

Developing Smart Appointment and Scheduling System for Innovation in Smart Universities

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Abstract: This paper proposes a conceptual solution for appointment and scheduling management system among university's student and lecturer. Smart appointment and scheduling system designed to help the university to build the system for consultation service management among lecturers and students. The main objective of this project is to process appointment and scheduling system effectively and efficiently through an online system and replace the current manual process that will contribute in developing smart and future universities. With this project, the lecturers and the students can manage their time to meet and do the consultation. This conceptual paper introduces to improve the quality of the service in smart/future universities through innovative system that lead to the prosperity. This paper offers nine blocks of Business Model Canvas (BMC) framework and Literature Review (LR) as the methodology of this research. The finding of this paper shows that the new innovative appointment and scheduling system can help the university to build the characteristic and personalization of the student as well as the innovation system in the smart/future universities.

Keywords: Smart Universities, Smart Appointment, Future Universities, Innovation, University Environment, Digital Universities, University Education, Scheduling System.

I. INTRODUCTION

Today, Lecturers and Teachers are become one of the most important persons that will decide the future of the student. William Boateng in his research found that student's interaction with their lecturer impact the positive effect to the students [1]. Therefore, the universities should encourage this students and lecturers relationship in developing the relationship. One of the ways to do this is by improving the quality of the consultation service between student and lecturer.

Unfortunately, many problems occur when implementing the manual consultation system that causes the low number of students who come to their lecturers for consultation. The researcher found that the student rarely meet their lecturers for consultation. It happened because a student has no idea on how to set an appointment with a lecturer. Usually a student made an appointment manually through email or face to face. In fact, only a few students use the consultation that is provided by the university. The reason is because they do not know how to manage their time and to meet the lecturer for consultation. Thus, the researcher suggests the smart appointment and scheduling system as the new platform/system that will replace the current manual system with an innovative digital system that will give contribution in developing smart universities.

A. Project Background:

The consultation between students and lecturers can be used as the way to gather the feedback from the students as well as detecting the students' misconceptions [2]. By having consultation and meet the lecturer directly, student can have better chance to improve their knowledge and understanding about the related paper as well as to gain the confidentiality and good personality. With the current manual system, the students need to make an appointment face to face or by phone or mailing the lecturer before going for consultation.

However, there were many problems that occur when implementing the current manual system. Based on the interview that conducted by the researcher, it is found that from the student's points-of-view, they expressed that they do not know how to make an appointment and felt guilty of disturbing the lecturer's time. Moreover, the student did not know when the time is provided by their lecturers for consultation purposes. Also there were some cases where they come to the lecturer's room and the lecturer was not there due to some reasons.

Not only that, from the lecturer's points-of-view consultation time was not used properly by the student even though it has already been provided by the lecturer. The lecturers in the university should provide their consultation times to their students. However, the lecturer sometimes needs to leave due to unavoidable circumstances during consultation hours. They could not inform the student. As a result, the lecturer would also need the new system that can provide a mechanism for them to inform the students of their available times. Moreover, they can manage the scheduling time for consultations.

As a solution, a new innovative appointment system should be developed to connect the student and lecturer in managing their consultation hour. Only that, by having good appointment and scheduling system, the effectiveness of the education can be reached through the consultation and interaction between student and lecturer.

B. Project Objectives:

The principal objective of this conceptual system is to respond to the needs of the lecturers and students in managing their time in making an appointment for consultation effectively and efficiently through an online system and replace the current manual process that will contribute in developing smart and future universities. Some of the objectives of the developing smart appointment and scheduling system in the university environments are:

- To help the student to book their lecturer's time for consultation
- To help the lecturer to manage their available time for consultation
- To help the student to manage their time for consultation and study
- To provide the system for the lecturer that will help them to view and prepare their time for upcoming consultations
- Give the easier way for students to book their lecturer's time
- The system will act as a mediator that will help the student and lecturer to pick their time for consultation

Beside that, there were some value that will gain when implementing the new smart appointment and scheduling system. This value included:

- Time Saving
- Monetary saving
- 24 hour convenience
- Efficiency of the system

Therefore, this project will bring the wellbeing to the university environment. Through a discussion and consultation between students and the lecturer, the trust between the lecturer and student can be build as well as mutual confidence. [03] With smart appointment and scheduling system, the consultation and interaction between students and lecturer can be made effectively and efficiently.

II. LITERATURE REVIEW

There are many researches that have been conducted regarding the interaction and consultation between the students and the lecturers. In the education environment, the consultation and interaction between lecturers and students brings the positive relationship that enable the students to have better academic skills and personalization as well as feel save and secure in their learning environment [3]. Richardson, B. G and Shape M. G mentioned that consultation is one of the strategy to make the teaching in classroom effective [4]. Not only that, consultation is also important and become one of the most effective ways to gather the feedback from the students [5].

Although the consultation plays an important role in developing the student's academic skills and personalization, there were many problems occurred that reduce the effective and efficiency of the consultation itself when implementing the

current system. Therefore, the researcher suggests the new innovative Smart Appointment and Scheduling system as the solution for appointment and consultation system in university environment.

Nowadays, similar online appointment system developed only for seeking the doctor at the hospitals, room reservation at the hotels, and table reservation at the restaurant [6]. In fact the innovative appointment system can be developed to replace the current manual system in the academic environment. Smart appointment and scheduling system can be developed to increase the effectiveness and efficiency of the consultation system that will brings the welfare for university students and lecturers as well to support the development of future/smart universities.

Smart appointment and scheduling system will be designed with an advanced technology in easy way, saving money and time as well improve the efficiency of the system it self. Smart appointment and scheduling system will provide an effective way that act as platform for university student and lecturer in managing their time in the university environment.

The features and activities that will be served in smart appointment and scheduling system are:

Smart Appointment System:

With a new system, user can easily search and find the lecturer's information including their contact information and availability time. It is easy to set an appointment in one click smart appointment feature that provided within the system. In the system, the lecturer can provide their available time for consultation and the student can view the available time and lecturer, so that they can pick any date and time for doing consultation. Not only that, the student can also print their appointment slip as their reference paper. The system will be available on the web based platform and smart application that can be easily accessed by the lecturer and student.



Fig. 1: Smart Appointment and Scheduling System Portal (Homepage)

Smart Scheduling System:

The Smart Appointment and Scheduling system is an innovative system that allows the student to set an appointment with their lecturer easily. The system will provide the availability time of the students as well as the availability time of the lecturer in order to set and find the proper time that both of lecturer and student can be met. The scheduling system will

be done automatically by the system. Also the system allows the students and lecturer to check their past appointment/consultation as well as upcoming appointment so that they can provide their time for an upcoming consultation. Also the user can have appointment reminder that will remind them about the upcoming appointment/consultation.

Real Time Appointment Notification:

Once the user confirm their new appointment, the smart appointment and scheduling system will send the notification about the new appointment and message that sent to the user through online portal, email and mobile application. For some cases, if the lecturer can't make a consultation on its time because of an avoidable circumstance, than the system will inform the students right away about the cancelation/postponed of the consultation/appointment. So, the effectivity of the consultation can be gained through this system.



Fig. 2: Smart Appointment and Scheduling System Application (Homepage)

Smart Appointment Statistics:

By implementing the smart appointment and scheduling system, the administrator has the right to view the appointment statistics including the number of the appointment that made by the student weekly, monthly, or annually. Not only that, the appointment report also can be produce automatically from the system about the activity of the users in the system. The statistics that produced by the system can be used to evaluate the system for improvement.

III. PROPOSED CONCEPTUAL SOLUTION

In order to propose smart/future universities, we can develop smart appointment and scheduling system as one of the innovation that will create the wellbeing in university environment. Counselling between lecturer and student is important because it will help the student to understand the subject, solve their self problem as well to develop their good personality [7], [8]. But, only few students utilize the service (counselling) that already provided by the university due to ineffective and inefficient of the system. So, researcher suggests the new smart appointment and scheduling system as the solution that can improve the effectivity and efficiency of counselling service.

In the smart appointment and scheduling system, the lecturer may select and provide any available time to their students for consultation hour. Then, they will see any updates from students if any student makes an appointment with him/her. The lecturer may see the profile of the student who creates an appointment such as student name, matric number, also include the appointment information like appointment date and time. Besides, lecturer also can send and reply the message that sent by the student.

For the students who want to make an appointment to their lecturers, they may log in to this system. Then they may search for the lecturer's name, and pick any available time for the consultation. Student also can see the lecturer's information including his office address, and time availability for the consultation. Moreover, student can also send and reply the message to the lecturer. And real time notifications will be sent through portal, email, and mobile apps once the student/lecturer makes a new update for an appointment/message.

Smart appointment and scheduling system will be developed by harnessing the internet connection. The system is not only developed in web based platform, but also it will be developed in smartphone apps platform since it becomes the most popular way to browse the internet [9].

Nine building block of Business Model Canvas (BMC) framework is used as the methodology of this paper. BMC is very useful because it help the organization to build the bridge and enable the dialogue between the technological words and business [10].

1. Customer Segments:

The Customer Segments is the society or the organization that involves and gives a contribution in developing smart appointment and scheduling system. The customer segments included:

- University student as the main user who will use the system
- University staff/lecturer as the main user who will use the system
- Programmer/Developer that will develop and maintain the activity of the system
- Academia that will give the contribution in the system

2. Cost Structure:

The Cost Structure known as the cost amount that must be paid from the activities that utilized during implementing the new system. The Cost structure included:

- Product development and maintenance cost for both web based platform and smartphone application.
- Staff salary
- Web Hosting and Web Server

3. Revenue Streams

The Revenue Streams describes as the revenue that generates from the customer to cover the cost structure in developing smart appointment and scheduling system. Since the system is provided for free to the users with no advertisement revenue in the product, then revenue streams only included:

- University fund
- Proposal funds from the government
- Donation/Sponsor

4. Key Partners:

The Key Partner is the people or group of people who that act as partners order to run the smart appointment and scheduling system. The key partners of this system include:

- Public
- Government agencies
- Public and Private University/Institute
- Ministry of Education
- Academia
- Internet providers

5. Key Activity:

The Key Activity describes as the main activities that provide in the system to develop the wellbeing to the society. The key activity of the development the system is to provide effective and efficiency of appointment and scheduling system that will bring the welfare to the student and lecturer.

6. Key Resources:

The Key Resources describes the most necessary assets required to process Islamic City Program work. The key resources such as:

- University staff and lecturer
- Developer and Programmers
- Government

7. Value Proposition:

The Value Propositions is the value of the services that provided in the Islamic society in order to satisfy the customer. The value prepositions included:

- Customer can save their time, because the system ca
- Customer can save their money because what they need is only internet connection
- The system is online in the internet and can be accessed 24 hour
- Efficiency and Effective of appointment and scheduling system
- Trusted information and database system
- Easy to use the smart appointment and scheduling system

The Business Model Canvas










Key Partners  <ul style="list-style-type: none">• Government Agencies• Ministry of Education• Public companies• Academia• Internet Providers	Key Activities  <ul style="list-style-type: none">• Effective and Efficiency of Appointment and Scheduling System	Value Proposition  <ul style="list-style-type: none">• Time Saving• Monetary Saving• 24 Hour Convenience• Efficiency and Effective of the system• Trusted Information• Easy to use	Customer Relationships  <ul style="list-style-type: none">• Student Consultation• University Community• Online Portal	Customer Segments  <ul style="list-style-type: none">• University Student• University staff/lecturer• Programmer/Developer• Academia
Key Resources  <ul style="list-style-type: none">• University Staff/Lecturer• Programmer/Developer• Government	Channels  <ul style="list-style-type: none">• Online SASS Portal• SASS Application			
Cost Structure  <ul style="list-style-type: none">• Product development/maintenance• Staff salary• Web Hosting and Server Cost		Revenue Streams  <ul style="list-style-type: none">• Government Fund• University Fund• Donation/Sponsor		

Fig. 3: Business Model Canvas (BMC) for SASS

8. Customer Relationship:

The Customer Relationships is the type of relationship that used in the project

- The purpose of this project is to provide the efficiency and effective of consultation management service among university students and lecturers as the innovation to the smart/future universities.

9. Channels:

The Channels are the parties that communicate in Islamic city program in order to achieve its Value Proposition. The Channels included:

- Online smart appointment and scheduling system portal/website
- Smart appointment and scheduling system application

IV. CONCLUSION

Consultation services play an important role to help the students in their studies [11]. In the consultation time, students can ask about the materials, tutorial, or other problems that they do not understand in the class as well to consult about their personal problem. But, some students are not prepared with consultation because they did not know the availability of the lecturer. To solve this problem, the researcher suggests this project to achieve the lecturer and the student's need in doing and managing the consultation time scheduling and help them in organizing their appointment.

With this project, the lecturers and the students can manage their time to meet and consult. In short, the lecturer will select and provide their available time for consultation hours. And student can view the available lectures and time, so that they can pick any date and time for doing consultation. Once they make an online appointment, the lecturer will be informed through portal and email and the data in the system will be updated automatically. This will encourage students to have consultations if they have any problem with tutorials, assignments, projects, and other related activities with their lecturers.

Nowadays, with the significant development of the technology, the researcher believes that the new proposed system will encourage students to have consultations if they have any problem with tutorials, assignments, projects, and other related activities with their lecturers. With the new innovative system, it will help the university to have good relationship between students and lecturers that will gain the positive effect in the learning environment [12]. Thus, the system can be implemented to all universities because it can create the welfare in the university environment and contribute to the development of smart/future universities.

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