

# Optimization of Information Systems Academic Schedule Based on Mobile Application Using WEB Service Bridge

Mohammad Ridwan<sup>1</sup>, Muhammad Khoirul Anam<sup>2</sup>  
{mridwan@unis.ac.id<sup>1</sup>, mkanam@unis.ac.id<sup>2</sup>}

Informatics Engineering Study Program, Islamic University of Sheikh Yusuf Tangerang, St. Maulana Yusuf Tangerang  
15118, Indonesia<sup>1,2</sup>

**Abstract.** Academic information systems are built to provide convenience to users in campus academic activities online. SINA system (Academic Information System) at Islamic University Sheikh Yusuf has been able to provide excellent service to students, lecturers, and university employees, but there are still some who need further development in order to realize the optimal information presented. It was recorded that only 16% of the total active students were actively logged into SINA, this was because millennial students prioritized viewing mobile applications rather than websites, especially those that smelled of social media. With less optimal information received by the students of Syekh Yusuf Islamic University today, especially information on class schedules. Therefore, it will be made a mobile-based application that is expected to be able to convey information to students in real time.

**Keywords:** academic schedule, lecture schedule, m-schedule, mobile app, mobile schedule.

## 1. Introduction

One technology that is almost always in our lives is web and mobile technology. In today's urban life, especially millennials, web and mobile technology have become important aspects. Coupled with the increasingly widespread social media and applications for exchanging messages, everyone can communicate with his friends anytime and anywhere.

Academic System at Islamic University Sheikh Yusuf (UNIS) has found his identity after developing the latest academic system called SINA (Academic Information System), the system has been able to provide excellent service to students, lecturers, and university employees, but there are still some who need development again in order to realize the optimal information presented, one of them in the aspect of mobility is the Mobile System. Currently Android or iOS mobile phones are already entrenched in the world of students including UNIS students. It was recorded that only 16% of the total active students were actively logged into SINA, this was because millennials students prioritized seeing mobile applications rather than websites, especially those that smelled of social media.

With the lack of optimal information received by UNIS students now and especially information on class schedules, there needs to be new breakthroughs and development using the latest technology to solve the problem. One of them is using camouflage techniques. The camouflage technique here intends to resemble the SINA system into a mobile system, which is where the habits of students are located.

So researchers try to research and provide solutions by making an application or mobile-based system that is expected to be able to convey information to students in real time. In this design the researcher uses web service as its bridge and AJAX technology as its generator service. Web Service is one of the back layer information technology capable of bridging two or more different technology platforms, while AJAX is a development technology from java script that is able to automatically call or wake up the system. Based on the description above, in this study we would like to conduct research with the topic of Optimizing Lecture Schedule Information on Mobile Application Based on Mobile Application Using the Web Service Bridge.

## 2. Related Research

In a previous study entitled Designing Mobile Applications for Notification of Android-Based Lecture Schedules (Case Study: Stmik Provisi Semarang), the main database of applications has not been combined with the database that already exists in STMIK Pro Visi Semarang. In this study, the main database of applications will be

combined with the database found at Syekh Yusuf Tangerang Islamic University. The purpose of this study is to create an application that is able to simultaneously connect data and information in the UNIS Academic System into the Mobile Application System. The Mobile Application System is able to show Lecture Schedule data and information as well as information on the UNIS Academic System to students and also as a reminder of the schedule for both the schedule of the day, tomorrow, tomorrow and tomorrow and the overall schedule according to the academic period.

### **3. Method**

#### *3.1. Research Method*

Researchers use Research and Development methods or Research and Development (R & D). According to Surya (Dharma, 2008) is a strategy or research method that is powerful enough to improve practice. What is meant by Research and Development or Research and Development (R & D) is a series of processes or steps in order to develop a new product or perfect an existing product so that it can be justified. These products are not always shaped objects or hardware, such as books, modules, learning aids in the classroom or in the laboratory, but can also be software, such as computer programs for processing data, learning in class, library or laboratory, or models of education, learning, training, guidance, evaluation, management systems.

The initial stage of this research is to develop an application, then develop according to the needs and circumstances in the field. Research and Development methods or Research and Development (R & D) will continue to run and develop according to the needs and changes in the field.

#### *3.2. System Development Method*

Extreme Programming (XP) is one of the most frequently used methodologies in Agile Development. This method requires more collaboration with customers and involves customers in the software development cycle than other structured processes [9]. One of XP's goals is to reduce the cost of possible software changes, with code carried out at each step being an indicator of project progress [3].

Stage in the development cycle of the Extreme Programming method [10]:

- Exploration Stage: At this stage, the user tells all the needs that will be involved in the software.
- Planning Phase: This stage focuses on setting the priority of the requirements provided by the user and setting the schedule for making software.
- Iteration Stage to Release: This stage focuses on creating a prototype and each progress produced will be discussed with the user. At this stage, the results of feedback by users will be evaluated and used for software improvements and then release new versions of software and of course according to user requirements.
- Productionizing Stage: This stage is the stage of making and releasing software that will be tested by the user. Previously it was checked again to be adjusted to the requirements of the user.

### **4. Result & Discussion**

#### *4.1. Business Modeling*

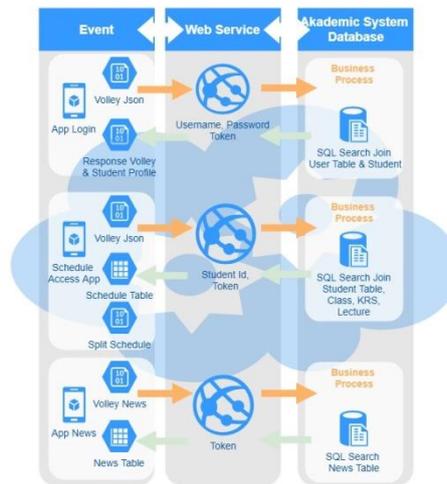
In designing this system, researchers need to use additional methods to help synchronize data simultaneously, among others :

- Parsing Data Method, data parsing is used when the system wants to exchange data from one platform to another. This method has a different scheme between one platform and another platform. In this study the base platform used is an Android Mobile App where data parsing methods use the Volley function.
- Web Service Method, Web Service is a media created as a provider of cloud data and as an object of data exchange (Parsing Data). Web Services must be connected directly to the Database Management System (DBMS) to be able to send data manipulation and search commands so that they can then be presented and utilized by Parsing Data Systems. To make it necessary to have additional methods with a website-based platform.
- Web Service Method, Web Service is a media created as a provider of cloud data and as an object of data exchange (Parsing Data). Web Services must be connected directly to the Database Management System (DBMS) to be able to send data manipulation and search commands so that they can then be presented and utilized by Parsing Data Systems. To make it necessary to have additional methods with a website-based platform.

From the description above, the researcher analyzed the data and processes using several methods described above, and visualized the analysis into the Modeling Business. This Modeling Business describes general and

technical processes that will be implemented into Design Modeling by emphasizing user and system needs. Next is the Modeling Business that has been designed by the Researcher.

### UNIS Integrated Lecture Schedule Mobile Application



**Figure 1.** UNIS Integrated Lecture Schedule Mobile Application

From the picture above, explain about 3 (three) main events, namely :

- **App Login**  
This activity starts from the mobile App sending a volley request to the web service by bringing a username, password, and token and will be received by the web service which will then be created a validation login search query before being sent to the UNIS Academic System Database to execute the query. After that, the new web service will display the results as a response that will be captured by the Volley function and will be arranged according to the needs of student logins and profiles.
- **Schedule Access App**  
This activity starts from the mobile App sending a volley request to the web service by bringing the student NIM and token and will be received by the web service which will then be made a schedule data search query before being sent to the UNIS Academic System Database to execute the query. After that, the new web service will display the results as a response that will be captured by Volley's functions and will be arranged according to needs, including today's schedule, tomorrow's schedule, day-to-day schedule, and all schedules.
- **App News**  
This activity starts from the mobile App sending a volley request to the web service by bringing a token and will be received by the web service which will then be made a search query news data before being sent to the UNIS Academic System Database to execute the query. After that, the new web service will display the results as a response that will be captured by the Volley function and will be arranged according to system requirements.

#### 4.2. Design Modeling

Furthermore, in designing this system there are stages of modeling design, the researcher divides the two stages in this design phase by including the main processes according to the modeling business. These two stages are among others :

- **Web Design Service**  
In designing this web service, researchers create functions that are simple and able to receive data from the Client App and will send a response back, Below is a Table of Request (Request) and Response (Response) web service:

**Table 1.** Design Web Service

No	Fungsi	Query	Request	Response
1	Loginmobile()	Select username, m.nama, m.tmplahir as tmp_lhr, m.tgllahir as tgl_lhr, m.alamat as alamat, m.hp as hp, m.email as email, m.jk as jk from user u join mahasiswa m on u.username=m.nim where username='username' and password='password'	Username, password, token	username, nama, tmp_lhr, tgl_lhr, alamat, hp, email, jk
2	Jadwalmobile()	Select k.namakelas, m.namamk, m.sksmk, p.idruang, p.tgljadwal, p.waktumulai, p.waktuselesai, w.nama, w.nip from kelas k join krs kr on kr.idkelas=k.idkelas join matakuliah m on (m.idmk=k.idmk and m.idkurikulum=k.idkurikulum) join perkuliahan p on p.idkelas=k.idkelas join mengajar j on j.idkelas=k.idkelas join pegawai w on w.nip=j.nip where kr.nim='username' and p.statusperkuliahan='0' and k.idperiode='periode' and tgljadwal is NOT NULL order by p.tgljadwal, p.waktumulai ASC	Nim, token	namakelas, namamk, sksmk, idruang, tgljadwal, waktumulai, waktuselesai, nama, nip
3	Jadwalberita()	select * from berita order by idberita DESC	token	All Field

- Design the Mobile Client App  
Below is a design template and App page from the login process to profile pages, schedules and news. Here's the design :



**Figure 2.** Design Login Page

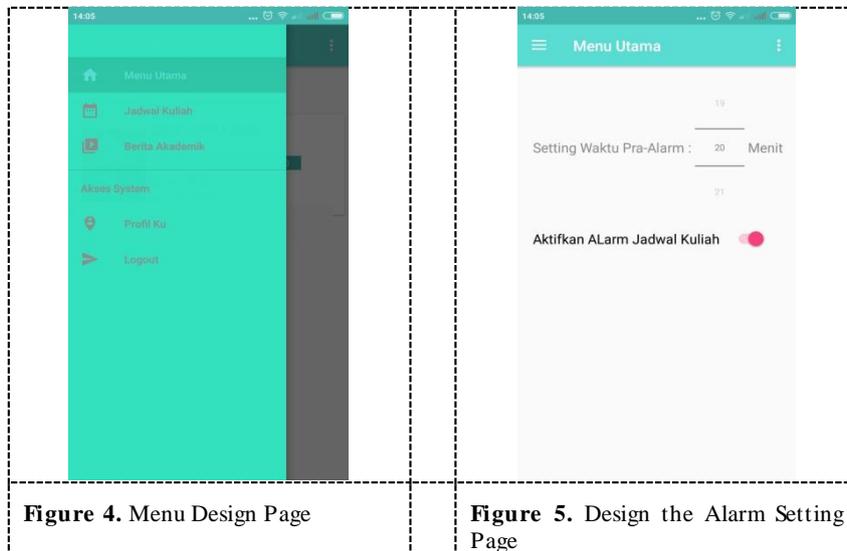
This page will interact directly with the academic system database to get validation whether the username and password entered matches the student data in the academic system.



**Figure 3. Main Page Design**

While for the page above is the main page of the system that displays a summary of today's schedule, tomorrow and also the day after tomorrow.

For the picture Figure 4 and Figure 5 below is the navigation menu and also additional system service settings.



While the page below shows the entire lecture schedule that adjusts to the academic period.

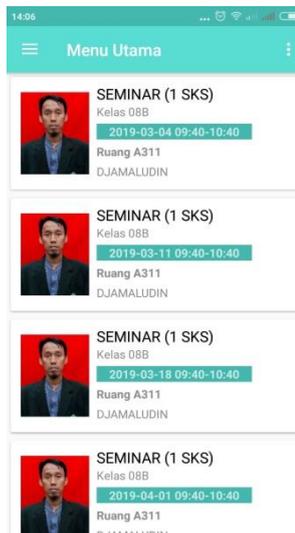


Figure 6. Design All Schedule Pages

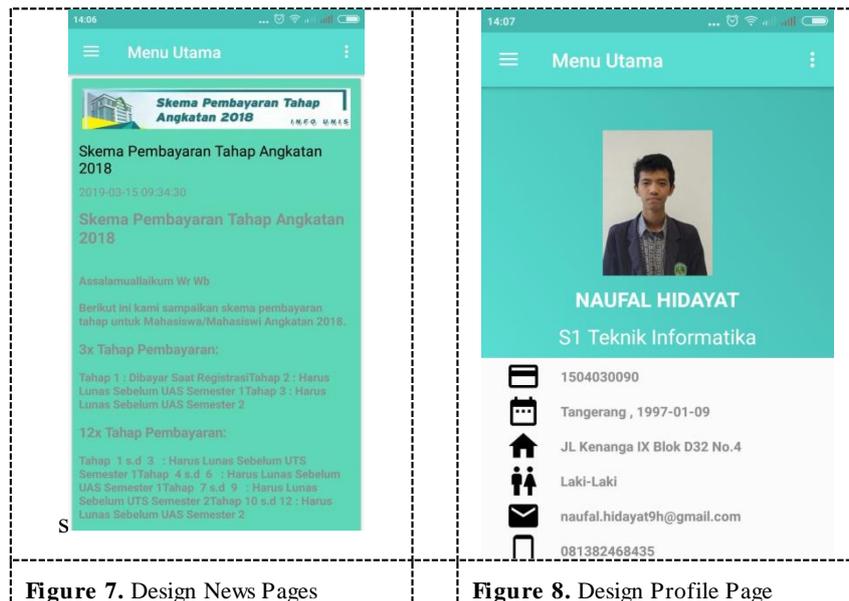


Figure 7. Design News Pages

Figure 8. Design Profile Page

Figure. 7 and Figure. 8 is each displaying an internal academic system news and also the profile data of the student concerned.

#### 4.3. User Acceptance Test

The researcher used the UAT (User Acceptancet Test) testing method which prioritizes satisfaction and approval of Systemusers, users here are active students.

The new SystemTest Results can be seen in the table below :

Table 2. Results of User Acceptance Test

No	Proses	Acceptment	Revisi	Status Revisi
1	Login	V	SINA Integration	Finish
2	Main Page	V	SINA Integration	Finish

3	Schedule Page	V	Data Filter	Finish
4	News	V	-	Finish
5	Profil	V	-	Finish

From the results of the system test / trial above, it can be concluded that the system has fulfilled the needs of users / students, to improve the mobile app system the class schedule will be carried out further research.

## 5. Conclusion

Making and developing Mobile Application Optimization Information on Academic Schedule Academic Systems Using the Web Service Bridge was successfully implemented by integrating into the UNIS academic system. The development of this research is able to be completed by simultaneously connecting data and information in the UNIS Academic System into the Mobile Application System. The Mobile Application System is able to show Lecture Schedule data and information as well as information on the UNIS Academic System to students and also as a reminder of the schedule for both the schedule of the day, tomorrow, tomorrow and tomorrow and the overall schedule according to the academic period. Future research needs to be made for lecture schedules and attendance processes in lectures, for further development will focus more on the lecturers' side in the theme of the lecture schedule.

## References

- [1] Agungsr. (2011). Sistem informasi. *Sistem Informasi*, 1–13. Retrieved from <http://agungsr.staff.gunadarma.ac.id/Downloads/files/3412/Konsep+SI.pdf>
- [2] Agungsr. (2011). Sistem informasi. *Sistem Informasi*, 1–13. Retrieved from <http://agungsr.staff.gunadarma.ac.id/Downloads/files/3412/Konsep+SI.pdf>
- [3] I. Borth, M. R. & Shishido, H. Y. A Comparative Analysis of Two Software Development Methodologies: Rational Unified Process and Extreme Programming. *Rev. Vértices* 15, 143–157 (2014). <https://doi.org/10.5935/1809-2667.20130035>
- [4] Klein, A., Mannweiler, C., Schneider, J., & Schotten, H. D. (2010). Access schemes for mobile cloud computing. In *Proceedings - IEEE International Conference on Mobile Data Management* (pp. 387–392). <https://doi.org/10.1109/MDM.2010.79>
- [5] Ramadhan, T., & Utomo, V. (2014). Rancang Bangun Aplikasi Mobile Untuk Notifikasi Jadwal Kuliah Berbasis Android (Studi Kasus: Stmik Provisi Semarang). *Jurnal Teknologi Informasi Dan Komunikasi*, 5(2), 47–55. <https://doi.org/10.1234/JTIK.V5I2.93>
- [6] Satria Darmawangsa, N., & Studi Ilmu Komputer, P. (2011). Rancang Bangun Web Service Untuk Penjualan Tiket Bus Damri. *Jurnal Informatika Mulawarman*, 6(2), 54–63.
- [7] Kasman, Akhmad Dharma. 2015. *Trik Kolaborasi ANDROID dengan PHP dan MySQL*. Yogyakarta. Lokomedia.
- [8] Json Org. JSON [Online]. Url: <http://json.org/json-id.html>. [20 November 2016]
- [9] Mohammadi, S. et. al. (2009). Challenges of user Involvement in Extreme Programming projects. *International Journal of Software Engineering and Its Applications*
- [10] Awad, M. A. (2005). *A Comparison between Agile and Traditional Software Development Methodologies*. The University of Western Australia.