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API REST Web service and backend system Of Lecturer's Assessment Information System on Politeknik Negeri Bali

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Abstract. Assessment of lecturers is a tool used to measure lecturer performance. Lecturer's assessment variable can be measured from three aspects : teaching activities, research and community service. Broad aspect to measure the performance of lecturers requires a special framework, so that the system can be developed in a sustainable manner. Issues of this research is to create a API web service data tool, so the lecturer assessment system can be developed in various frameworks. The research was developed with web service and php programming language with the output of json extension data. The conclusion of this research is API web service data application can be developed using several platforms such as web, mobile application

Keywords: *Lecture assesment Informations System, API Rest Web Service, JSON*

1. Introduction

Assessment of a lecturer is a tool that can be used to measure the learning and teaching done by a lecturer. In general, the assessment of a lecturer conducted by the students to assess the delivery and absorption of material from the courses taught by the lecturer concerned. The assessment process is done at the end of the semester or in the final week of the meeting. The assessment is done manually by distributing a questionnaire consisting of questions related to the lecture process, the result of the assessment is a composite of all the questions in the questionnaire.

A lecturer apprisal process conducted by distributing questionnaires is considered less effective, in addition to waste of paper is also not friendly to the accuracy of data such as vulnerable terjdi lost data and damaged data. In addition, the conventional lecturer's assessment system is not friendly to time and place. To assess the lecturers of students must be in a same place and the same time. The problems of conventional assessment can be solved by substituting the conventional rating system into a digital scoring system. The problem that tried to be lifted in this research is how to make a system of lecturers' assessment digitally, therefore it can solve the assessment problem happened.

Substitution process of lecturer appraisal system from conventional process to digital must be done thoroughly, this is because the application of digital scoring system will change the system that has been running. At the beginning of the research will be survey by random sample method, to know the habits of users involved in the system. Knowledge of system user habits becomes important, knowledge of user habits play a role in this research system is to know technology that will be used to build lecturer appraisal system. From the results of a survey conducted on student users habits of technology users is 85% of students were more fond of accessing the system by using mobile devices, while from the user side of the lecturers' devices that are often used to access technology were Laptops by 70% and mobile by 30%. Based on survey results, this study was conducted using webservice based on REST API with data output using JSON extension.

The webservice app of lecturer appraisal based on the RestFull API is developed by utilizing the MySQL server software as a data management application with DBMS concept. To connect third-

party applications with DBMS then developed webservice application using programming language PHP version 7.0. The developed webservice application generates a JSON extension. The JSON extension is chosen as the data output because it is considered to have lightweight properties and is easily recognizable by various devices, in addition JSON extension data has been commonly developed to handle data problems in webservice applications.

2. Research Methodology
A.   Lecture Assesment
Assessment of lecturers is a tool used to measure lecturers' performance during restoration activities. Assessment of lecturers is generally done by students who receive lecture materials taught by the lecturer concerned.Variables that are generally used to assess the performance of a lecturer such as:

a. Pedagogic aspects, related to the learning process take place such as: readiness of a lecturer in preparing or caring for a lecture, regularity and order of the ongoing process of teaching and learning, ability to liven up the lecture environment, clarity of material delivery and lecturer's ability to utilize technology in the delivery of subjects, material suitability to tasks assigned to students and conformity of values given by lecturers to students.

b. Aspects Professional, related to the ability of the personal profession as a lecturer, such as: the ability of lecturers in explaining the material on lectures, the ability to present the topic and interpret the real life, mastery of issues related to the topic being taught, and research support related topics taught by lecturers.

c. Aspect Personality, related to the nature of a lecturer, just as: the authority of a lecturer, the accuracy in making decisions in the class, the politeness of words and actions of a lecturer, the ability of self-control in various situations in both glory and campus environment.

d. Social aspects, related to the social interaction ability of a lecturer, such as: the ability to convey opinions, the ability to accept criticism and suggestions, good interaction to the environment either students or other lecturers, the attitude of tolerance shown.

Assessment of a lecturer related to the four aspects above, will be described in the form of questions. Each question will have a weight or point of judgment. The shape of the weight or the assessment of the lecturer varies according to agency needs. The following is a form of assessment weight of a lecturer:

a. Numerically, the weights assigned to each question are numbers such as (1,2,3,4,5). The use of numerical weights is used against scalable questions.

b. Alphabet, as well as numerical weights, the weight of the alphabet is also used to scale the scores of each question such as (A, B, C, D, a, b, c, d). The disadvantage of this weighting is that it can not be directly used in the process of calculating the results of the examination.

c. Decimal, the weight assigned to each question is a decimal value (0.1,0.2,0.3,0.4), the weakness of this weighting lies in the user side of the system (the system user is unfamiliar with the decimal choice).

d. Descriptions, not included in weighting, are more likely to be used to assess questions that can not be scaled.

This study uses the type of assessment above the assessment using the alphabet and description. The following is an example of weights and questions using alphabetical and descriptive valuations.

. Table 1 of Assessment

Value	Assessment of Description	Assessment of Alphabet
1	1,2,3 is given if the tendency of the given description is poorly connoted	The lowest value connotes very badly
2		Bad Value
3		Adequate Value
4	4-5 is given if the tendency of the given description is well-connoted	Good Value
5		Value connotes very well

B. REST
REST (Representational State Transfer) is an application of web-based communication architecture model. REST applications are often used for the development of web or mobile based services. The REST application uses HTTP as the standard protocol for communicating data from DBMS applications to third-party applications. REST-based webservice application development has many advantages:

1. It is new technology as compared to SOAP
2. This is not to say that REST is not enterprise ready. In fact, there are known successful RESTful implementations in mission critical applications such as banking.
3. REST developers would argue that it's got interface flexibility.
4. Changing services in REST web provisioning not requires any change in client side code.
5. REST is definitely lightweight as it is meant for lightweight data transfer over a most commonly known interface, - the URI.
6. It supports all data types directly.
7. REST is a wireless infrastructure friendly
8. While REST web services provide flexibility in regards to the type of data returned.
9. It consumes less bandwidth because it's response is lightweight.
10. Restful APIs can be consumed using simple GET requests, intermediate proxy servers / reverse-proxies can cache their response very easily.
11. REST on the other hand adds an element of using standardized URIs, and also giving importance to the HTTP verb used (i.e. GET / POST / PUT etc)
12. Language and platform agnostic
13. Assumes a point-to-point communication model—not for distributed computing environment where message may go through one or more intermediaries
14. Much simpler to develop web services than SOAP
15. REST assumes that the transport will be HTTP (or HTTPS) and the security mechanisms that are built-in to the protocol will be available
16. Lack of standards support for security, policy, reliable messaging, etc., so services that have more sophisticated requirements are harder to develop.
       (8)

3. Result and Discussions
A. Initial Description (Pre-Research)
The survey of lecturers was conducted using random method, taking lecturer survey data which was taken was permanent lecturer at Bali State Polytechnic Institute as 20 lecturers. Survey of lecturers in related institutions is intended

a. find out how important a lecturer to know information about student appraisal to teaching performance of lecturer.
b. Knowing the habits of a lecturer in using technology or an application
c. Know the level of intensity of use of the internet
d. Find out which devices are often used by both a Lecturer and a student in order to gain access online.

The survey was conducted on 100 students at the Bali State Polytechnic college. Data collection is done randomly from each department in related institution. The results of the survey process obtained the following results:

Table 2 Survey Result (Pre-Research)

No	Survey Category	Result (%) Lecture	Result(%) Student
1	How important is Lecture's Assesment		
	Do Not Know	3%	3%
	Important	37%	17%

No	Survey Category	Result (%) Lecture	Result(%) Student
	Very Important	60%	80%
2	Online Intensity		
	< 3 hout	15%	5%
	3 – 5 hour	83%	75%
	>5 hour	2%	20%
3	Where to go onlie		
	home	20%	5%
	Collage	80%	80%
	Outdoors and collage	0%	10%
4	Device to access online		
	Laptop	40%	20%
	PC	5%	5%
	Mobile	55%	75%

B. System Design Phase

System design is the result of data analysis and mapping after the survey process. From survey activity and result analysis hence resulted a system design like in figure 1 .
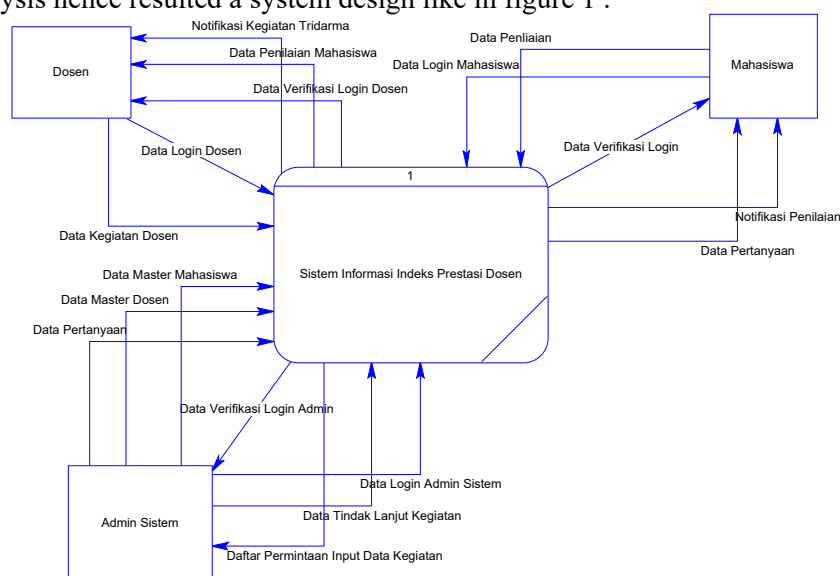

Figure 1 Context Diagram of lecturer appraisal application

The lecturer's assessment system involves three main entities:

System Admin Entity as a central entity in the system has a role as a regulator and system controller. The task of the system admin can be described as follows:

    a.   served in the process of data input of lecturers and student data.

    b.   Assigned in the process of generating user application access data

    c.   Filtering data from lecturers' activities

    d.   Input data question, which serves as a question used to assess lecturers, conducted by students.

The lecturer entity has several roles in the system, such as:

    a.   Input data of Tridharma Perguruan Tinggi Activity

    b.   Verify the tri dharma perguruan tinggi activity that is input into the system.

Student entity, has a role to conduct assessment on lecturers in accordance with the subjects that are followed by the students concerned.

C. Design DBMS Data Architecture Phase
The design of database is depicted with PDM (Phisical Data Model) which almost resembles the form or structure of the database. Scheme of system design of lecturer assessment system can be seen in figure 2.
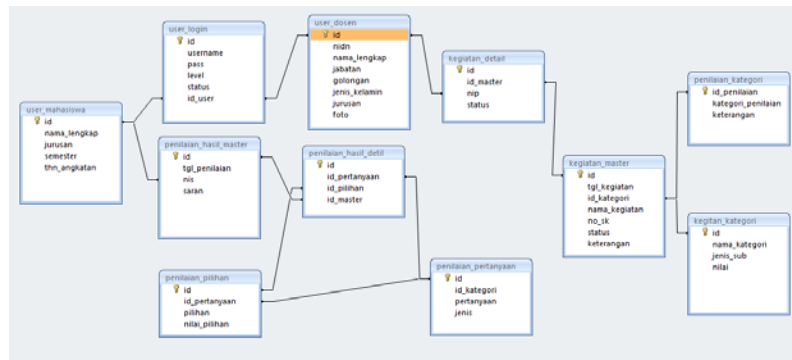

Figure 2 Physical Data Model of lecturer appraisal application

Based on the data scheme that has been designed, the need for data storage can be classified into three main groups

1. Login Scheme and User Data, consists of data storage tables (user_login, user_dosen and user_mahasiswa).
2. Data Scheme of Lecturer Assessment, consisting of tables (assessment_category, assessment_pertanyaan, assessment_pilihan and assessment_hasi_detail).
3. Lecturer Data Activity Scheme, consists of tables (activities_category, activities_master and activities_detail)

Results of the system analysis requires 11 types of tables as a database system. The results of the design scheme are implemented into the database engine (in this study using MYSQL as the data processing engine of the lecturer assessment system). Implementation of the scheme design into the MYSQL data processing engine can be seen in the figure 3
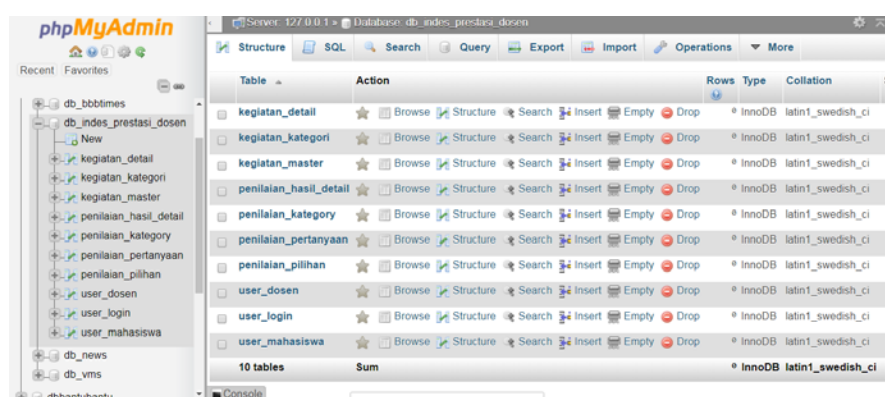

Figure 3 Database of lecturer appraisal application

D. WebService Application Development Phase
Webservice data processing requires a query analysis used to optimize data processing system Query Creation View Data List Activity and Query Creation View Data List Question.
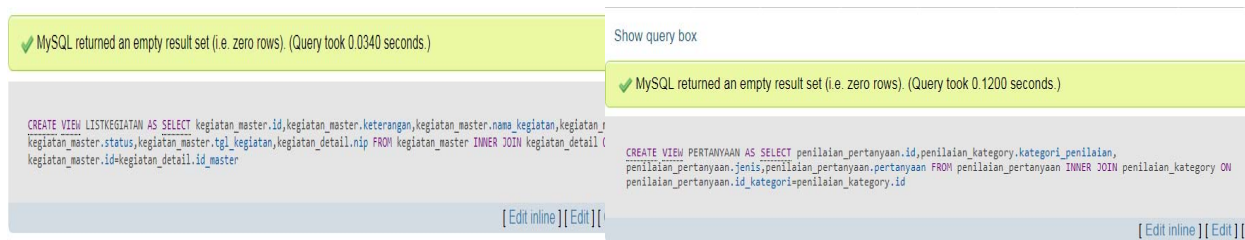
Figure 4 Querry Result For Question Table

Development of webservice applications, including the development of user data processing lecturers, student users, master category of activity and question data processing. Development of early stage backend is made using PHP programming language. The following is a description of the backend application that has been developed.

E. TestingPhase

Application of lecturer appraisal developed by using programming language using PHP. As for testing of the Apes REST Webservice application using open source POST MAN application. Application stage testing can be seen on the Figure 5
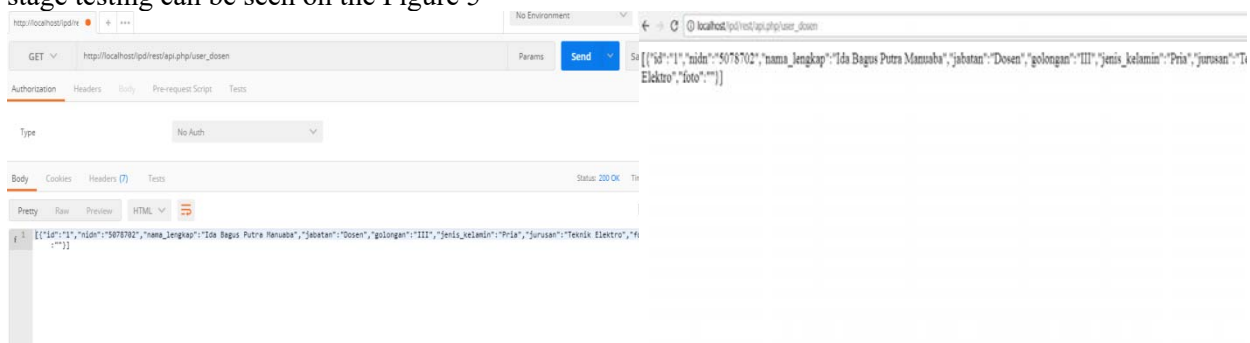

Figure 5 Rest Webservice Testing with POSTMAN software and web browser

The test results show that REST-based webservice application can run well, there is no pause or gap in the process of calling data from the server. Proof can be seen in the process of data calling using POSTMAN application, not finding of data delay during data calling from server.

4. Conclusions and Recommendations

Users of applications in the Politeknik Negeri Bali is very diverse to access the information system. Users used various technologies to acces an information systems. Webservice API data can be accessed from various devices like desktop applications, websites or mobile devices. The success of the application in submitting data can be seen from testing the app using "browser software" and JOSON data Testing unit "POSTman applications". Rest Webservice on lecturer rating information system provides many advantages : availability open resources, can be applied using the general website programming language (PHP) and the output of API Rest is very friendly with various tools such as websites, mobile applications (native or hybride).

5. Acknowledgments

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