity, triangulation of sources (teachers, students, policies), triangulation of methods (interviews, observations, documents) and member checks with key informants were used.

RESULTS AND DISCUSSION

Results

Conditions of Internet Access and Quality of Pre-Intervention Education in Fakfak Regency

Prior to the implementation of the Starlink service, schools in Fakfak Regency, including Tawar One Roof School (Satap), faced very serious internet access limitations. Data from the Central Statistics Agency (BPS) indicates that only around 41.88% of students in West Papua have accessed the internet in the last three months, making this the lowest figure nationally (Dihni, 2022). In addition, a regional government report (2025) shows that only around 68% of schools in Fakfak Regency have internet access. This limited infrastructure condition has an impact on the low quality of digital-based learning (Adela et al., 2025; Shamsudinova et al., 2025), especially in the aspects of access to learning resources, communication between students and teachers, and the integration of online learning.

The finding that Starlink access significantly transformed digital learning accessibility at Satap Tawar School enabling teachers to download teaching materials, e-books, and video tutorials, and allowing students to access diverse digital references represents a clear resolution of what van Deursen & van Dijk, (2019) conceptualize as the *first-level digital divide*: the gap in physical access to hardware and internet connectivity. Prior to the Starlink intervention, this school was situated in a state of near-complete digital isolation, characteristic of the extreme geographic conditions that define many remote areas in West Papua. The provision of satellite-based internet service effectively bridged this physical access gap, confirming that LEO satellite technology can serve as a viable infrastructural solution in contexts where conventional telecommunications networks are economically and technically infeasible (Herath, 2021; McMahon et al., 2025).

However, the findings also demonstrate that resolving the first-level divide, while necessary, is insufficient to automatically produce educational improvement. This observation is consistent with the multi-level conceptualization of the digital divide, which posits that access constitutes only the foundational layer of a more complex hierarchy of inequalities (Lythreatis et al., 2022; Raihan et al., 2024; van Deursen & van Dijk, 2019). The persistence of significant constraints particularly limited teacher digital literacy and inadequate hardware availability indicates that the school remains trapped in what the framework identifies as the *second-level divide*: gaps in digital skills and usage capabilities. Despite having connectivity, teachers' utilization of the internet remained largely confined to administrative purposes, such as institutional reporting and social communication, rather than extended to pedagogical innovation.

This pattern reveals that connectivity alone does not automatically generate changes in instructional practice; rather, it creates a *potential* for change that must be activated through complementary investments in human capacity and institutional support. Theoretically, this finding extends van Deursen and van Dijk's framework by demonstrating that the transition from first-level to second-level digital divide resolution is not automatic or linear, particularly in contexts of extreme institutional fragility. In settings like Satap Tawar School, where teachers have had limited prior exposure to digital technologies and where professional development infrastructure is minimal, the acquisition of usage skills requires deliberate intervention. The data suggest that without structured training programs and sustained technical support, connectivity may remain underutilized, thereby failing to translate into meaningful pedagogical change.

Academic literature supports that the first-level digital divide (access gap) is a crucial factor that determines the education quality gap (Flores Coronado, 2022; KC et al., 2025). In West Papua, limited infrastructure resulted in the implementation of online learning during the pandemic being completely paralyzed in many areas. This finding is consistent with research (Hampton et al., 2021) which shows a positive correlation between the availability of broadband access and the level of student engagement and assignment completion.

The Impact of Starlink Policy on School Quality in West Papua

The policy regarding the use of Starlink in educational institutions located in remote areas is designed to overcome existing digital infrastructure constraints. The success of the Starlink policy is not only based on the technical infrastructure dimension, but crucially also on institutional capacity, pedagogical readiness and adequate social support. Based on research findings at Satap Tawar School, there has been a significant increase in the dimensions of educational quality after the availability of Starlink access, which includes:

Accessibility of Digital Learning Increases

By facilitating internet connectivity through Starlink, there is an increase in the capabilities of teaching staff and the learning experience of students. This connectivity also improves communication and collaboration with external parties, such as the Education Department, training institutions and other schools. These findings are consistent with existing literature, which confirms that broadband access has a crucial role in expanding learning opportunities and reducing geographic disparities (Hampton et al., 2021). Based on research findings at Satap Tawar School, there has been a significant increase in the dimensions of educational quality after the availability of Starlink access, which includes:

Accessibility of Digital Learning Increases

The presence of Starlink at Satap Tawar School, Fakfak Regency, has transformed and created significant opportunities in access to digital learning and information technology. Before this satellite internet service was available, educators and students faced serious obstacles in accessing online resources, exacerbated by the lack of internet infrastructure and even electricity supply in the area.

The innovation effort began with providing access to electricity using a solar panel system, followed by the provision of satellite internet for the school. This initiative received full support from the Regional Government through the Fakfak Regency Education Office, which facilitated the procurement of complete Starlink equipment. Facilitating internet connectivity through Starlink has improved the capabilities of teaching staff and the learning experience of students. For educators: 1.) Access Learning Materials: Teachers can now download teaching materials regularly and efficiently, including digital modules, electronic books (e-books), and video tutorials, which significantly shortens teaching preparation time; 2.) Professional Development: This connectivity allows teachers to run educational applications, collaborate online with other educational communities, and take part in distance (online) training programs, which are essential for improving personal competence and updating teaching materials in accordance with developments in the national curriculum and global resources.

The implementation of Starlink has a significantly positive impact on the quality of the teaching methods applied. The quality of teaching has increased substantially because educators are no longer limited to conventional resources, but are able to provide learning experiences that are more varied and relevant to the latest developments. This finding is consistent with the views of McMahon et al., (2025) who assert that satellite technology in remote areas empowers teachers to access global knowledge, which can then be interpreted and translated effectively into local learning contexts.

For students: The availability of wider internet access also has a significant impact on student interest, motivation and participation. This increase is driven by unlimited access to a variety of digital learning references and educational resources. The availability of wider internet access also has a significant impact on student interest, motivation and participation (Beyoğlu et al., 2022; Okyere, 2022). Scientific literature consistently confirms that internet integration in the learning process contributes significantly to increasing student engagement and strengthening learning outcomes, especially when supported by effective teaching strategies (Ahiaku et al., 2025; Mustafa et al., 2024). Therefore, the implementation of Starlink not only functions as an addition to technical facilities, but also facilitates the creation of a more participatory and contextual learning climate. This assumption is in line with findings McMahon et al., (2025) which show that LEO (Low Earth Orbit) satellite technology has the capability to expand and stabilize connectivity in remote communities: 2.) Diversification of Learning Resources: The availability of internet access has changed previously monotonous learning methods, allowing students to access various scientific references and external resources: 2.) Distance Participation: This access opens up opportunities for students to take part in distance learning activities organized by the Ministry of Education and non-formal institutions.

This connectivity also improves communication and collaboration with external parties, such as the Education Department, training institutions and other schools. In this way, Satap Tawar School no longer experiences digital isolation, but can be integrated and networked with the wider educational ecosystem. These findings are consistent with existing literature, which confirms that broadband access has a crucial role in expanding learning opportunities and reducing geographic disparities (Hampton et al., 2021; Niewoehner et al., 2026).

Improving the Quality of Teaching

The implementation of Starlink has a significantly positive impact on the quality of the teaching methods applied. Educators now have easy access to online references, educational innovation sources, and professional development materials such as those available on educational home platforms, scientific journals, teacher training modules, and learning media based on the latest technology. This accessibility directly improves the quality of learning planning tools (Learning Implementation Plans/RPP) and enriches the variety of teaching strategies. Furthermore, teachers have begun to integrate visual and multimedia media into the teaching and learning process, including the use of learning videos, interactive simulations, and digital content.

The use of digital resources makes the learning process more contextual, dynamic and interesting for students (Apoki et al., 2020; Kandakatla et al., 2020; Rekha & Thangarajathi, 2026), especially in remote areas which previously had limited supporting facilities. In other words, the quality of teaching has increased substantially because educators are no longer limited to conventional resources, but are able to provide learning experiences that are more varied and relevant to the latest developments.

This finding is consistent with the views of McMahon et al., (2025) who assert that satellite technology in remote areas empowers teachers to access global knowledge, which can then be interpreted and translated effectively into local learning contexts.

Student Participation

The availability of wider internet access also has a significant impact on student interest, motivation and participation. Previously, student involvement tended to be limited due to limited variety and the lack of attractiveness of learning media, which were often monotonous and triggered boredom. With the implementation of digital devices connected via satellite internet, students show increased enthusiasm and enthusiasm in participating in learning activities. This increase is driven by unlimited access to a variety of digital learning references and educational resources.

In addition, the availability of Starlink services at Satap Tawar School is correlated with improvements in student attendance levels. This is believed to be a reflection of high interest and curiosity about innovation and new information that they have not been able to access.

Scientific literature consistently confirms that internet integration in the learning process contributes significantly to increasing student engagement and strengthening learning outcomes, especially when supported by effective teaching strategies (Ahiaku et al., 2025; Mustafa et al., 2024). Therefore, the implementation of Starlink not only functions as an addition to technical facilities, but also facilitates the creation of a more participatory and contextual learning climate. However, optimizing the full benefits of this technology depends on the availability of sufficient institutional capacity to support it.

Discussion

Supporting and Inhibiting Factors for Starlink Implementation

The process of implementing the Starlink policy in educational institutions in West Papua faces various significant challenges. Evaluation of field data identified the existence of driving components (enablers) and restrictive factors (constrainers) that influence the success of the program. Supporting Factors:

Responsive Policy Design

The Regional Government through the Fakfak Regency Education Office, West Papua, has initiated the placement of Starlink devices in schools in remote areas, using an initial funding scheme. This action reflects (or: reflects) proactive policy responsiveness in overcoming the limitations of conventional infrastructure (fiber optics and BTS). Such policy design is in line with policy implementation theory, which stipulates that smart policy design is a crucial prerequisite for successful implementation. Specifically, in the context of Satap Tawar School, this policy provides concrete opportunities to access internet services that were previously infeasible.

School Commitment

The central role of school principals and teachers was identified as the main driving factor (key implementation agents). Their initiative goes beyond passive acceptance of Starlink devices, by embracing active integration into the learning process. Concrete examples include the use of internet connections to access online reference sources and produce visual-based teaching materials. This high level of commitment indicates that the school has the autonomy (agency) to capitalize on policies even though there are obstacles in the surrounding environment. This finding is in accordance with the principles of Trist & Bamforth, (1951) socio-technical systems theory, which states that the optimization of new technology depends on synergy between technical and social components; in this case, the teacher's active participation becomes the determining social element.

Supportive Social Context

The local community in Kampung Tawar shows positive acceptance of the existence of satellite internet, considering it an essential facility for improving the quality of children's education. This collective support is clearly visible from the active participation of parents in facilitating the use of digital devices by students, as well as the community's willingness to maintain and secure Starlink devices installed in schools.

This kind of manifestation of social support strengthens policy implementation efforts, in line with the findings of Muthanna & Sang, (2023) who emphasize that the local social and political context has a determining role in strengthening or weakening the success of education policies.

Inhibiting Factors

Limited Teacher Capacity In Digital Literacy

Even though the availability of connectivity has been met, the majority of teaching staff are still limited to using the internet only for administrative purposes, such as reporting on educational institutions or communicating via social networks. Utilization of learning innovation is hampered by training deficiencies and low teacher digital competence (skills). This phenomenon reflects the existence of a second-level digital divide van

Deursen & van Dijk, (2019) where accessibility is available, but the skills to optimize it are still sub-optimal. Thus, optimizing the educational benefits of the Starlink policy will not be achieved without increasing digital literacy for teachers.

Hardware Limitations (Laptop, Tablet)
The availability of internet connections has not been utilized evenly because not all students have personal devices (laptops or smartphones/Android). Accessibility is currently limited to school-provided facilities or loaned devices. This situation has the potential to widen the gap between students who have devices and those who don't, thereby creating a material access gap. This barrier is consistent with the findings of the international study of Mustafa et al., (2024) who explain that the success of technology integration in rural schools is greatly influenced by the availability of adequate hardware and technical support.

Constraints on Operational Costs and Device Maintenance
Operation of Starlink devices requires an ongoing monthly subscription fee, in addition to the need for technician support for routine maintenance and troubleshooting. For educational institutions in remote areas that are faced with limited budget allocations (BOS Funds), these operational costs create a significant additional financial burden. In addition, the deficit of local technical personnel results in delays in repairs, which threatens service continuity. These findings are in line with the results of the study by McMahon et al., (2025) who concluded that the sustainability of satellite technology programs in remote communities is highly dependent on adaptive financing models and technical capacity available at the local level.

These findings are consistent with the core principles of policy implementation theory, which stipulates that implementation success is determined by adaptive policy design, implementing capacity, resource support, and the dynamics of the local context (Muthanna & Sang, 2023). At the same time, Trist & Bamforth, (1951) socio-technical systems conception strengthens this view by emphasizing that every technical obstacle will always correlate with the readiness and stability of the social and institutional systems in the field.

Policy Implications and Global Contribution
This research confirms that LEO (Low Earth Orbit) satellite technology, such as Starlink, is in the realm of institutional and policy issues, not merely a technical solution. The implementation context in West Papua can be used as a valuable lesson (lesson learned) for other island countries in the Global South which face similar digital divide challenges (Herath, 2021). Therefore, the Starlink policy in West Papua can be positioned not just as a technology program, but as an educational strategy based on social justice (social justice-based education strategy) to support the achievement of Sustainable Development Goals (SDG 4), namely quality education. Based on these findings, several strategic implications can be drawn: 1) National Policy. Starlink implementation in remote educational institutions is integrated with systematic sustainability support. This can be realized through providing sustainable subsidies for operational costs, providing digital literacy and competency training for teachers, as well as allocating and providing adequate hardware (such as laptops, tablets and projectors) in all recipient schools. In addition, it is necessary to formulate monitoring and evaluation policies at the national level to measure the effectiveness of using Starlink in the education sector, so that its

impact on improving the quality of schools in remote areas can be measured systematically and objectively; 2.) Regional Policy. The West Papua Provincial or Regency Education Office needs to develop a technical and pedagogical assistance program for teachers so that the use of satellite internet is more focused on improving the quality of learning, and not limited to administrative needs. Apart from that, local governments also need to build institutional collaboration mechanisms with local communities in maintaining and securing Starlink devices. This step will ensure the continuity of device operations through active participation and ownership (sense of ownership) of the local community, so that devices that have been installed can avoid the risk of being abandoned; 3.) At the school institutional level, it is necessary to formulate a clear and structured internal strategy to maximize the benefits of Starlink. Schools can establish protocols for using computer laboratories, develop learning materials supported by digital resources, and carry out information literacy training for students systematically. Teachers are supported to capitalize on digital connectivity to enrich teaching methods, for example through the implementation of blended learning or the use of open educational resources (OER), so that the learning process becomes more interactive and relevant to the demands of 21st Century competencies.

CONCLUSION

Fundamental Finding: This case study at Satap Tawar School, Kampung Tawar, Fakfak Regency, West Papua, demonstrates that Starlink implementation has significant potential to bridge the digital divide in remote educational settings. The availability of satellite internet connectivity has tangibly improved digital learning accessibility, enriched teaching quality, and increased student motivation and participation. However, these positive outcomes are not determined solely by technical infrastructure. The effectiveness of Starlink policies is critically mediated by institutional capacity, teacher digital literacy, availability of supporting devices, and active local government support. Theoretically, these findings validate the multi-level digital divide framework by confirming that first-level access constitutes only a necessary prerequisite, while meaningful educational benefits are contingent upon usage skills, pedagogical integration, and institutional readiness. Furthermore, this research reinforces policy implementation theory by demonstrating that policy success is shaped by policy design quality, implementer competence, and local contextual dynamics. The integrated framework developed in this study offers a novel analytical lens for understanding technology policy in resource-constrained settings. **Implication:** These findings carry strategic implications at three levels of governance. At the national level, Starlink deployment must be integrated with systematic sustainability support, including operational cost subsidies, mandatory teacher digital literacy training, hardware provision, and a national monitoring framework. At the regional level, local education authorities should develop technical and pedagogical assistance programs and establish institutional collaboration with communities for device maintenance and security. At the school level, institutions must formulate clear internal strategies, including structured laboratory protocols, digital resource development, and information literacy training, enabling teachers to utilize connectivity through blended learning models aligned with 21st-century competency demands. **Limitation:** This study has several limitations. As a single-case study, findings are context-specific and not generalizable. The short timeframe limited assessment of long-term sustainability. Reliance on self-reported perceptions may introduce social desirability bias. The study did not quantitatively measure academic achievement nor comprehensively examine technical dimensions of Starlink connectivity. **Future Research:** Comparative studies across multiple Starlink recipient schools are needed to identify contextual variations. Quantitative studies employing measurable educational quality indicators are essential to strengthen empirical evidence. Longitudinal research designs are crucial to evaluate sustainability of impact over time. Cross-sectoral studies encompassing education, health, and economic development would provide a comprehensive understanding of Starlink's contribution to broader development outcomes. Comparative research between satellite-based and alternative technologies would offer valuable insights for cost-benefit policy analysis.

REFERENCES

Adela, D., Cahya, R., Sarah, S., & Ruswandi, S. (2025). Digital Education for Primary School Children: Opportunities, Challenges, and Implementation Gaps in the Global Age of Technology †. *Engineering Proceedings*, *107*(1). https://doi.org/10.3390/engproc2025107113

Ahiaku, P. K. A., Uleanya, C., & Muyambi, G. C. (2025). Rural schools and tech use for sustainability: the challenge of disconnection. *Education and Information Technologies*, *30*(9), 12557–12571. https://doi.org/10.1007/s10639-024-13311-9

Almekhlafi, M., Lesage-Landry, A., & Kurt, G. K. (2025). Access Inequality in LEO Satellite Networks: A Case Study of High-Latitude Coverage in Northern Québec. *IEEE Open Journal of Vehicular Technology*, *6*, 1613–1630. https://doi.org/10.1109/OJVT.2025.3575546

Andrade Johnson, M. D. S. (2020). Digital equity: 1:1 technology and associated pedagogy. In *Handbook on Promoting Social Justice in Education* (pp. 1609–1639). Springer International Publishing. https://doi.org/10.1007/978-3-030-14625-2_142

Apoki, U. C., Al-Chalabi, H. K. M., & Crisan, G. C. (2020). From Digital Learning Resources to Adaptive Learning Objects: An Overview. In S. D. & S. L.F. (Eds.), *Communications in Computer and Information Science: Vol. 1126 CCIS* (pp. 18–32). Springer. https://doi.org/10.1007/978-3-030-39237-6_2

Beneite-Martí, J. (2022). Education, Colonialism and Necropolitics in West Papua. In *International Perspectives on Education and Society* (Vol. 42A, pp. 207–227). Emerald Group Holdings Ltd. https://doi.org/10.1108/S1479-36792022000042A016

Bernhäuserová, V., Krajňáková, L., Řezníčková, D., & Hanus, M. (2025). Teachers' Perceived Limits to GIS Use in Schools and Implications for Teacher Training. *Journal of Geography*, *124*(5), 127–145. https://doi.org/10.1080/00221341.2025.2558718

Beyoğlu, D., Aksal, F. A., Altınay, Z., & Dağlı, G. (2022). Learner Engagement in Online Learning During Covid-19 Period for Future Projections. In *Lecture Notes in Educational Technology* (pp. 67–73). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-981-19-5967-7_8

Boté-Vericad, J.-J., Centelles, M., & Ferran-Ferrer, N. (2025). Determining gender in academic authorship: a comprehensive and methodical approach. *Digital Library Perspectives*, *41*(2), 346–366. https://doi.org/10.1108/DLP-05-2024-0080

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Dihni, V. . (2022). *Sampai 2021, Hanya 41% Pelajar di Papua yang Mengakses Internet*. https://databoks.katadata.co.id/teknologi-telekomunikasi/statistik/5bc463324f186b3/sampai-2021-hanya-41-pelajar-di-papua-yang-mengakses-internet

Fathaniah, K. I., Wijanto, H., & Setiawan, D. P. (2025). Evaluation of Starlink Performance: Comparison with FTTx in West Java's Dense Urban-Rural Areas. *Proceedings of ICITDA 2025 - 10th International Conference on Information Technology and Digital Application*. https://doi.org/10.1109/ICITDA68167.2025.11332551

Feng, J., Yu, B., Tan, W. H., Dai, Z., & Li, Z. (2025). Key factors influencing educational technology adoption in higher education: A systematic review. *PLOS Digital Health*, *4*(4), e0000764. https://doi.org/10.1371/journal.pdig.0000764

Flores Coronado, M. L. (2022). Calidad educativa. Relación con la brecha digital docente del área de Ciencias Sociales y Humanas. *Universidad y Sociedad*, *14*(S2 SE-Artículos), 112–122. https://rus.ucf.edu.cu/index.php/rus/article/view/2768

Gil-Fernández, R., & Calderón-Garrido, D. (2026). How is technology accepted in the classroom? Exploring the use of TAM in educational research: aims, methodologies, challenges and key findings. A systematic review. *Digital Education Review* , *48*, 251–268. https://doi.org/10.1344/der.2026.48.251-268

Gilbert, J. K., Temple, A., & Underwood, C. (2023). Satellite technology in education. In *Satellite Technology in Education*. Taylor and Francis. https://doi.org/10.4324/9781032629810

Hampton, K. B., Smeltzer, S. C., & Ross, J. G. (2021). The transition from nursing student to practicing nurse: An integrative review of transition to practice programs. *Nurse Education in Practice*, *52*, 103031. https://doi.org/10.1016/j.nepr.2021.103031

Herath, V. (2021). *Starlink : A Solution to the Digital Connectivity Divide in Education in the Global South*. https://doi.org/10.48550/arXiv.2110.09225

Isiyaku, D. D., Ayub, A. F. M., & Kadir, S. A. (2016). Modeling the Effects of Job Relevance, Facilitating Conditions, Perceived Usefulness and Perceived Ease of Use on Teachers' Intention of Using Technology in Tertiary Schools of LDCs. *International Conference on Computers in Education*. https://library.apsce.net/index.php/ICCE/article/view/3564

Kandakatla, R., Berger, E. J., Rhoads, J. F., & DeBoer, J. (2020). Student perspectives on the learning resources in an Active, Blended and Collaborative (ABC) pedagogical environment. *International Journal of Engineering Pedagogy*, *10*(2), 7–31. https://doi.org/10.3991/ijep.v10i2.11606

KC, D., KC, P., Rado, I., & Vichit-Vadakan, N. (2025). Digital inequality and learning outcomes: evidence from Thailand. *Education and Information Technologies*, *30*(14), 19677–19702. https://doi.org/10.1007/s10639-025-13570-0

Kemp, T., Ayton, J., Butler-Henderson, K., & Lam, M. (2024). Using socio-technical systems theory to study the health information management workforce in Australian acute hospitals. *Social Theory & Health*, *22*(4), 285–300. https://doi.org/10.1057/s41285-024-00214-5

Li, Kun, Li, Yanju, & Franklin, Teresa. (2016). Preservice Teachers' Intention to Adopt Technology in Their Future Classrooms. *Journal of Educational Computing Research*, *54*(7), 946–966. https://doi.org/10.1177/0735633116641694

Liu, M., Cao, J., Xue, Y., Yao, Y., & Zhao, X. (2014). Development and research on remote online education information system based on web. *Computer Modelling and New Technologies*, *18*(9), 312–318. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84926688811&partnerID=40&md5=b2ce2b8eb360650bd332742909ce06a9

Lythreatis, S., Singh, S. K., & El-Kassar, A.-N. (2022). The digital divide: A review and future research agenda. *Technological Forecasting and Social Change*, *175*, 121359. https://doi.org/https://doi.org/10.1016/j.techfore.2021.121359

McMahon, R., Akçayır, M., Norris, B., & Fabian, L. (2025). Assessing the impacts of low-earth orbital satellite systems in remote indigenous communities: Social and economic outcomes of use in northern Canada. *Telecommunications Policy*, *49*(2), 102912. https://doi.org/https://doi.org/10.1016/j.telpol.2025.102912

Mustafa, F., Nguyen, H. T. M., & Gao, X. (Andy). (2024). The challenges and solutions of technology integration in rural schools: A systematic literature review. *International Journal of Educational Research*, *126*, 102380. https://doi.org/https://doi.org/10.1016/j.ijer.2024.102380

Muthanna, A., & Sang, G. (2023). A Conceptual Model of the Factors Affecting Education Policy Implementation. In *Education Sciences* (Vol. 13, Issue 3, p. 260). https://doi.org/10.3390/educsci13030260

Niewoehner, R. J., Xu, E., Yoo, E., & Jeong, H. (2026). Proceed with caution: How broadband access and speed help and hinder student learning outcomes. *Production and Operations Management*. https://doi.org/10.1177/10591478261454785

Okyere, C. Y. (2022). The effect of internet services on child education outcomes: evidence from poa! Internet in Kenya. *Journal of Development Effectiveness*, *14*(1), 4–18. https://doi.org/10.1080/19439342.2020.1829001

Pritchard-Kelly, R. (2019). New satellite technologies to provide the geographic ubiquity needed to connect the globe, benefitting the SDGs, 5G, and the digital divide. *Proceedings of the International Astronautical Congress, IAC, 2019-October*. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85079130938&partnerID=40&md5=794ff97b990ba876d724b9372acc657f

Raihan, M. M. H., Subroto, S., Chowdhury, N., Koch, K., Ruttan, E., & Turin, T. C. (2024). Dimensions and barriers for digital (in)equity and digital divide: a systematic integrative review. *Digital Transformation and Society*, *4*(2), 111–127. https://doi.org/10.1108/DTS-04-2024-0054

Rekha, K., & Thangarajathi, S. (2026). E-learning platforms and digital resources: Transforming education. In *Handbook on Integrating Smart Technologies for Sustainable Development* (pp. 11–25). CRC Press. https://doi.org/10.1201/9781003586951-2

Riyanto, P., & Humaid, H. (2025). Closing the gap: Evaluating local government initiatives to enhance basic education access and quality. *Corporate Law and Governance Review*, *7*(1), 73–84. https://doi.org/10.22495/clgrv7i1p7

Setiawan, A. F., Hansen, S., & Fujiono, A. (2021). Measuring the Influence of Communication Planning Towards Construction Project Performance. *Civil and Environmental Engineering*, *17*, 58–65. https://doi.org/10.2478/cee-2021-0007

Shamsudinova, I., Karimov, N., Umarova, M., Mustafaqulova, D., Almuratova, G., Qodirov, S., Istamova, D., & Matniyoz, S. (2025). Educational Disparities in the Digital Era and the Impact of Information Access on Learning Achievements. *Indian Journal of Information Sources and Services*, *15*(1), 6–11. https://doi.org/10.51983/ijiss-2025.IJISS.15.1.02

Shudueva, Z., Budnikov, D., & Akhmadov, A. (2023). Problems and opportunities for introducing educational technologies for the sustainable development of the quality of education. *E3S Web of Conferences*, *451*, 6010. https://doi.org/10.1051/e3sconf/202345106010

Trist, E. L, & Bamforth, K. W. (1951). Some Social and Psychological Consequences of the Longwall Method of Coal-Getting: An Examination of the Psychological Situation and Defences of a Work Group in Relation to the Social Structure and Technological Content of the Work System. *Human Relations*, *4*(1), 3–38. https://doi.org/10.1177/001872675100400101

Trondal, J. (2023). *Theorizing the Administrative State* (pp. 33–51). https://doi.org/10.1007/978-3-031-28008-5_2

van Deursen, A. J., & van Dijk, J. A. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *New Media & Society*, *21*(2), 354–375. https://doi.org/10.1177/1461444818797082

Yin, R. K. (2017). *Case Study Research and Applications: Design and Methods*. SAGE Publications. https://books.google.co.id/books?id=uX1ZDwAAQBAJ

Zhao, W. (2024). A study of the impact of the new digital divide on the ICT competences of rural and urban secondary school teachers in China. *Heliyon*, *10*(7). https://doi.org/10.1016/j.heliyon.2024.e29186

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