

ACADEMIC DASHBOARD DESIGN TO IMPROVE THE EFFECTIVENESS OF STUDY PLANNING

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Abstract

Student success in their studies cannot be separated from the accuracy of decision making in preparing learning plans each semester. Taking the right courses will be able to prepare students' abilities to the maximum. Obstacles that are often experienced by students when preparing study plans and monitoring studies are students' ignorance of what specializations exist, what each student's strengths are, poor communication with academic supervisors, unclear graduation status for a subject. according to predictions. These obstacles will have an impact on the choice of major to be taken next, so that students are sometimes forced to choose a makeshift major where their class quota still remains. This can certainly be detrimental to students, especially if the student already has a dream field of work or is currently doing an internship and will become a permanent employee after graduating from school. By designing a dashboard using Microsoft Excel and Power BI [5], it is hoped that students can

carry out consultations more interactively and have their tracks recorded, making it easier for the school to determine major policies, additional lessons, or suggest other short courses that can support learning outcomes and achieve specialization dreams. according to the student's talents. The use of Excel as source data is because the Reform Vocational School stores all data in Excel form, so this alignment does not require additional effort. The aim of creating a dashboard is to increase the efficiency of student study monitoring and study planning strategies, as well as a visual representation of key metrics and conditions. By analyzing this information, schools, students and academic advisors can collaborate better and make it easier to make major decisions for each student.

Index Terms: Akademik, Business Intelligence, POWER BI, Dashboard, Analysis Data.

Introduction

In the industrial era 5.0, the role of education in preparing students to become a productive workforce is very important. The quality and abilities of students as prospective workers also really need to be considered. The qualities and abilities of these students can be well prepared if from the start, when students enter the vocational school system, they can immediately make short-term and long-term learning planning strategies. This will enable students to understand the various specialization options and what requirements for each major must be met. With direction from academic supervisors and adjusting to students' abilities, interests, talents and aspirations[1], projections can be made of what majors need to be taken and when each course will be taken. Apart from that, in every study trip there are sometimes obstacles, whether financial or other obstacles, which cause the expected study target to be missed, thus having an impact on adjustments to the major [9]. It may sound trivial, but the consequences of adjusting the choice of major can cause students' dreams about work and their future to change too. Every major adjustment requires consultation with the academic supervisor so that the results can be optimal and maximized, so an indicator is needed that can display the current conditions of each case experienced by the student and can be responded to in real time by the supervisor [2] and traces of the consultation can be recorded. Apart from that, the dashboard that will be designed will help supervisors and students determine the best

course to take according to their interests and learning capacity [7]

For schools, this dashboard will make it easier for schools to see a cumulative recap of class needs from all open majors as well as the possibility of changing majors if there is minimal interest, so that any policy changes from the school can immediately be synergized with each student's study plan [8]. This is certainly in line with the benefits of using a dashboard, namely:

- ✓ Operational efficiency in terms of time and resources.
- ✓ Better decision accuracy in terms of information quality and timeliness.
- ✓ Increased student productivity and collaboration with supervisors and schools.
- ✓ Cost savings from the side of students, supervisors, schools.
- ✓ Increase student satisfaction with the learning system.
- ✓ Can detect risks and be able to prevent the impact of these risks.
- ✓ Make students, counselors, and schools more proactive.

The questions are how to design a dashboard that can facilitate students to plan study majors optimally, How to design a dashboard that can provide information on students' academic achievements, How to design a dashboard that can provide up-to-date information on the need for class openings or class transfers with minimal risk for all parties, How to design a dashboard that can provide a recapitulation of learning outcomes for students.

Related Work

Publication Title	Problem	Method	Result
Design of the Academic Dashboard: A Tool to Enhance Students' Efficacy in Decision Making (WIP) [6]	Some functionality gaps from a technical perspective, such as unreliability and lack of intuitive features for evaluation and tracking. A proactive messaging system between students and advisors where they can set up advising meetings. Take notes during a meeting with a student and upload these notes to be available to the student and other potential Student advisors early alert systems, such as Student Explorer, function as an early warning system that alerts advisors about students at risk of earning a low grade in their classes.	The theoretical basis for this paper is Byrnes' Self-Regulated Model of Decision-Making (SRMDM). Self-regulated (or adaptive) decision-making proceeds iteratively through three phases.	One of the main goals of this dashboard is to train students to become better and more adaptive decision-makers. Students can also learn this skill by practicing more and more.
Towards the Development of a Revised Decision-Making Competency Instrument [3]	In order to help students make adaptive, self-regulated decisions, rather than impulsive or maladaptive ones, we need a better understanding of the relationship between decision-making competency and real-world behaviors and outcomes.	Scale Construction Procedure. The Self-Regulation Model of Decision-Making (SRMDM) posits that self-regulated decision-makers spend time in three phases: generation of options, evaluation of options, and learning from the results.	The results of our exploratory and confirmatory factor analysis provide support for building an instrument that evaluates decision-making abilities of post-secondary engineering students. By focusing on building an instrument centered around the underlying constructs of the theory and support from our EFA and CFA results presented here, we have improved the original survey instrument, enabling it to be a more representative measure of the theory to which it is related.
DATA VISUALIZATION WITH BI TOOLS (CASE STUDY ON THE COMPANY PT.Liputan Enam Dot Com) [10]	One of the causes of this problem is the long time it takes for information or data to reach the management team in charge of decision-making.	This research aims to design a management information system in the form of a web-based real-time data dashboard model. Data collection was carried out using direct observation, interviews and discussions with several Stakeholders.	With this management information system dashboard, companies can process raw data obtained in the field into real time information for analysis and assistance in decision-making.

I. Methodology

The problem solving approach is carried out using a qualitative approach using a case study approach. By looking at the development of the dashboard from the results of previous research and adapting it to the needs of Reform Vocational Schools. The need for Reform Vocational Schools can be known from observations and experiences of collaboration with Reform Vocational Schools in community service activities in recent years. The data used is a sample from Reform Vocational Schools.

Method of collecting data

Data taken from student data for academic guidance at Reform Vocational Schools, study program syllabus in accordance with the latest curriculum, requirements for taking majors, passing grade for each subject:

1. Literature Study

Literature studies are used to collect library data and process research materials. This process was carried out to examine in more depth the dashboard and pure share method.

2. Data collection from the ongoing study planning system in this process, data is collected which is stored in Excel files. The data obtained will later be used to analyze needs in building an academic dashboard.

Analysis Method

The analysis is carried out by implementing a decision tree in Power BI, where learning achievements, interests and talents will be taken into account to provide recommendations for choosing the best major for students.

There are stages in the development of the dashboard, namely as follows [10], [11]:

1. Planning and design (planning and design stage highlights) this stage is carried out to analyze user needs and be able to communicate with users to determine what will be displayed on the dashboard.
2. System and data review (system and data review highlights)
This stage will be carried out by identifying data sources and collecting feedback to be developed and adapted to user needs.
3. Prototype design (prototype stage highlights)

At this stage, it will be designed to build a dashboard using a top-down and bottom-up approach simultaneously.

4. Refinement of prototype (refinement stage highlights) Based on a series of prototypes that have been built, a review will be carried out to obtain feedback for development that suits user needs.
5. Release
When the dashboard has passed the user testing stage, the dashboard will be implemented and used by the Academic Dashboard manager.
6. Continuous improvement (continuous improvement)
This stage is the stage for developing and disseminating dashboards to other areas in an organization if needed.

II. Evaluation

Data was taken from sources, namely Reform Vocational Schools, in the form of information on majors, subjects and major priorities for each student. The student names and grades are a simulation of research, this is to maintain the privacy of student data to unauthorized outside parties.

From the results of the discussion, it can be concluded that at least 5 main data tables are needed, consisting of: schedule table, subject table, student score table, specialization table, and student table. In addition, 1 duplication table is required which contains the NIS, lesson code and grades. This is necessary because grouping will be carried out on the original table and calculations, so that detailed data can still be obtained from

the original table, namely student grades, so the attributes and initial contents of the table are duplicated with the name Lesson Grades.

After we get the required tables, we carry out the data cleaning process by checking the data type, the similarity in naming the attributes that will become the primary key and foreign key, checking for writing errors or empty data. After ensuring that the data was valid and appropriate to the data type, we then began to make the necessary calculations to answer the needs of Reform Vocational Schools in the student's major and direct students to the major that best suited their academic potential.

This research has a limitation, namely that academic potential is seen from student achievements in the first semester of school, where if students take a specialization other than Marketing, a higher final score is required, namely 70, while the Marketing specialization has a minimum score of 60. The numbers 70 and 60 are the filters created to make it easier for the homeroom teacher to direct further learning strategies. If a student does not reach the minimum score of 60, the school will provide a dispensation, where the student will be monitored more intensively on their learning progress and will be required to only choose the Marketing specialization.

Academic potential will be better if the school has psychological tests and academic potential tests at the beginning of new student registration. Because this has not been implemented by the Reform Vocational School, the creation of this academic

dashboard follows the current system so that it can be used immediately.

In this dashboard, we need to calculate the achievement scores for each student by averaging all the scores achieved by each student and dividing it by the number of subjects taken. Here each subject has the same value weighting so we don't weight it like in semester credit units at universities.

Apart from that, we also calculate the status of the passing score for the specialization chosen by each student based on the study results achieved in semester 1. We subtract the achievement score of each student from the minimum required score (passing score) for each specialization taken by the student. these students.

From these results, we can create a dashboard that displays graphs depicting student achievement of passing scores for each specialization according to the one chosen by each student, a graph of the percentage of specializations taken by students, this is to help the school know the comparison of class capacity for each specialization so that there is no over capacity or class vacancies. We also display a graph of the percentage of subjects taken based on the type of subject (specialization subjects and general subjects), this is intended so that the school and homeroom teacher can direct the selection of subjects with an even level of difficulty each semester.

The results of the dashboard that we designed are as follows:

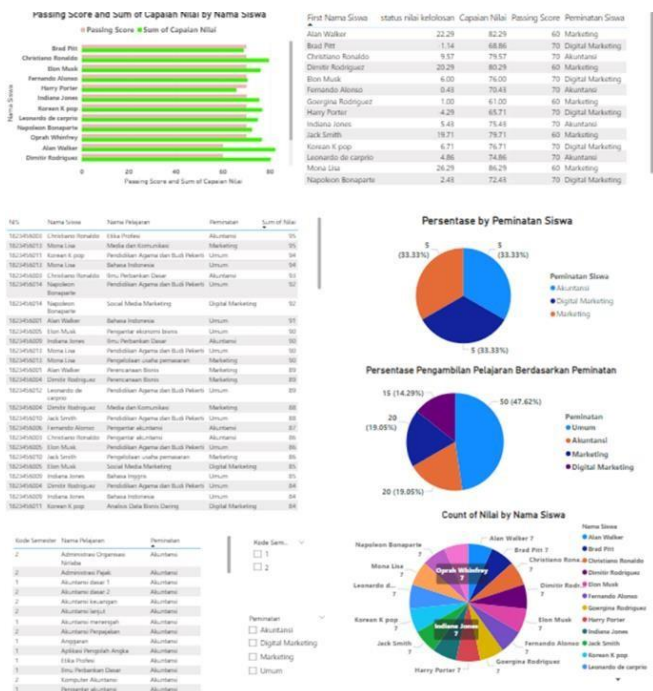


Figure 1. School Academic Dashboard Design

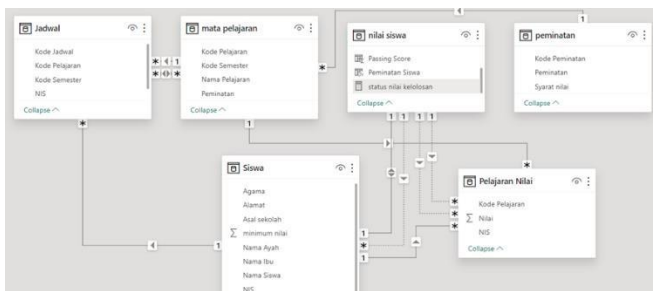


Figure 2. Academic Dashboard Design Table Relationships

Thank-YouNote

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References

- Yalida A. Faktor-Faktor Yang Mempengaruhi Pemilihan Jurusan Peserta Didik Di Kelas X Sma Negeri 1 Balantak Kabupaten Banggai. *Jurnal Sociohumaniora Kodepena (JSK)*. 2024 Jan 3;4(2):263–70.
- Brotherton HB, Manning JA, Orr MK. Design of the Academic Dashboard: A Tool to Enhance Students' Efficacy in Decision-Making (WIP). *American Society for Engineering Education*. 2022 Jun 26;
- Orr, M. K., & Ehlert, K. M., & Rucks, M., & Desselles, M. (2018, June), Toward the Development of a Revised Decision-Making Competency Instrument Paper presented at 2018 ASEE Annual Conference & Exposition , Salt Lake City, Utah. 10.18260/1-2--31149
- Ding DK. Power BI First Report. Apress eBooks. 2023 Jan 1;1-22.. Libby T, Schwabke J, Goldwater P. Using data analytics to evaluate the drivers of revenue: An introductory case study using Microsoft Power Pivot and Power BI. *Issues in Accounting Education*. 2022 May 9;37(4).
- Rhodes JM. Using Power BI to Find Inconsistent Data between Excel Spreadsheets. Apress eBooks. 2022 Jan 1;251–64.
- Brotherton HB, Manning JA, Orr MK. Design of the Academic Dashboard: A Tool to Enhance Students' Efficacy in Decision-Making (WIP). *American Society for Engineering Education*. 2022 Jun 26;
- Pangrazio L, Selwyn N, Cumbo B. A patchwork of platforms: mapping data infrastructures in schools. *Learning, Media and Technology*. 2022 Feb 2;1–16.
- Rawis ProfJoulandaA M., Kaligis JN. Management of Character Education in School-Based Quality Improvement (a case study at the YAYASAN EBEN HAEZER



- MANADO school) [Internet].
<https://cejsr.academicjournal.io>. MIDDLE
EUROPEAN SCIENTIFIC BULLETIN; 2021.
9. McWayne CM, Melzi G, Mistry J. A home-to-school approach for promoting culturally inclusive family-school partnership research and practice. *Educational Psychologist*. 2022 Aug 23;57(4):1-14.
 10. Hidayat A, Dila AS. DATA VISUALIZATION WITH BI TOOLS (STUDI KASUS PADA PERUSAHAAN PT. Liputan Enam Dot Com). *JUTEKIN*. 2023;11(2).
 11. Dwiyanaputra R, Wijaya IGPS, Bimantoro F, Agitha N, Mardiansyah AZ. Pengembangan Dashboard Berbasis Website Untuk Monitoring dan Evaluasi Di Program Studi Teknik Informatika Universitas Mataram. *Journal Begawe Teknologi Informasi*. 2023 Mar 31;4(1).