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APPLICATION OF BUSINESS INTELLIGENCE IN THE ANALYSIS AND VISUALIZATION OF XYZ UNIVERSITY ALUMNI DATA USING THE TABLEAU PLATFORM

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Abstract: Alumni data is one of the most important data that can be used as a reference for the quality of education at a university. XYZ University maintains alumni data on a regular basis, but the alumni data continues to grow each semester. The Alumni Data Report submission remains suboptimal and does not contain information to help universities assess the outstanding qualities of individual alumni. The purpose of the research conducted here is to analyze the application of business intelligence systems in the management of XYZ University's alumni data within the framework of XYZ University's quality assessment and management. The focus of this research is on the analysis of functional and informational requirements. The analysis process for this study is based on the Business Intelligence Roadmap methodology, which includes the inference or business justification, planning, and analysis phases. The study analyzed plans to implement a business intelligence system to manage alumni data in a way that meets the information needs of decision makers. Dashboard menjelaskannya secara visual, baik dari segi navigasi peta maupun diagram yang mudah dibaca. Dapat dilihat sebaran alumni di seluruh Indonesia yang ditandai dengan warna yang diarsir yaitu tersebar di wilayah Republik Indonesia Bagian Tengah dan Barat. Dari segi gender, data alumni menyajikan bahwa tingkat kelulusan setiap tahunnya sebagian besar berjenis kelamin laki-laki dan data tertinggi pada tahun 2017 yaitu 2.960 alumni.

Keywords: alumni data, business intelligence, tableau, visualization

Abstrak : Data alumni merupakan salah satu data penting yang dapat dijadikan acuan mutu pendidikan pada suatu perguruan tinggi. Universitas XYZ memelihara data alumni secara rutin, namun data alumni terus bertambah setiap semesternya. Penyampaian Laporan Data Alumni masih kurang optimal dan tidak memuat informasi untuk membantu universitas menilai kualitas luar biasa dari individu alumni. Tujuan penelitian yang dilakukan disini adalah untuk menganalisis penerapan sistem intelijen bisnis dalam pengelolaan data alumni Universitas XYZ dalam rangka penilaian dan pengelolaan mutu Universitas XYZ. Fokus penelitian ini adalah pada analisis kebutuhan fungsional dan informasional. Proses analisis penelitian ini didasarkan pada metodologi Business Intelligence Roadmap yang meliputi tahap inferensi atau pembenaran bisnis, perencanaan, dan analisis. Studi ini menganalisis rencana penerapan sistem intelijen bisnis untuk mengelola data alumni sedemikian rupa sehingga memenuhi kebutuhan informasi para pengambil keputusan. Dashboard menjelaskannya secara visual, baik dari bidang navigasi peta maupun diagram yang mudah dibaca. Dapat dilihat sebaran alumni di seluruh Indonesia yang ditandai dengan warna yang diarsir yaitu tersebar di wilayah Republik Indonesia Bagian Tengah dan Barat. Dari segi gender, data alumni menyajikan bahwa tingkat kelulusan setiap tahunnya sebagian besar berjenis kelamin laki-laki dan data tertinggi pada tahun 2017 yaitu 2.960 alumni.

Kata Kunci: business intelligence, data alumni, tableau, visualisasi

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INTRODUCION

The success of former students in professional life can be a measuring point or basis for measuring the quality of learning at the university in the future. decision support system can select the best candidate based on the information processed by the decision support system [1]. The Quantitative Research Method used can be describe the results of research into assessments from the community [2]. Reporting alumni data is very important and needed to support the accreditation process for each strata study program. In strata programs, the alumni data management process occurs routinely. Alumni data is collected via a Google form link in the Alumni Association group on WhatsApp. Previous research using Tableau software is as follows:
By using Tableau software, residents can now monitor growth rates more easily and accurately. The results of processing numerical data collected from January 2022 to October 2022 show that there was an increase in the number of babies born in June and a decrease in the number of people who died in August. Apart from that, the output results in the form of graphics also make it easier for residents to understand the development of population growth in their area [3]. By using visualization tools like Tableau, retail companies can turn sales data into easy to understand graphs, charts, maps, or tables [4]. Visualization data analysis of student graduation predictions can be visualized using the Tableau platform. The data used is based on data obtained from www.kaggle.com in excel format [5]. Tableau software allows stakeholders to understand analysis results visually and interactively [6]. Data analysis methods consist of data cleansing, data transformation, and map visualization with Folium, as well as additional map visualization using Google Earth Pro software and ranking visualization with Tableau software [7].

However, alumni information grows in each cycle and not all alumni are part of the alumni group, so creating alumni reports requires a long process. Alumni reporting is less than optimal because it is unable to provide alumni information such as waiting times, jobs, employment and competencies that can help study programs assess the superior quality of alumni. Even establishing an alumni association for a course cannot help provide the information needed for that course. Based on the description above, an analysis of the application of the Business Intelligence System as an alumni information management system is needed which can present or provide information and data needed by undergraduate programs to take strategies and decisions as well as steps related to improving the quality of alumni.

Business Intelligence is a type of information system technology application that can make it easier to analyze a problem so that it can be used as a reference or basis for decision making [8]. Business Intelligence (BI) or Intelligence System is useful for changing performance process data, company data, and other data in an organization to support business decisions [9]. When a technological tool such as a Business System is implemented in an organization, it offers various advantages such as architecture, effective information, and management of each customer's data [10]. The Tableau platform can make your dashboard theme interactive and engaging [11]. Tableau is business

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intelligence software that is very easy to operate for data management which is often intended for creating reports, displaying or visualizing data, and analyzing data. The application is very easy and simple because it uses the drag and drop method. Tableau can integrate data sources such as databases, journals, internal big data, and cloud data into a single application for powerful analysis needs [12]. This article discusses the analysis and visualization of alumni data which has not been presented optimally, so that information technology is not used as a tool to transform information results based on the data obtained into a series of reports. Business Intelligence can be used to organize information about information. Using business intelligence tools to visualize alumni data based on year of occurrence using Tableau to visualize alumni data at a university or institution. Tableau is a tool for creating interactive visualizations that make information more meaningful and easier to read when analyzing data [13]. Business Intelligence is a tool for transforming data about a business or educational institution to analyze current or past phenomena and predict future events [14]. The core task of business intelligence is to read, obtain, and interpret critical information to identify trends and interests and make comparisons with industry competitors. In business applications, business intelligence is the subject-led phases of determining a company's industrial policies and effective business processes [15]. ETL is mandatory for data warehousing and plays a very important role in data warehousing operations. ETL also has three main methods used, namely: Extract (method for reading data sources) and Transform (modifying data obtained using the method). Extraction and conversion to form before saving to data warehouse and loading (to process data entry and entry to data warehouse) [16]. Dashboard is a display or visualization of data with representative results, a display or visualization obtained from real-time information will analyze various information needed by industrial companies, the most important things to achieve goals that can only be shown at a glance [17].

METHOD

Several methods were used in the data collection stage, namely interviews with alumni who are responsible for managing alumni data. Another method of collecting and searching for data is by making direct observations by paying attention or observing and exploring the limitations of managing each alumni data. The final next step in this process of collecting all the information is a literature review that supports and helps the definition process. The analysis process for implementing this Business Intelligence system uses the Business Intelligence Roadmap methodology, which takes the analysis stages through six phases: Rational, Design, Business Analysis, Planning, Construction, Implementation [18].

The steps used in this research are only justification, planning and business analysis steps. These steps are only implemented up to the third step, because current needs still lie in the definition of each problem, infrastructure requirements and adjustments to business processes, after that it is decided whether it is necessary to continue to the system development stage. The activities of the Business

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Intelligence Roadmap stages can be seen below :

Image 1. Flow map Research

1. Justification phase. In this phase, the focus of activities is evaluating business processes, defining and explaining problems and finding existing solutions.
2. In the planning stage, activities are focused on analysis of infrastructure needs and operational plans.
3. At the business analysis stage, the adequacy of data for business processes and data processed to the system for analysis.

RESULT AND DISCUSSION

Justification

The following are business process assessment skills that can be used to examine and analyze alumni information needs that can support the accreditation process at universities :

1. Student study period report.
2. Report on the number of graduations.
3. Cumulative Assessment Index report average amount.
4. Pass percentage report.
5. Report on the year of graduation for each class.
6. Report on the waiting period for alumni to find work and the average number of people who get work during the waiting period.
7. Report on the accuracy of each alumni's work with expertise in their field of science.
8. Local reports of working alumni.

Several problems arise when identifying data that might be considered the basis for implementing a Business Intelligence System :

1. Decision makers need accurate, precise, relevant and fast information about the condition of alumni quality. The information provided by the system should be used as a basis for decision making for those involved.
2. The system must be able to present and review the results of data analysis in such a way that it becomes information that can be easily understood.

Based on these aspects, a system is needed that can offer solutions in handling alumni information management that supports alumni quality. Each solution provided is an introduction to the Business Intelligence system. The advantage of implementing the Business Intelligence system is that it can increase analytical power in the processing and management of alumni data.

Plan

In this phase, the current state of the plant's current technological infra-structure is determined. Let's analyze two needs, namely non-technical needs and technical needs. The results of the analysis of non-technical requirements are more focused on the ETL meta data process. The ETL process is applied to

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create a business intelligence system dashboard [19]. ETL is able to integrate data from various sources, producing a single data set [20]. In the ETL process, alumni data goes through extraction, transformation and loading processes. The ETL result set is imported into the data warehouse by the middleware. When a request comes from a user, the system will perform a query and then provide the report the user needs. The ETL process of the system is shown in the screenshot image 2 :

Image 2**.** Business Intelligence System ETL Process for Alumni

The results of the technical needs analysis are shown in the table below :

Table 1. Technical Requirements Analysis

No	Requirement	Description
1	System or Server Provider	Business intelligence systems require large server capacity because the transactions are very large so a high quality server is needed.
2	Database	It is necessary to upgrade the SQL server in accordance with the needs of the business intelligence system which will soon be developed.
3	Operating System	Can help with Business Intelligence System software including LINUX, Mac OS and Windows.
4	Security System	Anyone who needs information about alumni data can access the system. However, the right to enter alumni information must be limited to ensure the authenticity of the information.

Stages of Business Analysis

In this phase, the collection of information related to the information that will be processed by the system takes place to obtain relevant and accurate information to help decision makers. Extraction of processed information to the system includes the following :

1. How many graduates have there been in the last 5 years?
2. What is the average Cumulative Assessment Index for graduates each semester?
3. What is the percentage of graduates with a Cumulative Assessment Index > 3.50 in each semester?
4. On average, how long in months do graduates have to wait for a job to get them each semester?
5. What percentage of alumni graduates are already working in their field?
6. What is the average study period for graduates in each period?
7. What proportion of graduates are on time?
8. What is the percentage of alumni satisfaction level data?

The scope of the system that will be represented is a prototype that is focused on the management process for each alumni graduation data and several filters have been created such as dashboards, alumni distribution maps and gender. After defining the questions above, a data package needs to be created to capture the data requirements and determine how the data should be displayed. Examples of information packages from the system represented can be seen in the table below :

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Table 2. Information Package Business Intelligence System Alumni

	Aspect				
Range	Time	Alumni	Study Program	Position	Company
	years	NIM	Study Program Code	Position Code	Company Code
	Semester	Name	Study Program Name	Position Name	Company name
		Entry Year			Year of Starting Work
		Year Out			
		IPK			

Image 3. Dashboard Data Alumni

In Image 3, it can be seen that the Dashboard explains it visually, both in terms of map navigation and easy-to-read diagrams.

Image 4. Data Distribution Map Alumni

In Image 4, it can be seen that the distribution of alumni throughout Indonesia can be shown, which is marked with a shaded color, namely that they are all spread across the Central and Western parts of the Republic of Indonesia.

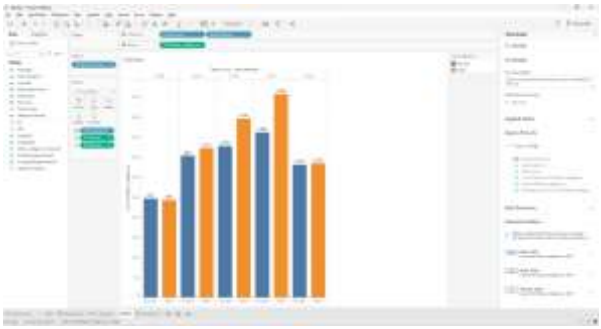

Image 5. Map Gender Data Alumni

In terms of gender, the alumni data presented in Image 5 shows that the graduation rate for each year is mostly men and the highest data was in 2017, namely 2,960 alumni.

CONCLUSION

From the results of the analysis of the implementation of the Business Intelligence System using the Business Intelligence Roadmap method, it can be concluded that the justification stage creates 8 types of information required by the system, the planning stage identifies non-technical requirements in the form of an ETL system process chart, and technical requirements are servers, databases, systems operations and security systems. An information package is created for the business analysis phase, which contains a presentation of the information required by the system. Based on this needs analysis, expectations can become the basis for management to decide whether to continue with the development and implementation phase of the Business Intelligence system.

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