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Presenting the Mash-up Progress at Higher Education and its Basic Functions

Rabiu Ibrahim and Prof. Dr. Alan Oxley
 Department of Computer and Information Sciences
 Universiti Teknologi PETRONAS
 31750 Tronoh, Perak, Malaysia
 brancyringim@yahoo.com, alanoxley@petronas.com.my

Abstract—Today mash-ups have been accepted by many users and by many organizations. The development of mash-ups is everywhere, yet until now there has been insufficient research and development of mash-up applications for use in the Higher Education. In this work, we focus on mash-ups in the Higher Education: its potential, how to provide training for users, and how to assess its effectiveness in the dissemination of information. Mash-up architecture consists of three main components: first is the content/service provider, second is the provider of the editor used to create the mash-up, and lastly is the server that hosts it and the client to whom the mash-up results are presented.

Keywords-component: *Data mash-up, Higher Education, Library, Mash-up editor, Development Methodology, Users, Web 2.0, Social Media.*

I. INTRODUCTION

Mash-ups are Web 2.0 applications, which use and reuses data, services which are accessible on the Web in combinations. Moreover, mash-up applications are developed rapidly in an ad-hoc fashion [1]. Mash-ups can be regarded as something similar to a simple Service Oriented Architecture (SOA) application. Both integrate information and this can be either locally produced information or information available on the Web.

A study by [2] gives an overview of the mash-up phenomenon; we now described few of the issues mentioned in the aforementioned study. Mash-ups are powerful techniques and means of accessing the nearly unlimited amount of data and services that are available on the Web. In addition, the development and the enhancement of mash-up tools used for building mash-up applications are impressive. They have reached a level of usability whereby normal Internet users, i.e. non technical users, can use the tools to create their own mash-up solutions. Mash-up data sources are classified into three different categories [4]. The categories are as follows:

- Online data resources, whose underlying data cannot be controlled by users and where access to the data requires special software that is available from the resource owner. For example, the data held by eBay, Flickr, Google can be accessed using the appropriate API.
- Local and other files that belongs to a user, and therefore can be controlled and accessed by the user.

Online data resources whose underlying data cannot be controlled by users and where access to the data required is readily available. Websites and RSS feeds are examples of this data category. The data is publicly available.

II. REVIEW

Data mash-ups in education and research are part of an emerging and richer information environment with greater integration of mobile applications, sensor platforms, e-science, mixed reality, and semantic, machine-computable data [8].

“Mash-up development is a promising End User Development (EUD) application area for several reasons” [3]. Too many different explanations of mash-ups have resulted in some confusion regarding the term ‘mash-up’ and its use [2]. Nevertheless, the commonly used definition of mash-ups classifies them into two divisions: Web mash-ups comprises of only data and people and enterprise mash-ups, which is designed to integrate data and people for use by a business process.

The methodology for using information mash-up editors to develop mash-ups for HE (educational mash-ups) is used. Below are the topics considered during this study, detailing some of the many aspects is under consideration.

2.2 An Open University Blog

Tony Hirst writes: "OUseful.info is a blog in part about... things that I think may be useful in a higher education context, one day..." [5]. In this blog there are several examples of how to make mash-ups in Google or Yahoo! using pipes; one mash-up allows a user to retrieve information concerning his/her studies, another mash-up allows a user to map the school location.

2.3 Library Lookup

The Library Lookup project started in December 2002 as five lists of bookmark-lets for libraries using these catalog systems: Innovative, Voyager, iPac, DRA, and Talis. The system allows a user to create a link using a bookmark-lets generator. (There are some links already available in the system.) The user can drag and drop links [6].

2.4 A Study to Find the Best Social Media for HE Mash-up

One study which was undertaken to identify the uses of mash-ups in HE, came up with what is regarded as the best social media mash-up for HE [7]. This study considered a number of mash-up applications. The study's author, Power, commented that although there are plenty of mash-up applications for HE, he favours few. This is what he has to say:

"The hardest part of any cohesive social media campaign is pulling it all together. It's why I'm so impressed when colleges or universities embrace the social stream and preset it on their own terms in a creative and meaningful way. I'm not talking about social media directories where a school lists all its accounts. I'm talking about a high-quality mash-up where colleges and universities wrangle feeds from blogs, Facebook, Twitter, YouTube, Flickr, and more to create a compelling page that gives a real-time snapshot of all an institution has to offer. (Hat tip to the folks over at mStonerblog; they have been talking about mash-ups for months.)"

Some example of mash-up applications for HE considered by the abovementioned study are now described.

- a. University of Maryland Baltimore County mash-up application.
- b. Missouri State University mash-up application.
- c. Tufts University mash-up application.
- d. Savannah College of Art and Design mash-up application.
- e. College of William & Mary mash-up application.
- f. Vanderbilt University mash-up application.

Power identifies the above six mash-up applications as his favourites [7]. The author looked into the use of

social media in HE. The examples of mash-up applications developed by the students mostly involve social media sites such as YouTube and Twitter. However, our research is focusing on general applications in HE.

III. METHODOLOGY

We are looking at mash-up applications for use at Universiti Teknologi PETRONAS (UTP). We have come up with five areas of HE that have the potential to benefit from the application of mash-ups. The five areas are teaching and learning, the library, research, administration, and security. We are focusing on only three of these. They are teaching and learning, the library and research. We have identified categories of application, which are suited for mash-up applications. We also wish to develop a framework for mash-up applications.

Let us describe our work on the teaching and learning area. In the Information Technology program at our university, one of the courses involves students studying Web 2.0 architecture. Mash-ups are Web 2.0 architectural pattern. Teaching mash-ups to the students enrolling the Web 2.0 architecture course is one of our plans, as an initial step in investigating the use of mash-ups in teaching and learning. Due to the fact that the student's major is IT and are taking a course on Web 2.0 architecture. Hence, we expected that they would be able to master the production of mash-ups easily. That is to say, the students are special case as they are IT savvy and Web savvy as well. Several activities have been made here and were all successful.

The second application area is the library. A library is a huge repository of physical and electronic resources. Mash-ups have a big role to play in the library. There is a considerable scope for using mash-ups to organize, distribute, and integrate information on its resources. There is a possibility for mash-ups to become widespread throughout the library. We planned to make use of mash-ups to resolve some of the issues faced by the information resource centre (IRC) at UTP. We focused on assisting users searching for online material, such as journal papers. Prior to our work, users had to search each subscribed-to database one at a time. We planned to alleviate this problem with the aid of a mash-up that automatically searches multiple databases. Work on this mash-up application started following a request by one of the librarians.

The third application area is research. Postgraduate students can make use of mash-ups as a way of exploring, researching, discovering, analyzing and so on and so forth. Mash-ups are formed from the collection of data. This can be remixed in different

ways. Other possibilities include getting real time updates on his/her area of expertise, rapid data sample collection, and rapid access to research output/developments taking place throughout the world or easy access to other research materials. Mash-ups can be a good tool for undergraduate and postgraduate students to utilize, since he/she can create the desired mash-up application. Postgraduates can tailor-make mash-ups to their own field of research. There are few issues that we are currently looking into.

IV. RESULT

A small number of Mash-up applications were developed by us. These new mash-up applications were tested and in all cases the Yahoo! Pipes mash-up application editor was found to be the editor with the greatest potential for our work. We found it to be well-suited, user-friendly and a tool that we considered one would wish to adopt especially in HE environment. Also in this work we consider the use of mash-up development framework for HE, which we construct during our previous studies on mash-up for HE, see in figure 1 below.

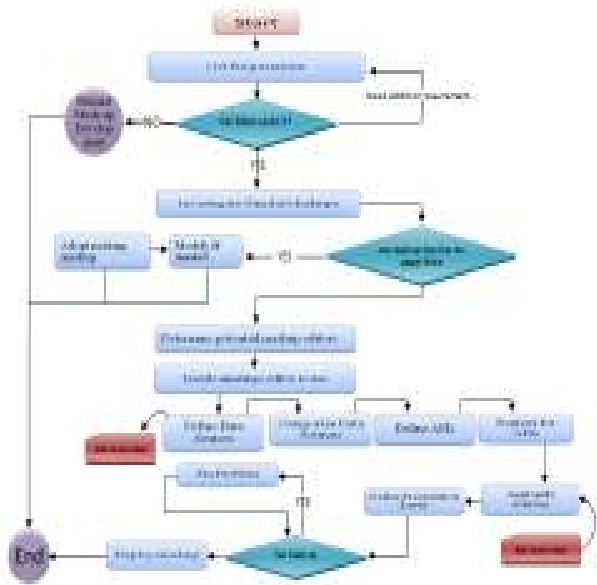


Figure 1: Mash-up Development framework.

We are, however, mainly focusing on the core activities of HE: teaching, research, and the library. As regards to teaching and learning, we conducted tutorials on 16 students. We found that the result were impressive, with very encouraging performances by the students during the sessions. Among these students we anticipated few of them to accept and adopt the concept of mash-up for their final year project. Three of them were selected for the Engineering Design Exhibition (EDX), one of the

students presented the Mash-up for Internship Placement. Therefore, the creation of this mash-up adopted by the aforementioned students was based on our effort and is thoroughly using our lead model recommended in our research. The students took the ability to demonstrate their own experience and understanding of the concept of mash-up, which we taught them during our class sessions. Figure 2 below, shows the Mash-up for Internship Placement source / engine design while the figure 3a and 3b presents the Mash-up for Internship Placement result to the user view in map, which shows the complete result that from between the range of Selangor and Kuala-Lumpur, while figure 3c presents the search result based on the user input. This input can be the name of a company, location, or the type of placement in a company. Lastly is the figure 3d, which presents the result of this mash-up in a list view, user can select to view the result in map, list, or image in some mash-up applications.

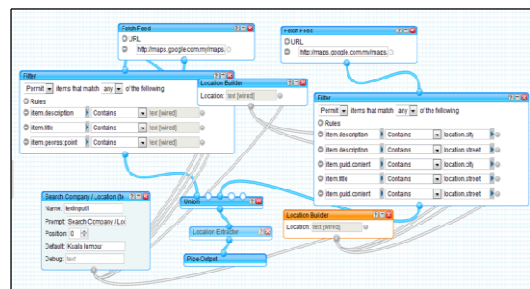


Figure 2: Mash-up engine using Yahoo Pipes editor

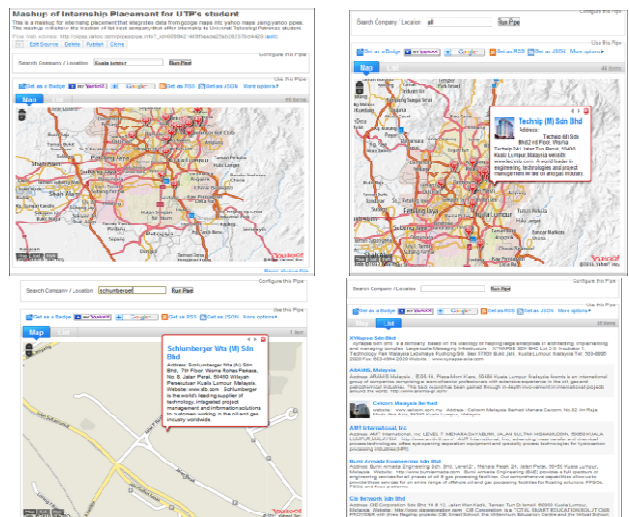


Figure 3: Mash-up for Internship Placement map and list view

We developed a mash-up application using Yahoo! Pipes to ease accessibility of online materials, such as journal papers. Now the UTP IRC users do not have to

go through each of the subscribed-to databases one at a time. A screenshot from the library mash-up which we developed is shown in figure 4. The system has currently been tested by many users in our academic department and so far there are positive results, which helped in the progress of our research.



Figure 4: UTP IRC mash-up interface

As regard to the research area of application, we are conducting an experiment, which involved few postgraduate students at the moment; this involves providing training to those participants. Our aim here is to try to assess their acceptance of mash-up applications, the areas of use, and how to teach them to develop their own useful mash-ups. This is a win-win situation as the work assists in our research yet, at the same time, the mash-ups helped the researchers in their own research work. Currently we picked few students from different engineering departments to assist in carrying out our work effectively.

Hamid (not his real name) is a postgraduate from the Civil Engineering department currently working on heritage building facility management. He is the first postgraduate to be involved in our work. We took about 25 minutes to explain to Hamid what a mash-up is and how to develop a mash-up application. He has been able to develop a useful mash-up application. (See figure 5 for a screenshot of the mash-up application developed by this postgraduate.) Some more mash-ups could be explored with other postgraduates in the future.



Figure 5: Heritage Buildings in Malaysia mash-up interface

V. CONCLUSIONS

Note that teaching and learning was the first activity

that we engaged upon; our motivation started from there after obtaining effective and impressive results from the class studying the Web 2.0 architecture course. We believe that this training of students on mash-ups could be extended to students of any discipline. An understanding of mash-ups is likely to be of benefit to other students on campus, particularly to those where maps form part of their curriculum.

For the library, everything went perfectly. Here, the users just benefit and do not contribute to mash-up development. We believe that, this is only the beginning for the use of mash-ups in UTP IRC and we expect that this will be the start of a new era for UTP IRC.

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