

The Development, Functions, and Challenges of Internet Centres Before and During the Covid-19 Pandemic Era: A Case Study on the Northwest Coast of Sabah

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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v14-i5/21240>

DOI:10.6007/IJARBSS/v14-i5/21240

Published Date: 04 May 2024

Abstract

This study thoroughly examines the development and advancement of Internet centres in Malaysia, with a specific focus on the Northwest Coast of Sabah and their roles and challenges during the COVID-19 pandemic. Utilising a comprehensive mixed-methods research approach, including participatory observation, text analysis, questionnaires, and in-depth interviews, the research engaged 13 informants and 133 diverse respondents. The compelling findings clearly show that Malaysia's Internet centres, established through long-term government plans in collaboration with various entities, were well-established before the pandemic and effectively achieved their intended objectives. However, critical issues such as limited awareness of their presence and remote locations have significantly hindered their effectiveness as practical communication tools and drivers of community socioeconomic development. During the pandemic, these centres struggled to fulfil their role as providers of free internet services and devices, greatly impacting residents who depend on them for virtual activities. The study conclusively presents strong recommendations aimed at optimizing digital communication and Internet centres to enhance rural community socioeconomic development and digital integration into the national landscape.

Keywords: Internet Centres, COVID-19 Pandemic, Development, Functions, Challenges, Sabah

Introduction

The development of the internet has had a profound effect on the various landscapes of human life, resulting in the creation of a global and digital community. In the age of digitisation and globalisation, internet use and ownership have become indispensable, particularly for metropolitan communities, owing to its benefits in terms of communication and socialisation, knowledge dissemination, seamless commerce, and entertainment resources. In a nutshell, being digitally literate is a must to function accordingly in today's world. However, the digital world has not yet touched all strata of society, notably in rural Malaysia, including Sabah. This scenario resulted in the phenomena of both digital literacy and illiteracy in society. To ensure that rural communities benefit from internet technology and to liberate them from internet deprivation, the Malaysian government has planned and successfully implemented several programmes, one of which is establishing the Internet Centres or Pusat Internet (hence PI), particularly in rural areas.

In certain aspects, rural communities, particularly those facing challenges to internet access and ownership, benefit from the establishment of PI. The global Covid-19 phenomenon has expanded society's reliance on the internet even more. However, from 18 March to 12 May 2020, the Movement Control Order (MCO) had limited human movement, including PI activities. This article aims to examine the establishment and development of PI in Malaysia, specifically in Sabah. Additionally, this study will analyse the PI's roles and challenges before and during the COVID-19 pandemic, focusing on the districts of Kudat, Kota Marudu, and Pitas on the Northwest Coast of Sabah.

Literature Review

Salman (2021) focuses on the dependency of people on the internet or online media while confined to their homes during the Movement Control Order (MCO). Using a quantitative approach, the study explicates the role of media and interpersonal communication in creating panic regarding COVID-19 during the MCO in Malaysia. It is ironic that while online media (internet and social media) amplified panic amongst users, it was also simultaneously a vital source of information on the pandemic and served as a medium that helped people carry on with their daily routines amid the lockdown scenario. The internet and social media play an important role in supporting and facilitating socio-economic activities such as buying and selling online, reading, and searching for information online, teaching and learning online, working from home as well as family bonding and socialisation. The study contributes towards the epistemology of media dependency theory by exploring the affective and behavioural effects of online media on a population during a pandemic.

Abu Hassan (2008) highlights the government's attempts to provide facilities and an internet connection to ensure that members of the community can optimise their use of ICT. His deliberation focuses on three target groups: people, families, and communities. He argues that ICT will be effective if it can overcome internal and external problems at the individual, family, and community levels. Both internal and external components must complement one another to ensure the success of an internet-related programme or activity. In addition to fostering awareness of the importance of ICT and the internet at all levels, external factors such as facilities at ICT centres, regular ICT programs and training, capable supervisors, funding, and hardware support for telecentre centres, as well as solid support from local agencies also play an essential role.

Noor and Ambali (2014) examine the link between the informatics community and the PID ('Pusat Internet Desa' or rural Internet centres in English) programme to provide outputs

that benefit the rural community. Digital inequities and imbalances seem to contribute to extending the existing gap between rural and urban communities. Telecentres located in rural or semi-rural locations continue facing obstacles to remain viable. Both questionnaires and interview data exhibit rural communities' awareness and engagement in social networking. The data also reveal the rural communities' willingness and desire to acquire and enhance their ICT skills and expertise through workshops and training courses. This study demonstrates that PID has enhanced the communities' quality of life through ICT services and applications. In addition, the study has demonstrated the efficacy and acceptability of informatics or information community programmes in interior and other areas in Malaysia. The study also proposes that subsequent improvements need to be implemented through the employment of relevant public policy programmes.

In another study, Ab Halim and Noor (2023) evaluate the empowerment of communities facilitated by the Community Internet Centre employing asset mapping and survey methods. Community empowerment refers to the communal efforts to instigate change and enhance the quality of life within the community. Based on their analysis, the Community Internet Centre has effectively established a suitable platform to empower rural communities. This assertion is substantiated by empirical evidence derived from the study's findings, which delineate three key domains of community empowerment: (1) active community participation, (2) communal ownership, and (3) provision of information services.

Yusop et al (2007) study the importance of PID as a catalyst for the development of a knowledge-based society. The study discusses the establishment of PIDs in response to the government's goal of establishing a knowledge society by 2020. Their findings on PIDs in northern Peninsular Malaysia also suggest that the centres must be empowered to accomplish their objectives.

Tahir et al (2016) also discuss the role of telecentres in the construction of smart ICT among rural communities. Their study indicates that the role of telecentres through innovative ICT programs in the urbanisation process of rural or interior localities generates a positive impact. There is a holistic development that fosters a generation of technology savvy. Telecentres provide opportunities and facilities related to economic management, improvement of academic performance and the daily routine management of rural communities. A collaboration from all stakeholders, including the government and private sectors, statutory bodies, non-governmental organisations (NGOs), and residents, is required to materialise the goal of the establishment of telecentres.

Sulaiman et al (2010) examine the Malaysian government's measures to bridge the digital divide between urban and rural communities. The issue is addressed by investigating the operation and progress of PIDs. The findings indicate a deep enthusiasm among the community to learn and upgrade their ICT skills. The Internet centre serves as a conduit for accomplishing that purpose. Moreover, the findings also demonstrate that the Internet centre managed to function effectively despite some operational deficiencies. The Internet centre successfully performs as a constructive communication channel through the implemented activities, a platform to nurture and create a social relationship, and a venue for information and skills sharing among users.

In the field of education, one of many studies that examine the abrupt shift from face-to-face to fully online learning, Jawing et al (2023) highlight the struggles caused by insufficient support and guidance in embracing new technology and teaching approaches for remote learning. These obstacles had an impact on marginalised groups looking to participate in school education, worsening existing educational disparities. To mitigate this situation, an

investigation conducted by Nordin et al (2023) delves into the significance of digital educational components within the prevailing reality and academic context, underscoring the necessity of keeping abreast of current technological advancements. According to their research findings, despite governmental endeavours and financial allocations towards initiatives such as the Malaysian Family Digital Economy Center (PEDi), National Digital Network Plan (JENDELA), CERDIK, funding for the BSN MyRinggit-I COMSIS Scheme, and provision of Student Devices (PerantiSiswa), various factors, including knowledge, physical, economic, and social considerations, seem to exacerbate disparities in the realm of digitized education.

Ali (2006) explores the function and role of information and communication technologies among rural students' development in Kampung Tradisi Lembah Keriang and Perkampungan Felda Bukit Tangga, Changlun, Kedah. A survey of 200 respondents examined rural populations' level of participation in ICT-related economic, educational, and social spheres. In general, the findings explicate several influencing factors and challenges frequently encountered by the population in ICT. Due to the expanding population, the existing ICT supply could not fulfil the future needs of the people. The construction of new computer centres is critical in every residential neighbourhood and educational institution, as the population continues to rise.

A study by Talib et al (2017) addresses the demand for establishing new computer centres to overcome the scarcity of ICT supply among youths in Kedah's Kubang Pasu District. The study also suggests that computer centres may reduce harmful activities among youths by serving as a resource centre for acquiring knowledge and receiving the latest information and current events.

Another study by Yakin et al (2021) explores the role and impact of internet centres in rural communities during the COVID-19 pandemic, focusing on Kudat, Pitas, and Kota Marudu districts in Sabah's Northwest Coast zone. Utilising participant observation, surveys, and in-depth interviews, quantitative and qualitative data were collected from Internet centre staff, students, teachers, and villagers. Findings indicate the limited effectiveness of internet centres during the pandemic, with some villagers unaware of their existence. Constraints such as quantity and location hindered their utility as communication mediums. The study proposes solutions to address these challenges, aiming to promote virtual communication and digital community development in rural areas.

A study by Abdul Malek et al (2014) probes the symbiotic interaction between telecentres and lifelong learning for rural community development. In the 21st century, telecentres can upgrade rural communities' socioeconomic situation, quality of life, and knowledge stability. The symbiotic relationship between telecentres and lifelong learning enables Malaysia to realise its goal of developing a healthy, self-sufficient, and competitive rural society. The digital and socioeconomic divide between urban and rural areas can be decreased through multi-stakeholder partnerships.

Apart from Malaysia, in Sri Lanka, the issue of bridging the digital divide between rural and urban residents has been prioritised as a national agenda. The Asian Development Bank (2017) conducted a study on rural communities in Sri Lanka to determine the impact, sustainability, and inclusiveness of public ICT centres or telecentres. It appears that rural ICT centres are viewed as capable of achieving the 'Sustainable Development Goals' agenda. The centres should be regarded as technology hubs that enable rural children to acquire ICT and autonomous learning skills and act as a catalyst for rural communities to achieve digital inclusion.

The studies, which have been reviewed in this section, demonstrate that PI or telecentres play a critical role and present a significant impact on rural communities' self-development and socioeconomic well-being. The literature review thus far indicates that there are significant gaps in the body of knowledge regarding the emergence, role, and challenges of PI in the age of the COVID-19 pandemic, especially in Sabah, Malaysia.

Methodology

The present research adopts a mixed-method design that uses both quantitative and qualitative approaches in data collection. The data collection was conducted for four days, in Kota Marudu and Kudat, Sabah after the initial Movement Control Order (MCO) phase ended right before cross-district control was implemented throughout Sabah on October 3, 2020. As a result, the field research in another district along the Northwest Coast zone, specifically Pitas, was cancelled. Despite this, the author was able to speak with an informant from Pitas who was previously viral on the YouTube website on October 23, 2020. The details of data collection are as follows:

i) Historical methods and text analysis were employed to explore the emergence and role of PI using data gathered from a variety of sources, including the MCMC website, MAMPU, and district internet centres; the content and information associated with RMK11 and RMK12; and the village profiles.

ii) Observation methods were also implemented in several important sites, namely PIs, secondary schools, GiatMara centres, district offices, and several villages. Visual records in images and films, audio recordings and written notes were employed as parts of data collection.

iii) In-depth interviews with some informants were undertaken to elicit more data, including district office personnel and administrators, private employees, village chiefs and residents, PI managers and employees, school instructors, Giatmara educators, and a university student. In both districts, a total of 13 informants were interviewed about PI and other related topics.

iv) A questionnaire was administered to 133 respondents from both districts, including public and private sector personnel, students, teachers, and villagers. The questionnaire is divided into sub-categories that detail the types of online obstacles or problems, the variables contributing to them, and the strategies used to resolve them. The questionnaire contains various questions about PI centres, which were analysed using SPSS software.

Results and Discussion

Qualitative data were gathered through participatory observations and interviews at the PID Pekan Kota Marudu, PI Tandek, Kota Marudu and PI Pekan Kudat as well as District Offices in Kota Marudu and Kudat. The observations and interviews were also conducted at Sekolah Menengah Kebangsaan Tandek 2 in Kota Marudu, Kampung Buang Jamal, Kampung Tajau Laut, and Kampung Simpang at Kudat. Additionally, an online interview was administered with a UMS student from Kampung Sapatalang, Pitas. Quantitative data were collected through the distribution of questionnaires in the following locations:

Table 1

The Location of Questionnaire Distribution

The location of distribution and respondents in Kudat	The location of distribution and respondents in Kota Marudu
Students and teachers at Giatmara	Students and teachers at SMK Tandek 2
The villagers of Kampung Tajau Laut	Visitors to the District Office are from these areas: Mantus Laut, Kg Tanjung Batu Darat, Kg Melangkap Tengah, Kg Taudon, Kg Taritipan, Kg Sungai Laut, Kg. Damai and Kg Baliantung
Visitors to the District Office and Tanjung Simpang Mengayau are from these areas: Garau, Narandang, Kabangan, Matunggong, Kitabu, PPR Taman Ehsan, Taman Lavendar	

The Establishment and Development of Internet Centres in Malaysia

From a historiographic perspective, the Internet started to pervade Malaysian life in the late 1980s. According to Abu Hassan (2008), the Internet was introduced nationally in 1987 and entered the global network in 1992. Since then, Malaysia's government has formulated and implemented a repertoire of methods and operational plans to expand and strengthen skills, internet use, and ownership in urban and rural communities. Among the initiatives are mass media campaigns emphasising the importance of information and communication technology (ICT), the "One Home, One Computer" computer ownership campaign, and the establishment of ICT centres or telecentres in urban and rural regions. Several agencies and projects are involved in bridging the digital divide and community development through ICT. These include KTAK-run projects such as USP, Pusat Internet Desa (PID), and SchoolNet; privately run projects such as Maxis Cyberkids, Maxis Cyberlabs, and Celcom Xchange; NGOs-run projects such as TaniNet, e-Deaf, and CyberCare; and government-run projects such as Medan Info Desa, K (Abu Hassan, 2008).

In March 2000, the first PID was introduced in Sungai Ayer Tawar, Selangor, and Kanowit, Sarawak. In 2006, a total of 42 Rural Internet centres were erected throughout the country in conjunction with the Ministry of Energy, Water, and Communications (KTAK). KTAK was renamed the Ministry of Energy, Green Technology, and Water Malaysia (KeTTHA) in April 2009. The management of the centres' operations and activities has been delegated to the local community, and the centres have supplied locals with work prospects and internet skills (Yusop et al., 2007).

PID was originally a communications-related initiative at KTAK. This programme entails equipping post offices with internet technology such as computers under Malaysia's 8th Malaysia Plan (8th Malaysia Plan, 2001-2005). Based on the findings of a study conducted by the Japan International Cooperation Agency (JICA) from January 2002 to March 2003 and involving 14 PIDs or telecentres, the PID project is proposed to operate in areas with high concentrations of people or traffic, such as a post office, district office, community hall, or state library. The Ministry of Communications and Multimedia (KKMM) has cooperated with Pos Malaysia Berhad (PMB) to conduct the initiative following the findings. Three PIDs have been formed in Sabah, one in Kota Marudu (located inside the Post Office area), and two in Kota Belud and Tenom.

INFOGRAFIC



Diagram 1: The Structure of PID

Source: The Malaysian Administrative Modernization and Management Planning Unit (MAMPU), 2019

PID is believed to have enhanced the rural community's standard of living and accomplished several of its founding objectives by implementing numerous ICT-related activities as intended. To further strengthen the digital community and improve the socioeconomic status, KKMM collaborates with the Malaysian Digital Economy Corporation (MDEC) on several programmes, including e-Rezeki, e-Entrepreneur, e-Global Freelancer, and online marketing platforms (Kumoten, Shopee, and Facebook), where the telecentre manager serves as a resource. Additionally, PID will partner with various agencies, government departments, schools, and educational institutions to establish programmes or activities that reach a broad audience.

Apart from PID, the Ministry of Multimedia and Communications manages an Internet Centre (PI) (MCMC). PI, also known as Pusat Internet 1 Malaysia, is the community's wireless village or wifi. The initiative is part of the Universal Service Provision (USP) programme, aiming to provide broadband internet access to marginalised rural communities while bridging the digital divide between urban and rural areas. Both PID and PIK share a common goal: to empower rural communities, particularly those marginalised from the virtual world's life so that they can also benefit from the internet facilities.

Table 2

Comparison of PID and PI Functions (Wireless Village)

The Objectives or Functions of the Village Internet Centre	Objective or Function of Internet Centre (Wireless Village)
Acts as a digital centre under one roof	Provide internet access to rural and low-income communities
Creating an informed community through the dissemination of information and government initiatives	Provide training programs on ICT, entrepreneurship, science and multimedia, technology, engineering and mathematics (STEM)
Bringing people together with information, communication and technology	Improving the socio-economic status and development of human capital among rural communities
Improving community ICT skills in line with market needs	Bridging the digital divide between urban and rural communities
Encourage the construction of local elements	

Source: Adapted from The Malaysian Administrative Modernization and Management Planning Unit (MAMPU), 2019 and the website of the Kudat, Kota Marudu and Pitas Internet centres

The functions and roles of PI have germinated. They are now considered a hub for local community development, including community networking and relations, entrepreneurship and e-commerce, community learning, creativity and innovation, and transformation centres and repositories. As of 30 September 2019, 871 Internet centres have been established nationwide with the achievement of 600,000 registered members and 400,000 non-members.



Diagram 2: The statistics of Internet Centres

Source: The Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), 2019

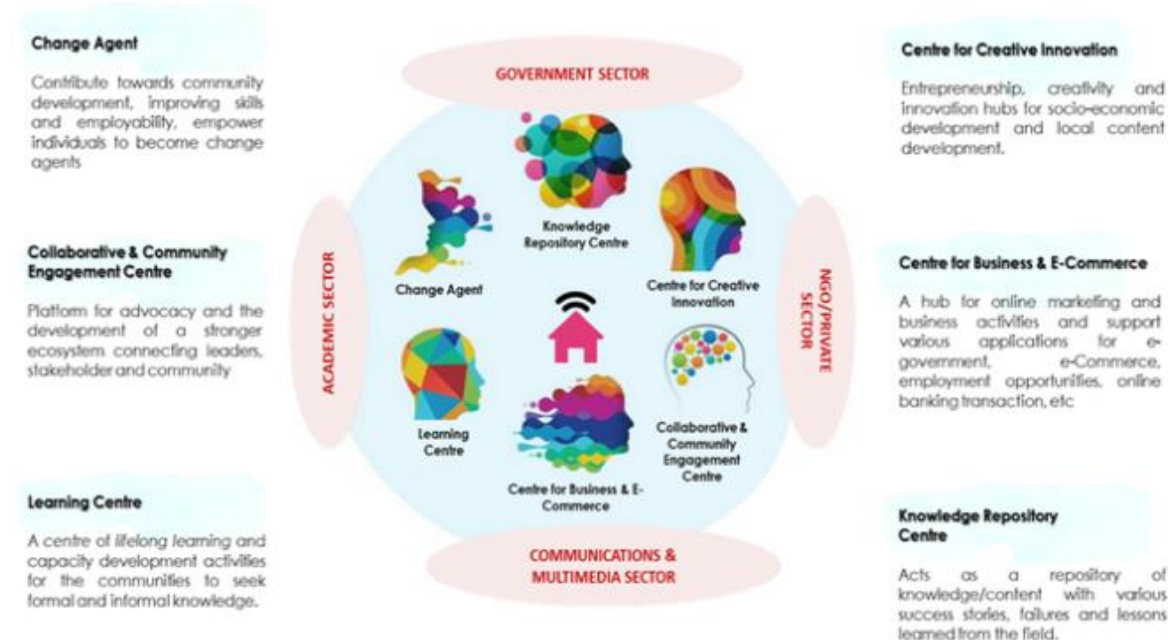


Diagram 3: The objectives and functions of Internet Centre

Source: The Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), 2019

There are 114 PIs which have been constructed in Sabah as part of the MCMC programme. Since 2012, PIs have been operating in the districts of Kudat, Pitas, and Kota Marudu while closely cooperating with Celcom Berhad and Nusuara Technology Sdn Bhd. Based on the PI managers' accounts, Kudat has three PIs located in Pekan Kudat (near the District Office), PPR Taman Ehsan, and Pekan Matunggong. In addition to those in Kudat, there are three PIs in Kota Marudu, located in Kampung Tandek, Kampung Ranao, and Kampung Tingkalanon. In Pitas, another three PIs located in Pekan Baru, Kampung Kalumpang, and Kampung Pinggan-Pinggan.

Table 3

Number and locations PIK in Kudat, Kota Marudu and Pitas

District	Number of PID	The Total of PIK	Location
Kudat	0	3	Pekan Kudat, PPR Taman Ehsan Pekan Matunggong
Kota Marudu	1	3	Kg Tandek Kg Ranao KgTingkalanon
Pitas	0	3	Pekan Baru Kg Kalumpang Kg Pinggan-Pinggan

The role and challenges of internet centres before and during Covid-19 pandemic, notably during the phase 1-4 Movement Control Order implementation (MCO)

Qualitative information on the role and challenges of PI were acquired from participatory observations and interviews with managers and employees at PID and PI Kota Marudu and Kudat, and several schoolteachers. The results demonstrate that these centres do contribute to the attainment of the SKMM and KKMM agendas. Residents in the districts have reacted favourably to PI, especially students who wanted to complete their schoolwork and assignments. PI has become the focal point due to the absence of electronics and internet connectivity in the areas. In addition, based on the interview accounts of the assistant district officer of Kudat and the assistant administrative officer of Kota Marudu, most of the population in Kudat and Kota Marudu fall into the B40 income range with fishers, farmers, and rubber tappers constitute much of the population. Henceforth, many residents encounter limited internet accessibility, primarily stemming from financial constraints and geographical isolation. Our study is in congruence with the research by Abu Hassan (2008); Yusop et al (2007), indicating that notwithstanding these challenges, residents within the B40 income range continue to demonstrate a positive inclination towards PI, notably observed among students striving to fulfil their academic obligations. PI has assumed a pivotal role due to the absence of electronic devices and internet connectivity in these areas.

Before the pandemic and MCO, the PIs Tandek PI and Kudat town, which have operated in multi-purpose halls and district offices since 2012, were accountable for supplying SKMM-funded ICT-related programmes. The activities are available for all groups of the village population, including students, public and private sector personnel, and neighbouring villagers. Each PI is directed by a manager and supervised by an assistant manager. The initiatives include unlimited and accessible programmes and facilities such as computer and ICT classes for all age groups from primary school to senior citizens; WIFI facilities for laptop users; WIFI systems within 300 metres; internet community outreach programmes such as Click & Smart; safe internet use, electronic waste management; and the recognition of mobile MCMCs, and entrepreneurship workshops. At any PIs, computer and internet services are free for students aged 21 and below. For adults, internet usage is charged at a rate of RM1 per hour. Funds from the fee collection will subsidise further activities at the SKMM Sabah regional headquarters in Kota Kinabalu. To assess the efficiency and performance of PIs, MCMC has designed specific KPIs for each district/village PI, such as implementing 30 programmes per year with a total of 700 participants. In addition, a questionnaire survey was undertaken to evaluate PI achievement. Previously, government officials in Kudat and Kota Marudu demonstrated remarkable effectiveness in achieving their objectives and fulfilling the responsibilities assigned to them by MCMC. Our study corroborates the findings of Abu Hassan (2008); Ainin et al (2010) that external factors play a crucial role in ensuring the effectiveness of programs that assist individuals in utilising technology. The external factors namely access to computer facilities and the internet, regular training programs, effective supervision, sufficient financial resources, hardware for computer centres, and robust support from local organisations. Collectively, these elements form an integrated structure that enhances the success of technology programs.

The interviews indicated that geographical elements such as mountainous terrain and dense forests played a role in the dependence on physical interaction (PI) among residents in specific areas. Furthermore, economic limitations were a significant factor, as several individuals within the community faced financial constraints that prevented them from affording or accessing electronic devices and the Internet. In addition, social factors such as

the residents' inclination to engage with peers and the general public, and their eagerness to exchange knowledge, played a role in the importance of PI among students and young people. Consequently, this led to a greater dependence on PI among these users in these regions. The existence of PIs mitigates the dilemma of rural community ownership and access to the Internet. Our findings resonate with those examined by Abdul Malek et al (2014); Nordin et al (2023) underscoring the imperative of incorporating digital educational components into the academic landscape to keep pace with technological advancements despite the geographical barriers and economic constraints experienced by these residents.

Despite its accomplishments, PI confronts a range of hurdles from administrators and users. To begin, from the perspective of staffing constraints, PID now employs only one assistant information technology officer, while PI employs one manager and one assistant manager. The fund is inadequate to cover the expenses of various programmes and projects, which are growing with the number of active and regular members and heavier internet use among the villagers. Despite the growing population of internet users and interest in internet use, the current status quo and infrastructure at PID are not encouraging. Some community members are still oblivious to the existence and location of PIs in their districts. The space and remote location of PIs have contributed to their inadequacy in functioning as a medium of communal communication.

The function of PIs during the COVID-19 pandemic phase, notably during the MCO had been dire as all PIs were prohibited from operating to contain the pandemic's spread. This predicament has exacerbated the difficulties experienced by people who have been entirely reliant on internet connectivity offered in PI. Consequently, many PIs have not functioned effectively in delivering their mission of supplying free internet to the community.

Data on schoolteachers' interviews indicate that teaching and learning could not be administered efficiently for the impacted groups during MCO. Additionally, teachers reported that before to throughout the MCO, students living on flat topography, namely those who had access to the internet, showed more improvement than students dwelling in mountainous areas or having difficulty accessing the internet. Issues in teaching and learning, requiring student evaluation reports via computers and internet connection, appear to complicate instructors' workloads further. The absence of transmitter modems and multi-media and ICT equipment in laboratories and multi-media rooms in schools has compounded the situation. This impediment has compelled students and teachers to work in PIs to complete their daily teaching and learning activities and responsibilities. Teachers recognised that ordinary students were falling behind wherein terms of learning, primarily during MCO, due to students' lack of internet and gadgets. This impediment demonstrates how critical the internet and ICT technology are for teaching and learning before and during the COVID-19 pandemic.

Observations and interviews with villagers, specifically the elderly, demonstrate that they are indifferent to the availability of PI or the ownership of gadgets and internet access. The reason is that they prioritise water and electricity supplies in meeting daily requirements. Those who encounter water supply issues due to the village's absence of pipelines must bathe and clean their clothing with water pumps and commute to their family members' homes in nearby towns (approximately 40 minutes by vehicle) once a week to replenish their drinking water.

The questionnaire was distributed to 133 respondents to collect quantitative data. The questionnaire comprises seven specific items investigating the PI related matters using the Likert scale denoted by the letters P1, P2, P3, P4, P5, P6, and P7 as in the following Table 4:

Table 4

The item regarding Internet Centres

P1	I often visited the Internet centre near the village area before PKP
P2	I have trouble going to the Internet centre because it is located far from my home/village area
P3	My village does not have an Internet centre
P4	I visited the Internet centre because of the difficulty in accessing the internet in a residential area/village
P5	No/lack of notification or information about the existence of an Internet centre in my village area
P6	I have trouble going to Internet centres because there is often not enough money
P7	I think the Internet centre should be opened during PKP

P1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	12.0	12.0	12.0
	Disagree	24	18.1	18.1	30.1
	Neutral	8	6.0	6.0	36.1
	Agree	56	42.1	42.1	78.2
	Strongly agree	29	21.8	21.8	100.0
	Total	133	100.0	100.0	

P2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	30	22.6	22.6	22.6
	Disagree	18	13.5	13.5	36.1
	Neutral	66	49.6	49.6	85.7
	Agree	15	11.3	11.3	97.0
	Strongly agree	4	3.0	3.0	100.0
	Total	133	100.0	100.0	

P3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	6.0	6.1	6.1
	Disagree	13	9.8	9.8	15.9
	Neutral	53	39.8	40.2	56.1

	Agree	36	27.1	27.3	83.4
	Strongly agree	22	16.5	16.6	100.0
	Total	132	99.2	100.0	
Missing	System	1	.8		
Total		133	100.0		

P4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	24	18.0	18.0	18.0
	Disagree	18	13.5	13.5	31.5
	Neutral	12	9.0	9.0	40.5
	Agree	53	39.9	39.9	80.4
	Strongly agree	26	19.6	19.6	100.0
	Total	133	100.0	100.0	

P5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	2.3	2.3	2.3
	Disagree	33	24.8	25.0	27.3
	Neutral	33	24.8	25.0	52.3
	Agree	40	30.1	30.3	82.6
	Strongly agree	23	17.3	17.4	100.0
	Total	132	99.2	100.0	
Missing	System	1	.8		
Total		133	100.0		

P6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	9.8	9.8	9.8
	Disagree	23	17.3	17.4	27.3
	Neutral	41	30.8	31.1	58.3
	Agree	21	15.8	15.9	74.2
	Strongly agree	34	25.6	25.8	100.0

T Total	132	99.2	100.0	
M Missing	S System	1	.8	
T Total		133	100.0	

P7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	3.8	3.8	3.8
	Disagree	20	15.0	15.0	18.8
	Neutral	30	22.6	22.6	41.4
	Agree	68	51.1	51.1	92.5
	Strongly agree	10	7.5	7.5	100.0
	Total	133	100.0	100.0	

For item A1, which examined respondents' inclination to visit PI, 42.1 % and 21.8 %, respectively, stated 'agree' and 'strongly agree', whilst 18.1 % responded 'disagree' and 12 % expressed 'strongly disagree'. The responses in item A demonstrate that a substantial proportion of respondents frequented the Internet centre before PKP.

For item A2, which pertains to the obstacle to attending PI because of the institution's remote position from the home or village area, most respondents, 49.6% of the respondents, stated 'unsure' when asked whether the distant locations of the PIs from their village would be the main factor that discourages them from visiting the PIs. The number of respondents who disagreed with item A2 was also higher than those who agreed. The responses to A2 imply that the location of PI is not a significant impediment to visiting, yet there are still those who are unsure of the location of the PIs.

For item A3, nearly half of respondents, 27.1 % and 16.5 %, of the respondents stated that they 'agree' and 'strongly agree' that their villages do not have PI. The number of respondents who answered 'not sure' about internet centres in their villages was also reasonably high, at 39.8%.

Item A4 is on the justification for a visit to PI is attributable to poor internet connectivity in the village area. For this item, more than half of the respondents agreed, 39.9 % (agree) and 19.6 % (strongly agree), that poor internet connection in their villages forces them to visit PIs while only 13.5 % and 18% responded 'disagree' and 'strongly agree' to the statement. The responses suggest that the villages are undergoing internet connectivity issues.

47.7 % agreed with item A5, which referred to the absence of notification or information about the presence of PI in the village area, whereas 27.3% reported receiving information about the presence of PI. Responses to item A5 indicate that initiatives to promote the existence and function of PI should be intensified.

For item A6, financial difficulties were cited as a barrier to respondents attending PI by 41.7 %, while 27.2 % claimed that financial difficulties were not a hindrance. Responses to item A6 demonstrate that economic factors appear to affect the frequencies of their trips to PI.

Regarding item A7, most of the respondents believed that PIs should be permitted to operate during MCO, with 78% agreeing, while 18.8% opposed item A7. Responses to item A7 illustrate that PI is essential for day-to-day operations during MCO.

Life in the pandemic era experienced by people around the globe demonstrates the critical relevance of enabling virtual communication via the Internet, particularly for rural communities that continue to confront access and ownership issues. According to the mainstream change scenario, Malaysia, particularly Sabah, is not yet prepared to fully embrace virtual communication or everyday online activities due to existing obstacles or challenges that have not been resolved or addressed thus far. There might be a significant difference when compared to people residing in urban areas as proven by a study conducted by Lee, Leow & Kong (2019) among students at a private university in the Klang Valley on their readiness to utilise mobile technologies for learning in higher education. Those students are ready to move towards technology as they are fairly and very comfortable with the use of mobile technologies. Furthermore, they have access to personal mobile devices for learning. However, the students are only moderately ready to adopt M-Learning although they are open to the idea of learning new technologies and perceive M-Learning to be simple and beneficial. Our findings exhibit congruence with the findings presented by Salman (2021); Jawing et al (2023) indicating that hence, it is imperative to confront educational inequalities to foster global advancement and collaboration, as unequal educational access may hinder student growth, potentially contributing to the ongoing trend of deglobalization. In this context, ensuring that learners and communities are prepared to effectively utilize ICT technologies becomes crucial in navigating current scenarios.

In the case of Sabah, particularly in the Northwest Coast zone, which serves as the backdrop for this study, there is an urgent or critical need arising from the internet problem that the government and other stakeholders must address, namely the provision and upgrading of basic needs such as piped water supply and electrical facilities in associated villages. Three billion ringgit were granted for rural power supply projects in the 11MP, while ten billion were approved for rural water supply projects. It is hoped that this issue will continue to receive attention in the 12MP, as there are still villages in Sabah that lack such fundamental needs.

Additionally, the current number of PIs in Kudat, Pitas, and Kota Marudu is insufficient to address the growing population's needs for teaching and learning, profession, and daily affairs. The location of PI, which is remote from most people's homes and schools, is also an impediment for certain people who want internet connectivity.

One of the 11MP's focus strategies is inclusivity or inclusion other than human capital, green growth, infrastructure, innovation, and productivity. It signifies that no segment of society will be excluded from the country's growth, especially challenges linked to expanding internet connection in rural regions. Malaysia's Education Development Plan 2013-2015 likewise emphasises the importance of STEM expertise in terms of the country's competitiveness. Additionally, the 12MP that will be presented aims to boost human capital development in line with the needs of the national economy and expand access to lifelong learning to create sustainable employment. The aim is consistent with the country's evolving economic environment toward a digital economy. The COVID-19 pandemic also demonstrates to the globe how critical it is to have access to the internet to maintain survival and daily routines and avoid being affected regardless of where it occurs. Derived from the study's results, our investigation seeks to proffer the subsequent recommendations as illustrated in Figure 1 below:

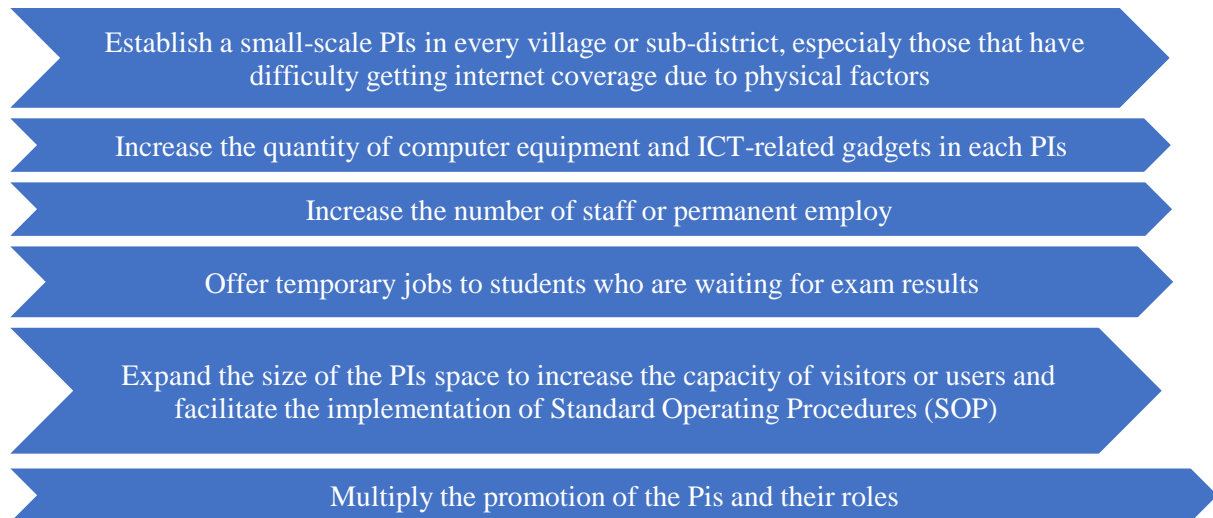


Figure 1: Recommendations for PI Effectiveness

Conclusion

In collaboration with various stakeholders and significant agencies, the formation and development of PI in Malaysia will take place in stages following the Malaysian government's long-term plans. Before the COVID-19 pandemic's outbreak, PIs on the Northwest Coast of Sabah had undertaken various activities to bridge the digital divide between urban and rural communities. Besides, PI has successfully assisted organisations and communities that struggle with device ownership and internet connection. However, PI encountered multiple hurdles before and throughout the Covid-19 pandemic, owing to various administrative, operational, physical, and infrastructural issues. Movement Control Orders (MCO) may be another significant factor limiting the Internet Centres' effectiveness and functions in offering free Internet access and gadgets to the community at the research location. It is hoped that the agencies involved can resolve issues and implement some recommendations to further strengthen the role of PI to assist rural communities in establishing a digital community and culture, especially in the light of the pandemic, signifying that the internet plays a critical role among communities from all walks of life.

The study is based on several fieldworks conducted at only two districts in the Northwest Coast of Sabah, therefore the outcomes are not able to represent the overall population of the region. Another limitation is that the quantitative data presented here utilised simple statistics namely frequency. It is recommended that future studies should expand the sample to include a larger population from across the Sabah territory. Furthermore, employing multiple quantitative research analysis methods such as standard deviation, correlation coefficient or ANOVA is expected to generate richer and more extensive findings. These suggestions could enable further the generalisation of the findings to better visualise the functions and challenges of Internet Centres Before and During the Covid-19 Pandemic Era. The study on the Internet and social network services that specifically focus on the development, functions, and challenges of Internet Centres in rural societies, is relevant and significant in today's digital world. As a developing nation, Malaysia must strategically enhance its network services, especially in rural areas, to keep up with the digitalisation of the world and prepare for an uncertain future full of humanitarian crises and global conflicts. This study emphasises the critical need to consistently prioritise empowering current principal investigators (PIs) and fostering the development of new, more advanced PIs in the national

contemporary and future agenda. Thus, Malaysia must take swift action to improve its network services and invest in the growth of its PIs to stay ahead and thrive in the digital age.

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Acknowledgement

This paper is partially based on research grants namely, I). SDK0270-2020: The Implications of Virtual Communication in Managing the Covid-19 Pandemic New Cultural Norms: A study on Rural Communities in Sabah; II). LPS2111: Digital Poverty among Sabah Rural School Students in the Endemic Era: Issues and Challenges

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