

Challenges in Implementing Early Intervention for Students with Special Needs in Remote Areas: A Case Study of Tioman Island

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ABSTRAK

Studi ini mengeksplorasi tantangan dalam menerapkan intervensi dini bagi Siswa Berkebutuhan Khusus (SSN) di daerah terpencil, dengan fokus khusus pada Pulau Tioman. Penelitian kualitatif ini menggunakan desain studi kasus dan melibatkan wawancara mendalam dengan 12 peserta yang terdiri dari guru pendidikan khusus, orang tua, dan administrator sekolah. Temuan mengungkapkan tiga tantangan utama: keterbatasan sumber daya dan infrastruktur, masalah terkait sumber daya manusia dan pelatihan, serta tantangan geografis dan logistik yang unik di konteks pulau. Studi ini juga mendokumentasikan berbagai strategi adaptif yang diterapkan oleh sekolah, termasuk pengembangan bahan ajar menggunakan sumber daya lokal, kolaborasi dengan masyarakat setempat, dan penggunaan pendekatan pengajaran yang fleksibel. Temuan ini menunjukkan perlunya pendekatan yang dikontekstualisasikan untuk pelaksanaan intervensi dini di daerah terpencil yang mempertimbangkan keterbatasan sumber daya dan karakteristik spesifik lokasi. Secara keseluruhan, hasil ini memberikan implikasi penting bagi pembuat kebijakan dalam merancang program intervensi dini yang lebih efektif dan sesuai konteks untuk daerah terpencil di Malaysia.

Tujuan penelitian ini adalah untuk mengeksplorasi tantangan dan strategi adaptif yang terlibat dalam pelaksanaan intervensi dini bagi siswa berkebutuhan khusus di konteks pulau terpencil, khususnya Pulau Tioman.

Bahan dan metode. Penelitian ini mengadopsi pendekatan kualitatif dengan menggunakan desain studi kasus untuk meneliti pelaksanaan intervensi dini bagi siswa berkebutuhan khusus di konteks pulau terpencil. Penelitian ini dilakukan di Pulau Tioman, Pahang, melibatkan dua sekolah yang menyediakan program intervensi dini, yaitu SMK Tekek dan SK Tekek. Pengambilan sampel secara purposif digunakan untuk memilih peserta yang memiliki pengalaman langsung dalam pelaksanaan intervensi dini. Sebanyak 12 peserta terlibat, terdiri dari enam guru pendidikan khusus, empat orang tua siswa berkebutuhan khusus, dan dua administrator sekolah.

Hasil. Temuan menunjukkan empat tema utama yang mempengaruhi pelaksanaan intervensi dini di Pulau Tioman. Tantangan yang paling menonjol adalah kurangnya sumber daya dan infrastruktur, termasuk keterbatasan bahan ajar dan konektivitas internet yang tidak stabil, yang membatasi akses ke teknologi pendidikan dan dukungan profesional dari daratan. Kendala geografis dan logistik lebih lanjut memengaruhi pelaksanaan, karena orang tua harus menempuh jarak yang jauh melalui laut untuk mendapatkan layanan spesialis, sementara kondisi cuaca dan ketergantungan pada transportasi laut mengganggu kontinuitas layanan dan perencanaan sekolah. Meskipun menghadapi tantangan tersebut, guru menunjukkan kapasitas adaptif yang kuat dengan mengembangkan bahan ajar menggunakan sumber daya lokal dan daur ulang, memperkuat kolaborasi dengan masyarakat setempat, serta mengadopsi pendekatan pengajaran yang fleksibel yang disesuaikan dengan kondisi lingkungan dan kemampuan siswa. Temuan ini menyoroti baik keterbatasan struktural maupun ketahanan kontekstual yang membentuk praktik intervensi dini di wilayah pulau terpencil.

Kesimpulan. Temuan mengungkapkan empat tema utama yang memengaruhi pelaksanaan intervensi dini di Pulau Tioman. Tantangan yang paling menonjol adalah kurangnya sumber daya dan infrastruktur, termasuk keterbatasan bahan ajar dan koneksi internet yang tidak stabil, yang membatasi akses terhadap teknologi pendidikan dan dukungan profesional dari daratan. Kendala geografis dan logistik juga memengaruhi pelaksanaan, karena orang tua harus menempuh jarak jauh melalui laut untuk mendapatkan layanan spesialis, sementara kondisi cuaca dan ketergantungan pada transportasi laut mengganggu kontinuitas layanan dan perencanaan sekolah. Meskipun menghadapi tantangan ini, para guru menunjukkan kapasitas adaptif yang kuat dengan mengembangkan bahan ajar menggunakan sumber daya yang tersedia secara lokal dan daur ulang, memperkuat kolaborasi dengan komunitas setempat, dan mengadopsi pendekatan pengajaran yang fleksibel sesuai dengan kondisi lingkungan dan kemampuan siswa. Temuan ini menyoroti baik keterbatasan struktural maupun ketahanan kontekstual yang membentuk praktik intervensi dini di daerah pulau terpencil.

Kata kunci: intervensi dini, siswa dengan kebutuhan khusus, daerah terpencil, pendidikan inklusif, studi kualitatif

ABSTRACT

This study explores the challenges of implementing early intervention for Students with Special Needs (SSN) in remote areas, with a specific focus on Tioman Island. This qualitative research employed a case study design and involved in-depth interviews with 12 participants comprising special

education teachers, parents, and school administrators. The findings revealed three main challenges: limitations in resources and infrastructure, issues related to human resources and training, and geographical and logistical challenges unique to the island context. The study also documented various adaptive strategies implemented by schools, including the development of teaching and learning materials using local resources, collaboration with the local community, and the use of flexible instructional approaches. The findings suggest the need for a contextualised approach to early intervention implementation in remote areas that takes into account resource constraints and location-specific characteristics. Overall, the results provide important implications for policymakers in designing more effective and context-appropriate early intervention programmes for remote areas in Malaysia.

The study purpose was to explore the challenges and adaptive strategies involved in implementing early intervention for students with special needs in a remote island context, specifically Tioman Island.

Materials and methods. This study adopted a qualitative approach using a case study design to examine the implementation of early intervention for students with special needs in a remote island context. The study was conducted on Tioman Island, Pahang, involving two schools that provide early intervention programmes, namely SMK Tekek and SK Tekek. Purposive sampling was employed to select participants with direct experience in early intervention implementation. A total of 12 participants were involved, comprising six special education teachers, four parents of students with special needs, and two school administrators.

Results. The findings revealed four main themes influencing the implementation of early intervention on Tioman Island. The most prominent challenge was the lack of resources and infrastructure, including limited teaching materials and unstable internet connectivity, which restricted access to educational technology and professional support from the mainland. Geographical and logistical constraints further affected implementation, as parents were required to travel long distances by sea to obtain specialist services, while weather conditions and dependence on sea transportation disrupted service continuity and school planning. Despite these challenges, teachers demonstrated strong adaptive capacity by developing teaching materials using locally available and recycled resources, strengthening collaboration with the local community, and adopting flexible instructional approaches tailored to environmental conditions and students' abilities. These findings highlight both the structural constraints and contextual resilience shaping early intervention practices in remote island settings.

Conclusions. The findings revealed four main themes influencing the implementation of early intervention on Tioman Island. The most prominent challenge was the lack of resources and infrastructure, including limited teaching materials and unstable internet connectivity, which restricted access to educational technology and professional support from the mainland. Geographical and logistical constraints further affected implementation, as parents were required to travel long distances by sea to obtain specialist services, while weather conditions and dependence on sea transportation disrupted service continuity and school planning. Despite these challenges, teachers demonstrated strong adaptive capacity by developing teaching materials using locally available and recycled resources, strengthening collaboration with the local community, and adopting flexible instructional approaches tailored to environmental conditions and students' abilities. These findings highlight both the structural constraints and contextual resilience shaping early intervention practices in remote island settings.

Keywords: early intervention, students with special needs, remote areas, inclusive education, qualitative study

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INTRODUCTION

Inclusive education serves as a fundamental pillar of national efforts to ensure that all students, regardless of background or ability, have equitable access to high-quality and holistic educational experiences. In this study, Students with Special Needs (SSN) are a key focus, as they require more structured and targeted support to achieve optimal developmental outcomes. Early intervention has emerged as a critical component of special education systems, as it provides SSN with appropriate developmental stimulation during the most significant stages of early childhood. Research in child development consistently highlights early childhood as a period of high neuroplasticity, making early intervention not only effective but also capable of positively altering students' long-term developmental trajectories. However, the effectiveness of early intervention programmes is highly dependent on the quality of implementation, availability of resources, and educators' understanding of individual student needs.

In the Malaysian context, the implementation of early intervention varies considerably across urban, suburban, and rural areas. Tioman Island, located off the eastern coast of Peninsular Malaysia, is often underrepresented in mainstream educational discourse. Its small population, geographical separation from the mainland, and reliance on sea and air transportation present clear logistical constraints. These factors affect not only access to formal education but also the provision of essential support services such as therapy, professional assessment, and teacher training, all of which are fundamental to effective early intervention. For instance, a report by the Ministry of Education Malaysia (2022) indicated that only 45% of schools in remote areas offer comprehensive early intervention programmes, highlighting significant disparities in special education service provision.

Furthermore, challenges in remote areas extend beyond logistics to include issues related to human resources, community readiness, and parental awareness of the importance of early intervention. Teachers in such contexts often assume multiple roles beyond their formal responsibilities, including acting as therapy facilitators, programme coordinators, and family advisors, due to the absence of professional support specialists. These limitations directly affect the continuity, consistency, and outcomes of early intervention programmes. Socioeconomic factors within local communities also influence parental participation, despite family involvement being a crucial determinant of early intervention success.

Therefore, this study aims to examine in depth the real challenges faced by teachers, parents, and school administrators in implementing early intervention on Tioman Island. By exploring the realities of early intervention in a remote setting, the study provides empirical insights into existing constraints and potential strengths while identifying meaningful areas for improvement. The findings are expected to inform policymakers in developing more responsive and context-sensitive strategies to reduce disparities in special education services between urban and remote areas. Overall, this study contributes to the development of a more inclusive, sustainable, and contextually relevant early intervention model for students with special needs in island communities.

Research Objectives

This study aims to develop a comprehensive understanding of early intervention implementation within the context of special education in remote areas, with a specific focus on Tioman Island. Accordingly, the objectives of this study are to:

Identify the main challenges in implementing early intervention for students with special needs (SSN) on Tioman Island.

This objective focuses on identifying critical issues that hinder effective early intervention implementation, including human resources, infrastructure, access to support professionals, availability of teaching materials, parental involvement, and geographical factors affecting programme delivery.

Analyse the adaptive strategies employed by teachers and schools in addressing these challenges.

This objective examines practical approaches, local innovations, and pedagogical adaptations used by education practitioners to sustain early intervention programmes despite various constraints.

Propose an effective early intervention implementation framework for remote areas.

Based on the study's findings and contextual analysis, this objective seeks to develop a relevant and realistic framework encompassing planning, implementation, monitoring, and community support components that can be applied in island and rural schools to enhance access to and quality of early intervention services for students with special needs.

METHOD

This study was conducted in full compliance with the research ethics guidelines established by Universiti Kebangsaan Malaysia (UKM) and the research regulations of the Ministry of Education Malaysia (MOE). Prior to data collection, official approval was obtained from the Faculty of Education, UKM, and the Educational Planning and Policy Research Division (EPPPD), MOE, in accordance with the prescribed procedures for research involving school institutions. All participants were clearly informed about the purpose of the study, data collection methods, and their rights as respondents, including the right to withdraw at any time without consequences. Written informed consent was obtained before the interviews were conducted, and the confidentiality of participants' identities and involved institutions was fully assured. Throughout the research process, ethical principles such as confidentiality, academic integrity, transparency in data reporting, and researcher responsibility were upheld to ensure that the findings were valid, ethical, and aligned with academic research standards set by UKM and the Ministry of Education Malaysia.

This study employed a qualitative approach using a case study design to explore in depth the implementation of early intervention within a remote geographical context. This design was selected as it allowed for a holistic examination of the phenomenon by focusing on the experiences, perceptions, and adaptive strategies employed by teachers, school administrators, and parents in the special education setting on Tioman Island. The approach also enabled an in-depth understanding of the complex interactions between geographical factors, human resources, and school organisational structures that influence the effectiveness of early intervention.

The research was conducted in two schools on Tioman Island that offer early intervention programmes for Students with Special Needs (SSN), namely SMK Tekek and SK Tekek. Schools were selected using purposive sampling based on programme activity level, accessibility, and institutional willingness to participate. A total of 12 participants with direct experience in early intervention implementation were recruited, comprising six special education teachers, four parents of SSN, and two

school administrators. Purposive sampling was applied to ensure that participants were able to provide relevant and meaningful information aligned with the study objectives.

Data were collected using three primary methods. First, semi-structured interviews lasting between 60 and 90 minutes were conducted to obtain narrative data related to challenges, experiences, and early intervention practices. Second, informal classroom and school environment observations were carried out to examine intervention implementation in real-life contexts and capture interactions that could not be fully elicited through interviews alone. Third, document analysis was conducted involving Individualised Education Plans (IEPs).

Data were analysed using thematic analysis following the procedures outlined by Braun and Clarke (2006). The analysis process involved interview transcription, initial coding to identify patterns of meaning, development of preliminary themes, review of themes for alignment with the overall dataset, and final theme definition. Data triangulation was achieved by integrating information from interviews, observations, and documents to enhance the credibility of the findings. In addition, member checking was conducted to ensure that the researcher's interpretations accurately reflected participants' actual experiences.

FINDING AND DISCUSSION

The findings identified four main themes that influenced the implementation of early intervention on Tioman Island. Overall, the results indicate that early intervention practices in this remote island context are shaped by a combination of structural constraints and local adaptive responses, reflecting both persistent challenges and contextual strengths within the education system.

The first theme relates to the lack of resources and infrastructure, which emerged as the most dominant challenge. Schools operated with limited teaching and learning materials, requiring teachers to independently develop instructional resources to support early intervention activities. The shortage of specialised materials for Students with Special Needs (SSN) negatively affected the effectiveness of lesson planning and the consistency of intervention implementation.

In addition to material limitations, unstable internet connectivity was identified as a critical infrastructural barrier. Several participants highlighted that poor internet access hindered the use of modern educational technology and restricted communication with specialists on the mainland. As a result, continuity of professional support, including consultation and follow-up services, was frequently disrupted.

Geographical and logistical challenges also emerged as significant constraints. Tioman Island's remote location requires parents to undertake long journeys, including ferry travel to Mersing or Teluk Gading, to access specialist services such as speech therapy, occupational therapy, and psychological assessments. Dependence on sea transportation increases both travel costs and time, while unpredictable

weather conditions further disrupt mobility, delivery of educational materials, and school planning, thereby affecting the smooth implementation of early intervention programmes.

Despite these constraints, teachers demonstrated strong adaptive capacity through creative and context-sensitive practices. Teaching materials were developed using locally available resources such as natural and recycled materials, while schools leveraged community collaboration involving parents and local organisations to provide additional support in terms of manpower, logistics, and learning spaces. Furthermore, flexible instructional approaches were adopted, including adjustments to schedules and activities based on weather conditions and students' ability levels.

Taken together, these findings illustrate that early intervention implementation in remote island settings is not solely constrained by structural limitations but is also shaped by the capacity of schools and educators to adapt to local conditions. The coexistence of significant challenges and innovative responses underscores the importance of recognising contextual factors when designing and implementing early intervention programmes for rural and geographically isolated communities.

Discussion

This study highlights that the implementation of early intervention in remote island settings such as Tioman Island is strongly shaped by structural constraints related to resources and infrastructure. The findings suggest that early intervention in geographically isolated contexts cannot be understood solely through standard implementation models commonly applied in urban areas. Instead, such contexts require closer examination of how material availability, infrastructure readiness, and environmental conditions interact to shape educational practice. These structural limitations form the foundational conditions under which early intervention programmes are delivered, thereby influencing both access and quality of services for students with special needs.

Limited access to specialised teaching and learning materials emerged as one of the most dominant challenges affecting early intervention implementation. Schools frequently operated with minimal instructional resources, requiring teachers to independently design, adapt, or improvise intervention materials to meet students' needs. This reliance on self-developed materials placed additional demands on teachers' time and expertise, potentially affecting the consistency and depth of intervention activities. The lack of specialised materials for students with special needs further constrained the ability of teachers to implement evidence-based practices, which are central to effective early intervention outcomes.

In addition to material constraints, unstable internet connectivity significantly limited the use of digital technologies in early intervention practices. Participants highlighted that poor internet access hindered communication with mainland-based specialists, reduced opportunities for professional consultation, and restricted access to online resources and training. Given that contemporary early

intervention increasingly relies on digital platforms for assessment, collaboration, and monitoring, limited connectivity undermines the continuity and responsiveness of support services. Consequently, students in remote island contexts may experience delayed or fragmented intervention compared to their peers in better-connected regions.

Geographical and logistical challenges further compounded these structural limitations. The physical isolation of Tioman Island necessitated long-distance sea travel for parents seeking specialist services such as speech therapy, occupational therapy, and psychological assessments. Dependence on sea transportation increased financial costs and time commitments for families, which may discourage consistent service utilisation. Moreover, unpredictable weather conditions frequently disrupted travel schedules, delivery of educational materials, and school planning processes. These findings reinforce existing literature that identifies geography and environmental factors as major barriers to equitable access to early intervention services in island and rural contexts.

Despite these substantial challenges, the study reveals a strong capacity for adaptation among special education teachers and schools. Teachers demonstrated creativity and professional resilience by developing teaching and learning materials using locally available and recycled resources, thereby partially mitigating the effects of material shortages. In addition, schools actively engaged parents and local community organisations to provide supplementary support in the form of logistics, manpower, and learning spaces. This collaborative approach reflects the principles of inclusive education, which emphasise shared responsibility, community participation, and the mobilisation of local resources to support students with special needs.

However, while these adaptive strategies highlight high levels of teacher agency and contextual responsiveness, reliance on individual initiative alone is insufficient to ensure sustainable and equitable early intervention implementation. Without systematic institutional and policy-level support, such practices risk overburdening teachers and widening disparities between urban and remote schools. Therefore, the findings underscore the need for a contextualised early intervention framework that integrates targeted teacher training, strengthened community partnerships, and technology solutions aligned with local infrastructure. Such an approach is essential not only to enhance the effectiveness of early intervention programmes in remote settings but also to promote long-term sustainability and equity within inclusive education systems.

CONCLUSIONS

This study concludes that the implementation of early intervention for students with special needs in remote areas such as Tioman Island is shaped by a complex interaction of resource limitations, geographical isolation, and logistical challenges. Limited access to specialised teaching materials, unstable internet connectivity, and restricted availability of professional support services significantly affect the

continuity and effectiveness of early intervention programmes. These findings highlight persistent disparities between urban and remote contexts and underscore the limitations of applying standardised early intervention models without considering local realities.

Despite these constraints, the study demonstrates that special education teachers and schools exhibit strong adaptive capacity through the use of locally available resources, community collaboration, and flexible instructional practices. Teachers' professional agency plays a crucial role in sustaining early intervention efforts under challenging conditions. However, reliance on individual initiative alone is insufficient to ensure long-term sustainability and equity. Systematic institutional support, including targeted professional development, improved access to specialist services, and infrastructure-appropriate technological solutions, is essential to strengthen early intervention delivery in remote settings.

In addition, this study contributes to the growing body of knowledge on early intervention in geographically isolated contexts by providing empirical insights from an island-based setting. The findings support the need for a contextualised early intervention framework that integrates educational, community, and policy-level support. Future research should explore the effectiveness of such frameworks across different remote and rural contexts, as well as examine long-term outcomes for students with special needs. By addressing these areas, policymakers and practitioners can work towards more inclusive, equitable, and sustainable early intervention practices in Malaysia.

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