THE COLLEGE ACADEMIC SERVICE DECISION SUPPORT SYSTEM USES SERVICE QUALITY AND IMPORTANCE-PERFORMANCE ANALYSIS METHODS

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Abstract

The impact of the Covid-19 pandemic that has hit the world affects human needs in utilizing technology to be able to solve the problems they face. Likewise, universities that want to improve the quality of academic services during a pandemic sometimes have problems with accuracy and speed in data processing when measuring the level of student satisfaction whose information will be used as support in making decisions to improve services. It is better to develop a computerized system that can replace all activities in the process of implementing the measurement of academic service quality from distributing questionnaires to getting the results of Service Quality (Servqual) and Importance-Performance Analysis (IPA) analysis using the Unified Modeling Language (UML) approach. The design of the decision support system used in this design, namely: Use Case Diagrams, Class Diagrams, Activity Diagrams, Sequence Diagrams and Deployment Diagrams. By using a computerized decision support system, the process of measuring the level of student satisfaction with academic services can be carried out quickly, precisely and accurately compared to using word processing and spreadsheet software and provides easy-to-understand information and suggestions for improvement. academic services based on the attributes of the questionnaire accurately using the Service Quality (Servqual) method on Gap 5 and Importance-Performance Analysis (IPA).

Keywords: Decision Support System; Service Quality; Importance-Performance Analysis; Satisfaction Level; Unified Modeling Language; Waterfall

1. Introduction

The rapid development of information technology greatly affects the human need to utilize the technology in order to solve the problems it faces. Likewise, universities that want to improve the quality of academic services sometimes get problems of accuracy and speed in data processing when measuring the level of student satisfaction whose information will be used as a supporter in decision making. The information used must be guaranteed the truth, reflecting the actual circumstances, according to the needs, provided in its entirety and has greater benefits compared to the costs incurred. One way to get information

with these characteristics is to replace the role of humans in the process of processing their data with computerized systems.

The academic services of today's colleges have undergone very significant changes in a very rapid time. This change must be made as a result of the impact of the Covid-19 pandemic that hit the world. For these changes, The Institut Kesehatan Medistra Lubuk Pakam conducted an evaluation of academic services by measuring the performance of the services they provided. Measurements are carried out by distributing questionnaires first to students and then processing data. To get the level of satisfaction used service quality method (Servqual) and to get performance from the attributes of the questionnaire in order to improve performance used importance-performance analysis method (IPA) [7].

In processing data to get the results of analysis is still done calculations manually using word processing applications (word processing) and number processing (spearsheet). By using only the application, the information is obtained but takes a long time and the level of accuracy is sometimes not appropriate. Manual data processing also has the disadvantage in comparing quality measurement information from each implementation period because the processing data is stored in different files.

To be able to solve the problems faced in the quality measurement of service quality conducted by the Institut Kesehatan Medistra Lubuk Pakam, a computerized system should be developed that can replace all activities in the process of implementing quality measurement of academic services from the dissemination of questionnaires to get the results of Service Quality (Servqual) and Importance-Performance Analysis (IPA) analysis. The results of the computerized system will be used as supporting data in decision making for the improvement of academic services.

But before the development of a computerized system, it is better to first build a system design based on business processes that run. The design to be built must be easily used and understood by programmers who will translate it in computer program code to produce a computerized decision support system. The design will be built using the Unified Modeling Language (UML) approach, which is the standard language used in designing documentation, specifications and developing software. This model language is used because most information system designers in describing their information utilize UML diagrams to help project teams communicate, explore design potential and validate software architecture design. Of the many components owned by UML, only five components will be used in this design, namely: Use Case Diagram, Class Diagram, Activity Diagram.

Based on the background of the above problems about the needs of computerized systems, researchers are interested in designing decision support systems using information technology to measure student satisfaction levels of academic services using Service Quality (Servqual) and Importance-Performance Analysis (IPA) methods based on Unified Modeling Language (UML).

2. Method
2.1 Approach
The research approach here is quantitative, namely to design a decision support system that first analyzes the level of satisfaction by comparing the performance of academic services during the Covid-19 pandemic against the expectations of students.

2.2 Population and Sample
The population of the study was 3835 people. The number of polulations was obtained from the total active students of the Academic Year 2020/2021 from 15 existing study programs. They will analyze their satisfaction levels by comparing the performance of academic services during the Covid-19 pandemic against the expectations of students. While the sample studied amounted to 362 people, calculated based on the formula Slovin [4].

2.3 Design

Researchers outline the design of the study to provide an overview of the steps taken in this study so that the objectives of the research can be achieved. This design will lead to research that can be done gradually and structured (Figure 1).
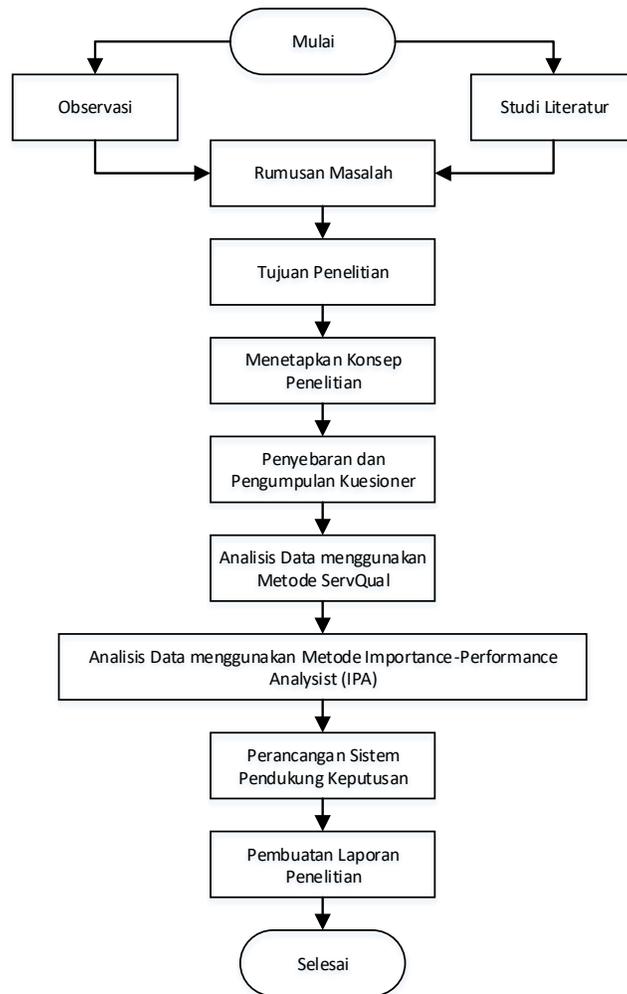
Figure 1. Research Design

2.4 Sample Retrieval Techniques

The sample data collection technique used is non probability sampling with purposive random sampling type that determines research samples where researchers determine respondents based on the assumption that informants can provide definitive, complete and accurate data. Purposive Random Sampling is used by assigning samples that all members have an equal chance and are not bound by anything to be included in the research sample. The study of this study will be described quantitatively in the form of mathematical numbers and statistics.

3. Results and Discussion

In this section will be presented the results of testing of the design of decision support systems developed and discussed pages that are very important in the process of measuring the level of student satisfaction with academic services.

3.1 Hasil

Decision support systems that have been developed in accordance with the design of the system analysis are then tested.

3.1.1 Hasil Analisis dan Perancangan Sistem

From the results of field observations and interviews to facilitate and accelerate the development of decision support systems, the author designs and analyzes the needs of the system using UML:

a.   Use Case Diagram

In Figure 2, there are two actors who can usethe system and playdifferent roles. Administrator actors have the most roles such as entering a list of statements, entering categories of questions, entering survey information and sorting all questions and categories into surveys. All activities of the administrator must be done by logging into the system. Respondent actors can only view survey information and fill it out and see the results of the survey.
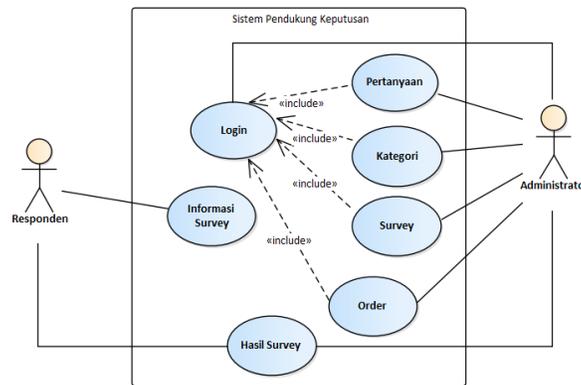
Figure 2. Use Case Decision Support System

b.   Class Diagram

In the class diagram used in the database design consists of 7 tables and is linked as shown in Figure 3.
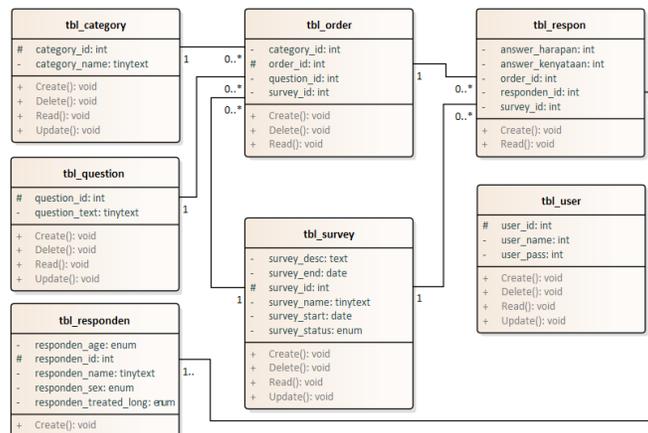
Figure 3. Decision Support System Diagram Class

c.   Activity Diagram

More detailed diagrams of use case diagrams are made one by one so that they can be easier to understand the flow of the decision support system. As shown in Figure 4, it is one of the Actifity

Diagrams that describes the flow of Survey Results that uses service quality and importance-performance analysis methods to process and analyze data from questionnaires.
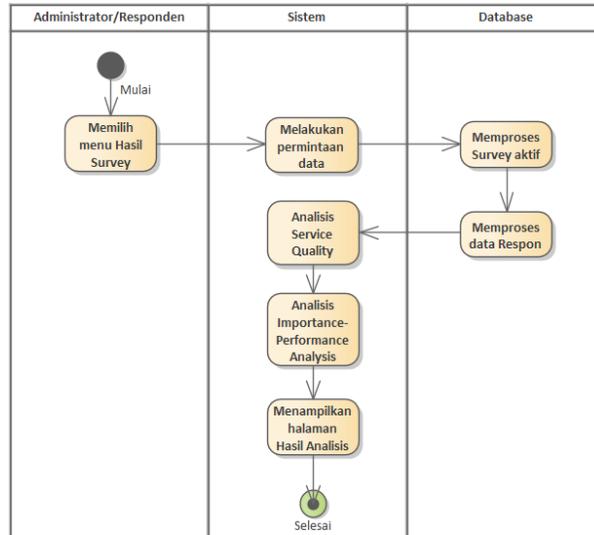
Figure 4. Activity Diagram survey results

d. Sequence Diagram

To facilitate the development of the system, the behavior carried out by actors and objects of the system is made in sequential form and based on a series of sequences of system use. As shown in Figure 5, it is one of the Sequence Diagrams that describes the behavior of actors in survey results that use service quality and importance-performance analysis methods to process and analyze data from questionnaires.
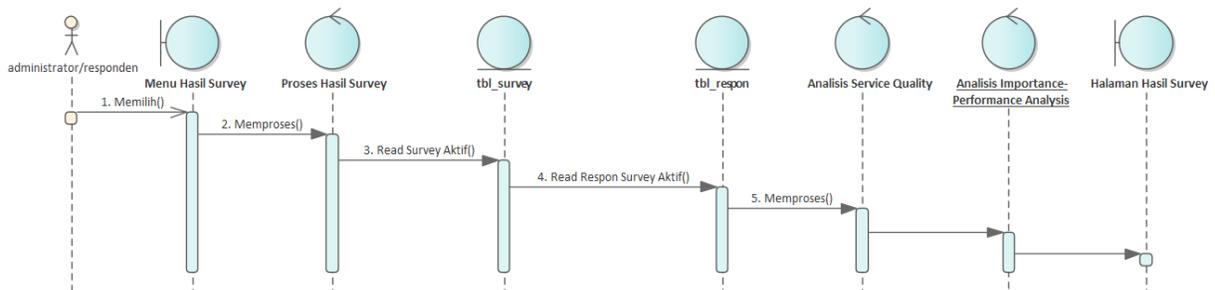
Figure 5. Sequence Diagram of Survey Results

e. Deployment Diagram

The need for physical infrastructure and server software to be able to run a decision support system is well described in the Deployment Diagram. Based on Figure 6, the software needed on the server side is the service of a Web Server bundled with PHP and a MySQL Server Database Management System (DBMS). And hardware for clients in which there is a Web Browser.
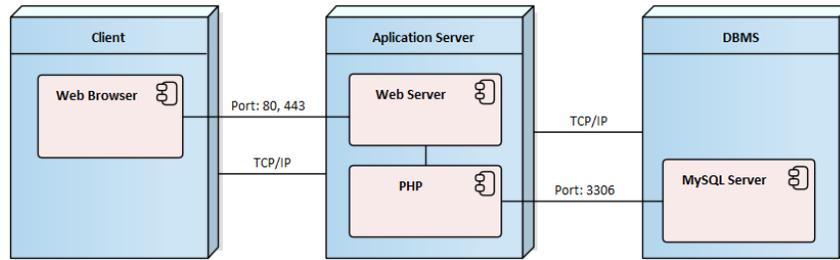
Figure 6. Deployment Diagram of Decision Support Systems

3.1.2 Results of System Analysis and Design

System testing results can be viewed in Table 1 for respondent page testing and Table 2 for administrator page testing.

Table 1. Respondent Page Test Results

No.	Activities	Expected results	Information
1	Respondents access the Survey URL	Displays the main page of the Survey that contains a description and form to fill out the respondent's bio and if the respondent has not met the number of samples based on the slovian formula, when fulfilled will directly display the Survey Results page.	Succeed
2	Respondents fill out a biodata	The respondent's input on the biodata form is validated in accordance with the specified provisions.	Succeed
3	Click "Next"	Validated respondent inputs will be stored in sessions and display questionnaire filling pages and how to fill them out.	Succeed
4	Respondents fill in answers to attributes	Input of respondents' answers validated with the provision should not be empty.	Succeed
5	Click "Save"	Display a popup window for approval input with the entire input or want to change back.	Succeed
6	Click "Yes"	All previous inputs are stored into tbl_responden, tbl_respon and display survey results from data analysis and processing using service quality and importance-performance analysis methods.	Succeed
7	Survey Results	Displays the Survey Results page of data analysis and processing using the Service Quality and Importance-Performance Analysis methods.	Succeed

Table 2. Administrator Page Test Results

No.	Activities	Expected results	Information
1	Administrator accesses Admin Login URL	Displays the main page of the system and forms to fill in the login.	Succeed
2	The administrator fills in the Username and Password	The administrator input on the login form is validated in accordance with the specified terms.	Succeed

3	Click "Login"	The administrator input that has been validated will be checked based on the data on the table_user, if there is a suitable will display the Dashborad page, otherwise it will be displayed a message in the login form "repeat login".	Succeed
4	Click the "Questions" menu	Displays the Questions page that contains all the attributes for the questionnaire from tbl_question.	Succeed
5	Click "> Add Questions"	Displays the Add Questions page that contains Forms to add attributes.	Succeed
6	Fill in the question	Attribute input is validated with the provision must not be empty.	Succeed
7	Click "Save"	Attribute input is saved into the tbl_question and displays the Questions page.	Succeed
8	Click "Questions > Change"	Displays the Change Questions page that contains forms to change the attribute fill.	Succeed
9	Change the question	Change Validated Questions with the provision should not be blank.	Succeed
10	Click "Save"	Change the saved attributes into tbl_question and display the Questions page.	Succeed
11	Click "Delete > Questions"	Display the popup window for delete approval.	Succeed
12	Click "Yes"	The selected attribute will be removed and tbl_question and display the Questions page.	Succeed
13	Click the "Categories" menu	Displays the Categories page that lists categories from tbl_category for questionnaire attributes.	Succeed
14	Click "Add > Categories"	Displays the Add Category page that contains the form to add the category.	Succeed
15	Fill a Category	Category input is validated with the provision that it should not be empty.	Succeed
16	Click "Save"	Category input is saved into the tbl_category and displays the Categories page.	Succeed
17	Click "> Categories Change"	Displays the Change Categories page that contains Forms to change the category fill.	Succeed
18	Change a Category	Change Validated Categories with the provision must not be blank.	Succeed
19	Click "Save"	Change categories saved to tbl_category and display the Categories page.	Succeed
20	Click "Delete > Category"	Display the popup window for delete approval.	Succeed
21	Click "Yes"	the selected category will be removed and tbl_category and display the Categories page.	Succeed
22	Click the "Survey" menu	Displays the Survey page that lists the survery of tbl_survey.	Succeed
23	Click "Survey > Add"	Displays the Add Survey page that contains forms to add surveys.	Succeed
24	Fill out a Survey	Survey input is validated with the provision that it should not be empty.	Succeed

25	Click "Save"	Survey inputs are saved into the tbl_survey and display the Survey page.	Succeed
26	Click "Survey > Change"	Displays the Change Survey page that contains the form to change the survey fill.	Succeed
27	Change a Survey	Change the validated survey with the provision that it should not be empty.	Succeed
28	Click "Save"	Change the survey saved to tbl_survey and display the Survey page.	Succeed
29	Click "Survey > Delete"	Display the popup window for delete approval.	Succeed
30	Click "Yes"	The selected survey will be deleted and tbl_survey and display the Survey page.	Succeed
31	Click the "Order" menu	Displays the Order page that lists the survery of tbl_survey.	Succeed
32	Click "Order > Details"	Displays the Details page of the Survey along with categorized attributes.	Succeed
33	Click "Order > Details" > Populate"	Displays a Populate page that contains forms for adding and removing questions and categories into a survey.	Succeed
34	Click "Save"	All inputs on the form will be saved into the tbl_order and back to the Order page.	Succeed
35	Click the "Results" menu	Displays an active and analyzed Survey Results page.	Succeed
36	Click the "Logout" menu	Delete the login session and display the login page.	Succeed

3.2 Discussion

Information from respondents and administrators is discussed based on the results of the development of decision support systems.

Figure 7. Respondent Biodata Form Page

On the Biodata Form page shown in Figure 7, input consists of the Respondent's Full Name, Gender and Study Program. From these data will produce information on respondent characteristics based on gender and study program from all respondents who took the survey.

The Questionnaire page shown in Figure 8 displays a list of attributes that have been grouped by category from the dimensions of the Servqual method. The respondents' answer fills from each attribute are divided into 2 i.e. Hope and Reality based on the Likert Scale.

Figure 8. Questionnaire Page

The Survey Results page that appears in Figure 8 is the result of analysis and processing of data from answers from the respondent. The results of the analysis of the Servqual method describe the Gap Score of each attribute and the Pattern Results of the test with a pattern when the Gap Score is smaller or equal to Zero then the resulting pattern "Dissatisfied", if the Gap Score is greater than Zero then the resulting pattern is "Satisfied". Furthermore, the results of the analysis of the Importance-Performance Analysis method are presented in the form of a table that is grouped based on 4 quadrants namely Quadrant I (Top Priority): the attributes in this quadrant are prioritized improvement because their existence is considered very important, Quadrant II (Maintain Achievement): the attributes in this quadrant need to be maintained because its Performance and Importance are in accordance with expectations, Quadrant III (Low Priority): attributes in this quadrant It is considered less important and Its Performance and Interests are categorized as ordinary or sufficient, and Quadrant IV (Redundant): Performance and Importance on the attributes in this quadrant are excellent, but not very important in existence.

Figure 9. Survey Results page

4. Conclusions

From the results of the analysis of the methods used in processing data, the design of decision support systems with Unified Modeling Language, testing of systems that have been built, it can be concluded:

a. By using a computerized decision support system, the process of measuring the level of student satisfaction with academic services that the implementation starting from the creation and dissemination of questionnaires, processing and analysis of data to the creation of reports can be done quickly, precisely and accurately compared to using word processing software and spearsheet.

b. Analysis and processing of data with the Servqual method on Gap 5 provides easy-to-understand information on the level of satisfaction of students for academic service during the Covid-19 pandemic and with the Importance-Performance Analysis method provides academic service improvement advice based on the attributes of the questionnaire accurately.

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