Management Information System Identification and Projection of Staff Requirements at Manado State Polytechnic

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Keywords: Management Information System, Managers, Decision, Staff, Projections, Analysis.

Abstract: The current staffing of both teaching and educational staff at Manado State Polytechnic is still being analyzed manually without looking at the parameters that affect quality. This is because there are no future projections for the number of staff required based on the number of staff who will be active and retire each year. If we have computerized staffing tenure data, of course we can make projections annually for the number of staff we need. This is of course also compared with other parameters such as the number of students and available classrooms. Management Information Systems are computer-based systems to support leaders or managers in making analysis and making managerial decisions. In this study, researchers will create a Management Information System application that will accommodate all employee data, namely the work period and retirement period. It can also contain data on classrooms and class numbers of students per study program each year as parameters for analysis and decision making on projected staff needs. This system will be able to store and display staff statistical data with certain parameter criteria in the form of graphs or diagrams. So that the leadership of Manado State Polytechnic can easily display and analyze the needs of staff each year. Thus, this management information system is expected to be able to accommodate employment data in terms of tenure and can also help the leadership to propose the number of staff needs per year in detail.

1 INTRODUCTION

The distribution of teaching staff and teaching staff at Manado State Polytechnic is still not balanced and efficient. This is due to the large number of staff who have the same competence and very few staff who have the competence required by the work unit. The main cause of this problem is the absence of a system that can identify and project staff requirements according to the needs of the work unit. Therefore, an application that can store information on tenure and staff competency is needed. The Management Information System is a computer-based system that can assist leaders and decision makers in solving managerial problems. This information system application is urgently needed at Manado State Polytechnic to store data on staff tenure and their competencies. With this information system, the leadership of the institution can analyze staff requirements based on criteria and other parameters such as the number of students and classrooms. So that the annual projections for staff requirements can produce efficient results. This application will help the leadership to display the number of active staff

and who will retire each year. With this management information system can store and display the results of the analysis of employee needs accurately. So that the projected staff needs will be obtained to be proposed to the central government. It is hoped that this application can help a balanced and efficient distribution in competent work in each work unit.

2 BASIC THEORY

The concept of Information Management has been defined as the ability of an organization to create, maintain, retrieve information at the right time, in the right place, and in the right person, at low cost, to be used as the best medium and used in decision making. In short, therefore, the key content involved in information management is managing information in an organization using modern information technology. The concept of Information Systems is a system for receiving data / information as raw material and through one or more transmutation processes, producing information as a product. It consists of the following functional elements relating

to the organization and the environment in the form of physical records of data, processing - transformation according to the "special" needs of the organization, transmissions - flows that occur in information systems, storage - presupposing some expected future use, recovery - searching for recorded data, presentations - reporting, communication, and decision-making - inclusions that are controversial, except to the extent that the information system is involved in making decisions concerning itself.

2.1 OLAP (Online Analytical Processing)

According to Turban, Sharda, Delen, and King (2011: 77) the main operational structure in OLAP is based on a concept called a cube (cube). The cubes (cubes) in OLAP are multidimensional (actual or virtual) data structures that allow fast data analysis. It can also be defined as the ability to efficiently manipulate and analyze data from multiple perspectives. Arranging the data into cubes aims to overcome the limitations of laser-relevant data. Relational databases are not suitable for fast and close analysis of large amounts of data. Instead, they are better suited for manipulating records (adding, deleting, and updating data) that represent a series of transactions. Online Analytical Processing (OLAP), which is a database concept where data processing is used to analyze data. yet clear and complex so that no immediate solution can be used).

Such as sales and age trends. OLAP features:
1. Is read-only
2. Oriented in business subjects
3. Integrated data
4. Data is historical
5. Erratic data activity

2.2 The Several Differences between OLTP and OLAP

From the above understanding, there are several differences between OLTP and OLAP:
- OLTP (Online Transaction Processing):
  1. The query used is quite simple.
  2. The processing speed is basically very fast.
  3. The required data space is relatively small.
  4. The processed data includes the latest data.
  5. The main function of OLTP is to support the operational activities of a company using daily databases. An example is an application for entering consumer data, viewing transaction data, adding employee data and so on.

- OLAP (Online Analytical Processing):
  1. The query used is quite difficult.
  2. The speed of the process depends on the data being processed.
  3. The required data space is relatively large.
  4. Processed data includes past data (history data).
  5. The main function of OLAP is to be able to produce information from existing data analysis so that it can assist in making a decision in a company

2.3 ETL Concept (Extract Transform Load)

Data extraction is the process by which data is retrieved or extracted from various operational systems, either using queries, or ETL applications. There are several data extraction functions, namely:
1. Automatic data extraction from the source application.
2. Filtering or selection of extracted data.
3. Sending data from various application platforms to data sources.
4. Change the data layout format from the original format.
5. Storage in temporary files for incorporation with extracted results from other sources.

2.4 Electric Field Generating Electrodes

Transformation is a process in which raw data (raw data) extracted is filtered and modified according to applicable business principles. The steps in data transformation are as follows:
1. Map the input data from the original data scheme to the data warehouse schema.
2. Convert data types or data formats.
3. Cleaning and eliminating duplication and data errors.
4. Calculation of derivative or preliminary values.
5. Calculation of aggregate or summary values.
6. Data reference integrity check.
7. Filling in empty values with default values.
8. Merging data.

The last process that needs to be done is the process of loading the data obtained from the transformation into the data warehouse. The way to load data is to run SQL scripts periodically.

2.5 Website

Website or site can be interpreted as a collection of pages that are used to display text information, still or motion pictures, animations, sounds, and or a

combination of both static and dynamic that form a series of interrelated buildings, each of which is connected with page networks. The relationship between one web page with another web page is called a hyperlink, while the text is used as a connecting medium is called hypetext. There are several things that are prepared to build a free website, then the supporting elements must be available as follows:

1. Domain Name (Domain Name / URL - Uniform Resource Locator)
2. Home Website
3. Content Management System (CMS) The development of the website world at this time is more emphasis on content management is a website. Users who can not website programming languages at this time can create a website using the CMS.

Types of Web Along with the development of information technology so quickly, the website also experienced a very significant development. In grouping web types, more directed based on the function, nature or style and the programming language used.

The types of web based on nature or style, namely:

1. Dynamic Website, is a website that provides content that is always changing at any time. The programming languages used include PHP, ASP, NET and utilizing a MySQL or MS SQL database. For example the website www.artikel.com, www. detik.com, www.tecnomobile.co.cc, and others.
2. Static Website, is a website whose content is very rarely changed. The programming language used is HTML and has not utilized the database. For example: organization's web profile, and others.

3 RESULT

3.1 Data Flow Diagram

Data flow diagrams are an overview of the data flow that runs on the application system where in this design the data flow diagram will be explained either through context diagrams or DFD Level1 so that it can be known the details of the process related to the data flow from the system process to entities that use the system.

• Context Diagram

In this stage the author will explain the data flow in the application as a whole where it is known that there

is a support system for employee performance appraisal decision which is the core data flow process that is accessed by 3 system user entities, namely admin, leader and also officers.
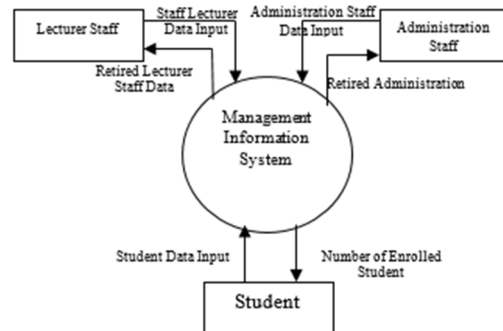

Figure 1: Context Diagram.

• Level 1 Diagram

Next will be described about the system process flow in more detail per sub-process system for each application page, the following will be divided process data flow for each application page, among others.
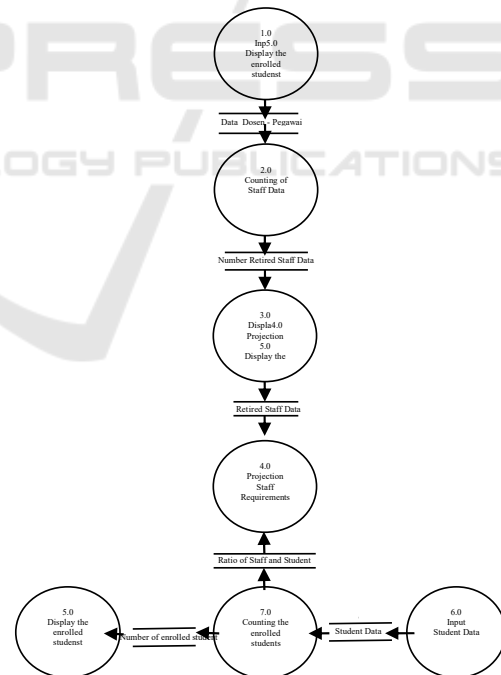

Figure 2: Level 1 Diagram.

3.2 Table Relational Model

Based on the level 1 diagram above, we build 3 related tables. The tables contain the property called

fields and a primary key. To relate the all tables, we make an additional table at the center that connect the 3 tables by itself. So, there are 4 related table altogether with its own fields.
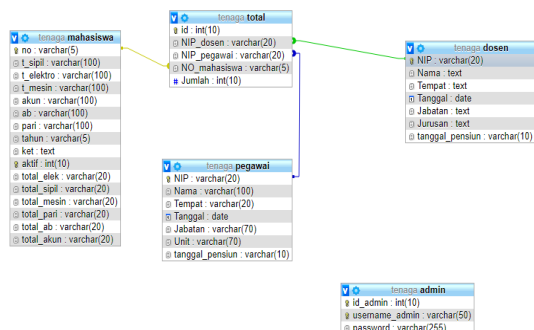

Figure 3: Table Relational Model.

3.3 System Design

In the plan to implement the management information system into computer application. It is necessary to carry out activities of its application. The steps that need to be taken to implement the system are making programs, testing programs, training and receiving documentation, but in writing this thesis the implementation of the system is carried out only to the stage of making the program. From the results of the needs analysis, the design, design and manufacture of the application program the author succeeded in making a decision support system application related to performance appraisal in providing information of the number employment who will retired ini a certain period. So does the enrolled student information in all department in Manado State Polytechnic. Where in the system created by the author will be operated by 3 users with access capacity of each according to the needs of the management information system to calculate the ratio in order to have an accurate projection of staff requirements.

The ability of the application made is that it can process employee data related to each employee's personal data information and number, in addition there is also an analysis of employee assessment criteria where each employee will be aggregate to have a total number of requirements of administration staff and the lectures. We design the database based on the data flow diagrams. There are three tables consist of personal data of the students, lectures and administration staff. Students' table consist of the number of the student in all department based on study program and education level (D3 or D4). Lecturers' table consist of NIP, name, date of birth

and department. Administration staff table consist of NIP, name, date of birth and working unit. Advantage of the application is that there is data collection related to their own department. So, we can calculate the time of retired based on their date of birth. After that we displayed it based on department and year period. The calculation of the number of enrolled students in certain year is calculated by the total of all year in the period minus the number of graduates. Noted that the number of graduates is counted for D3 in 3 years of study and D4 in 4 years study. For example, the total number of enrolled students in 2019 is total enrolled student in 2015 till 2019 minus in 2019 (D4 – 4 years) and 2018 (D3 – 3 years). The number of retired lecturers and administration staff are calculated for the certain year minus the date of birth. After getting the total number of students, lecturers and administration staff, we displayed it based on the certain period. It will display the data of employee who will retired in that year. Then the graphic in several year of retired can be display. So, the manager or the leader in Manado State Polytechnic can analyze the tables and the graph. Based on the aggregated table of lecturer and administration staff, the leader can analyze and decide the employee requirement for a certain year period. Finally, it can make a projection of the lecturers and staff administration every year based on the enrolled student and retired employee. So, it is hoped that by applying this application by the leader or decision maker in Manado State Polytechnic, can analyze and make a projection of staff accurately.

3.4 Result and Discussion

• Dashboard/ Home Page

The dashboard page of application contains several button and option such as Student, Lecturer and Administration Staff. The number of them in current year are displayed in the dashboard/ main page. It displayed the number of student and lecturer in all department.

Figure 4: Dashboard.

- Retired Lecturer Data

At the second row of dashboard display the graph of the number of retired lecturers in several year period. The result is shown by the chart and the number of the lecturers in bar. In the total number of students is calculated automatically by the list of the retired lecturers.
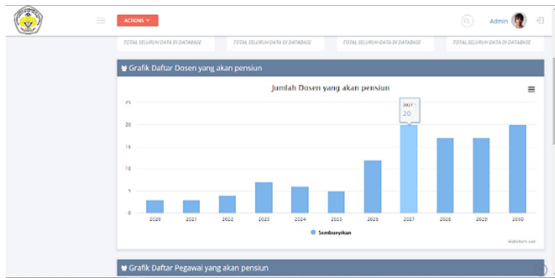

Figure 5: The number of retired lecturer.

- Retired Administration Staff Data

The second graph ini the dashboard is the number the retired administration staff. The graph displays the number of retired staff in certain year period. The graph can be used by the leader for make a projection of staff requirements. The number of yearly retired administration staff displayed per-year by the bar and number.

Figure 6: The number of administration staff.

- Enrolled Student Data

At the third row displayed the number of enrolled students. The chart shows the number of the student calculated by 5 years accumulation enrolled student minus the graduate students. The graduate student of D3 program is only three years and D4 program is four years.

The form bellow shows us the number of enrolled students in certain year, for example 2019. The pages show the number of students in all departments. It shown the number of enrolled student and graduate student in certain department. Based on the graph, the

leader can analyze the characteristic of the enrolled student for the period of 2019.

Figure 7: The number of enrolled students.
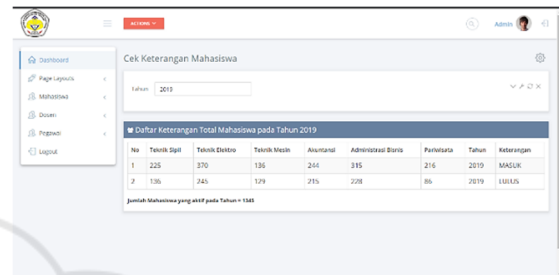
Figure 8: The number of enrolled student in a year.

- The Accumulation of Retired Staff Data

The table below show us the number of lecturers who is retired until 2023. It shown there are 7 lecturers with their own department. It ordered in department for grouping it easily. So, the leader knows the number of lecturers in 2024 that is without the 7 lecturers.
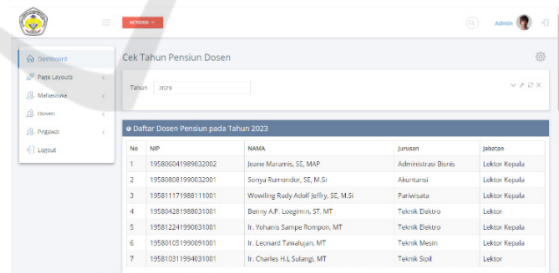
Figure 9: The list of retired lecturers in a year.

The ideal ratio of the lecturer and student for vocational school is 1:20 with its compensation of 50% low and up maximum number. For getting the ratio number we calculate the number of lecturers in a certain year – retired lecturers: the number of enrolled students. It must be considered that the student in a year consist of 4 serial year of D4 students and 3 serial year of D3 students. Because the D3 student will graduate in 3 years only. The table below

shows us the accumulation number of lecturers and students in all department in Manado State Polytechnic. It is also calculated and displayed the ratio of lecturer and student in all departments in a certain year.

Figure 10: The accumulation of retired lecturer of a department in a year.

Figure 11: The accumulation of retired lecturer of a department in a year.

Next table show us the number of retired administration staff in 2025. It shown there are 7 staff will retire in 2025. It shows s their own working unit, so leader can evaluated the requirement in the working unit. If the Unit have 2 retired staff in that year period, that it will be a requirement for that unit to have a new staff.

Figure 12: Retired administration staff in a year.

The next table show us the accumulation of the retired administration staff who will be retired in a certain year. So, It displayed the total number of administration staff with their unit and which year they will be retired. As an accumulation it shows the

number of the of retired administration staff in a year. Figure below tell us that there will be 9 administration staff of retired in 2021.

Figure 13: The accumulation of retired administration staff in several year.

4 CONCLUSION

With this application, calculations can be made more quickly, and the results of the calculations can be verified by the leadership of the leader to make a good projection of staff requirements. This application can calculate the number of enrolled student in certain year or period. The number of retired lecturer and administration staff can be calculated by the year of birth. Where the lecturer will retire at the age of 65, the administration staff at the age of 58. But the lecturer who have the predicate of professor can be retired at the age of 70. The number of enrolled student is calculated by the followed 4 years, but the graduate student are 4 years of D4 and 3 years of D3. So this application can describe the characteristic of the number of employee and student by showing it in graph. So, the manager can easily analyse the requirements of staff in a certain year and period by a good projection. The result is accurate enough by comparing with the manual calculation. This application can be used easily and accurately.

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