

Academic Dashboard For Monitoring KPI Based Using Data Feeder Dikti

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Abstract

University management requires accurate and fast academic reports that make it easier to make strategic decisions and in order to improve the quality of education. Therefore we need a tool that can monitor, evaluate and measure the performance of universities. A common problem is that there is a lot of academic data stored but to present it in reports at the time of evaluating academic activities is difficult and takes a long time. Academic evaluation can be presented with a dashboard so that it becomes easy for decision making. Dashboard is a page that shows graphs as KPIs (Key Performance Indicators) of an organization and provides all the important measurements needed to make key executive decision making. Universities in Indonesia report data on students, lecturers and lecture activities to the PDDIKTI (Higher Education Database). The data contained in the PDDIKTI Feeder is made an academic Dashboard in the form of visualization to assist and support decision making at the academic level and also to monitor using KPI as an evaluation. With the existence of an academic dashboard based on KPI, the presentation of reports becomes faster and easier to understand because it is in the form of visuals and indicators to find out what things need to be improved and the extent to which the achievements of each academic component are used as benchmarks in submitting study program accreditation.

I. INTRODUCTION

Higher education management requires accurate and fast academic reports that make it easier to make strategic decisions and in order to improve the quality of education. Therefore we need a tool that can monitor, evaluate and measure the performance of universities. The problem that exists is that there is a large amount of academic data stored but to present it into reports at the time of evaluating academic activities is difficult and takes a long time. Academic evaluation can be presented with a dashboard so that it becomes easy for decision making. KPI (Key Performance Indicators) is an indicator to measure the success of an organization in carrying out its goals [1]. A dashboard is a page that graphs the KPIs of an organization and provides all the important measurements needed to make key executive decision-making [2].

Universities in Indonesia report data on students, lecturers and lecture activities at the PDDIKTI (Higher Education Database). PDDIKTI provides an application in the form of the PDDIKTI Feeder which is a substitute for the previous reporting method, namely EPSBED (Evaluation of Study Programs Based on Self-Evaluation) and universities are required to use it if it refers to the circular letter of the Director General of Higher Education no.2332/E1.2/KP/2015 concerning PDDIKTI Feeder and Circular of the Director General of Higher Education No. 0543/E1.2/PL/2015 concerning the obligation to use PDDIKTI Feeder. The PDDIKTI feeder uses web service technology in synchronizing data from universities that act as clients to the PDDIKTI server. The data reported to PDDIKTI must be valid and in accordance with existing standards or regulations. According to Law no. 12 of 2012 concerning Higher Education, article 56 paragraph 1 explains that the Higher Education Database is a collection of data on the implementation of

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Higher Education for all Higher Education which is nationally integrated. PDDIKTI is one of the instruments for implementing quality assurance and referrals.

Based on the above, using the data contained in the PDDIKTI Feeder to create a model used for the academic dashboard and presenting it in visual form will be very helpful and support leadership decision making in the academic domain. Coupled with the Key Performance Indicator (KPI) of each component of the academic report, it will be very easy to see the extent of the achievements of each academic component which is the benchmark in applying for study program accreditation.

II. LITERATURE REVIEW

A. Dashboard

Dashboard is a visual presentation of data from important information needed to achieve a goal, displaying it on one screen so that information can be seen as a whole [3]. The visual display in this dashboard needs to be well prepared and designed, so that the information displayed in the dashboard can be understood quickly and accurately. The dashboard contains critical information because by just looking at the dashboard, you can find out what is in the dashboard, the dashboard can consist of a combination of text and graphics[4]. There are 3 types of dashboard models[5] :

1. Strategic Dashboard, used to help adjust the goals to be achieved.
2. Tactical Dashboard, focuses on determining the evaluation of certain conditions or events in achieving goals.
3. Operational Dashboard, monitor business activities to be able to find out specific progress.

There are several characteristics of a dashboard if it is designed properly as follows [6]:

- a. The dashboard displays a dynamic and real view of the data which is updated regularly.
- b. Dashboards allow users to stay up-to-date with any changes in the business.
- c. Dashboards require minor code changes to be delivered, implemented, and maintained.
- d. Dashboards use a visual component to highlight at a glance, data and exceptions that require action.
- e. The dashboard is transparent to the user, which means that the user needs a little training and it is easy to use the dashboard
- f. Dashboards combine data from a variety of data sources into a compact, unified business view.
- g. Dashboards allow browsing against existing data sources or reports and provide context that can be compared and evaluated in more detail.

B. Key Performance Indicator (KPI)

KPI is a measuring tool used to measure the effectiveness of a company or organization in achieving business goals. The KPIs used must be in line with the company's vision and mission [7]. KPI can be used as a parameter that focuses on aspects of performance in the organization that are used as the most important organizational performance measures to achieve current and future targets [8]. There are four layers of performance measurement which are illustrated in the following figure 1:

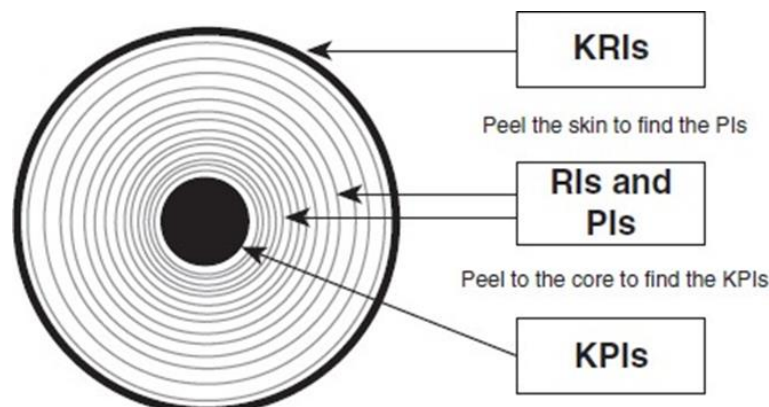


Fig 1 Layer of performance measurement. [9]

The explanation of the picture above is:

- a. **Key Result Indicator (KRI)**
KRI provides ideal information for company management, in this case it is the result that has been achieved from various actions and shows whether the organization is moving in the right direction.
- b. **Performance Indicator (PI)**
PI is a complement to non-financial KPIs by showing what should be done to the organization's performance and adjusting the organization's strategy.
- c. **Result Indicator (RI)**
covers activity, and all financial performance measurement (eg daily or weekly sales analysis). Examples of coverage in RI are:
 - 1. Net income on major product lines.
 - 2. Results of sales made yesterday.
 - 3. Complaints received from major customers.
- d. **Key Performance Indicator (KPI)**
Indicates a set of measurement measures that focus on the aspects of organizational performance that are most important to the current and future success of the organization

C. Monitoring

Monitoring is an advanced process of management which has a function as a tool to supervise in carrying out planning and organization within a company or organization [10]. Monitoring is an activity to observe progress in implementing a development plan that identifies and anticipates problems that arise or will arise with the aim of being able to take an action as quickly as possible to fix it [11].

The monitoring principles according to [11] are as follows:

- a. Monitoring must be done continuously.
- b. Clarity of objectives and results obtained.
- c. Implementation is carried out objectively.
- d. Proactively involve various parties deemed necessary and interested.

D. Business Intelligence

Business Intelligence is a set of mathematical models and analytical methodologies that exploit available data to generate useful information and knowledge for complex decision-making processes [12].

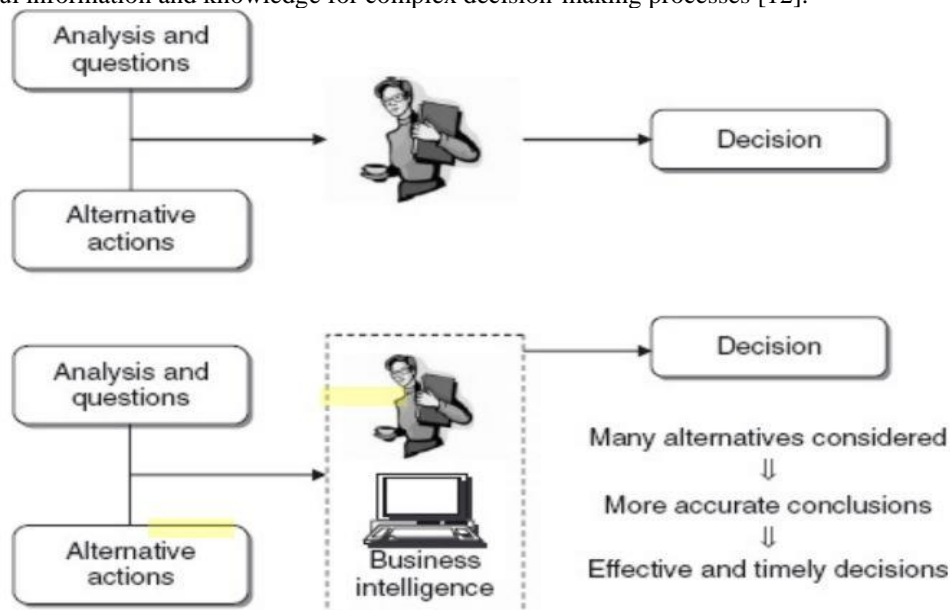


Fig 2 Decision Making Process with BI [12]

III. METHODS

The method used to create this academic dashboard is the System development life cycle in which there are 5 stages as shown below:



Fig. 3 System Life Cycle [13]

- a. **Planning**
 The initial stage is to plan for making a monitoring dashboard to help present data and facilitate decision making, then make what stages need to be done in making the dashboard.
- b. **Analysis**
 In this stage, an analysis is carried out to collect and identify several factors that become problems or factors that become a reference for KPIs in the academic process so that they can assist in decision making.
- c. **Design**
 at the design stage, the dashboard creation process is carried out, starting with determining the KPIs used, creating the required database and designing the dashboard page interface that is made as easy and attractive as possible to assist the user in its operation.
- d. **Implementation**
 At this stage the author begins to code the program using the PHP programming language for the web and to store the data that will be used as a database using MySQL. When finished the author will do the test and if an error occurs or get debugging the author will immediately fix it.
- e. **Maintenance**
 This stage is to ensure and maintain the system to be able to operate correctly through the use of the features contained in the system then the user will adapt himself according to his needs.

IV. RESULTS

A. KPI Design

Determination of KPI (Key Performance Indicator) as the basis for measuring performance in universities. KPIs are obtained from a review of academic activities contained in the PDDIKTI FEEDER and refer to the BAN-PT Undergraduate Accreditation Assessment Matrix (S1) with assessment elements Standard 3 (Students and Graduates) and Standard 4 (Human Resources), the following is the KPI table :

Table 1. KPI Result

No	KPI	Sub KPI
1	Ratio of New Transfer Students: New Students Not Transfers.	-
2	Quality of Graduates of Students in each Study Program.	Average GPA of Graduates in each Study Program
		Average Study Period of Graduates in each Study Program

3	Quality of Graduates of Students as a whole.	The total score of the Quality of Graduate Students in each Study Program divided by the number of Study Programs.
4	Sufficiency and Qualifications of Permanent Lecturers in each Study Program.	-
5	Sufficiency and Qualifications of Permanent Lecturers as a whole.	Total Score of Adequacy and Qualifications of Permanent Lecturers in each Study Program divided by the number of Study Programs.
6	Interested Student Ratio: Capacity	-
7	Ratio of the number of graduates of a certain class: the number of new students of the class	-
8	Ratio of Number of DO Students: Number of New Students	-
9	Percentage of Active Students	-

Each of the KPIs above has five scores on a scale of zero to four, namely Very Poor, Less, Enough, Good, and Very Good.

B. Use Case Design

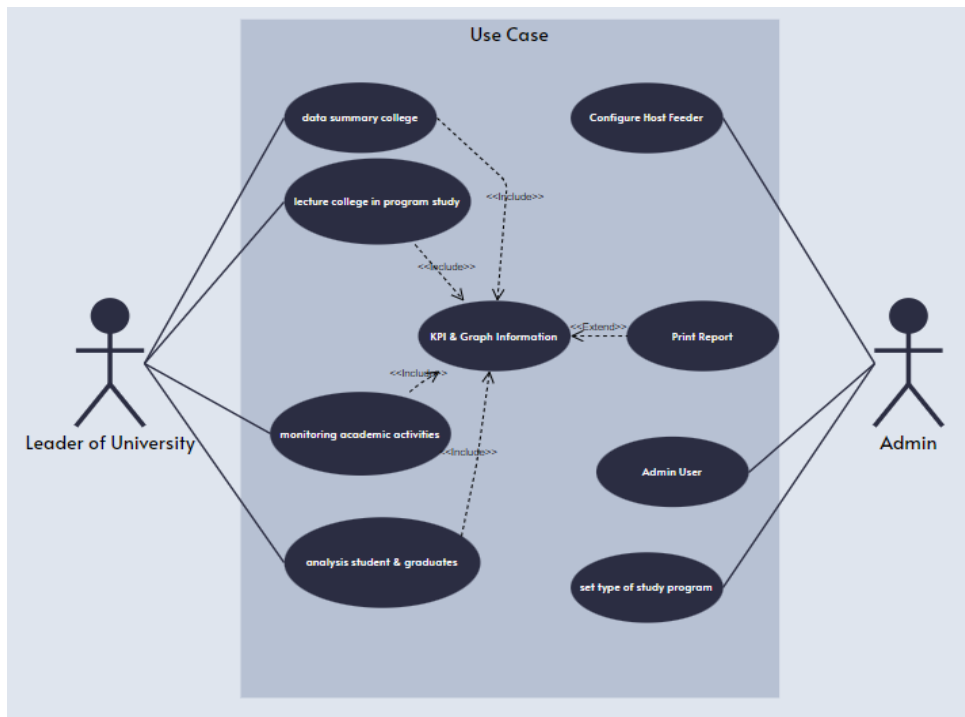


Fig. 4 Usecase Diagram

C. Database Diagram

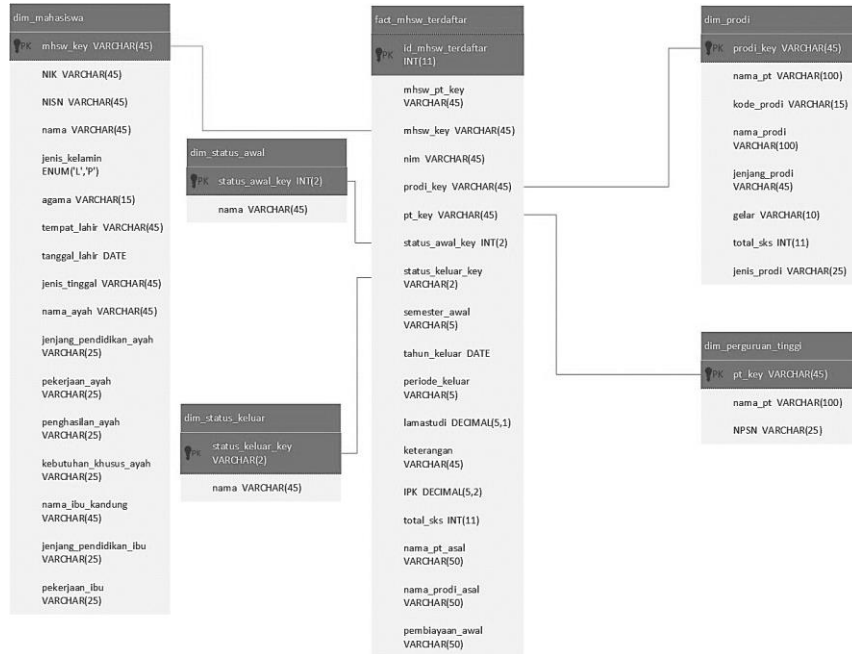


Fig 5. Database Diagram

D. Dashboard

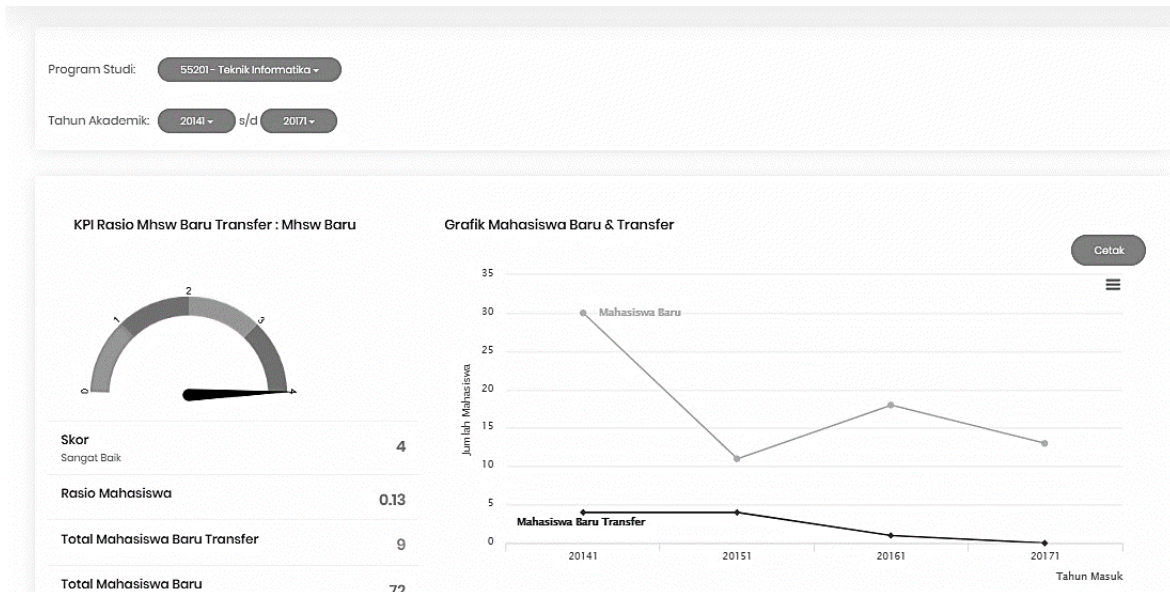


Fig 6. Dashboard Display

On this dashboard page it contains a summary of the number of study programs, the number of students enrolled in tertiary institutions, the number of graduates and the number of permanent lecturers as well as a graph in the form of a gauge that displays the KPI (Key Performance Indicator) of Graduate Students and Permanent Lecturers Overall Ratio where detailed information regarding the above KPIs can be seen in the Lecturer Analysis & Student & Graduate Analysis menu.

V. DISCUSSION

KPI-based academic dashboards can assist in the reporting process and speed up decision-making as well as improve academic quality in universities. More indicators are needed that support the academic process in order to involve more academic activities that can be reported in the form of a dashboard. as well as external data not only from PDDIKTI but also other data to be used as a comparison so that the quality of the university can be improved. In addition, the academic dashboard needs to be further supported so that it is directly integrated with the current academic process system, so that it does not require any more steps to transfer data from the Online Transaction process to the Online Analytical process.

VI. CONCLUSIONS

Making KPI-based academic dashboards using the Dikti Feeder data can help universities to process reports and support decision making so that the quality of the University's quality increases. This dashboard also makes it easier for decision makers to conduct academic analysis, monitoring and evaluation so that strategic steps for development can be more effective and efficient compared to conventional methods.

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