

Web-Based Academic Information Systems in Vocational School

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ABSTRACT

An academic information system is an application that can facilitate to processing of data and information related to academic problems. Currently, SMK Negeri 1 Tondano as one of the vocational schools in North Sulawesi still uses manual methods in processing the data and information needs, so it feels less effective and efficient. This causes the data process to not be integrated properly, and it takes a long time to process data or information. This research was conducted to develop a web-based academic information system at SMK Negeri 1 Tondano. Where this information system is expected to be able to help the data and information processing process. In developing the system to be built, the research method used is the prototype development method and Unified Modeling Language (UML) modeling to simplify the design of the system to be built. Based on the results of system testing using black-box testing, it is stated that the system can run as well as expected.

Keywords: Academic Information System, Prototype, Vocational School

INTRODUCTION

A school is a formal educational institution established to provide a learning process for students to acquire knowledge, skills, and personal development. In general, school is a place where students interact with teachers and the learning environment to achieve educational goals. School is also a form of educational institution in which teaching and learning activities take place, as well as various other

activities that support the implementation of the teaching and learning process. Teaching and learning activities (KBM) are related to several elements such as students, teachers, and subject matter which are incorporated into a school curriculum. KBM is also supported by several processes such as the process of paying school fees and managing them, the process of providing and managing educational facilities, as well as other information management processes.

Almost all activity processes that occur in schools must have output in the form of reports that are submitted to the principal periodically, for example, school financial reports. However, A school is a formal educational institution established to provide a learning process for students to acquire knowledge, skills, and personal development. In general, school is a place where students interact with teachers and the learning environment to achieve educational goals.

School is also a form of educational institution in which teaching and learning activities take place, as well as various other activities that support the implementation of the teaching and learning process. Teaching and learning activities (KBM) are related to several elements such as students, teachers, and subject matter which are incorporated into a school curriculum. KBM is also supported by several processes such as the process of paying school fees and managing them, the process of providing and managing educational facilities, as well as other information management processes.

Almost all activity processes that occur in schools must have output in the form of reports that are submitted to the principal periodically, for example, school financial reports. However, currently schools generally still use traditional methods in collecting, processing, and managing the data or information they need, so they are felt to be less effective and efficient. This is due to the data process not being properly integrated, as well as the long processing time of data or information in making reports, so technology is needed in the form of an information system to manage data and information to make it more effective and efficient.

Traditional academic information systems that use manual methods in data collection and processing are often prone to human error and require a long time to update information. As a result, teachers, students, and parents may receive inaccurate or late information, such as changed lesson schedules or exam results that have not been updated, but web-based academic information systems can overcome this problem by providing real-time data updates, reducing errors and delays in conveying information to users.

Web-based academic information systems provide better accessibility because they can be accessed via the internet from any device connected to the network. It allows teachers, students, and parents to access academic information anytime and anywhere (Devi, 2015). This web-based academic information system can also help manage complex data efficiently and structure, reducing the risk of human error and making school administration tasks easier (Syarifah, 2019). This web-based academic information system can provide features such as discussion forums, online assignment submissions, and direct communication between users, which increase interaction and collaboration in the learning process, making the learning process more effective (Panuju, et al, 2018). Web-based academic information systems automate administrative processes such as attendance management, grading, and reporting, which helps save schools time and resources (Wang, et al, 2019).

As a solution to this problem, a school academic information system is needed that can support and help manage data and information so that the learning process at school can run well and integrate

all processes in the school with related data. It is hoped that this information system can improve the data collection process so that this system can simplify and speed up the process of collecting, processing, and managing data or information, as well as supporting the implementation of teaching and learning in schools.

LITERATURE REVIEW

Academic Information System

An academic information system is a system created to process data and information related to academics in an organization or educational institution, both formal and informal, from elementary to tertiary level. In short, an academic information system is an application that can facilitate the processing of data and information related to academic problems (Arifin, et al, 2021).

An academic information system is a system that provides information services in the form of data on matters related to academics. Where in this case the services provided include: storing new student data, determining classes, determining lesson schedules, making teaching schedules, distributing homeroom teachers, and the assessment process. Based on the description above, it can be concluded that a web-based academic information system is a system designed to collect various kinds of data which is managed and processed automatically with certain online tools and methods. SIA will produce the information needed to carry out academic activities well to provide satisfactory service quality for users. The implementation of an academic system using SIA is considered more effective and efficient (Suryandani, et al, 2017).

Web Application

Web Application also called Web App is a term used to refer to a website that gives its users control, in contrast to websites that only provide information that is usually static and does not give the user any control, a Web App provides the ability for users to interact with the database, such as sending the form, update data and or in short can do CRUD (Create, Read, Update and Delete) (Pangaribuan, et al, 2019).

Unified Modeling Language (UML)

In general, Unified Modeling Language (UML) is an attempt to provide a single approach to Object Oriented Programming (OOP) that is applicable across all software domains with the primary goal of representing software architecture. Unified Modeling Language (UML) analysis modeling focuses on user models and system structural model views. Detailed specifications of the attribute data structure and procedural design of all operations are created during object design. The design of systems and objects in the Unified Modeling Language (UML) is extended to consider user interface design, data management, and task management for predefined subsystems. Artifacts from software systems are visualized, constructed, specified, and documented using Unified Modeling Language (UML). Unified Modeling Language (UML) can be described as a description of a system that has standard diagrams from various points of view. These diagrams include use case diagrams, use case scenarios, sequence diagrams, and class diagrams (Jain, et al, 2019).

Prototype Method

According to Roger. S. Pressman, stated that the Prototyping Paradigm begins with gathering requirements. The developer and customer meet and define the overall objectives of the system (software) to be created, identify all known requirements, and outline areas where further definition is mandatory, and then “flash design” is carried out (Pressman, 2012).

Visual Studio Code

Released on April 29, 2015, Visual Studio Code (VS Code) is a code editor developed by Microsoft for the desktop computer platform. VS Code is an editor that is quite popular because of its extraordinary capabilities, apart from its use and capabilities as a VS Code editor. still considered light in terms of workload for computers, the language support provided by VS Code also varies from JavaScript, TypeScript, and Node.js which are available built-in, this editor also has a very adequate environment for development using languages such as C++, and C#, Java, Python, PHP, and Go, apart from these languages, this editor also has a development ecosystem suitable for runtimes such as .NET and Unity (Pressman, 2002).

MySQL

MySQL is an open-source Relational Database Management System (RDBMS) with a client-server model. RDBMS itself is software or services used to create and manage databases based on a relational model. MySQL itself was developed by MySQL AB which is a company from Sweden in 1994 (Microsoft, 2020).

XAMPP

XAMPP is an acronym for Cross-Platform (X), Apache (A), MariaDB (), PHP (P), and Perl (P), XAMPP itself is a web server distribution from Apache which aims to create a local web server (Boyett, 2021).

METHODS

This research aims to build a Web-based academic information system that aims to make it easier for schools to process school data or information. In this research, the system development method used by researchers in designing this system is the prototype model method where which method has illustrations as seen in Figure 1.

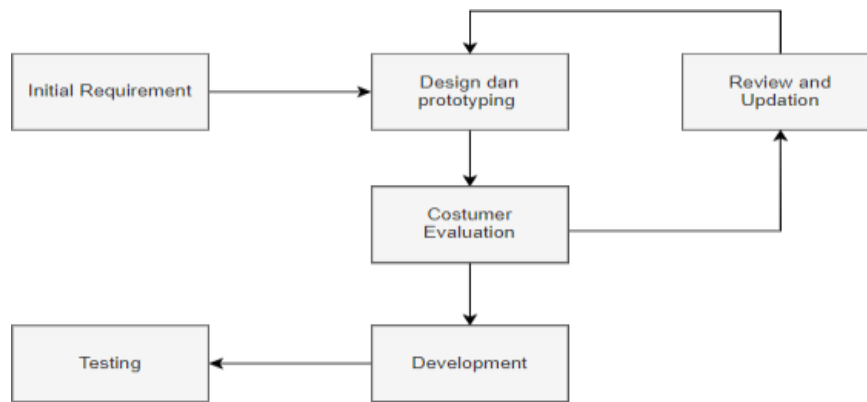


Figure 1. Illustration of the Prototype Method Model

1. Initial Requirement

In this session, the researcher collected information. This information collection aims to obtain as much data as possible from customers so that researchers can get an idea of the system they want to create. This session requires researchers to fully understand how school staff process information and data. This stage is needed to translate the design into programming language coding.

2. Design dan Prototyping

At this stage, the author determines the requirements needed to design what features and who will be the users of the website that will be created. Then the author continues the process by creating an overview of the workflow of the system that will be created.

3. Customer Evaluation

The user evaluates the results of the previous stage whether the system workflow created is following the customer's wishes or not. If it is appropriate then the process will continue in the development session, and if still not, then the system will be repaired (review and update).

4. Review and Updation.

At this stage, systems that are not suitable will be repaired and then adjusted according to the results of the evaluation that has been carried out.

5. Development.

This stage is carried out when the customer feels that the system to be created is suitable for their wishes. In this stage, coding is carried out until the system is completely created.

6. Testing.

When the development stage has been carried out, the author then tests the system that has been created. The purpose of this testing is to detect whether an error has occurred in the system that has been created and then after that, the system can be repaired.

RESULTS AND DISCUSSION

Initial Requirement

1. Current System Analysis

Based on the needs analysis carried out, the researchers collected data regarding the implementation of the academic processing system currently running at the Tondano 1 State Vocational School. Academic data management activities at SMK Negeri 1 Tondano are still carried out manually, such as student data collection, employee data collection, and data storage still using a document archiving system. This data management process can cause data accumulation and can take a long time for the data search process.

Based on observations made by the author, the roles of system users currently running at SMK N 1 Tondano are shown in the following table 1.

Table 1. User Roles in the Current System

No	User	Responsibility
1	Administrative Officer	<ul style="list-style-type: none">Working on the mainbook of academic activitiesManage absenteeism for teachers and employeesManage personnel data and reports
2	Curriculum	<ul style="list-style-type: none">Prepare teaching programsCompile an educational calendarPrepare a lesson schedule
3	Teacher	<ul style="list-style-type: none">Carry out assessments on daily tests, mid-semester tests and end of semester testsFill in the student's score listCreate a teaching programCarrying out learning activities

2. New System Analysis

At this stage, the researcher analyzes the needs of the new system and develops a system that meets the needs. Then the researcher determines the role of the user in the new system which can be seen in Table 2. The new system requirements are as follows:

- The system can be accessed by parties who play a role in the academic activities of SMK Negeri 1 Tondano.
- The system provides appropriate access rights based on user level.

- The system can manage academic data based on the access rights granted.
- The system provides access for students with certain feature limits.

Table 2. User Roles in the New System.

No	User	Responsibility
1	Admin	Is responsible for managing academic data such as users, subjects, classes, schedules
2	Teacher	Is the educational staff who is given access to manage students. Is the educational staff who is given access to manage students
3	Student	This is the party that is given access to view schedules and classes

3. System Process

At this stage, the researcher determines all the processes that will exist in the academic information system that will be created. See Table 3.

Tabel 3. System Process.

No	Process	Description
1	Login	This is the process of entering the system by entering a username and password.
2	Manage Teacher data	It is a process for managing teacher data which includes the process of adding, deleting and editing teacher data.
3	Manage Student Data	It is a process for managing student data which includes the process of adding, deleting and editing student data.
4	Manage Subjects	It is a process for managing subject data which includes the process of adding, deleting and editing subject data.
5	Manage Class	It is a process for managing class data which includes

Design dan Prototyping

At this stage, the researcher used Unified Modeling Language (UML) UML system modeling with the diagrams used, namely use cases, activity diagrams, sequence diagrams, and class diagrams.

Use Case Diagram

a use case diagram for the Academic Information System of SMK Negeri 1 Tondano which depicts the interaction between one or more actors and the system created. See Figure 2.

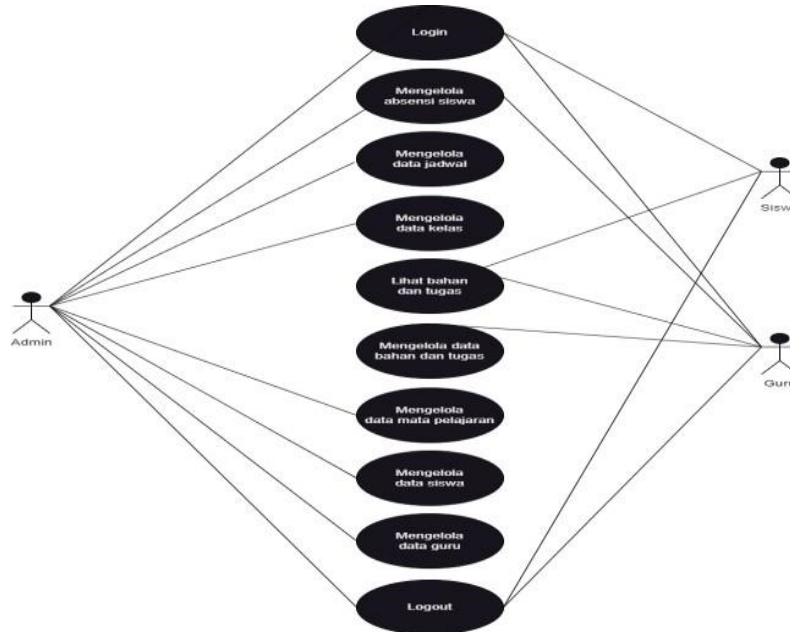


Figure 2. Use Case Diagram

Activity Diagram

The following is an activity diagram that describes the workflow of the system in the academic information system of SMK Negeri 1 Tondano. See Figures 3, 4, and 5.

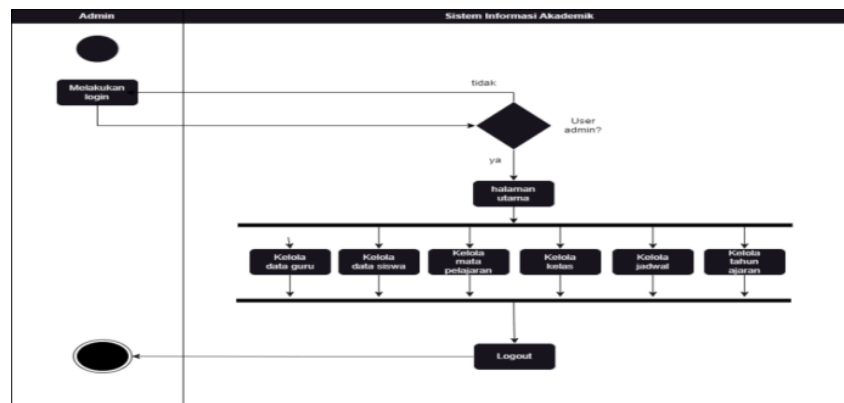


Figure 3. Admin Activity Diagram

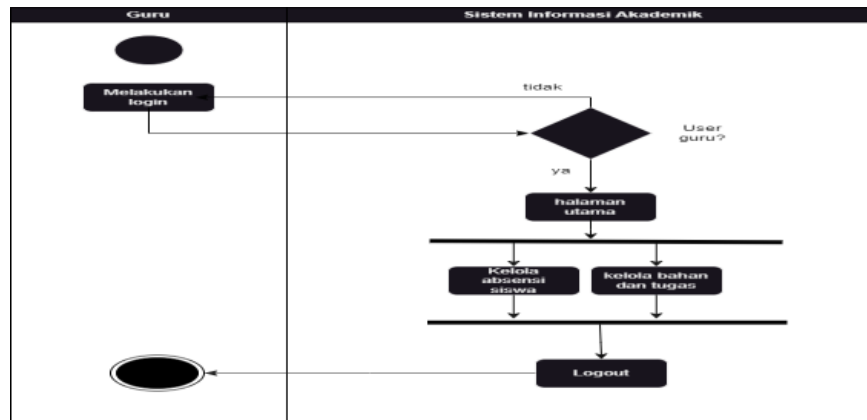


Figure 4. Teacher Activity Diagram

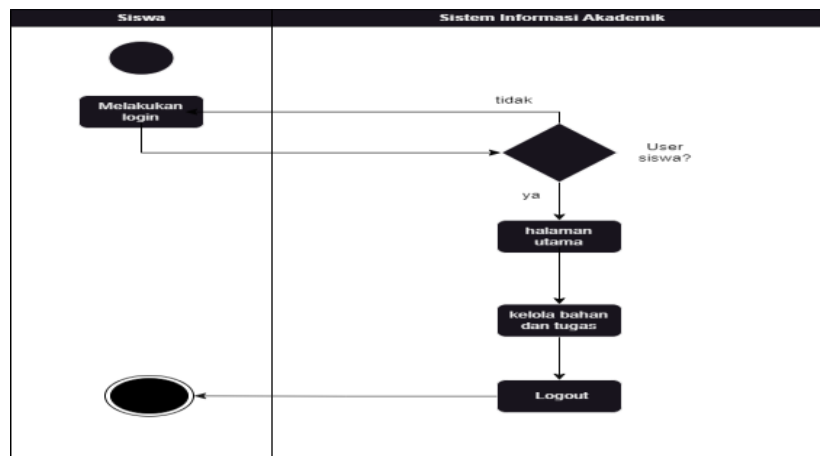


Figure 5. Student Activity Diagram

Class diagram

In designing a database, researchers use class diagrams to explain the data model of a program. See Figure 6.

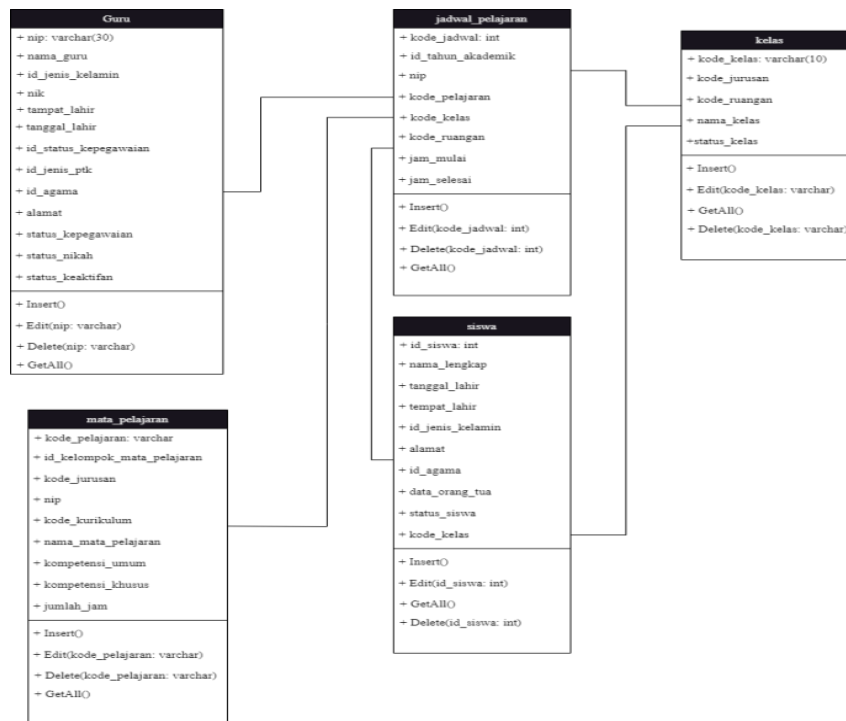


Figure 6. Class Diagram

Development

Database Implementation

This is the implementation of the academic information system database at SMK Negeri 1 Tondano which is shown using a relational diagram database. See Figure 7.

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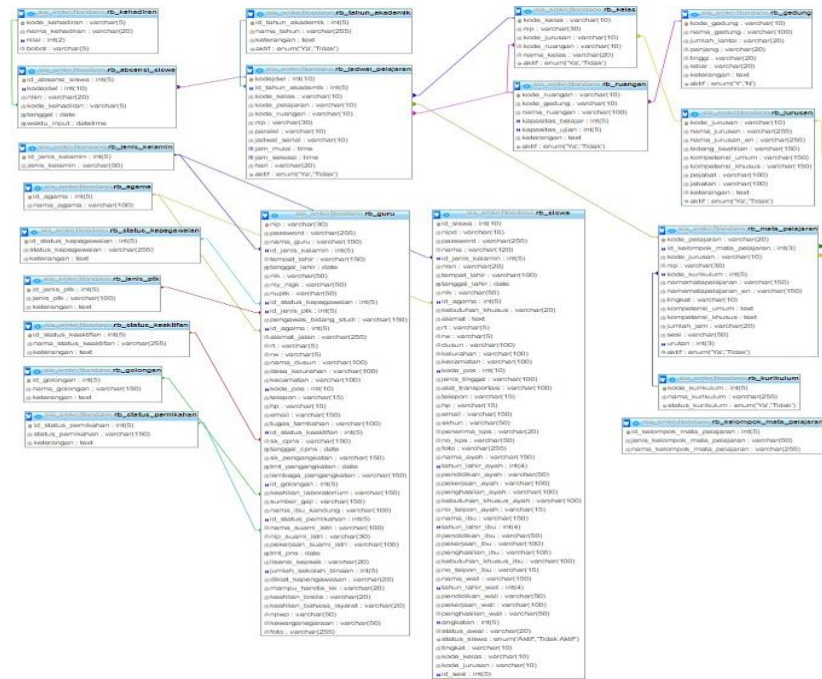


Figure 7. SMK Negeri 1 Tondano Database System

Web Page Implementation

The following is the implementation of the web page interface design for the Academic Information System of SMK Negeri 1 Tondano following the design that has been made. See Figures 8, 9, 10, and 11.

SISTEM INFORMASI AKADEMIK SMK NEGERI 1 TONDANO

Silahkan Login Pada Form dibawah ini





☐ Remember Me

Masuk

Figure 8. Login Page



Figure 9. Admin Dashboard Page

No	Kode Pelajaran	Jadwal Pelajaran	Kelas	Guru	Hari	Mulai	Selesai	Ruangan	Semester
1	MKD6	Pengantar Teknologi	Kelas XII Multimedia	Judithira Sinaulan (Guru Kelas)	Senin	09:00:01	11:00:00	A.1	2023I

Showing 1 to 1 of 1 entries

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Figure 10. Teacher Dashboard Page

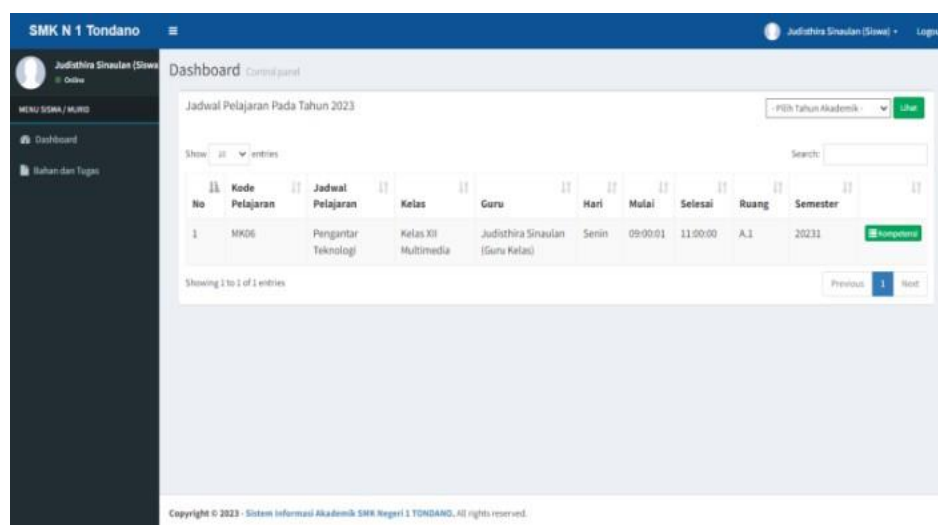


Figure 11. Student Dashboard Page

Testing

The development of the website-based Academic Information System for SMK Negeri 1 Tondano has been completed and testing of the application has been carried out. Application testing is carried out using black box testing. Black box testing is a test carried out to test the functions in the system, especially the input and output systems, whether they are following what is desired or not.

The development of a web-based Academic Information System for SMK Negeri 1 Tondano can help process academic data at the SMK Negeri 1 Tondano school. This system has been created and tested using black box testing. From the results of the tests that have been carried out, it can be concluded that all functions in this system have run as expected and are valid.

CONCLUSION

The development of the web-based Academic Information System for SMK Negeri 1 Tondano has been successfully carried out which can be proven by the results of system testing using black box testing with the conclusion that all functions in this system have run as expected and are valid. This web-based Academic Information System for SMK Negeri 1 Tondano is also able to help users manage, process, and search for academic data more effectively and efficiently so that academic data can be integrated well, this also means that users don't need more time. again to manage academic data.

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