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Optimizing New Student Admissions: Overcoming Challenges with Business Intelligence to Achieve Efficiency and Quality of Decision Making

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ABSTRACT

This study aims to analyze the role of Business Intelligence (BI) in improving the efficiency and quality of decisions in the New Student Admission (PMB) process. The objectives of the research include an in-depth understanding of the operational challenges faced by educational institutions, as well as efforts to utilize BI to optimize PMB data management. The research method involves the implementation of BI in the process of collecting and analyzing PMB data. Predictive analytics are used to predict the academic performance of prospective students, allowing for smarter selection. The results of the study show that BI can improve operational efficiency by accelerating the selection process and providing a more solid basis for decision-making. This study underscores the importance of implementing BI in improving the quality of decision-making at the PMB level. The implementation of this technology not only helps the institution improve operational efficiency, but also provides a competitive advantage through a better understanding of the profile of prospective students.

Keywords *: Business Intelligence, New Student Admissions, Efficiency, Decision Quality, Predictive Analysis.*

1. INTRODUCTION

In the context of higher education, the New Student Admission (PMB) process is a crucial part that requires effective and efficient data management. With the growth in the number of prospective students and the complexity of the information involved, educational institutions face challenges in ensuring accurate and efficient selection. The background of this problem arises along with the increasing competition between universities to attract and accept the best prospective students. An inefficient PMB process can result in delays in decisionmaking, the potential loss of potential prospective students, and even a negative impact on the institution's reputation. Related issues involve the complexity of data management, in-depth analysis for better selection, and the need to optimize the efficiency of the PMB process.

In this context, the application of Business Intelligence (BI) emerged as a potential solution to improve the quality of decisions through sophisticated data analysis. Several previous studies have touched on aspects related to the use of BI in the context of education and data management.

Business Intelligence (BI) is an important element in intellectual capital management and decision-making processes to help leaders and managers improve university performance. Ika Kurniawati uses business intelligence to determine the promotion strategy for new students, the results are obtained a promotion strategy for prospective students in accordance with the study program of interest. Mustafid conducts research using a business intelligence system to support the management of academic business programs in a more competitive direction through a system of planning, measuring, and improving performance based on intellectual capital. The intellectual capital of universities is described based on the resources of the university owned, so that the management of intellectual capital becomes more optimal. Intellectual capital includes structural and human capital. Giat Karyono, Ema Utami, in a research on business intelligence with the title Development of Data Warehousing and Online Analytical Processing (OLAP) for Information Discovery and Data Analysis (Case Study: Information System for New Student Admissions STMIK UNIVERSITAS TEKNOLOGI PURWOKERTO). It is revealed that competition is inevitable along with the growth of institutions, and to anticipate this, educational institutions/institutions need to improve themselves in terms of infrastructure, education system, data processing system, etc. The result of using this approach is to provide a solution to the need for educational institutions/institutions to search for academic information, assist with reporting, and assist in decision-making more effectively and efficiently than just using intuition. [1] [2] [1] [3]

Stephanie Pamela et al. analyzed and designed real time business intelligence using the Change Data Capture (CDC) method to assist in strategic decision-making that has an impact on improving the quality of the institution and assisting in the preparation of accreditation boring. The process of creating a data warehouse includes designing a data warehouse, retrieving academic data from data sources, extraction, transforming, loading (ETL) processes, making cubes, and making reports. The ETL process is carried out using the Change Data Capture (CDC) approach so that data changes can be moved in real time. Nur Ardista et al designed a data warehouse for the preparation of reports and analysis on outpatient visit data at Airlangga University hospital. Online Analytical Processing (OLAP)-based data warehouse can be applied to handle the problem of the RSUA medical record section in making reports. The data warehouse is built through seven stages, namely analysis, design, ETL (Extraction, Transformation, and Loading) process, OLAP implementation, trials, exploration for report and analysis results, and evaluation. Devriady Pratama conducted research with the implementation of data warehouse and dashboard applications as well as OLAP processes to report sales status. The substance methodology for designing a data warehouse will follow Ralph Kimball's process for the retail industry. The result is a data warehouse on sales complete with a web-based reporting application from the OLAP process and a dashboard application that displays the sales group's sales progress over time in a graph view. Kristiawan Nugroho uses time series to make predictions about something based on periodic data. [4] [5] [6]

Periodic data is data collected from time to time to describe the development of an activity. Although several studies have been conducted, there are still knowledge gaps related to the implementation of BI specifically in the context of PMB. Therefore, this study aims to fill this gap by analyzing the role of BI in improving the efficiency and quality of decisions at the PMB stage. By understanding the conceptual framework and previous findings, this study hopes to make a significant contribution to the literature and practice of higher education management. [7]

2. METHODOLOGY

The method used in this study refers to the stages in the System Development Life Cycle (SDLC). SDLC is a general methodology used to develop information systems. The method used is as shown in figure 1. [8]

Figure 1. Research Methods

These stages are in line with the stages carried out in the business intelligence process, namely problem identification, location identification, data change, data retrieval, storage and installation of applications. The research includes problem identification, research objectives, system needs analysis, system design, system implementation, results analysis, as well as conclusions and suggestions. At the problem identification stage, it is a stage in the initial process of data warehouse development, namely identifying problems that arise in the admission of new students. Among them are the increasing data error and the lack of use of this data by the university management as a necessity in supporting strategic policies. [9]

The purpose of the research is to outline the objectives to be achieved for the system built related to data analysis in the new student registration section. System needs analysis is a stage in analyzing system needs both in hardware and software. This needs analysis includes web-based applications used, as well as hardware needs to support the system. As well as analyzing the needs for business processes that can support the university's promotion needs. System design is the stage of designing the information system needed in accordance with the needs of the intelligence business process. Design includes the design of network architecture, and the design of the information system used. The implementation of the system is a stage of data processing in the information system related to new student admission data. Result analysis is an analysis activity on the data displayed by the system and analyzing the results of needs in university promotion from the data graph presented. Conclusions and suggestions are stages in drawing conclusions from the implemented system and providing suggestions for improving the system to be better.

3. RESULTS AND DISCUSSION

In this section, it is explained the results of research and at the same time is given the comprehensive discussion. Results can be presented in figures, graphs, tables and others that make the reader understand easily. The discussion can be made in several sub-sections.

3.1 Analyze ongoing business processes

The analysis of the current system business process is used to determine the needs of the system and the problems that occur. Based on the results of the research, several procedures are currently running for new student admissions.

- Prospective students register online and offline.
- Then students get an exam card.
- Students carry out exams.

In this process, data on prospective students from year to year is only used as transactional data. The leaders only accept the number of students who register, while the new student admission data, if processed, has a very important information need for university promotion needs.

3.2 Datawarehouse logic architecture

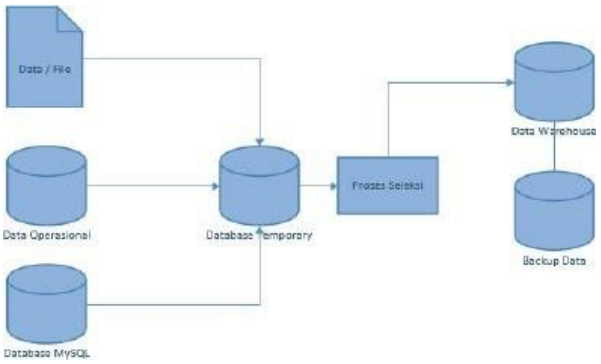

Figure 2. PMB Data Logic Architecture

Figure 2 shows the logic architecture of the new student admission data needed. The data consists of several source data derived from several files stored in the transaction process. From the data set, a selection is then carried out to select the appropriate data to be entered into the new student admission data warehouse.

3.3 Datawarehouse physical architecture

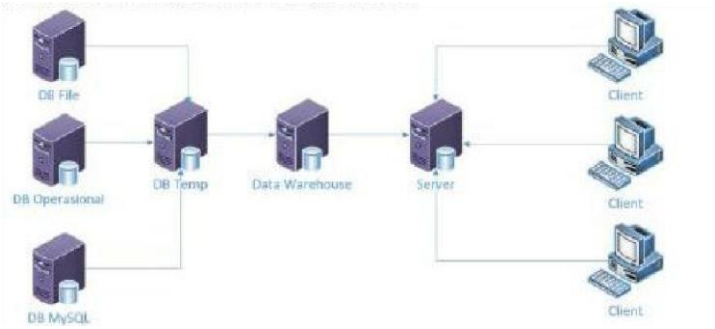

Figure 3. Physical Architecture of PMB Data

Figure 3 shows the physical architecture of the new student admission datawarehouse. This physical architecture includes source data components from the finance department, PMB, and operational data for new student admissions. Temporary databases are used to accommodate data from source data and are used as operational data shelters. Datawarehouse is a place where data has been selected and sorted to be used as a report to the university that will use the system.

3.4 Business process selection

After the system design is formed, an analysis of the business process is carried out which will be used as a report for the needs of the university. The business processes that are used as report material for the university on university promotion are:

- Analyze the number of new student admissions.
- Analyze the chosen study program.
- Analysis of the distribution of student areas from year to year.
- Student analysis based on the selected faculty.

At this stage, it is the result of the implementation of new student admission data analysis which is displayed in the form of an information system. The information system displayed includes the system login display, the main dashboard page, and the new student admission information page grouped by the student's home city, the student's home province, the majors of interest, and the faculties that are of interest to new students. The following are the results of the implementation of data analysis using the intelligence business.

1) System Design

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In the results of the system implementation, a web-based information system is used consisting of the login page, the main display of the system, and new student admission data information.

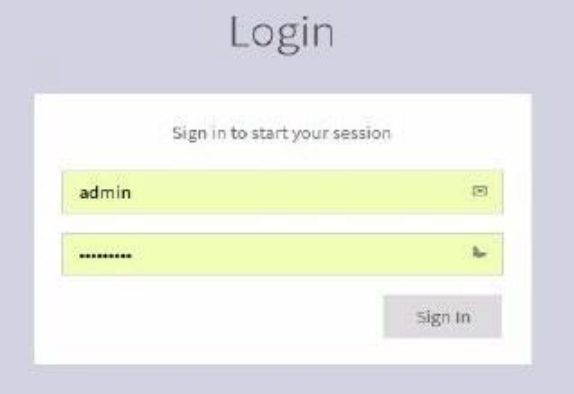

Figure 4. System Login Page

Figure 4 shows the display of the system login page that was built, consisting of username and password.

Figure 5. Main View of Dashboard

Figure 5 shows the main display of the information system dashboard which includes a graph of data on the most cities of new students, the most provinces, favorite majors of interest, and favorite faculties of interest.

2) Results of data analysis of new student admissions for student cities

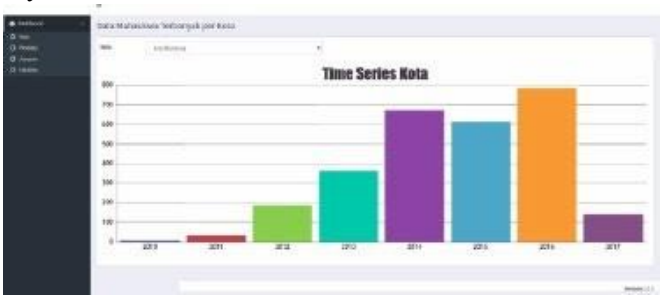

Figure 6. New Student City Results

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Figure 6 shows the results of data analysis based on the time of new student admission to the student's home city. From these results, it can be seen that the origin of the city that dominates universities is registering from Banyumas district.

3) Results of Analysis of New Student Admission Data on the Province of Student Origin

Figure 7. New Student Provincial Results

Figure 7 shows the results of data analysis based on the time of new student admission to the student's home province. From these results, it can be seen that the origin of the province that dominates universities is registering from the province of Central Java.

4) Results of data analysis of new student admissions for study programs

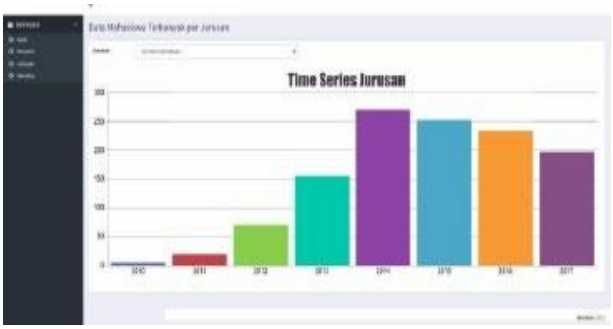

Figure 8. Results of Elective Study Programs

Figure 8 shows the results of data analysis based on the time of new student admission to the student's chosen study program. From these results, it can be seen that the study programs that are most in demand by students are the Informatics Engineering, Information Systems, Management, Communication Science, and Visual Communication Design study programs.

5) Results of data analysis of new student admissions to faculties

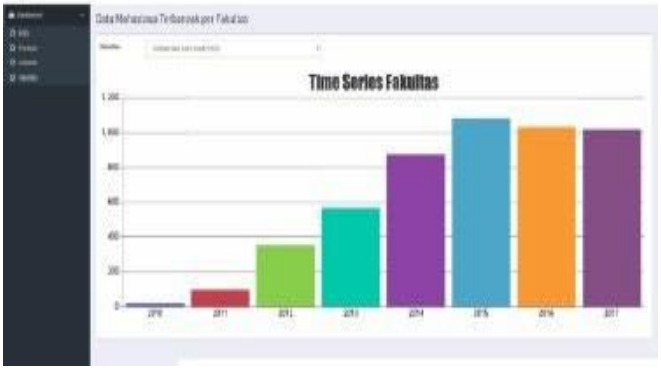

Figure 9. Selected Faculty Results

Figure 9 shows the results of data analysis based on the time of new student admission to the faculty of the student's choice. From these results, it can be seen that the faculty that is most in demand by students is the faculty of Engineering, economics, and design.

4. CONCLUSION AND RECOMMENDATION

After analyzing the data on new student admissions with the intelligence business process, conclusions were obtained, namely:

1. With the existence of an information system for analyzing new student admission data, it is hoped that it can help the university to be able to increase university promotion.
2. Making it easier for universities to spread university promotions based on regions.
3. The university can see which study programs are of interest to prospective students.
4. The potential of the faculty and engineering study program is still a favorite choice for every prospective student.

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