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Feasibility Study of Web-Based Academic Information Systems at Bhakti Semesta Polytechnic Salatiga Using The Feasibility Method of Telos

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ABSTRACT

In the process of developing information systems, there are often problems that are detrimental in terms of time and money in an organization. Bhakti Semesta Polytechnic, which is a polytechnic that was established in 2021, needs to develop an Academic Information System after observations and interviews with the academic community have been carried out. So that development can run according to needs and does not cause losses. The feasibility test is carried out using the Telos method. This method is used to determine the feasibility of a project with several criteria, namely Technical, Economy, Legal, Operational and Schedule. The results of this study indicate the value of the feasibility factor is 8.4 with an evaluation design for developing a feasible information system (B) and the risk of developing a system is relatively low.

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1. INTRODUCTION

Bhakti Semesta Polytechnic is the first private polytechnic in the city of Salatiga, academic information systems are a must-have for Bhakti Semesta Polytechnic, but in fact the Bhakti Semesta Polytechnic Academic Information System is not yet connected to each other, the input system is done manually from eye data lectures, study program data, KRS and distribution of KHS to students. The author's observations and interviews conducted with the academic community of the Bhakti Semesta Polytechnic show that human errors often occur in the data input process, besides the manual academic information system slows down the processing of information dissemination at the Bhakti Semesta Polytechnic. Starting from these problems, it is necessary to create a WEB-based academic information system. To get to this stage, a feasibility test is needed to find out whether a project is feasible or not. According to Harahab Mistakes and errors in assessing investments will cause large losses and risks. Investment appraisal is included in the feasibility study which aims to avoid the occurrence of unprofitable investments due to unfeasible businesses [1]. One method that can be used to test the feasibility of a system is the Telos method.

This method was used by Ibrahim to assess the feasibility of the project with the results of data testing showing that the system is feasible to continue with a feasibility value of 8.67 [2], the next research was carried out by Kurniawan in 2020 to analyze the vehicle security information system project using the SWOT and TELOS analysis methods with research results above 8.34 which means the project is very feasible to be developed [2]. The Telos method is also used by Ariyanto to test the feasibility of designing and implementing system administrator tools with the SSH protocol with a value of 8.95 [3]. Based on this, the Telos Method will be used in this study to test the feasibility of a Web-based Academic Information System at the Bhakti Semesta Polytechnic.

2. RESEARCH METHOD

The information system is informed about the maintenance of important communication lines, processing, management, and other events of certain types of daily transactions. This is important both inside and outside the company and provides an information basis for decision making. Feasibility Study, A feasibility study is a study used to determine whether the development of a system project is worth continuing or discontinuing. Feasibility studies are also known as high point reviews. The method used to perform calculations the feasibility of this research is the TELOS method. The TELOS framework can ensure a data-driven decision-making process [5]]. Method TELOS is applied in order to be able to conclude several conditions that occur are Technical Feasibility, Feasibility Economics, Legal Feasibility, Operational Feasibility and schedule feasibility and Assessing Telos Eligibility Factor are Assessing Technical Feasibility, Assessing Economic Feasibility, Assessing Legal Feasibility, Assessing Operational Feasibility, and Assessing schedule Feasibility [5]

2.1 TELOS Eligibility Factor

2.1.1 Technical Feasibility

Technical feasibility highlights the requirements of the system that are formulated from the technical point of view of the system being used. If the technology needed for system development is readily available, inexpensive, and has a simple utilization rate, the proposed system requirements can be declared technically feasible [7].

2.1.2 Economic Feasibility

The most dominant aspect of other feasibility aspects is economic feasibility. It is undeniable that the purpose of developing an information system in a company or organization is to achieve optimal profit. Therefore, aspects of winning and losing are the main considerations in system development. Economic feasibility is related to the return on investment.

2.1.3 Legal Feasibility

Legal explanation of whether the system to be developed violates the law when applied to the research subject. Example: How to create a legal information policy generated by an application program.

2.1.4 Operational Feasibility

The operability assessment is used to measure whether a system that will be developed later can operate well within an organization.

2.1.5 Schedule Elogibility

This schedule feasibility assessment is used to determine that the system development can be carried out within the specified time limit.

2.2 Assessing TELOS Eligibility Factor

2.2.1 Assessing Technical Feasibility

Sample questions to be asked by each evaluator must be entered in the TELOS Compliance Score Worksheet and the correct answers provided. For example, technical feasibility. If the new system uses a known stable technology, the rating will be 9.5 or 10. Or the technology is new or non-standard for the company and its users, contains initial vendor output, involves multiple vendors, or uses highly complex network systems. Therefore, one or a combination of "yes" answers will tend to score well below 10.0 (between 6.0 and 8). In this example, we have determined that the general system design alternative to be evaluated requires technology that is new and common in the industry and has proven feasible, so a rating of 9.0 is appropriate [8].

2.2.2 Assessing Economic Feasibility

You need to inquire whether it is economically feasible to use sufficient resources to support the development of your systems project to completion. Without top management support, other factors are good, but it is very difficult to complete the system if possible. If top management continues to support the system but indicates that no funds have been allocated to complete it, the economic feasibility rating ranges from 5.0 to 8.0. If the required funds are approved, the score will be in the range of 9.0 to 10.0.[9]

2.2.3 Assessing Legal Eligibility

In some cases, the legality of the system project may not be a problem. The legality check should be evaluated at 10.0. If the designer is unable to adequately design and control the resulting confusion, a group of stakeholders (founders) and others will also file claims against the systems expert who designed the company or system. In this example, the following is a common system design alternative:

It does not contain sensitive data that needs to be compromised. Therefore, they plan to design and install a special set of equipment to protect the system from malfunctions and other abuses. Therefore, there is a rating of 9.5 for legal compliance.

2.2.4 Assessing Operational Feasibility

Locally or group-based systems are generally easier to use than company-wide systems because they are smaller, simpler, and require less training. Some users are new users and are not trained in their job. The key to assessing usability is the availability of trained users to help eliminate some of the potential negative effects of this unique and unproven system. The alternative design system evaluated in the sample worksheet is a group-based system that some users are not familiar with. Therefore, in the operational feasibility study only 7.0 [10]

2.2.5 Assess Schedule Eligibility

Work schedules and dates are made in the form of a gantcart. Schedule is approximate and may be wrong. The size of the estimation error is an important consideration. If the system is finished after the date [11]

3. RESULTS AND ANALYSIS

3.1 Feasibility study

After analyzing the development of the information system, it is necessary to analyze the feasibility of the information system, namely the proposal or development of siabest. To ensure that the proposal can be forwarded or not into an information system, a feasibility analysis is carried out from several aspects of feasibility,of them

1. Technical Feasibility
2. Economic Feasibility
3. Legal Eligibility
4. Operational Feasibility
5. Eligibility schedule

In the final stage, the TELOS Feasibility Factor assessment is carried out. The evaluators consist of: project manager or person in charge, system professional or information system developer, and at least one user representative.

3.1.1 Technical Feasibility

The feasibility of this technology highlights the need for a system composed of the technology used at the Bhakti Semesta Salatiga Polytechnic for applications in academic information systems. Bhakti Semesta Polytechnic Salatiga requires good technical infrastructure. This academic information system is a web-based system that is used to support student data, lecturers, academic process staff, and all information for academics who need a PC and good computer network infrastructure. All of this helps advance the academic process, academic reports, and other academic information from students, lecturers, and staff of the Bhakti Semesta Salatiga Polytechnic. The table 1 shows the hardware requirements at the Bhakti Semesta Polytechnic.

Table 1 the hardware requirements at the Bhakti Semesta Polytechnic

No.	Hardware	
1	Processor Type	Processor type intel ® Core i5
2	Memory	Memory 16Gb DDR3 (2DIMMs)
3	Hard drive type	HD type 1TB
4	Network	Network Gigabit Network
5	Optical drive	Optical drive Type DVD RW

Software requirements are shown in table 2

Table 2 the Software requirements at the Bhakti Semesta Polytechnic

No.	Software	
1	Operating System	Windows 10
2	System Web Development	Php, HTML
3	Design Web sistem	Photoshop, Visualcode
4	System Planning	Microsoft visio pro 2007

5	Web Server	Xampp
6	Web Browser	Internet explorer, mozila firefox
7	Database Server	My SQL Server

Network devices are shown in table 3

Table 3 the Software requirements at the Bhakti Semesta Polytechnic

No.	Network Device Name	Utility
1	Switch	Windows 10
2	UTP Cable	Php, HTML
3	45 RJ Connector	Photoshop, Visualcode

Database system are shown in table 4

Table 4 Database system at the Bhakti Semesta Polytechnic

No.	System Database	Information
1	Microsoft Excel	Microsoft excel used in storing active student data and teaching lecturer data
2	Microsoft Access	Used for slumni data storage as well as other academic data storage

The database is not integrated, and the input still be manual. These databases are highly vulnerable due to potential input errors, file loss, file corruption due to viruses, and data loss due to hardware problems. This is because the Polibest database does not yet have a data server that keeps a secure copy of its data. Also, when accessing data, use manual search instead of system search.

It is expected to develop an academic information system in which all data is integrated into all academic data. Your data is, of course, safe because you have a copy of it on your data server and you don't have to worry about data loss or corruption. It is also very accessible, as users simply enter data entry on all running systems. Because the data of the Bhakti Semesta Polytechnic does not yet have a good database, data security problems can be in the form of data loss or falling to irresponsible parties. In this system, each user has their own password, which makes these things less likely to happen.

3.1.2 Economic Feasibility

It takes a lot of money to build a new system. Building a new system as a form of investment requires resources and funding. Cost-benefit analysis is used to analyze profitability. The purpose of the cost-benefit analysis is to give the user an idea of whether the benefits of the new system outweigh the costs. Several quantitative methods are used in the cost-benefit analysis to find the feasibility criteria of a project. To carry out a cost and benefit analysis, two components are needed, namely a cost component and a benefit component.

3.1.2.1 Cost Component

The costs associated with the creation of this system can be classified into 3 main categories, namely:

1. The cost of procurement (procurement cost), namely the cost of purchasing hardware, this cost is used at the beginning of making the system.
2. Development costs, namely the cost of making system software which includes consulting fees, system analysis stage, system design stage and system implementation stage.
3. Operating costs and maintenance costs, namely the costs incurred to run the system, namely overhead costs, these maintenance costs include hardware and software maintenance.

3.1.2.2 Benefit Component

The benefits derived from information systems are classified as follows:

1. Tangible benefits are profits in the form of savings or improvements in administration that can be measured in the form of units of money value. Tangible advantages include:
    a. Reduction of operating costs

b. Reduction of overtime costs
c. Reduction in equipment costs

2. Intangible benefits are profits that are difficult or impossible to measure in terms of money. These advantages include:
   a. System reliability and availability
   b. Increasing the effectiveness of employees and academics
   c. Increased satisfaction of students, lecturers, and employees

The methods for conducting cost and benefit analysis are:

1. Payback Period Method
   This method is a quantitative test that is used to calculate the period of time required to pay back the investment portfolio in the implementation of activities that have been issued. Assessment of eligibility for payback
   a. Eligible if the payback period is less than the life of the investment
   b. Not feasible if the payback period is greater than the life of the investment.

   PP Calculation:
   Investment value : Rp. 48,000,000;
   Process Th 1: Rp. 92,500,000;
   PP = 48,000,000/92,500,000
   PP = 0.51 Years
   PP = approximately 6 months

   From the calculation above, we can see that the payback period can be achieved in year 0, or in year 1 if the application is used directly for academic purposes. The breakdown is 0.51. We can conclude that the investment in the design of this system will be amortized in about 6-7 months. That is, the benefits of the system will be felt after 6 months. This means that we can develop this system because the payback period is longer than the break even point or shorter than the investment period.

2. Net Present Value Method
   The present value method is a method that considers the time value of money. Discounted interest rates affect income or cash flow. The net present value (NPV) can be calculated as the difference between the project value at the beginning of the year minus the annual income collected in the first year at the discounted interest rate.

   NPV Criteria:
   NPV > 0 Feasible
   NPV = 0 Indifferent
   NPV < 0 Unfesible

$$Npv = \underline{-48.000.000} + \frac{390.600.000}{(1+3.5\%)^1} + \frac{767.232.000}{(1+3.5\%)^2}$$

$$= 1.045.761.051$$

   In the above calculation the time value of the money invested (3.5% based on the interest rate from www.bi.go.id on 10 February 2022). in the 2nd year investment or NPV is Rp. 1,045,761,051 ; Because NPV > 0 means the investment is profitable and acceptable, or means the system development is declared feasible.

   After receiving the results of the cost-benefit analysis and full commitment from top management, the funds were not ready, but top management gave it a score of 7.8 because it could convince the team of the availability of funds.

3.1.3 Legal Eligibility

Legal eligibility is eligibility related to legality or legal force. Means that the proposed information system must not violate applicable laws, both laws set by the government and laws established based on

organizational regulations. This project Legal Because the system being designed does not include approved sensitive data, system designers working on systems projects are very aware of controls. So they plan to design and include special controls to prevent the system from malfunctioning and so on. Consequently, the score is given 9.3.

3.1.4 Operational Feasibility

Operational feasibility is assessed using the PIECES framework developed by James Wetherbe to measure whether the system to be developed can be operated properly or not within the organization. The PIECES framework includes: Performance (performance) to determine whether the system provides sufficient throughput and response time. Information (information) to determine whether the system provides quality information for end users and managers. Economy (economy) to find out whether the system offers an adequate level and capacity of service to reduce costs and increase profits. Control (control) to determine whether the system offers controls (controls) to overcome fraud and to ensure the accuracy and security of data. Efficiency (efficiency) to find out whether the system is using the maximum available resources including people, form flow time, minimizing process delays. Services (services) to find out whether the system provides the desired and reliable service to anyone who wants it, and whether the system is flexible and extensible. Assessing Operational Feasibility because the system is new and many users, and is not known by some users. And some of the users are new students or new employees who have not been trained for the work and process of the system. The value becomes 7.3

3.1.5 Eligibility schedule

Feasibility schedule is used to determine that system development can be carried out within a certain time limit. System development should be completed in up to ±16 weeks. The estimation of the system development system is planned as follows: In the academic information system development project, this is the first stage of system analysis, and is carried out in the second stage of the system trading system. The analysis after the system analysis level is carried out can obtain three stages of system requirements analysis obtained after the discrete analysis system. The four steps at this stage require a system and data analysis level from the fifth level. From the user interface design, this phase requires the system analysis stage data, and the sixth level data design stage at this stage is required for feasibility investigation and user interface design, and the 7-step process design stage at this stage is in progress. This process is established, and the 8th stage of preparing the facility site to the installation site is the feasibility and user interface form is the hardware system after the installation site preparation level and the 9-stage software stage after the level. software. The 10 steps of the current testing program occur after the design process and the hardware process. Software installation, personal stage 11 This stage of the personal selection is carried out after the design of the student eligibility platform and user interface. In the personality training stage at this time, after the Peonel selection stage, the system system in the system testing stage this system is the result of the program test results and system testing, 15 steps, that is, the documentation phase, or the final Stage after receiving the results, we carry out the fourth system conversion of the fourth system conversion.

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16
survey																
create team																
equipment procurement																
data collection																
coding																
revision																
monitoring																
closing																

Project system development. Assessing Schedule Eligibility, Since development is measured in hours, days, weeks and months, the estimation error required for design and implementation is small. Then the value is 8.9.

3.2 TELOS Eligibility Factor Final Score

The sum of all eligibility factors = 42.2. Total score = 42.2/5 = 8.4, meaning that the information system development design that is evaluated is DECENT(B), with low system development risk.

4. CONCLUSION

Conclusion Based on the objectives of the Feasibility Study analysis of web-based academic information systems at the Bhakti Semesta Polytechnic, it can be concluded:

1. The results of the analysis of the TELOS feasibility study for a web-based academic information system at the Bhakti Semesta Polytechnic Salatiga, the system development is feasible.

Based on the conclusions above, there are suggestions, namely as follows:

1. Analysis of the system feasibility study carried out for further analysis is not only the analysis of the TELOS feasibility study but also the PDM (strategic factor) and MURRE (design factor) analysis.
2. The web-based Academic Information System should be continued at the implementation stage, so that it can facilitate the Bhakti Semesta Salatiga Polytechnic as well as academic admins, lecturers and students of the Salatiga Bhakti Semesta Polytechnic.

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