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# Pustaka in a box: bridging the digital gap

**Japri Bujang Masli**
Library Services Sector, Sarawak State Library, Kuching, Malaysia.
E-mail address: japribm@sarawak.gov.my

**Johari Abdullah**
Faculty of Computer Science & IT, Universiti Malaysia Sarawak, Kota Samarahan, Malaysia.
E-mail address: ajohari@fit.unimas.my

**Musa Ayub Abd Rahman**
Information and Communication Services Sector, Sarawak State Library, Kuching, Malaysia.
E-mail address: musaaar@sarawak.gov.my



## Abstract:

*At about 124,450 km $^{2}$, Sarawak is the largest state in the Federation of Malaysia. The total population of Sarawak is about 2.6 million and that gives a population density of about 21 per km $^{2}$. This is a real challenge in providing library services even online as the digital gap exist not just because of geography but also due to economic reasons.*

*Microcomputer is used as a server to store digital resources including e-books, articles and videos. The system is called Pustaka in a Box and it was tested in remote areas of Sarawak. Access is via local wifi from the microcomputer.*

*The system could accommodate 20 users simultaneously and the signal is good about 20 meters away. Pustaka in a Box is a cheap way of providing access to information resources. Power needs by the microcomputer is minimal and it can also run on power bank. This is a very effective way of addressing the digital gap.*

**Keywords:** Pustaka in a Box, digital gap.

## 1.0 Introduction

Between latitude $0^o$ 50' N and $5^o$ 0' N, and longitude $109^o$ 36' E and $115^o$ 40' E, on the world's third largest island of Borneo, Sarawak sits peacefully. As part of the Federation of Malaysia, a nation consisting of Sabah, Sarawak and Peninsular Malaysia, Sarawak stands with 37% of Malaysia's total land mass. Having only 2.6 million population and measuring approximately 124,450 $km^2$, Sarawak has a population density of about 21 persons per $km^2$.

Internet broadband penetration rate in Sarawak is about 53%. The digital gap between urban and rural areas is huge as the population base is not big enough in rural areas to make it profitable for private internet service providers. The Universal Service Provision initiatives implemented by the government offer some relief in many villages but the speed is so slow when many users are online simultaneously.

In places where private broadband service is available, the cost for data subscription become a barrier and that contributed to the digital gap. Even in urban areas, there are some in the community who just can't afford to pay for continuous data subscription.

## 2.0 Methodology

A microcomputer, Raspberry Pi 3 which include on board WiFi and Bluetooth capability, is set up as a web server. The operating system used is Raspbian Jessie Ver. 4.4. A 32 GB micro Secure Digital Memory Card or SD card acts as storage. A 2.5A 5.1V power supply provide electricity from a standard 240V power source. Alternatively, it can also run from electricity supplied from a power bank with equivalent output. A portal with free e-books from Project Gutenberg and articles from Wikipedia for Schools.

Access to the portal is made possible using standard browser from any device. Tests using Safari and Chrome browsers from notebooks and handphones proven successful. The product has been successfully tested at rural villages of Kampung Telok Melano in Sematan, Kampung Telaga Air in Kuching and Ulu Katibas in Song.

## 3.0 Discussion

### 3.1 Cost

One unit Pustaka in a Box (PiaB) costing approximately RM300 to produce. This is a huge advantage compared to building one physical village library, with 1,000 sq. ft. floor area, which would cost about RM350,000 excluding land.

### 3.2 Content and capacity

Content wise a traditional village library can accommodate around 10,000 books while PiaB, with 32GB SD card, can easily hold about 50,000 e-books plus 6,000 articles. The seating capacity of a 1,000 sq.ft. village library is about 10 and PiaB can be accessed by 20 concurrent users within 20 m radius.

### 3.3 Financing

The first few units of the PiaB were sponsored by an NGO and another interested party. This financing model could be pursued especially for implementation in schools where the Parent Teachers Association can sponsor the product to support teaching and learning. Individuals can easily purchase it for home use.

### 3.4 Safety

Content of the PiaB is easily controlled and users will only be able to see what has been put into the storage. Children would not have the opportunity to stray elsewhere when browsing its content.

### 3.5 Prospect

PiaB has a potential to be used for serving other customized contents including content with interactive capability. Multiple units of PiaB can act as mini server farm to provide more contents including multimedia and hypermedia. Where continuous electricity is absent, PiaB can run on a 20,000 mAH power bank for about 24 hours.

## 4.0 Conclusion

Pustaka in a Box is an excellent opportunity to provide digital information resources to users. With its simplicity, low cost and also low power consumption, bridging the digital gap should be one of its main purpose. Students and teachers using PiaB at Kampung Telaga Air and Ulu Katibas expressed their satisfaction and said that PiaB helped them in their study.

## Acknowledgments

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## References

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