Subang Jaya Community WiFi Social Audit

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Project Summary

This project aims to examine the community wifi and verify the claims by the sub-national government (in Malaysia, sub-national government is referred to as state governments) (OECD, 2016) on its accessibility and reliability, in addition to the assessment of the value of the project and services provided to the community. The goal is to highlight and provide proper documentation and evaluation on the realities of the wifi that would be more reflective of social, environmental and community objectives based on the Digital Gender Gap Audit Scorecard Toolkit by the World Wide Web Foundation. The project aims to confirm whether government commitments relating to internet accessibility are reflected within marginalised communities. In addition to the social audit, data will be collected on possible Internet censorship with an OONI probe test using lists provided by Citizenlab.

The project also wants to find out what is needed to empower this community and make the internet and technology more accessible to them.

Background and Justification

PROJECT OBJECTIVES

Sinar Project conducted a social audit from October to February 2021 in Sri Tanjung Flats USJ16, Subang Jaya consisting of questionnaires and observations in seeking to illustrate and appreciate the plight of members of the lower-income community in their fight for better internet access. The questions include but are not limited to the following:

1. How does a respondent access government service?
2. What internet-enabled devices does a respondent own and use?
3. Whether a respondent gets to access the internet as much as desired?
4. Has a respondent used public Wi-Fi service?
5. Has a respondent used public Wi-Fi service provided by the government (e.g. Wi-Fi Selangorku, Wi-Fi Smart Selangor by the Selangor state government)?
6. Whether a respondent is able to and can afford to work from home?
7. Whether a respondent can comfortably work from home?
8. Can family members of a respondent learn online, if applicable?
9. Are the family members of a respondent able to learn comfortably online (if applicable)?
10. How much would a respondent pay a month for internet access service?
11. How much would a respondent pay for a computer or laptop (notebook computer)?
12. How much would a respondent pay for a smartphone or tablet?

This project also aims to understand the additional need of the community library and any other ways that might help to empower the community.

Unlike some other community areas, this community is not selected for the Government's initiative on an Internet Centre under the Malaysian Communications and Multimedia Commission (MCMC). This community however received a community wifi provided by the state government called Wifi Selangorku, later rebranded as Wifi Smart Selangor (Dewan Selangor, 2019).

The Internet Centre by MCMC is part of the government's Universal Service Provision (USP) programme's under Section 204 of the Communications and Multimedia Act 1998 with the main objective to provide collective and individual access to basic telephony and Internet services throughout the country (MCMC, 2002). In the USP 2018 Report (MCMC, 2019), it specifies that the internet centre has "20 units of computers,10 of which are dedicated for the use of ICT and entrepreneurship training." However, such detailed specifications were not repeated in the next report. The report now would instead state "the Internet Centres are equipped with full ICT facilities, collective internet access at a very nominal cost, and provide collective internet access at very nominal cost free ICT training to the local community. The Internet Centres also provide additional services such as printing and photocopying." (MCMC, 2020). Certainly, the USP report agrees that having an internet centre enables the local community to be trained and encouraged to use the internet in all aspects of life whether for banking, education, business, health, employment opportunities and access to government services.

According to the USP Annual Report 2019, the implementation of this program is focused in rural areas and for the urban poor (MCMC, 2020). From the year 2007 until December 2019, a total of 873 internet centres were established with 42 in Selangor. However, as can be seen from the graph below, despite a gradual rise in the centres set up, the recent years see a slow down in the internet centres completed with only five completed in 2019. Of these five, all of them are built in East Malaysia, three in Sarawak, one in Sabah and one in Labuan. The last internet centre in Selangor was built in 2017 with two units (MCMC, 2018). Similarly, from 1295 community wifi implemented, only three were installed in 2019, and all

were installed in Labuan.

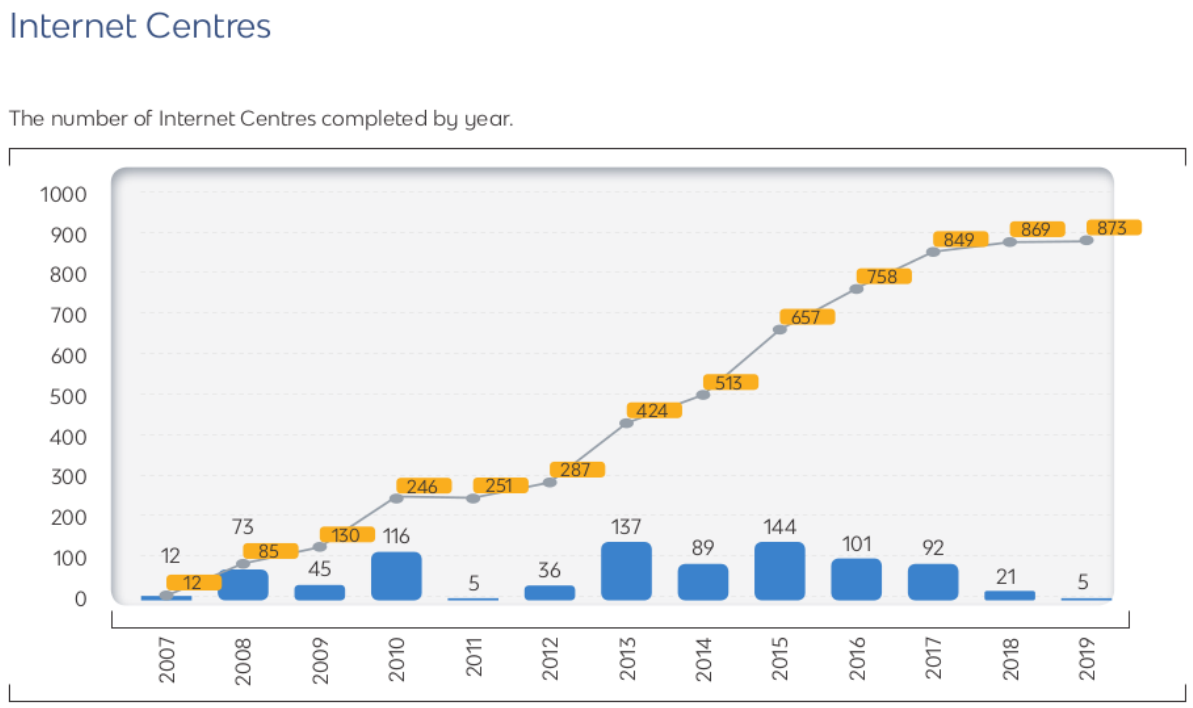


Figure 3: Number of Internet Centres completed by year

Source: USP Annual Report 2019 (MCMC, 2020)

The USP programme is also funded by the USP contributions from designated services on a rate of 6% of total weighted net revenue.[1] There are no clear guidelines on the application process to have an internet centre or community wifi in a community. The reports are infographic based, and some information is not published such as the speed and bandwidth of the internet centre and community wifi. The locations of the list of internet centres and community wifi by MCMC are listed in its portal [registration and login required]. From the portal, the team found that there were no internet centres and community wifi in Subang Jaya. The nearest of these facilities to us in Petaling district would only be two internet centres, Kg Kubu Gajah and PPR Sri Meranti. The state of Selangor, aside from receiving the programmes under USP, also received slightly similar programmes from the state government on a network of community wifi called Wifi Smart Selangor. It needs to be clarified here that the Wifi Smart Selangor is not part of the community wifi under USP and not using USP funds, as clarified in the State Assembly (Dewan Selangor, 2019). Referring to the Smart Selangor Action Plan 2025 (Smart Selangor, 2020), the Smart Wifi is aimed to have 2000 wifi hotspots with speed of 10Mbps per user with unlimited data.

According to the local councillor, the library was built by the Subang Jaya City Council (MPSJ) through Resident Representative Council (MPP) Zone 3. The funding was provided

[1] Regulation 27 of the USP Regulations requires all licensees (except for Content Applications Services Provider (CASP) license holder), whose total net revenue for the previous calendar year derived from the designated services exceeds minimum revenue threshold of RM2 million to contribute 6% of its weighted net revenue to the USP Fund.

through the Corporate Social Responsibility (CSR) programme by Unza Wipro Sdn Bhd. The building of the community library is part of the entire plan to upgrade facilities in the flat which also includes a cabin for a recycling point and awnings for the community hall. This library was built next to the community hall and flat management office, which is able to receive the range of the Wifi Smart Selangor installed in the upstairs office. This library was completed around June 2020, during the lockdown of the Covid19 pandemic (Movement Control Order, MCO), a few months before the audit.

Despite the library completed in June, Wifi Smart Selangor was earlier discontinued citing plans for future upgrade according to the team's call to the provider, SmartSel[2]. The previous wifi has an access speed of only 4Mbps, upgraded in 2019 from an earlier speed of 1Mbps (Dewan Selangor, 2019). The State Government plans to restructure and upgrade the wifi on high impact areas, focusing more on the education, health and religious sectors with focus on rural areas and the urban poor. A source from SmartSel also told us that the plan would include reliance on a better fibre network compared to cellular.

Despite the much more focused goal, it does come at the cost of slower execution and it took until February 2021 for the community here to get wifi access for their library. And this happens after two official complaints regarding the wifi.

Users and uses

The users of these findings would be those who would make use of or implement the wifi or other means of internet for a community. As stated by Alliance For Affordable Internet, in their 2019 report on the need for community networks for increased access to the internet to expand connectivity to more people, build digital skills and cultivate demand for internet access.

In addition, the project also published information of location of Selangor Smart Wifi (hereinafter referred as community wifi) in open data format and coordinates, which can be used to add or map out locations of these access points. The current way of publishing wifi locations by either Selangor Government or MCMC is through their own portal which requires registration and login.

The project sought to understand the overall needs for an Internet community access centre, beyond just Internet access and computers such as additional devices such as printers and basic furnishings.

[2] SmartSel (also called Smart Selangor) is a Selangor state-backed Telecommunication infrastructure company that has been mandated to develop and deliver Smart Digital Infrastructure with support and resources from the MBI Group and the Selangor state. https://www.smartsel.co/

The team reports that the computers and temporary internet set up during this project provided Internet access and online classes to at least three children[3] from the community during Covid19 lockdown periods. At least three adults use the printers to make copies of legal documents either for government processes or applications.

Indicators

Baseline	Indicators	Progress	Assessment	Course of action
Refers to the initial situation when the projects haven't started yet, and the results and effects are not visible over the beneficiary population.	How do you measure project progress, linked to your objectives and the information reported on the Implementation and Dissemination sections of this report.	Refer to how the project has been advancing in achieving the indicator at the moment the report is presented.	Descriptions should be clear and ideally contain operational terms where needed. Please describe the quality dimensions.	What is the project team planning to do next is very important to document, specially if changes to the original plan have to be implemented for the success of the project.
Zero community wifi detected	Average access speed of wifi	Wifi has been installed but not working (January 2021) Fix to wifi (February)	Wifi with average access speed of 7Mbps	Formal complaint and contact with officer in charge after wifi not detected and available.
Community wifi location was last updated 2017	Number of wifi locations collected and listed with coordinates	Data was extracted from the website provided by the agency, listed with coordinates and plotted on Google maps.	Found and plotted 362 wifi locations	Plot the locations in readable format and visualise in map A ticket suggestion was also made to SmartSel to publish the lists of wifi locations.
Zero computer and printer access for community library	Number of people using computer and printer	Completed, the library now has computer and printer access Number of people using the computer/printer is recorded in a log book	Average of 3 children (under 18) using computer/printer per session Average of 3 adults uses computer/printer services per week	Complimentary additions include printer, table and chairs. Initial Raspberry Pi was swapped with a newer model
Average of 8 people visited the library on every Saturday session	Number of people visiting the library	The number of people visiting the library is recorded as well as for Covid SOP compliance	Average of 11 people visited the library on every Saturday session	Publishing library location to Google Maps
Affordability of 1GB of data plans is not quantified at community level	Price of 1Gb of Mobile Broadband Data / Median monthly household income of community members	Community affordability index of 1 GB of data plan is calculated	0.1667% for prepaid 0.109% for postpaid	Does not exceed 2% based on the A4AI standard of 1 for 2. Therefore affordable

[3] Children defined as persons under the age of 18

Affordability of average monthly mobile data use is not quantified at community level	Price of average monthly mobile data use from major service provider / Media monthly household income of community members	Community affordability index of average mobile data use	3.5% for prepaid 2.29% for postpaid	

Project implementation

Input	Project activities	Outputs	Outcomes	Timeline	Status	Assessment
Selection of a community wifi area	Contacting multiple sub national government agencies on wifi status	Community area selected	Pangsapuri Sri Tanjung was selected was the project	2 Weeks from 15 October to 31 October 2020	Completed	Location chosen is suitable for a public being a community library and within community access.
Preparing questionnaire	Conducting survey	Data Collection from survey	Data collected	3 Weeks from 1st of November to 21 November	Completed	Understanding the need of the local community
Gathering data on community wifi locations	Making the wifi locations easily accessible and publicly available	Location plot on map	List of wifi and coordinates constructed. The coordinates are then used to visualise a location map.	2 weeks from 7th January to 21st January	Completed	The list of wifi is available here. A suggestion was also made to the agency to publish the lists of wifi locations.
Installing computers and temporary wifi	Provide computer access for the community	Computers for library	At least 20 children can benefit from this project with some coming from women-led families	2 months Nov 2020 until December 2020	Completed	No of people using will be limited due to social distancing measures and much stricter library opening times.
New book racks	Provide storage space for new book donations.	Book racks	At least 3 book racks with 300 books are able to be stored nicely.	2 Weeks	Completed	Books racks are able to store new books received as a donation.
Training children to use computers	Teaching students tutorials on how to use computers	Training session	At least 5 five students are trained who will then be able to teach their friends	2 months	Completed	Additional instructions on how to use the computers were pasted in the library whiteboard.

SELECTION OF COMMUNITY WIFI SITE

The initial location proposed was SS19 Flats, but that plan fell apart as there were no community leaders or representatives that we could engage. This community is the closest

to Sinar's office, relatively about 7 minutes drive. Following the wifi upgrade plan, the wifi that was first installed the past few years was relocated to a nearby mosque behind the flats. The reason as answered in the State Assembly queries (Dewan Selangor, 2020) was to focus on education, health and religious sectors.

The next location was suggested by one of the City Councillors, Kamarul Hisham on a flat in Angsana Flat USJ 1. This flat however does not have a community centre or hall, but it does have a Pusat Peduli Kanak-Kanak (Child Care Centre) maintained by the Selangor state government which was recently opened. The team reached out to the manager of the centre and realised the limited availability and functionality due to not being open during the Movement Control Order.

The next location which was finally chosen was the Sri Tanjung Flats, which was recommended by Lee Jen Uyin, one of the City Councillors. The Subang Jaya council had completed a community library in June, and wished to provide more resources and facilities to accommodate the community.

Survey Results

The results of the survey show concerning developments on the affordability and accessibility of the lower-income group on meaningful internet connectivity.

The minimum threshold for meaningful connectivity here is defined as :

- Regular internet use | minimum threshold: daily use
- An appropriate device | minimum threshold: access to a smartphone
- Enough data | minimum threshold: an unlimited broadband connection at home or a place of work or study
- A fast connection | minimum threshold: 4G mobile connectivity

From the survey, the respondent's earn significantly less than the median household income for the State of Selangor at RM 8,210 and national level of RM 7,910. From the survey, 84.5% of them earn less than RM 4,000, the maximum income is RM 8000 which is still below the median stated above. This hugely impacts their ability to afford certain criteria of internet connectivity such as an unlimited internet plan. A majority of the B40 group can only afford RM 50 or less for monthly internet service. Besides, 53% of total respondents strongly agree that the cost of purchasing the internet is too expensive for them. RM 50 will surely afford oneself a good internet plan for cellular networks but it does not necessarily provide unlimited data. The minimum that is found accessible to get unlimited fibre broadband connection would be Telekom Malaysia's 30Mbps for RM 89 that is available to subscribe for Flat residents. This might seem fair, but consider this, for certain high rise beyond the means of the lower-income, Time Internet is available for 100Mbps for RM 99. This shows disparity and the need for lower-income to pay more for less speed simply because of the location of where they live.

Though Malaysia leads in terms of overall affordability of the internet where 1GB of data is less than 2% of Gross Median Income (A4AI, 2019) this measurement takes into account overall population and might leave out certain people who do not come close to the median income for Malaysia. Furthermore, as applications and software become more advanced, the need for more bandwidth and resources increases, making old hardware obsolete and diminishing the value of 1 GB of data as users avoid using data mobile data for certain tasks and wait to connect to a wifi due to the scarcity of data (A4A1, 2020). Examples of such tasks from the survey include accessing online classes, learning from online videos and accessing government services and portals.

Disturbingly, out of the 110 respondents' reply on device ownership, 49 of them (44.5%) only have a smartphone as the means for internet access and from that amount, 47 of them earn RM 4000 and less, which is the bottom 40% of household income earners in Malaysia (DOSM, 2020). From this, we can also see the gender gap between men and women who only have a smartphone (20% to 48%). Some problems then arise especially on certain tasks that require more computing power/ bigger screen for the workload.

Income level (RM)	People who only have a smartphone as their only device
0-1000	5
1001-2000	19
2001-3000	12
3001-4000	11
4001-6000	2
6001-8000	0

This hindered the progress of children in this community to study online classes especially during the lockdown in which schools are closed, as can be seen from the results:
26% of the B40 communities are not able to access online learning.
33 % of the B40 communities are not comfortable with online learning.

The affordability to purchase a laptop or computer is also not in favour of the lower-income group. 42% of them can only afford to pay less than RM 300, while 53% less than RM 500 and 79% less than RM 1,000. This correlates with 61% of the total respondents strongly agreeing that the cost of buying a new device (laptop, desktop or smartphone) is too high.

In a question asked on the services or devices they think are needed for themselves and family in which they do not currently have, among the B40 group, 80% of the respondents

require internet connection, 40% requires a printer, and 52% requires a computer or a laptop (results are not mutually exclusive of one another).

Hence, this explains the struggle to work from home or study online classes either in ability and capacity or comfort. In addition, this widens the disparity between those with fixed, unlimited connections and those connected at margins (A4AI, 2020). Azman (2020) tells factors such as limited internet and lack of gadgets, and study tools will make students lose interest in their studies as being left out likely results in poor exam results. A solution to bridge the gap within the community is to create public access points to become anchors of connectivity and a strategy to expand internet access.

There exists a community library that has been set up by the local council, MBSJ but since it's still new, facilities are limited especially on its functions (not having a computer and internet connection). The community wifi by Selangor government, Wifi Smart Selangor is supposed to provide free wifi access to the community beside the library but we have not been able to test the wifi (until December 2020) and see the completion of the project. Hence, the audit period was extended (until February 2021) as inquiries with Smart Selangor mentioned that the wifi were in the final stages of completion.

The community wifi was not available for the duration of the MCO and subsequent lockdowns and restrictions that followed from March 2020 until February 2021. The wifi is supposed to provide the connectivity bridge to the income poor and part of the initial plan of this audit is to also look at the reliability and accessibility of the wifi.

The audit also found that the key needs of the community for devices and internet connectivity are for communication, accessing information, banking, payment methods and education. Such devices and amenities that help to accommodate their needs are absent in particular a computer and public internet access. A great part of the team's interaction with the community also reveals that community members with smartphone and internet connection have started using digital wallets especially with the injection of stimulus to digital wallet with registration of MySejahtera app (MOF, 2020).

Hardware and Complementary Support

As part of the audit, Sinar also includes some hardware that can help encourage access to the community and promote digital inclusion. From here, the team deployed a used computer loaded with Ubuntu OS and Raspberry Pi 3 Model B+. The team found that the Pi had been performing poorly as the desktop screen hangs and stopped responding especially when using the web browser. Sinar Project also received complaints from users that they are not able to play browser games on the Pi. The Pi 3 was later replaced with a Pi 400. This issue and complaint was not found on the computer running Ubuntu OS.

The specifications for the computer:

- Motherboard: Asus M4A88T-M/USB3
- Processor: AMD Phenom II X4 945
- RAM :12 GB DDR3 1066Mhz (8GB + 4GB)
- Storage: Gigabyte 120 SSD 2.5 inch SATA
- TP Link, 2.4ghz wifi card
- Operating System: Ubuntu 20.04 Focal Fossa

Specifications for the Raspberry Pi 3 Model 3+:

- Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
- 1GB LPDDR2 SDRAM
- 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
- Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
- Extended 40-pin GPIO header
- Full-size HDMI
- 4 USB 2.0 ports
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- 4-pole stereo output and composite video port
- Micro SD port for loading your operating system and storing data
- 5V/2.5A DC power input
- Power-over-Ethernet (PoE) support (requires separate PoE HAT)
- Operating system: Raspberry Pi OS

Specification for the Raspberry Pi 400:

- Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
- 1GB LPDDR2 SDRAM
- 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
- Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
- Extended 40-pin GPIO header
- Full-size HDMI
- 4 USB 2.0 ports
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- 4-pole stereo output and composite video port
- Micro SD port for loading your operating system and storing data
- 5V/2.5A DC power input
- Power-over-Ethernet (PoE) support (requires separate PoE HAT)
- Operating system: Raspberry Pi OS

A 4G LTE modem, Huawei B310 was provided to the library with temporary internet connectivity. The modem can use any available Malaysian Simcard, and Internet speed should be fine around 6 to 12 Mbps as long as the place is within the range of cell phone coverage and the nearest cellphone tower is not congested. The sim card used is from Umobile, using their GX68 plan.

The cellular network-based internet, however, is also heavily dependent on good weather conditions, and with Malaysia having a tropical climate with seasonal monsoons, during heavy rain, internet speed drops drastically. During heavy rain, the internet was tested to have an average speed of 3Mbps compared to the usual 7Mbps, in addition to the more instability of the connection, seen here through the higher jitter. From the usage observation, during heavy rains, accessing websites that requires video output is not achievable.

The printer provided is a laserjet printer, HP LaserJet Pro MFP M28a with print, scan and copy functions. The printer can only print in grayscale (black and white). It has a monthly duty cycle of 80,000 pages and the toner can print up to 1000 pages. Also, there is availability of OEM compatible toners that are much cheaper than the original. Alongside the printer, the team also provides three rims of papers and two OEM toners. The printer is selected based on the specifications mentioned above, considering it will be enough to support the community.

A banquet table measuring 150cm (length) x 60cm (width) x 76cm (height) was also provided to the community along with two plastic chairs. The table is foldable for easier storage or relocation. In addition, Sinar provides five bookshelves in total, three units of bookshelves measuring 60cm (length) x 180 cm (height) x 24cm (width) and two units of bookshelves measuring 62cm (length) x 165cm (height) x 24cm (width).

Affordability in the Context of the Community

The affordability index is adapted to a more localised context to understand the affordability of data according to the micro level of income within the community. Unlike the macro level that uses either Gross National Income, this measurement will use the median household income of the community respondents . The median income of the respondents is RM 3000. Using price data collected by Rachel Gong, 2020, calculations on percentage of price of 1 GB per median monthly income can be established at price per GB for prepaid mobile, and postpaid mobile, at RM 5 and RM 3.27 respectively.

Percentage of price for 1 GB data (prepaid mobile) to median household income

RM5 ÷ RM3000 x 100% = 0.1667%

Percentage of price for 1 GB data (postpaid mobile) to median household income

RM3.27 ÷ RM3000 x 100% = 0.109%

The percentage for both prepaid and postpaid mobile using median household income is below the threshold suggested by A4AI, 2016 on the standards of “1 for 2” which means

1GB of Data for less than 2% average monthly income. However in this context, the team uses median household income as proposed by Gong, 2020, instead of Gross National Income per capita.

Next, calculations are made for percentage price of fixed broadband[4] price per median household monthly income using RM89 for broadband prices (cheapest option).

Percentage of price for fixed broadband plan to median household income

RM 89 ÷ RM3000 x 100% = 2.9667%

As Gong argues, this interpretation of data for fixed broadband pricing is not comparable to prices for mobile data for the following reasons:

1. The affordability measure does not consider the price per GB of data, instead the price of access to unlimited data.
2. Access to fixed broadband is accessible in the household by more than one person, but prices are calculated for an individual subscriber. If multiple household members use large quantities of data, it becomes likely that the price per GB of fixed broadband would be lower than price per GB of mobile broadband.

Taken from Gong, an estimate price per GB of fixed broadband data was derived based on the following assumption:

1. Average mobile broadband data usage in terms of total data volume is representative of the average internet user (regardless of having fixed broadband)
2. Two thirds of usage occurs at home
3. If internet users have fixed broadband at home, they will use that while at home instead of their mobile broadband
4. Average household includes two internet users

The estimate of average monthly mobile data use is 14GB in 2019 based on annual reports from Axiata, Digi and Maxis but the average monthly data increased in 2020 to 21GB. The rising usage was explained in the report citing increase in higher usage concentration and intensity of work and study from home, such as web and online related productivity and collaboration apps such as Netflix, YouTube, Zoom and Microsoft Teams (Maxis, 2021).

Hence, the average fixed broadband home subscriber uses:

2 / 3 x 14 x 2 = 18.67 GB per month in 2019

2 / 3 x 21 x 2 = 21 Gb per month in 2020

[4] Fixed broadband here refers to connectivity plans with unlimited data and a fibre connection, asymmetric digital subscriber line (ADSL) is not considered as the ADSL plans are being outphased by fibre network and are no longer available.

Therefore, calculation on the cost of the mobile broadband data to satisfy the use case for fixed broadband would follow:

For prepaid mobile plans

21 x RM 5 per GB = RM 105 in 2020

For postpaid mobile plans

21 x RM 3.27 per GB = RM 68.67 in 2020

Percentage of price for monthly mobile broadband usage (prepaid) to median household income

RM 105 ÷ RM 3000 x 100% = 3.5%

Percentage of price for monthly mobile broadband usage (postpaid) to median household income

RM 68.67 ÷ RM 3000 x 100% = 2.29%

This analysis adopted from (Gong, 2020) agrees that data affordability is not the barrier to getting people connected as mobile data plans are extremely affordable. The main issue right now is that internet users solely on mobile broadband may not be able to take advantage of the benefits of fixed broadband connectivity unless they are able to pay for two broadband subscriptions. This might suggest the reason an individual might not want to subscribe to fixed broadband considering the person already subscribes to mobile broadband.

Project outputs, communication and dissemination activities

Project outputs	Status	Assessment	Dissemination efforts
Installation of computers	Completed	Computers are working fine.	Dissemination is through community person for the use of community
Availability of community wifi	Installed but not working	Answers to initial inquiry stated wifi as actively working. New inquiry was submitted.	The dissemination is mostly within the community through word of mouth and Whatsapp group to let them know about the wifi.

Additional support for printers, tables and chairs.	Completed	The new additions should be able to supplement the computers and library	Dissemination is through community person for the use of community.
Additional book racks	Completed	New books from donations are able to be stored and arranged nicely.	
Official Complaint on Community Wifi	Installed and finally working	Wifi is working with 7 Mbps upload and download speed and good range of coverage	Reach out to community representatives on the progress of the fix.
Training for Children of Computer Literacy	Completed	Library volunteers were trained with basic computer literacy, the volunteers are now able to teach and guide basic usage of the computers.	
Installing temporary wifi	Completed	Temporary wifi was installed while awaiting the community wifi	Dissemination is through community person for the use of community.

Project outcomes

The result of the survey and its analysis was published in a blog.

Some of the key findings:

- The mean household income of respondents is RM 3,063 while the median household income is RM 3,000
- The percentage of price of monthly usage of mobile data plans, prepaid and postpaid to median household income are 3.5% and 2.9% respectively
- From the B40 group, 18% of them are not able to work from home especially during the lockdown, while 25% of them are not comfortable working from home.
- For online learning, 26% of the respondents from the B40 group are not able to pursue online learning while 33% of them are not comfortable with online learning.
- For the B40 group, 65% of the respondents can only afford to purchase internet not more than RM 50 per month, and 30% can afford between RM 50 and RM 100 per month for internet.
- Out of 49 respondents who only have a smartphone as their device, 47 of them come from the B40 group.
- Out of the 33 respondents who replied “No” to the ability to use the internet as much as they want, 28 of them came from the B40 income group.
- Most of the respondents are aged between 31 to 35, followed by 36 to 40 and 26 to 30.

The project was able to get positive responses from the implementing agency of the Selangor Government, SmartSel, the officer in charge welcomed the input and recommendations of the community wifi and were positive of the complaints made.

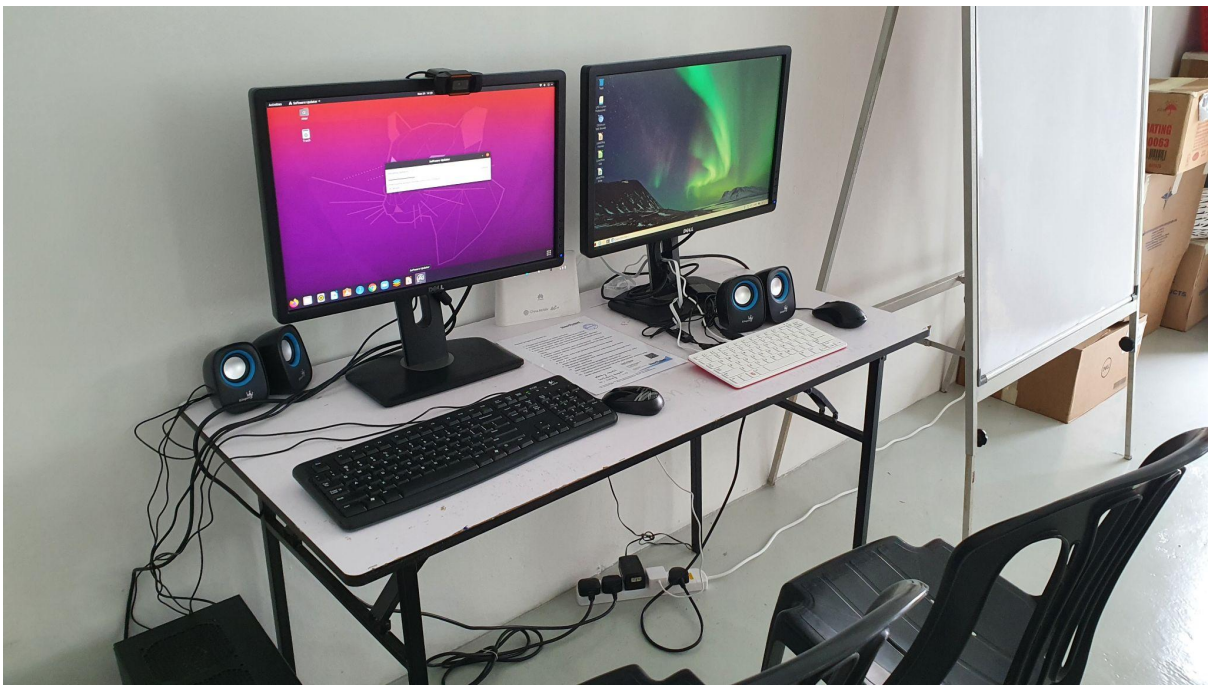
Despite the claims that wifi was installed and working improved in the first complaint ticket, audit found that the wifi is not working at the library and cannot be detected, so a dispute was initiated with a second ticket and the issue has been addressed with the wifi now working. The response to the first ticket indicates that the wifi is working.

This project shall reflect on the persistent need by the government and authorities to invest in a public access option for the internet such as a community wifi and community access centre to complement the commercial market for the Internet. The audit emphasised this approach in the lower income community as they are the ones who are going to be hit

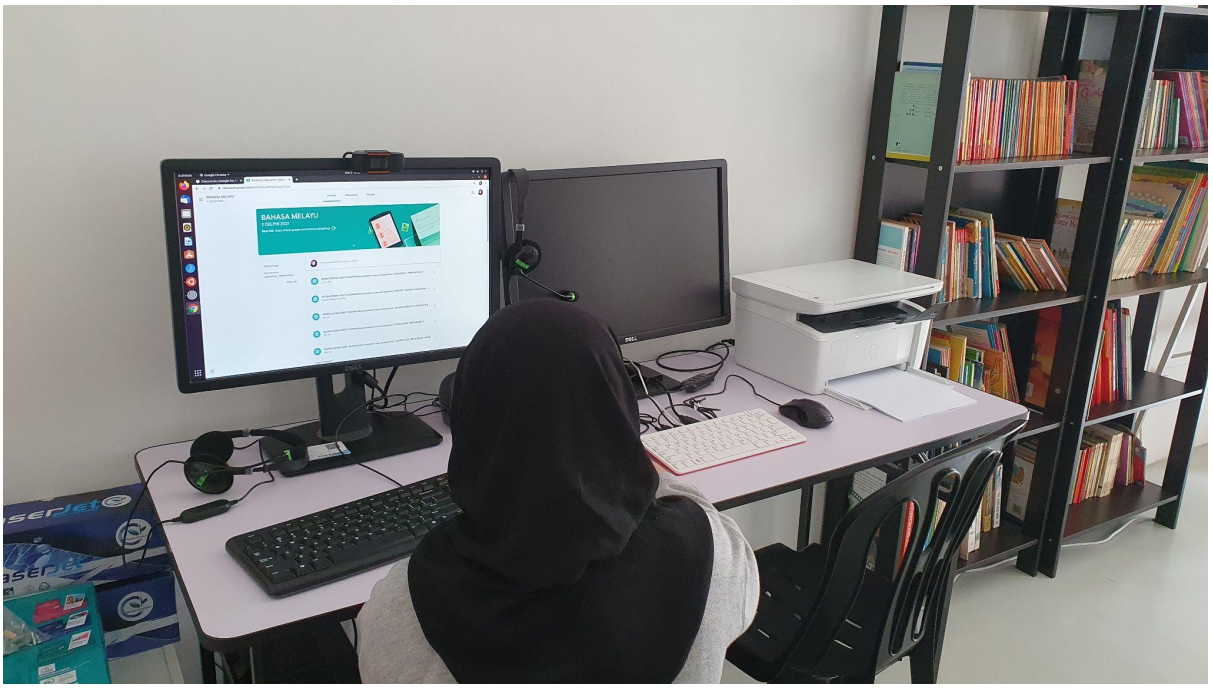
hardest with the unaffordability of meaningful internet connection. Participation in this project also reflects the difficulty in getting in contact with the right government agencies or implementing partners as bureaucracy takes precedence over accessibility of information. One might get a good response from the official suggestion/complaint channel, but the answers given might simply be further from truth in reality.

The project also helps the team in understanding the capabilities of the tools installed and the needs of the communities. The team's initial use of Raspberry Pi 3B+ is considered too slow and laggy. Another example would be the data of lists of wifi community locations that are not available either on OpenMaps, Google Maps, or the agency's SITS mobile app. In fact, a person needs to register to the agency's website to know the location details, and even then there are no search options available and you would have to drag and search the map manually.

The computers and a raspberry pi3 provided to the community library.



The Raspberry Pi 3 Model B+ was swapped with the much newer Raspberry Pi 400 for a faster computer after the children complained about the lags/buffer of the Pi 3 not being able to open flash games on the web browser.



The computers were later added after printers, headphones, tables, and chairs.

The additional bookshelves provided in the library are able to complement the books in boxes that previously have no space to be stored.

The picture above shows the way in which the community wifi locations are presented. The search tab is not working well, there is simply no list with coordinates, and this visual is only available on the site, and not on any map services such as Google Maps, and the complimentary SITS app.

Other outcomes from the projects include increasing the awareness of family members on the increasing need to learn new technologies and for children to have basic computer literacy to help them complete school tasks and navigate through important websites to seek

information. This is done through training sessions as the children were mostly curious about the equipment that we brought in. For some of the secondary school children, the ability to use and navigate using smartphones are a given from the survey and observations, but such skills does not translate to using a computer.

Project management and sustainability

The project has enabled a consultant to be recruited to help with the project. In the period without access to community wifi, the project has also provided temporary internet with average speed of 7 Mbps.

The project has inspired the team in looking for likely and possible cracks or gaps in the implementation network of the government. For example, the team found out that despite lockdown measures and emphasis on procedures and access to services to be done online, the community wifi programme is not available during this period in the lower income communities.

For the library, the electricity usage is covered by the management office of Sri Tanjung Flats as part of the funds from monthly contributions required by residents to maintain the flat. The library does not have its own electricity meter, as the electric connection is sourced from the office. The management office however have cited that they are able to sustain the electricity. This is because the library uses fans (2 units) when open and only uses lights during rain and cloudy weather. The addition of 2 computers and a printer also does not drastically increase electricity usage as said by the office.

The printer used has high yield counts and uses laser toner which are more economical and cheaper than inkjets. An OEM toner can be purchased online for around RM30 including shipping that will give a yield of 1000 print pages. Aside from the original toner, the team also supplied the library with additional 2 OEM toners which will extend the usage of the printer before purchasing new toners.

With the Smart Selangor Action Plan, the internet speed and bandwidth is expected to be improved to 10Mbps by 2025.

Impact

Before the audit, there was no community wifi. Two community wifi were installed in the community with one near the entrance to the flats and another one at the office next to the library. Now with the wifi, the children can continue online learning at the library with spacious space and comfortable chairs and tables.

After completion of the wifi, audit and additional support for the library, the upgrade plan for the Sri Tanjung Flat community which includes the library was officiated by the Subang Jaya Mayor, Subang Member of Parliament and Subang Jaya State Assembly Member. A campaign for a book exchange programme at the library was also launched. The library's location was also published on Google Maps as encouraged by the community representative to inform nearby residents and people outside this community to access the wifi and library. A campaign for a book exchange programme at the library was also launched.

The long term impact to the community will not be tangible in the short period of time especially with restricted opening hours during Covid-19 pandemic. The team will continue to engage with the community to see possible support mechanisms for the library.

Overall Assessment

From this audit, it is apparent that this community needs help in getting them to have meaningful internet connectivity especially for those who require online learning and without any access to computers. As most community members are low-income earners, they do not have enough excess income to buy better internet and a computer. The community also answers that their need for the access mentioned above would be on key priorities such as, communications, accessing information, banking, and education.

This project highlights the importance of the culture of Open Access in particular to the Internet and the means of access regardless of income and social levels.

Other lessons that can be learned is that government implementation can be quite lengthy in comparison to the actual plan, and in getting a response from the government side, might not be in the favour of poor communities that simply have no time for complicated bureaucratic processes. Even with a more streamlined online system of complaint, it favours those who are literate, have access to the internet and have a device to connect online to begin with. The local state legislative member's office might even miscalculate the distribution of the state government's plan despite having better or closer access to the implementing agencies. Example can be seen as one of the posters of the local assemblywoman's poster cited the wifi being completed in December 2020 despite being non-existent at the time.

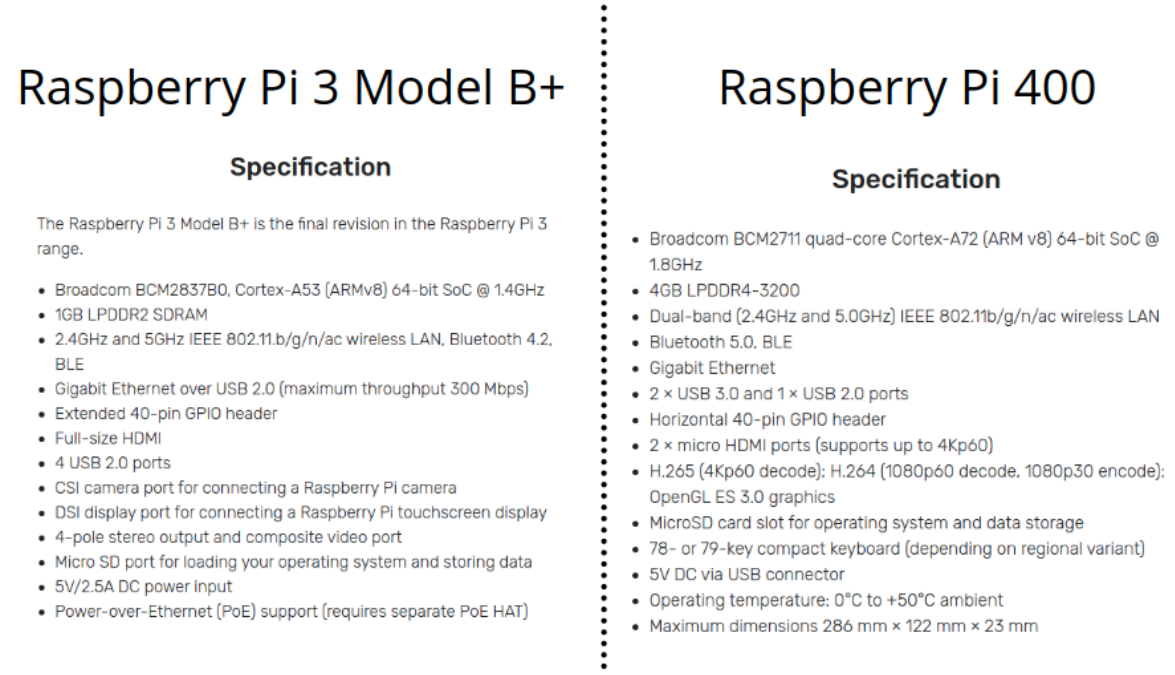
The questionnaires for the survey were mostly derived from GSMA's toolkit for Researching Women's Internet Access and Use. Despite being published in 2018, some parts of the toolkit does not reflect the current technological use in smartphone use within the community. The toolkit for example, does not ask about the tendency or reliance especially for women to use digital wallet for daily use. There are questions about online banking, but the guide reflects banking and financial services as the process of sending or receiving money. Meanwhile, digital wallets are seen by the community as forms of payment. Some community members, when asked, prefer digital wallets such as Touch and Go E-wallet

because government aids too are also channeled through digital wallet such as RM50 as seen in the Penaja Scheme (MOF, 2020). With the increasing use of digital wallets in the community with government endorsement, the audit needs to add forms of prefered payment as part of the survey as well as the application used. Additionally, digital wallets such as Touch and Go require internet connection to function and do not require a bank account to set up as reload pins are available in multiple locations.

Additionally, the audit lacked indicator coverage on the output of the project. Initial assessment of computer literacy, and internet usage were not done comprehensively with a specific indicator initially in mind. For example, the audit failed to capture the baseline on computer literacy for students as well as adults. In fact, earlier assessments do not differentiate between the output and impact to children and adults. Only later on in the audit, it was realised that the major benefits of fixed broadband internet are children coming to the library for online learning. An indicator for this is extremely useful in capturing the long term improvements and benefits that respondents or community members get from the wifi and library.

Recommendations

When using the Raspberry Pi 3 Model B+ as a desktop for the library, the children using it complained about the lag/delay in loading websites and web applications, in particular flash games in browsers. The team swap the current Pi to the newer Raspberry Pi 400 edition. Upon looking at the technical specifications, the Pi 400 is superior in terms of clock speed and amount of RAM, and having a bigger heatsink. The differences can be seen below and pi400 was chosen instead of the pi4 because of the built-in keyboard which saves desk space, larger heatsink and a receiving a good review by other reviewers who have experience using the Raspberry Pi lineup.



Raspberry Pi 3 Model B+

Specification

The Raspberry Pi 3 Model B+ is the final revision in the Raspberry Pi 3 range.

- Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
- 1GB LPDDR2 SDRAM
- 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
- Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
- Extended 40-pin GPIO header
- Full-size HDMI
- 4 USB 2.0 ports
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- 4-pole stereo output and composite video port
- Micro SD port for loading your operating system and storing data
- 5V/2.5A DC power input
- Power-over-Ethernet (PoE) support (requires separate PoE HAT)

Raspberry Pi 400

Specification

- Broadcom BCM2711 quad-core Cortex-A72 (ARM v8) 64-bit SoC @ 1.8GHz
- 4GB LPDDR4-3200
- Dual-band (2.4GHz and 5.0GHz) IEEE 802.11b/g/n/ac wireless LAN
- Bluetooth 5.0, BLE
- Gigabit Ethernet
- 2 × USB 3.0 and 1 × USB 2.0 ports
- Horizontal 40-pin GPIO header
- 2 × micro HDMI ports (supports up to 4Kp60)
- H.265 (4Kp60 decode); H.264 (1080p60 decode, 1080p30 encode); OpenGL ES 3.0 graphics
- MicroSD card slot for operating system and data storage
- 78- or 79-key compact keyboard (depending on regional variant)
- 5V DC via USB connector
- Operating temperature: 0°C to +50°C ambient
- Maximum dimensions 286 mm × 122 mm × 23 mm

Pi 3 Model B+ source: https://www.raspberrypi.org/products/raspberry-pi-3-model-b-plus/
Pi 400 source: https://www.raspberrypi.org/products/raspberry-pi-400-unit/

In addition to computers and the internet; the community also requires a printer to enable the community to print, scan and copy documents and paperwork, especially among children undergoing online learning. Besides, other complementary accessories and devices for the machines such as speakers/headphones and a computer table and chairs are needed.

Majority of the respondents are women, and part of the motivation for answering the questionnaires is the concern on the impact of the internet on their children and family members in particular access to online education during the pandemic.

As a means of providing meaningful connectivity, the current plan for wifi community access should be followed through promptly as more delays do hinder the initial goals of the initiative.

The current tool is based on the WRO Gender Toolkit on studying the gender gap on Internet Access. The Gender Toolkit is used as a guide especially in the indicators for affordability and the recommendation to use Global Bank data to see the percentage of women who use mobile phones to receive or pay/send money. In addition, the use of more specific measurement of the internet such as meaningful connectivity in the guide “Meaningful Connectivity: A New Target to Raise the Bar for Internet Access” by Alliance for Affordable Internet, helps the team to understand better the full power of internet access for the community (A4AI, 2020). The conversation right now and the future is slanted to meaningful connectivity based on positive development across low and middle-income countries. Not as means of setting back progress made on internet penetration and access, but much more challenging horizons for internet connection need to be set moving forward.

To quote on what is mentioned by A4AI (2020), “Governments can prioritise broadband access at priority institutions such as schools, libraries, and other public buildings to create anchor points of high-capacity connectivity for its occupants.” The quote reflects on the audit looking into how the library can offer meaningful connectivity to the community. In coherence with the article by (A4AI, 2021), the findings from the project supports the idea that the library provides connectivity to the most vulnerable and can act as an entry into ICT system s especially for first time users, and offering equipment access to users who will not be able to afford themselves.

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