

# Design and Implementation of PIAK: A Personalized Internet Access System for Kids

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**Abstract**—Internet plays an important role to deliver information worldwide. But the available huge amounts of online information are not all appropriate for children. This paper presents the design and implementation of PIAK, a Personalized Internet Access system for Kids. It aims to assist and teach children about using the Internet in one single and safe environment. PIAK features four personalized components: cross-platform user interface, multilingual support, educative and assistive mediums, and web content filtering. Its design is based on the children’s needs inferred from a survey finding. This will enable the Internet access to be more appealing to the children as they can explore the Internet in a controlled environment.

**Index Terms**—Children; Internet Access; Personalization; Survey Finding.

## I. INTRODUCTION

With the keywords “internet access child”, Google search engine finds 86,400,000 hits on 27 January 2017. On the same day, with the keywords “learn internet access child”, the number of hits goes down to 23,500,000 hits, and even further down for the keywords “teach internet access child” with only 5,380,000 hits. These numbers indicate that the topic on Internet access for children is important, but not all online documents are focused on teaching or learning that access. It is known that Internet is as good as bad for children. In addition, many children lack access to the Internet or do not have the sufficient knowledge to use the Internet technology due to the digital divide between the urban and rural areas [1].

Furthermore, parents without higher education background might not be able to maximize the benefits and minimize the risks of their children going online [2]. Presently, there is no perfect solution that can be referred to control the Internet environment for the children, although many commercial parental control software and websites dedicated to children exist. This paper presents the design and implementation of a personalized Internet access for kids called PIAK, which has been developed in Sarawak, where the dominant ethnic group is Iban. It happens that the word PIAK sounds like ‘Biak’, which means “young people or kids” in Iban language.

The main contributions of the work presented in this paper can be summarized as follows:

- PIAK is the first system that integrates the personalization concept in the context of Internet access education for children;
- PIAK development process follows a user-centered design approach to fulfill the needs of indigenous children in Sarawak, Malaysia with regard to their Internet usage, safety and convenience when they are

online.

The rest of the paper is organized as follows. Section II provides an overview of personalization techniques and applications. Section III describes the proposed methodology in designing PIAK. Section IV discusses the implementation of PIAK. Section V provides pre-finding of the evaluation with uses. Section VI discusses the implication of the system and Section VII concludes the paper.

## II. RELATED WORK

### A. Digital Divide in Internet Access

Research into information, communication and technology (ICT) and indigenous around the world has a long history. Furthermore, the rural area communities are facing lack access to the Internet or do not have the expertise to train them in ICTs. The deficiency to access the computers and Internet continues to be a major form of social and economic exclusion for them, including difficulty in accessing the technology due to cost, isolation, poor telecommunications infrastructure and low computer skills [3].

Survey on digital inclusion among indigenous people in Perak has clear insight of indigenous problems with the ICT. The researcher has verified a high percentage of indigenous people did not know how to use email, word processing software or even naming the computer parts [4]. Their findings have confirmed the existence of digital divide due to socio-economically disadvantaged. Surprisingly, another survey in rural area of Sarawak found that more than half of the respondents have access to the Internet at home or their workplace [5]. Although the Internet connectivity issues may have been resolved over the years but, still a lot to be done to understand current Internet access problems among the indigenous children.

### B. Safe Internet Access

To date, various methods have been deployed to make the Internet a safe place for the children, such as SafeSearch feature and other commercial filtering software. Figure 1 shows the example when a child performs query searching on the Internet without any filtering system. The results might contain both good and bad web pages.

An alternative way to avoid bad web pages is by referring to a human-edited Internet directory, namely DMOZ Open Directory (<http://dmoz.org>). The directory is an open content distribution which can be referred by the Internet users. The information from such database is much more assured to be represented to the children, even though it has limited listings of web pages compared to the Google listing. Although this is not fully automated and requires extra steps to the Internet