ULa Lab: Ubiquitous Open Contents Web-Based Language Laboratory using REST Protocol Web Service

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Abstract

Language Lab have been playing as one of the most crucial role in foreign language school. With the crucial role in the school, how to distribute the inexpensive system is more and more considered. As the REST Technology increasing function and security, the dream of creating ubiquitous open contents web-based language laboratory is increasing in its possibility. In this paper, based on the research of the REST-based Web Service, we propose an Open Contents Web-Based to be implemented using Protocol of REST Web Service.

Keywords: *Language Laboratory; Web Service; Rest; Ubiquitous*

1. Introduction

Language Laboratory classes play a crucial role in foreign language schools. Good pedagogical reasons, such as a place for doing role-playing, developing skills with multimedia instrumentation, and encouragement of study in language course.

Besides, language laboratory can be expensive, need continuous equipment maintenance, and sometime in limited features. Hence, for that reasons, the adoption of alternative (*e.g.*, computer-based language lab is more and more considered.

Nevertheless, computer-based language lab are not best solution: 1. they have limited space, 2. they have limited curricula, 3. they have limited devices. In short, most of language laboratory are design for single room at a time. In that point, students that engaging in lab are isolated. Moreover, current solutions not yet supported reuse of material.

In order to couple with the described problems, the objective is "avoiding reinvent the wheel" of PoodLL (Open Source Language Laboratory of Moodle CMS) [1]. This publication point is even all about how to make it "out of the box", the idea to make it works in any kind of devices such as: Laptop, Netbook, Mobile Phone, Smart Phone, Tab Devices, Surface Device, TV, or maybe even Smart Kitchen Devices that in line with ubiquitous concept.

For technical reason to make it possible, REST (Representational State Transfer) Web Service protocol is chosen. REST has capability in developing multimedia conferencing applications and communicating one or more devices via the URL. REST Protocol also are now emerging as an alternative to SOAP-based Web services with better performance [2].

As a protocol, REST has showed a new paradigm that aim to provide reliable, customized, and QOS guaranteed dynamic environment for end users. This publication will attempt to explore ubiquitous Open Content that could support learners in order to support lifelong learning style.

End the end, state of the art of this research is that we propose a developing open contents Web-Based Language Laboratory for learners using Ubiquitous concept and REST protocol web service enable user to study related activities in language laboratory anytime and

anywhere. It also benefit the learner to identify and giving feedback anytime about something that need to be improved to the web via online feedback or questionnaire.

2. Background

ULa Lab: Ubiquitous Open Content Web-Based Language Laboratory with REST Protocol Web Service target a large range of devices, with limitless area of operation. This means that they are not restricted to a single area of education topic also with non-exclusive content.

Ubiquitous learning offer us a learning environment namely "Seamless Learning". It is used to describe the situation where student/user can learn whenever they want easily and quickly using one device or more per student as a mediator [3]. In this publication, we also stresses the importance of linking students to study in anyplace to create seamless learning for academic success [4].

Our relation to the internet is huge. People now are willing to share their resources at internet forum, FACEBOOK, and TWITTER. It seemingly open possibilities to changing the style we live, learn, communicate, and interact with each other. The dynamic flow of new, more user-friendly, and 'smarter' devices amplifies that change.

With the collaboration use of social media, learner are rapidly being adopted and integrated into the style of learning interaction. Thus, creating a potential seamless open contents and integrated language laboratory using REST protocol that play result in practices of interaction and group of dynamic learner [5].

Under these new methodology, the conventional view of learning process such as 'remember, transfer, and recall' will be transformed into 'create, discover, apply, and share' or maybe could be expanded to shifted towards 'create, discover, interconnect, and understand ways to apply knowledge' [6].

The possible challenges for all level of language education institution is to establish collaboration with researchers and designer working in the field of education in order to create, adapt, and integrate design of learning [7, 8].

REST protocol allow you to share personal experiences, resources of language laboratory for purpose of combining personal experience with collaboration and creativity. The multimedia mediated and supported by digital devices providing a stronger and more impact than text media, it can be proved in mediated story telling [9].

Another prove, that multimedia work better than text is situated recognition. Authentic learner learn from what happened in the real world, so called authentic environment [10]. It used for learning vocabulary from conversation, TV, and other daily activities. The core idea is imagine if that can be shared as open contents.

This study maybe mainstream but we specialized in Open Content Language Laboratory using REST Protocol with Ubiquitous concept.

3. Rest Impact in Education

The current condition of education especially in developing countries still has many problems [11], such as:

1. Some of institution do not have the technical expertise to support, operate, and maintain their infrastructure.
2. The imbalance development between developed region and remote undeveloped region (some school can't afford language laboratory).

3. Although some institution have network and infrastructure. But, the e-learning in the market are not customizable and not fit for them. Application doesn't work like they wanted.
4. A large number of old computer desktop and refurbished one, low configuration notebook computer may be abandoned because of their poor performance.
5. Some institution have good application in running, but they cannot share with other learner.

With REST Technology, when the cloud is no longer just a concept, could encompasses an expanding array of software services that are growing in capability y and complexity of education content via information sharing [12].

With the huge growth of user / learner, educational content, that open for each other like Wikipedia in the internet. Some institution could reduce the operating, development, and maintenance cost so they can focus on improving teaching and learning outcomes rather than thinking about resources.

With REST, teacher / facilitator can customize their student education experience by giving open learning content that free to be shared and at specific needs.

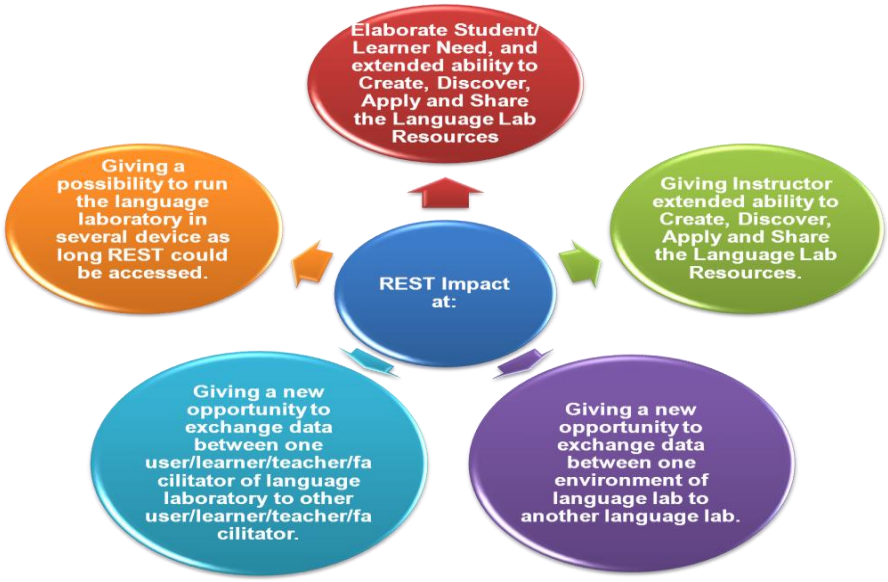

Figure 1. REST Capabilities in Open Content Language Laboratory

4. Proposed Method

A. The Protocol

REST Protocol has emerging a world-class development for building versatile distributed system. With the increasing development in recent years, the paradigm of Service Oriented Architecture has received significant attention from both practitioner and researcher. Some company developed RESTful web services such as FACEBOOK API. With the FaceBook API we can share FaceBook user data through a well-defined interface.

The implementation of REST protocol has been studied for almost a decade. Many of them appeared on the web but lack of use in Language Laboratory. For example: sharing of URL of multimedia of language laboratory content.

Table 1. Sample Features shared Via REST Web Service (WS)

Feature	Content	WS-Share Able	WS-Securable
Link (URL)	Picture	**Yes (FAST)**	**Yes via Token**
	Music	Yes **(FAST)**	**Yes via Token**
	Movie	Yes **(FAST)**	**Yes via Token**
	Compressed	Yes **(FAST)**	**Yes via Token**
Username / Pass of study place	String/text	Yes **(FAST)**	**Yes via Token**
People who study	Mixed Content	Yes **(FAST)**	**Yes via Token**
XML	Formed	Yes **(SLOWER)**	**No**

The main feature that difference REST and SOAP Web Service is REST – clients submit requests to Web services as HTTP requests and SOAP – clients submit request in form of XML document. That's make REST run faster than SOAP because of lack time of XML Parsing.

B. Conventional Protocol

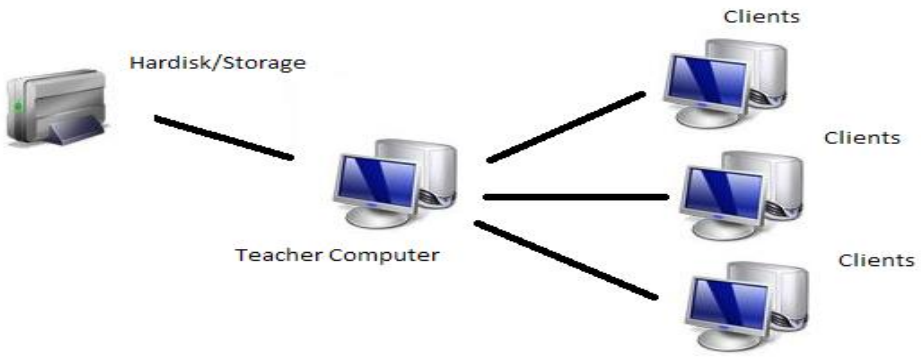

Figure 2. Traditional Way – Every Laboratory has their Own Content

In traditional way of language laboratory application, every laboratory will have their own computer that connected to teacher computer. Every language laboratory will have their very own application / multimedia storage. Each time they need to update the content, they must find it to the internet (if available) or create it by themselves.

The problem will issued if they don't have a talented multimedia to couple with the standard of the education. They will just use the very old material (not updated), and let their laboratory become more and more deprecated.

If they have talented multimedia person? How much they will pay for it? Can we really rely on the material that not updated? Will they just isolated?

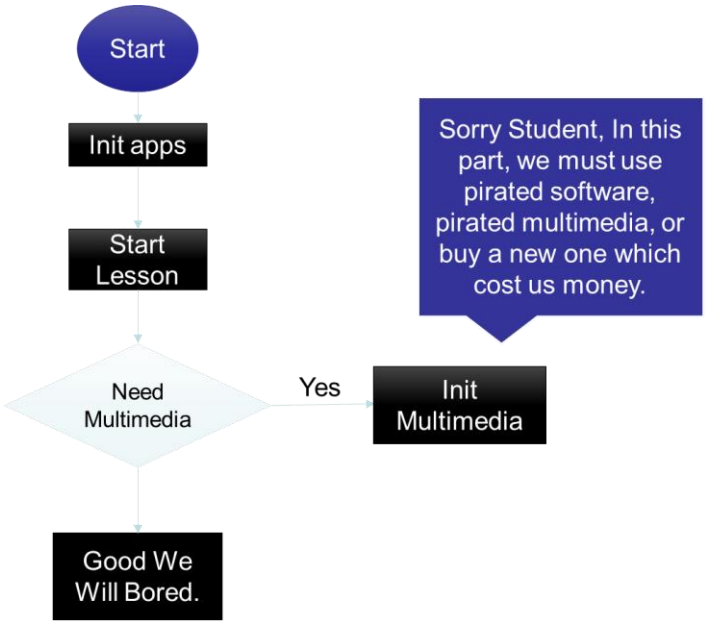

Figure 2. Bored Language Laboratory Scheme

C. Purposed Protocol

The purposed protocol enabled the web service server to be accessed in device including mobile device as they have the secure token (if secured) or access to REST SERVICE tools to the server. What they need just request the server.

The steps:

1. All clients must upload their multimedia content to the server first before they can use the facility.
2. After they upload their content at least 1, they will get a username token that valid for 1 year use.
3. They can access the content share from all over the world using their username token via any devices.
4. When user **REQUEST the file they looking for, to the SERVER, the server will looking at the shared DB.**
5. If file exist, server will check if the URL valid at the FTP server.
6. If not valid, server will update the URL and Return “NO SUCH FILE FOUND”. If valid, server will return the multimedia URL via REST Protocol.

Figure 4. Open Contents Web-Based Language Laboratory

D. Statistic of Cost in Conventional vs. Proposed Protocol

Table 2. Benefit Analysis

Issue	Conventional	Proposed	Benefit
Update Picture Media	Yes. Each time Update of curriculum.	**Yes. But Min. 1 to continue use the service.**	Less time use for create picture Media
Update Music Media	Yes. Each time Update of curriculum.	**Yes. But Min. 1 to continue use the service.**	Less time use for create new Music Media
Standardization of Curriculum	Hard	**Easy**	Easier, because we use the same open content
Update of Link	Hard	**Easy**	Easier, because automatically update by server
Ubiquitous	No	**Yes**	Learn anywhere
Multiple User Interface (different UI)	No	**Yes**	Could be used by any software with their own UI Design
Multiple Device Access (mobile phone, pad)?	No. Limited	**Yes**	More Flexible
Need Classroom	Yes	**No**	Less Cost
Could be share via social media	No (boring one)	**Yes (more fun)**	More Fun. Fun is important in learning right?

5. Conclusion

In this paper, REST protocol is used on principle of creating facility toward teacher / facilitator to customize their student education experience by giving open learning content that free to be shared and at specific needs.

The contributions of the paper can be summarized as follows:

1) We developed an idea of implementing REST Web Service to Language Laboratory Section.

2) We provide the result of implementation of REST Web Service.

3) Increase curious in using REST Protocol in Language Laboratory Education Section.

Our research show that the RESTFul web services can be quite flexible and more attention should be paid for this topic in our future.

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