Implementation of ERP system functionalities for data acquisition based on API at the study program of Universities

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Abstract. ERP was built to simplify existing business processes so that business processes became more effective and efficient. The term "business" also refers to individuals or organizations organized efforts and activities to produce added value, unexceptionally in education. Higher education institutions have an education system that must be accredited as an assessment of the institution's performance. Based on the accreditation assessment criteria carried out by BAN-PT, there are at least nine assessment criteria in which almost all universities have their data in their system. This paper discusses collecting the right data to acquire data from various systems within the university into an integrated accreditation system. The data transactions between various university information systems and accreditation systems implementing the Application Programming Interface (API) to make the data acquisition process more effective. The results showed an increase in accreditation data collection speed, and assessors could see quickly and clearly through the data collected in the accreditation system.

1. Introduction
In this digital age, surely a university has various management systems that aim to provide excellent service to stakeholders. In general, the services provided by universities are academic-related. Universities provide this service to stakeholders who need this academic service. Stakeholders in universities are none other than students, the government, and other academic communities [1]. A university must own the system to manage its organization, namely academic management system, human resource management system, planning, financial management system, and other resources management system [2].

Given the information system owned by a college for the benefit of business processes, this system must have a high sustainability level. Sustainability is important in a business process [3]. Through an accreditation system that implements Enterprise Resource Planning (ERP), these systems will provide more benefits and obtain a high sustainability level. Through data sharing from various subsystems, an information system will provide more benefits [4]. The level of sustainability and benefits of a system is filtering hand in hand and supporting each other [5] [6].

The accreditation system of study programs, namely the assessment system of study programs based on various aspects of the study program's performance, is reviewed from the academic aspects, management of resources, and other supporting aspects [7]. The accreditation assessment of the study program itself is an assessor that reflects the performance and output that the study program has resulted. According to Stura (2009), there is a strong correlation between student ability and accreditation results themselves [8]. Through this, universities as education providers must provide an accreditation system that has valid output data. Therefore, the author seeks to provide solutions to universities in the accreditation process using completely valid data so that the data displayed to the study program's assessor is completely complete.
The use of the ERP concept in this system's preparation is because the author pursues the effectiveness and efficiency of data inputting and prevents data redundant. Shatat (2012) described that ERP usage could prevent data redundant and reduce operations [9]. ERP also makes big data better because each process will be honed continuously and will be shaved maturity level so that with better big data, the whole process of the information system that becomes the backend will increase [10]. Therefore, the author emphasizes using this ERP to be improved in terms of building business processes from each system to be better and have more added value.

2. Methods
The efforts made by the author in creating an accreditation system is to implement the concept of Enterprise Resource Planning (ERP). Through ERP management, it is expected that the main system is formed from another subsystem. It is intended to operate efficiently and efficiently data before starting the process of creating writers mapping existing data resources in universities to the accreditation information system, as seen in Figure 1. 1. The selection of information systems included in this accreditation information system adjusts the accreditation form of Indonesia's latest study programs. Currently, the accreditation form consists of 9 standards described in Permenristekdikti no. 32 of 2016, namely: 1) Vision, Mission, Strategic Objectives, 2) Governance, Governance, and Cooperation, 3) Students, 4) Human Resources, 5) Finance, Facilities, and Infrastructure, 6) Education, 7) Research, 8) Community Service, 9) External and Tridharma Achievements. The result of system analysis that researchers have created in order to map the needs of data on existing systems as well as designed can be seen in Figure 1:

![Figure 1.1 Mapping of Information Systems to Accreditation Information System](image-url)
After all information systems are mapping, the author performs various activities merging several information systems into the accreditation information system through Restful Web Service as the backend of this accreditation system. The methods applied in implementing ERP concepts in the accreditation system of study programs are described Figure 2.

![Flowchart Accreditation System](image)

**Figure 2.** Flowchart Accreditation System

The flowchart above is implemented sequentially from mapping data and making Application Programming Interface (API). The author also chooses whether the data used in the API is localized to the internal accreditation database system or only displays from the API data only. Afterward, the author carried out the development process using the System Development Life Cycle prototype model because with this prototype model client, in this case, the study program, actively participated in the development of this system. Afterward, the author analyzes in terms of the efficiency and effectiveness of the accreditation information system that has been built.
3. Results and Discussion

3.1. Results

The result of this research is the accreditation information system was compiled using the concept of Enterprise Resource Planning. The resulting information system uses a process that is quite simple and simple. Users only need to retrieve data from the API and verify the data that has been obtained; if there is a change, the user can change the data as needed then the data can be verified. Furthermore, validators can view the data fields and perform validations and assessments done online. The value can be seen directly by the operator of the accreditation system of the study program. The accreditation information system developed with the ERP concept can be seen in the activity diagram in Figure 3.3.

![Accreditation System Diagram of Study Program](image-url)
3.2. Discussion
After the development of the Accreditation Information System of the study program, the authors tried to create a questionnaire containing the study program manager's response on the effectiveness and efficiency of this system. The author used a Likert scale with a range of 1 – 5, 1 to strongly disagree, 5 to express strongly agree. The author provides 13 questions, seven questions to look for efficiency, six other questions to look for the level of effectiveness. The author tried to socialize with 10 study program managers and manually compare the results with the creation of LKPS and LEDs. The result of data tabulation from the feedback of study program managers on the accreditation information system is shown in Table 1.

| Question | Efficiency | Effectiveness |
|----------|------------|---------------|
|          | 1 2 3 4 5 6 7 8 9 10 11 12 13 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 1        | 4 5 5 3 3 5 4 3 5 3 4 3 3 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 2        | 4 4 5 4 4 4 4 4 5 5 5 4 4 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 3        | 4 2 4 5 4 5 5 5 2 5 3 4 3 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 4        | 4 4 3 3 3 3 4 3 3 3 4 3 3 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 5        | 5 3 3 3 5 3 5 5 2 3 3 4 3 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 6        | 3 3 3 4 4 5 2 4 5 4 5 3 4 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 7        | 4 2 3 4 4 4 4 4 5 5 3 5 4 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 8        | 3 3 5 3 3 4 5 3 5 3 4 4 4 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 9        | 3 4 4 4 4 5 5 3 4 2 4 4 3 4 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| 10       | 4 3 4 4 4 4 5 4 4 5 4 3 3 4 | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
| Average  | 3.8 3.4 3.7 4.1 4.1 4.3 3.8 4.3 3.7 3.5 |

The survey results above show that the study program's accreditation system can be said to have good efficiency and effectiveness, judging from the average survey that shows a value above the middle value of the Likert scale.

This study program's accreditation system also has a very fast data management travel time compared to manual data collection. If reviewed based on the time of collection, the accreditation information system will present data automatically from the data in the backend information system and then presented in the form of tables and can be printed in the form of LKPS and LEDs. Study programs no longer need to collect data manually with the possibility of data differences or high data redundancy data.

4. Conclusion
Accreditation information system created using the concept of Enterprise Resource Planning and built with a LiveCycle prototyping system development model can accelerate the process of data collection that causes this system to have good effectiveness and efficiency. Implementing the ERP concept in the development of this system makes big data from information systems in universities more increased. The use of data from other supporting information systems also provides more added value to each subsystem information. Data reduction can be suppressed due to repeated resource usage.

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