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| *** Relevance: to IES 2015 topics |
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The method used in this paper needs is not a novel technology. The author must explain more detail about the needs of the tools.

============== Review 2 ===============

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Relevant (3)

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Not bad (3)

**** Contribution: to the technical area and Emerging Technology
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1) it's look like not to overcome bandwidth consume, it just delay the upload process
2) it not easy to teach lecturer/users to use the apps since its involving many technical step
The use of Lecturer Based Supportive Tools (LBST) as Data Provider for Indonesian lecturer administrative problems

Abstract:
Recently, Indonesia has more than 3,000 Higher Education Institutions, 300,000 lecturers, and 7.8 million higher education students. To handle those numerous stakeholders, Directorate General Higher Education Indonesia Government (DGHEI - as the regulator of higher education institutions) has been developed several websites as Information Systems (IS). The developed information system was used to manage information that attached on the stakeholders entities. Those information entities were projected for open public data access. In other hand, the Information Systems that offered by DGHEI are not only single information system. But also several information system that not integrated yet become single portal. Moreover, DGHEI regulates lecturers to upload their entities such as portfolios and other supporting documents developed IS's. However, this will be cause a time consuming, repetition activities and data redundant. Those problems are called administrative problems. In the meantime, our current development Lecturer Based Supportive Tool (LBST) has been developed as lecturer assistance to enrich learning materials on limited bandwidth condition. This paper discusses the use of LBST as Data Provider to solve the administrative problems that has been occurred in Indonesia higher education environments. Instead of uploading into DGHEI information systems, lecturers eager to use LBST as an alternative systems that offered by DGHEI. As a result, LBST could be driven into data provider that provides information that needed by DGHEI or other data customers.

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Surabaya, Indonesia, September 29-30\textsuperscript{th}, 2015
# Table of Contents

2015 International Electronics Symposium (IES) Committee ................ iv  
Conference Program Committee ......................................... vi  
Foreword ........................................................................... vii  
Welcome Message from General Chair ................................. viii  
Guidelines IES 2015 ............................................................. ix  
Maps and Location for IES 2015 .......................................... x  
Technical Program ............................................................. xii  
Keynote Speaker 1 .............................................................. xxviii  
Keynote Speaker 2 .............................................................. xxix
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Rengga Asmara
Imam Mujoko
Bowo Raharjo
Ira Prasetyaningrum
Isnadi
Katijo
Legend:

A. Registration, Opening ceremony and Certification delivery:
Pascasarjana Hall Floor 6

B. Seminar Room

<table>
<thead>
<tr>
<th>Session</th>
<th>Track</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel 01</td>
<td>Electronics Technologies and Applications; Electrics &amp; Energy Technologies and Applications</td>
<td>13</td>
</tr>
<tr>
<td>Parallel 02</td>
<td>Recent Advances in Signal, Image and Video Processing Technology; Multimedia Creative Technologies and Applications</td>
<td>15</td>
</tr>
<tr>
<td>Parallel 03</td>
<td>Mechatronics &amp; Robotics Technologies and Applications</td>
<td>17</td>
</tr>
<tr>
<td>Parallel 04</td>
<td>Informatics &amp; Computer Technologies and Applications</td>
<td>18</td>
</tr>
</tbody>
</table>

C. Lunch
Pascasarjana Hall Floor 6

D. Information
Pascasarjana Hall Floor 6

E. Poster Presentation and Exhibition Session
Pascasarjana Hall Floor 6
<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Honorable Person(s)</th>
<th>Person in Charge / Moderator</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.00 - 08.30</td>
<td>Registration</td>
<td>-</td>
<td>Committee</td>
<td>Pascasarjana Hall Floor 6</td>
</tr>
<tr>
<td>08.30 - 09.30</td>
<td>Keynote Speech II</td>
<td>Prof. Nobuo Funabiki (Okayama University, Japan)</td>
<td>Dr. Sritusta Sukaridhoto</td>
<td>Auditorium Pascasarjana Hall Floor 6</td>
</tr>
<tr>
<td>10.00 - 10.15</td>
<td>Photo Session</td>
<td>-</td>
<td>All Participants</td>
<td>Auditorium Pascasarjana Hall Floor 6</td>
</tr>
<tr>
<td>10.15 - 10.30</td>
<td>Coffee Break</td>
<td>-</td>
<td>Committee</td>
<td>Pascasarjana Hall Floor 6</td>
</tr>
<tr>
<td>10.30 - 12.00</td>
<td>Poster Presentation and Exhibition Session</td>
<td>-</td>
<td>Dr. Achmad Basuki</td>
<td>Pascasarjana Hall Floor 6</td>
</tr>
<tr>
<td>12.00 - 13.00</td>
<td>Break &amp; Lunch</td>
<td>-</td>
<td>Committee</td>
<td>Pascasarjana Hall Floor 6</td>
</tr>
<tr>
<td>13.00 - 15.00</td>
<td>Conference Parallel Session</td>
<td>-</td>
<td>Committee / Moderator</td>
<td>Pascasarjana Hall Floor 3</td>
</tr>
<tr>
<td>15.00 - 15.15</td>
<td>Coffee Break</td>
<td>-</td>
<td>Committee</td>
<td>Pascasarjana Hall Floor 6</td>
</tr>
<tr>
<td>15.15 - 16.00</td>
<td>Giving Certificates, Best Paper &amp; Poster Awards, and Closing Ceremony</td>
<td>Dr. Zainal Arief (Director of PENS)</td>
<td>Dr. Riyanto Sigit</td>
<td>Auditorium Pascasarjana Hall Floor 6</td>
</tr>
</tbody>
</table>

-xxii-
<table>
<thead>
<tr>
<th>Time</th>
<th>ID Paper</th>
<th>Title</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.15-13.30</td>
<td>1570210281</td>
<td>River Water-quality Analysis: “Critical Contaminate Detection”, “Classification of Multiple-water-quality-parameters Values” and “Real-time Notification” by rSPA Processes</td>
<td>Chalisa Veesommai, Yasushi Kiyoki (Keio University, Japan)</td>
</tr>
<tr>
<td>13.30-13.45</td>
<td>1570210359</td>
<td>Implementing Singleton method in Design of MVC-Based PHP Framework</td>
<td>Umi Saadah, Jauari Hasim, Masfu Hisyam (Politeknik Elektronika Negeri Surabaya(PENS), Indonesia)</td>
</tr>
<tr>
<td>13.45-14.00</td>
<td>1570210435</td>
<td>Measuring Level of Difficulty in Game Using Challenging Rate (CR) on 2D Real Time Strategy Line Defense Game</td>
<td>Christyowidiasmoro, Ramadhany Candra Putra, Supeno Susiki (Sepuluh Nopember Institute Of Technology, Indonesia)</td>
</tr>
<tr>
<td>14.00-14.15</td>
<td>1570210445</td>
<td>The use of Lecturer Based Supportive Tools (LBST) as Data Provider for Indonesian Lecturer Administrative Problems</td>
<td>Irwan Kautsar (Kumamoto University, Japan); Shin-ichiro Kubota (University of Miyazaki, Japan); Yasuo Musashi and Kenichi Sugitani (Kumamoto University, Japan)</td>
</tr>
<tr>
<td>14.15-14.30</td>
<td>1570210489</td>
<td>Ecological Context-Dependent Analysis and Prediction using MMM:A Case of Dengue Fever Disease</td>
<td>Wahjoe Sesulihatien (Keio University; Politeknik Elektronika Negeri Surabaya, Japan); Yasushi Kiyoki and Shiori Sasaki (Keio University, Japan)</td>
</tr>
<tr>
<td>14.30-14.45</td>
<td>1570210833</td>
<td>A Survey on Botnet: Classification, Detection and Defense</td>
<td>Pedram Amini (Malek-Ashtar University, Iran); Muhammad Amin Araghizadeh (University of Tehran, Iran); Reza Azmi (Alzahra University, Iran)</td>
</tr>
<tr>
<td>14.45-15.00</td>
<td>1570211179</td>
<td>Spatio-Temporal History of Islamic Inventors Based on Mobile</td>
<td>Liwan Abdullah, Entin Martiana Kusumaningtyas, Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia)</td>
</tr>
</tbody>
</table>
The use of Lecturer Based Supportive Tools (LBST) as Data Provider for Indonesian Lecturer Administrative Problems

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Abstract—Indonesia has more than 3,000 Higher Education Institutions, 300,000 lecturers, and 7.8 million higher education students. To handle those numerous stakeholders, Directorate General Higher Education Indonesia Government (DGHEI - as the regulator of higher education institutions) has been developed several websites as Information Systems (IS). The developed information system was used to manage information that attached on the stakeholders entities. The example entities are the profile and academic activity of the lecturers, the Institutions and the students. Those information entities were projected for open public data access. However, The Information Systems that offered by DGHEI are not only single information system. But also several information system that not integrated yet become single portal. The regulation is obligates a lecturer upload their entities such as portfolio’s and other supporting documents to several developed IS. However, this will cause a time consuming, repetition activities and data redundant. Those problems are called administrative problems. On the other hands, our current development Lecturer Based Supportive Tool (LBST) has been developed as lecturer assistance to enrich learning materials on limited bandwidth condition. This paper discusses the use of LBST as Data Provider to solve the administrative problems that has been occurred in Indonesia higher education environments. Instead of uploading into DGHEI information systems, lecturers eager to use LBST as an alternative systems that offered by DGHEI. As a result, LBST could be driven into data provider that provides information that needed by DGHEI or other data customers.

Keywords—Higher Education; Administrative Problems; Lecturer Based Supportive Tool;

I. INTRODUCTION

Lecturers are the key role to enhance education quality on the Higher Education Institutions [1], [2]. By 2014, Indonesia has 3.658 Higher Education Institutions (HEI), 313,076 lecturers, and 7,857,927 higher education students [3]. With numerous amounts of students on the higher educations institutions, lecturers were eager to use electronics media to adapt with imbalance of lecturer-students ratio. The electronics media so called LMS was an alternative solution to deal with numerous students in one session academic activity [4].

It has been reported about several IS’s that offered by DGHEI [5]. Developed IS’s were designed to look after data that attached on the higher education entities (lecturers, students and higher institutions itself). It’s called FORLAP (http://forlap.dikti.go.id), SERDOS (http://serdos.dikti.go.id) and SIPKD (http://sipkad.dikti.go.id). Although, the developed IS are designed to provide public domain access about Indonesia education environments, it is necessary need lecturer’s involvement in order to complete the data for the public domain access. Directorate General Higher Education Institutions (DGHEI) Indonesian Government obligate lecturer to record their academic activities and report it into designated Information Systems. This condition will imply the lecturer performance when do teaching and reporting using different systems. Because, at the same time, lecturer must be adapt with the regulation from DGHEI and use a LMS as part of their academic activities.

This paper presented as follows: Section II, describe and analyze the problems. Section III, discuss LBST as proposed method. Section IV, Implementation. Section V, Conclusion and Future Work.
II. PROBLEM ANALYSIS

A. Lecturer as Learning Materials Authors

Learning Management Systems (LMS) was chosen by lecturers as part of their academic activity because LMS’s has offered the flexibility and customization systems for delivering learning materials [1], [4]. Also, the use of LMS’s allows for 24/7 access to courses and content. Furthermore, by using LMS’s, rich media content such as presentation files, videos and other electronics media such as e-book can be accessed from anywhere as long as learners have an Internet access. Also, it has flexibility for learner’s to learn on their own time. However, good LMS’s are need rich learning materials. For this, it was one of lecturer’s roles.

Especially in Indonesia, to use LMS’s as daily basis still remained ineffective. The common problems when using LMS as academic activity are:

1. Bandwidth Limitation.

Mostly, eLearning tools such as LMS was developed as web technology and deploy the LMS on designated server on public domain, then both lecturer and student can use it anytime anywhere. This mean the use of LMS will remain ineffective on limited bandwidth condition.

2. Ease of Installation

Because the LMS was developed as web applications, it need pre configuration of the web server, database, and the LMS itself, when lecturer need to use it on local machine. This pre configuration is not user friendly for lecturers.

B. Lecturer and Administrative Task

By regulation from DGHEI, lecturer needs to report their academic activity both teach and research. To teach and research, it may use the desirable media. But to report the academic activities, it was obligated to use the DGHEI Information Systems. Lecturers are obligate to update their recent information about their portfolios and upload supporting documents into DGHEI Information Systems. These pursue lecturers to transfer created learning materials and other portfolios from their chosen LMS into DGHEI Information Systems, periodically. From this condition, it has two main problems.

1. Time consuming

Since lecturer are obligate to report their academic activities (teaching and researching), lecturer need to allocate their valuable time to meet with DGHEI regulations. Because, even though lecturers use information systems that can be use anytime and anywhere, lecturers should follow the period time that decided by DGHEI. And upload the portfolios and supporting document into designated information systems. In this case, lecturer need to follow regulations, where the proper information system, whether SIPKD, FORLAP or SERDOS.

2. Repetition and Data Redundant

The administrative job such as reporting academic activities are possibly forced lecturers doing repetition activity. Since, DGHEI Information Systems has not been integrated into single information systems. Furthermore, when there is an updates from lecturers about reported activities or uploaded documents, it will possibly data redundant on DGHEI server. Fig. 1 show the redundant document that uploaded to other DGHEI information systems called STUDI DIKTI (http://studi.dikti.go.id/). The STUDI DIKTI is the information systems designated for lecturer to report their academic activities during their study abroad activities.
III. LECTURER BASED SUPPORTIVE TOOL (LBST)

A. LBST as a Authoring Tools

Lecturer Based Supportive Tools (LBST) has been proposed to solve common problem that occurred when lecturer need to use e-learning as daily basis such as bandwidth limitation and ease of installation [5]. With LBST, lecturers could author learning materials offline conditions. Also, LBST enable lecturer to upload their created learning material into existing LMS’s. Fig. 2 illustrates how LBST solve bandwidth limitation while lecturers need to use LMS to author learning materials.
LBST designated to solve two problems that have been mentioned on section II A: Bandwidth limitation and ease of installation. In order to solve bandwidth limitations, LBST has been developed to enable lecturer create learning material in offline condition, then using local network infrastructure (LAN or Wi-Fi) to upload created materials.

To use LBST, lecturer only need run single script to initiate the applications (Fig. 3). Then it will activate web server which lecturer could start author learning materials (Fig. 4). Compare with web based LMS’s such as Moodle LMS; lecturers will experience with complex installation and pre-configuration, in order to use LMS in offline condition with install it on the local machine.

The example created materials that created from LBST are shown on Fig. 5.
B. LBST as Data Provider for Administrative Task

Lecturer has been proposed to be a Pivot Data Provider as in order to solve administrative problems with REST (Representational State Transfer) approach [6]. The mentioned administrative problems are time consuming, repetition activities, and data redundant. In this paper, LBST and created material are propose to use as portfolios and to store supporting document with consider to problems that has been mentioned in section II B. LBST could solve those problems if:

1. LBST has a feature that enables lecturers to record their academic activities, portfolios and uploads supporting documents. The evidence of lecturer academic activities is needed by DGHEI to certificate lecturers. As written in Indonesia Act (No.14/2005) and Ministry of National Education (No. 47/2009).

2. LBST are able to upload into designated information system that determined by DGHEI or other server that accessible by public domain or data customers. In this case, DGHEI could be as data consumers.

Table 1 compares existing features on LBST when using to enrich learning material on remote LMS and expected features on LBST as data provider as meet the need of DGHEI regulations. Table 1 show that to enable LBST become data provider, it doesn’t need extreme reengineering on the LBST. It can use existing learning materials to generate into portfolios.

| TABLE I. COMPARISON OF DEVELOPED FEATURE ON LBST AS AUTHORING TOOL AND DATA PROVIDER |
|-----------------------------------------------|-----------------------------------------------|
| LBST – Authoring Tool | LBST - Data Provider |
| 1 Authoring learning material and uploaded to remote LMS. | Authoring portfolios and upload supporting documents to designated Information Systems. |
| 2 Synchronize created materials with remote LMS. | Synchronize created portfolios and uploaded supporting documents from LBST into designated Information Systems. |
| 3 Provide created learning materials, directly from LBST. | Provide created portfolios and uploaded supporting documents directly from LBST. |

IV. IMPLEMENTATION

Three important features that needed on LBST that mentioned on section III are 1). Lecturer could make portfolios from created learning materials and 2). Lecturer could upload supporting document to LBST. And 3). LBST could be as data provider for public data customer.

A. Portfolio from created learning materials

Lecturers could make portfolios by select the created learning materials. Shown on Fig. 6.
B. Upload supporting documents

It some case, lecturers might be has previous portfolios documents in open document format (ODF) or supporting documents such as project report in PDF format. All documents or evidences from academic activities are called artifacts. To enable LBST as data provider, it is necessary to develop LBST as virtual storage for lecturer artifacts (Fig. 7).

C. LBST as data provider

The last feature and the important features are expose the created portfolios and uploaded artifacts. In the previous reports, it has been proposed using REST approach to expose lecturer user profiles on the data provider called Institution Data Provider. In this experiment, it has been developed REST web services to expose created portfolios and uploaded supporting documents/artifacts. Shown on Fig. 8.
LBST has been proposed to create portfolios from created materials and virtual storage to store supporting documents/artifacts. Also LBST is an alternative system to upload necessary information that needed as regulated by DGHEI. The necessary information’s are portfolios, supporting documents that show evidences of academic activities.

With expose the lecturer academic activities evidences as portfolios and other artifacts, it made possible to grab data from lecturer machine that installed LBST. These mean lecturers do not need upload to DGHEI information systems and lecturers machine/laptop became data provider for public data consumer. This novel approaches eliminate time consuming, repetition activities and data redundant. Lecturers were eager to focus on authoring learning materials.

As future works, LBST features need to be developed are real time collaborations in order to create portfolios within pair works and discuss security aspect when expose lecturer resources.

REFERENCES