



Development of a Neo-Feeder Integrated Web-Based Study Results Report Information System in Inland and Ferries Transport Polytechnic of Palembang

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Abstract

The purpose of this study focuses on developing a system for printing Student Study Result Cards (KHS) in the information environment of the River, Lake and Crossing Transportation Polytechnic. The information system was developed using the Waterfall Method. Overall, there are four stages of research including information system needs analysis, information system planning, information system development and information system development. Initial research focuses on identifying problems and finding efficient problem solving. Furthermore, analysis and information on the planning development system are carried out so that a mature planning system is obtained and ready to be developed. The information system prototype was tested with the aim of measuring system performance, both in terms of functionality and effectiveness. The test results show that the information system has effectiveness as indicated by the validation results with a value reaching 100 percent. Meanwhile, functional testing also shows that the entire module can work well. Based on testing and analysis, it can be concluded that the information system developed is suitable for use.

Keyword: Information System, Study Result Report, Waterfall Method.

1. Introduction

Information Technology (IT) is developing rapidly by significantly changing various fields. The increasing need for information processing and recording supported by increasingly rapid internet connectivity has a major impact on all institutions and organizations (Schwab, 2019). One of the agencies/institutions that is dependent on IT is higher education, the increasingly tight competition between higher education institutions, encourages the taking of anticipatory steps through policies and strategies in competition, especially in the IT field (Aswati, 2015). In addition, the government also encourages the use of IT in several processes that run in higher education, one of which is in the management and reporting of higher education

data (Sitorus, 2023). One of the ITs that is commonly used to support processes/activities in an institution is the Information System (IS) (Sulistiyanini, 2018). IS is a series of components that work together to coordinate, process, summarize and share the information needed to support policy making in one entity/institution (Wiguna, 2017). The need for valid and accurate information, especially lecture activity data, is a core need of a university in supporting policy making (Ali, 2015). Based on the Regulation of the Minister of Transportation Number PM 117 of 2021 concerning the Organization and Work Procedures of the Palembang River, Lake and Ferry Transportation Polytechnic (SDP) Palembang is a state higher education under the Ministry of Transportation which is responsible to the Head of the Transportation Human Resources Development Agency (BPSDM). As a higher education institution under the Ministry of Transportation, the SDP Palembang Transportation Polytechnic implements the use of IS to support the recording of student conduct activity data (Firzatullah, 2023).

In line with this, the government also encourages the use of IS in recording student academic data so that it can be integrated with the higher education database (Perwira, 2017). One of the academic data recaps published to students is the Study Result Card (KHS). KHS is the result of a recapitulation of students' academic achievements from each semester as indicated by the Semester Achievement Index (IPS) and Cumulative Achievement Index (IPK) during the relevant effective study period (Umagapi, 2019). The recapitulation of KRS using SI has been carried out in research (Ismail, 2018) and (Muliawan, 2023) providing benefits in ease of recapitulation, efficiency of reporting and facilitating data search. Based on the Regulation of the Minister of Research, Technology, and Higher Education Number 61 of 2016 concerning the Higher Education Database (PDDikti), it is mandatory for universities to report data on the implementation of education through the Higher Education Database (PDDikti). Reporting data to PDDikti is very important because this information is used in SI SIVIL, SISTER, SIM TENDIK, PIN, KIP, the accreditation process by BAN PT/LAMP, research and journals, student and lecturer service, and scholarship requirements. Meanwhile, Neo Feeder is a higher education data reporting management application that integrates higher education reporting with PDDikti (Sitorus, 2023). Data reporting through Neo Feeder must comply with the regulations of Permenristekdikti Number 61 of 2016 Article 10 point (7) and Article 12 point (3). Failure to report can result in actions from the Ministry of Education and Culture such as delayed accreditation applications to invalid diploma numbering.

Research by (Abdi, 2017) and (Belluano, 2021) shows that the integration of SI KHS and Neo Feeder can be done using the Application Protocol Interface (API) programming interface by accessing the web service provided by Neo Feeder. Meanwhile, API is a mechanism that allows two software components to communicate using a series of definitions and protocols (Salim, 2021). Based

on the problems that have been explained, this study focuses on developing a website-based KHS Information System in the SDP Palembang Transportation Polytechnic environment that can be integrated with Neo Feeder..

2. METHOD

2.1. Framework Research

The stages in the KHS IS development research are presented in the flowchart. The first stage is the collection of IS functional requirements from stakeholders involved, literature and field observations. The data collection process is carried out using interview methods, literature reviews and report observations. The next stage is IS design, where IS is designed in the form of an Entity Relationship Diagram (ERD) to determine the relationship between data entities in IS, creating Usecase Diagrams to analyze activities and interactions between users in IS and creating IS user interface mockups.

The next stage is IS development, where the IS development process refers to the Waterfall method which is one part of the SDLC model. The Waterfall method is implementing a systematic and gradual approach, where the stages of requirements, design, implementation, verification and maintenance run systematically and gradually. The Waterfall method has advantages, where the results of IS development have good quality compared to development using other methods. Meanwhile, the Waterfall method has disadvantages, where the development time will be longer which also results in increased production costs (Maulana, 2023). The final stage in the research is the evaluation and validation test stage, where testing uses the blackbox method by testing the functionality of the IS that has been developed. Blackbox testing (Irwan, 2022) is behavioral testing, where testing is carried out to observe the input and output results of the software without knowing the code structure of the software. Testing is carried out at the final stage of software development to determine whether the software's functionality is functioning properly. Meanwhile, Blackbox techniques that are commonly used in testing software include all pair testing, boundry value analysis, cause-effect graph, equivalence partitioning, fuzzing, orthogonal array testing and state transition (Nidhra, 2012).

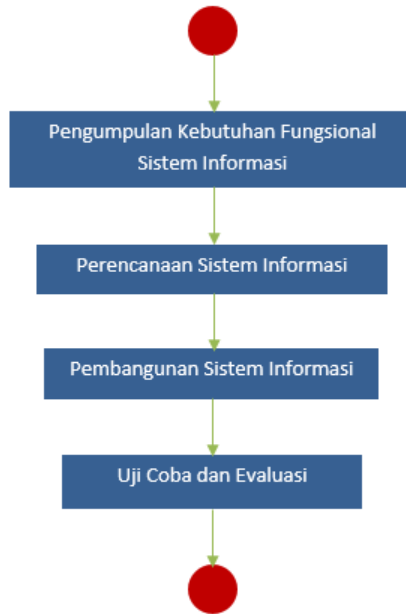


Figure 1. Research Framework Diagram

2.2. API Integrated on Information System

The integration between three different SIs including SI KHS, Neo Feeder and PDDikti takes place as shown in the diagram in Figure 5. SI KHS can perform Get, Post, Put and Delete processes on the Neo Feeder application by utilizing the REST API protocol. The data integration process between SI KHS and REST API occurs synchronously, where SI KHS will process data in the local database if the process taking place on the Neo Feeder Web Service runs well. Meanwhile, data integration between Neo Feeder and PDDikti runs asynchronously, where in data integration, the Neo Feeder administrator needs to carry out the synchronization process first.

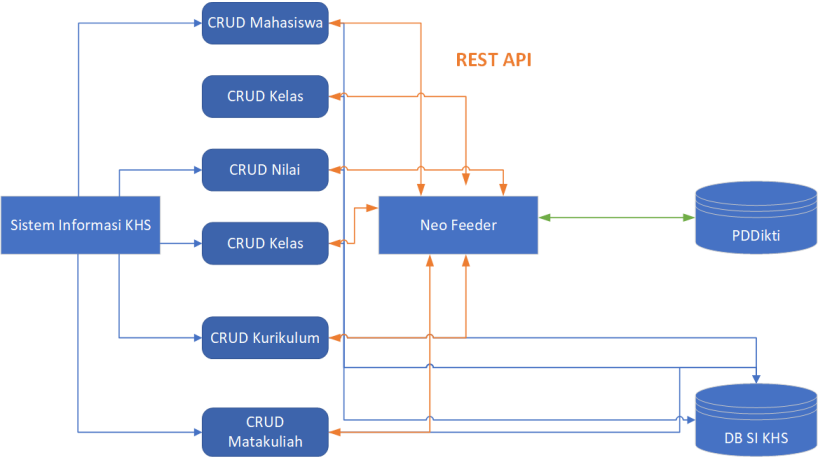


Figure 2. API Integrated on Information Systems

2.3. Usecase Information Systems

Usecase diagrams are used to model information systems that include interactions between actors and information systems (Gemino, 2009). In this study, there are 4 (four) actor entities including administrator users, academic fields, study programs and students. Where the interaction between the actors is depicted in Figure 3.

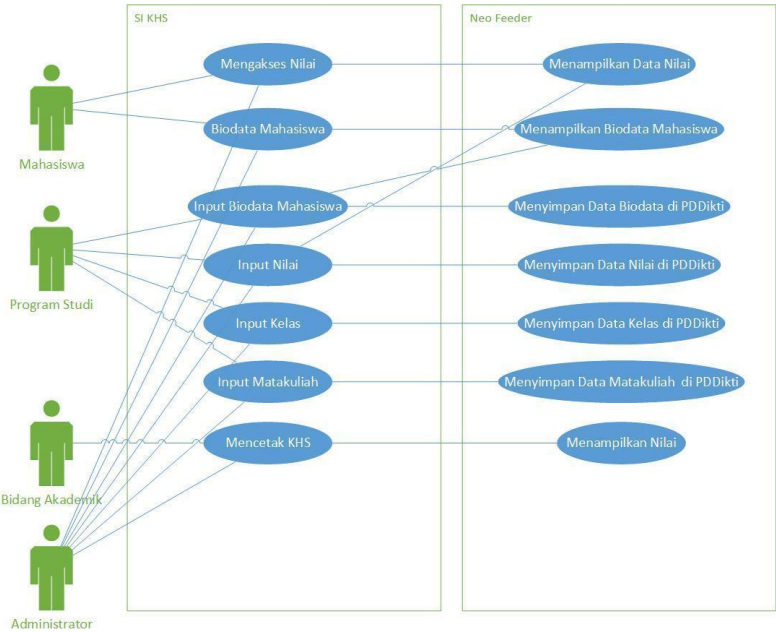


Figure 3. Usecase Information Systems

2.4. Mockup Information Systems

The user interface mockup is used as a reference source in building the IS user interface. Where the user interface mockup of the data display page is depicted in Figure 4.

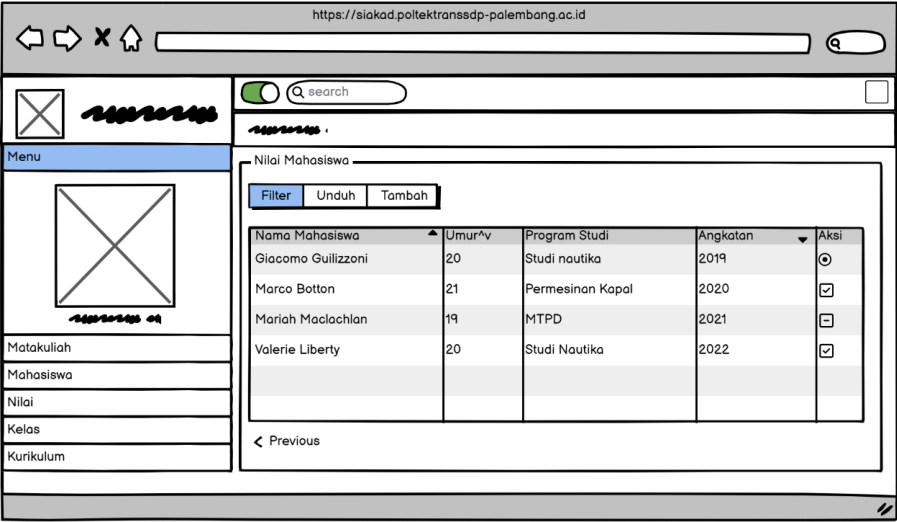


Figure 4. Mockup Information Systems

2.5. Information Systems Testing Scenario

Testing and evaluation of the information system were conducted using the black box method, where the test respondents were stakeholders directly involved in the KHS IS business process in the SDP Palembang Transportation Polytechnic environment. The number of respondents involved was four people covering four types of users, including administrator users, academic field users, study program users and student users. Meanwhile, the test scenario instruments are listed in Table 1.

Table 1 Information Systems Testing Scenario

No	Testing Unit	Result
1.	The program can display data on SI.	Success / Failed
2.	The program can input data into the SI database.	Success / Failed

3.	The program can change data into the SI database.	Success / Failed
4.	The program can delete data into the SI database.	Success / Failed
5.	The program can be integrated with Neo Feeder in displaying data.	Success / Failed
6.	The program can be integrated with Neo Feeder in inputting data.	Success / Failed
7.	The program can be integrated with Neo Feeder in changing data.	Success / Failed
8.	The program can be integrated with Neo Feeder in deleting data.	Success / Failed

In evaluating the efficiency, effectiveness and reliability of IS, an evaluation was carried out using a questionnaire on a Likert scale as in Table 2.

Table 2 Unit evaluation in liert scale

No	Unit Evaluation	Score				
		1	2	3	4	5
1.	Data management efficiency.					
2.	Business process efficiency					
3.	API transaction efficiency procedure.					
4.	PDDikti reporting efficiency					
5	Data distribution efficiency.					

3. DISCUSSION AND RESULT

3.1. Implementation

Based on the analysis and planning carried out, the next step is the development process of the implemented information system components. The implementation

of the information system is used as a benchmark for the design and implementation process as a whole, both on the software and hardware sides.

3.2. Software

Software used in developing information systems to control basic hardware such as operating systems, programming languages and utilities, as follows:

- Microsoft Windows 11
- XAMPP Local Server
- Microsoft Visual Studio Code
- Microsoft Edge
- Neo Feeder Version 2.4.0
- Postman
- Composer
- Codeigniter 3

3.3. Hardware

Hardware plays an important role in program creation and data processing, because to be able to implement the designed information system, hardware is needed that is in accordance with the proposed information system. While the hardware used is as follows:

- MSI Thin Core i7 Gen 10, 8 GB RAM, Nvidia Geforce RTX 2040, 512GB SSD.
- Virtual Machine 2 VCPU, 4GB RAM, 60GB SSD.

3.4. Interface

Aksi	Kode Mata Kuliah	Nama Mata Kuliah	Bobot MK (SKS)	Program Studi	Jenis Mata Kuliah
Aksi	BB 245	KEWARGANEGARAAN	2	Manajemen Transportasi Perairan Daratan	Wajib
Aksi	BB 245	KEWARGANEGARAAN	2	Pengelolaan Pelabuhan	Wajib
Aksi	BB 544	PERATURAN PERUNDANGAN ANGKUTAN DI PERAIRAN	2	Pengelolaan Pelabuhan	Wajib
Aksi	DPKA10B2	Pendidikan Agama I	2	Pemesinan Kapal	Wajib
Aksi	DPKA10B2	Pendidikan Agama (Religion Education)	2	Pemesinan Kapal	Wajib
Aksi	DPKA4011	Budaya Keselamatan, Keamanan dan Pelayanan (Safety, Security, and Service Culture)	1	Pemesinan Kapal	Wajib
Aksi	DPKA4052	Pendidikan Pancasila	2	Pemesinan Kapal	Wajib
Aksi	DPKA4062	Pendidikan Bahasa Indonesia (Indonesian Language)	2	Pemesinan Kapal	Wajib
Aksi	DPKA4092	Pendidikan Kewarganegaraan (Civic Education)	2	Pemesinan Kapal	Wajib
Aksi	DPKA4011	Budaya Keselamatan, Keamanan dan Pelayanan VI	1	Pemesinan Kapal	Wajib

Figure 5. List of courses

Based on the planning that has been done, the implementation of the development of the Study Result Card (KHS) information system in the River, Lake and Crossing Transportation Polytechnic environment is obtained, which is shown on the course list page which displays a list of courses as in Figure 8. There are several menus available on the course list page, where there is a download function, namely data matching between the Study Result Card (KHS) information system and Neo-Feeder, after the button is pressed, a progress bar will appear indicating that the data matching process is in progress. Meanwhile, if the data matching process fails due to technical factors, an error message will appear at the top as in Figure 9. There is also an add menu used to add courses that are integrated with Neo-Feeder, where the added data is not only stored in the KHS information system, but also stored in Neo-Feeder. In addition, there is also a delete and update menu by pressing the action button, where the delete feature will only delete data from the KHS information system, but not on Neo-Feeder, this applies to overcome the dependency of deletion errors on other tables in Neo-Feeder

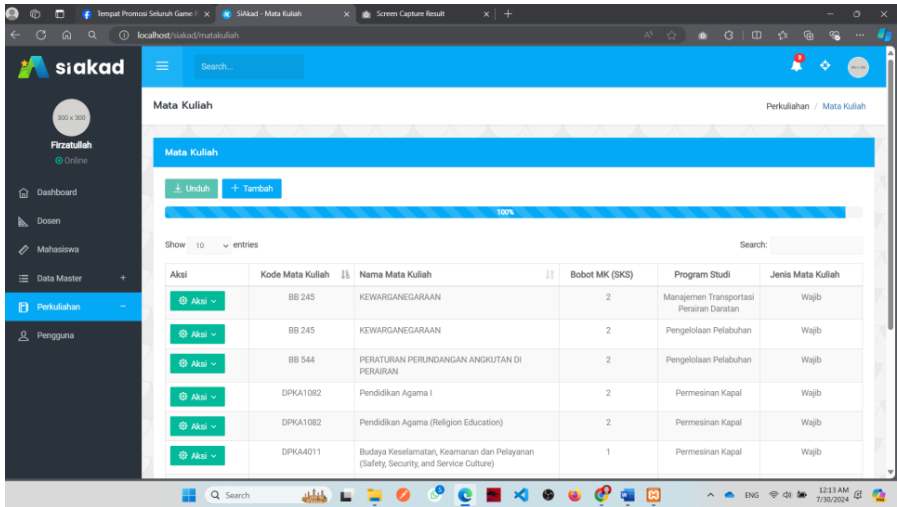


Figure 6. API Integrated Process

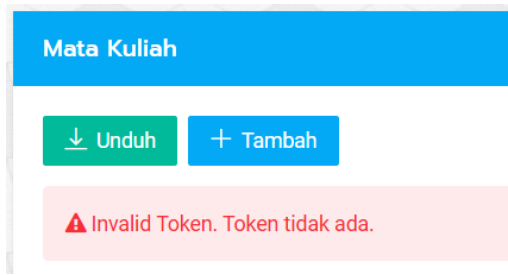


Figure 7. Integrated error

Next is the student menu, where this menu has two features including the download feature to download and match student data in the KHS information system database with Neo Feeder, while the other feature is student details. The student details feature will display student data along with KHS and KRS details that students are studying in each semester by pressing select semester which will be displayed as in Figure 8.

KARTU HASIL STUDI (KHS)					FM.PU.AT 02.09-01
TAHUN AKADEMIK : NAMA TARUNA : NOMOR TARUNA : ANGKATAN : TINGKAT/SEMESTER : PROGRAM STUDI :			Catatan : Lembar 1 : Taruna Ybs Lembar 2 : Orang Tua Taruna Ybs Lembar 3 : Program Studi Diploma III Studi Nautika		
No	MATA KULIAH	BOBOT SKS	NILAI		BOBOT x ANGKA
			ANGKA	HURUF	
1	MATEMATIKA TERAPAN	2	3.50	AB	7.00
2	AGAMA	2	3.00	B	6.00
3	BAHASA INGGRIS MARITIM	2	3.00	B	6.00
4	ILMU PELAYARAN DATAR	2	4.00	A	8.00
5	BUDAYA KESELAMATAN PELAYARAN	1	4.00	A	4.00
6	PENDIDIKAN KEWARGANEGARAAN	2	3.00	B	6.00
7	BAHASA INDONESIA	2	3.00	B	6.00
8	SISTEM NAVIGASI ELEKTRONIK	3	4.00	A	12.00
9	PROSEDUR DARURAT DAN SAR	2	3.50	AB	7.00
10	PANCASILA	2	3.50	AB	7.00
11	KOMPAS DAN SISTEM KEMUDI	2	4.00	A	8.00
12	FISIKA TERAPAN	2	3.00	B	6.00
Jumlah		24			83.00
INDEKS PRESTASI SEMESTER (IPS)					3.46
NILAI KONDITE (NK)					3.00
NILAI KESEMAPTAAN (NS)					3.00
PERINGKAT AKHIR SEMESTER (PAS)					3.32
INDEKS PRESTASI KUMULATIF (IPK) PADA SEMESTER					
I	II	III	IV	V	VI
3.46					

Figure 8. Study Result Report

While the course grades page displays a list of student grades for certain courses in each semester, on the page there is a select semester so that the data displayed is not too much, because if the data displayed is too much, the client computer that displays the data requires a rendering process that takes more time. The page only has one feature, namely the download feature which functions to download and match data between the KHS information system and Neo-Feeder as in Figure 9.

siakad

Kenny Ridgion
Online

Dashboard
Dosen
Mahasiswa
Data Master
Perkulahan
Program Studi
Mata Kuliah
Kelas Kuliah
Nilai Kuliah
Pengguna

Nilai Kuliah

Semester: 2022/2023 Genap

Unduh

Show 10 entries

Aksi	Semester	NIM	Nama Mahasiswa	Mata Kuliah	Kelas	Nilai
Aksi	2022/2023 Genap	2103104	FEBRINA DEVI SIRINGORINGO	Manajemen Risiko	2 E	A
Aksi	2022/2023 Genap	2103104	FEBRINA DEVI SIRINGORINGO	Perawatan Fasilitas Kapal	2 E	A
Aksi	2022/2023 Genap	2103104	FEBRINA DEVI SIRINGORINGO	Perawatan dan Perbaikan Kapal (Preventif Maintenance)	2 E	A
Aksi	2022/2023 Genap	2103104	FEBRINA DEVI SIRINGORINGO	AMDAL SDP	2 E	AB
Aksi	2022/2023 Genap	2101008	ADHIKA ATHA SUWANDI	BAHASA INGGRIS MARITIM	N2A	AB
Aksi	2022/2023 Genap	2101008	ADHIKA ATHA SUWANDI	ILMU PELAYARAN DATAR	N2A	AB
Aksi	2022/2023 Genap	2101008	ADHIKA ATHA SUWANDI	ISYARAT DAN VISUAL	N2A	A
Aksi	2022/2023 Genap	2101004	ANTONIO WIRASAGA	BAHASA INGGRIS MARITIM	N2A	B
Aksi	2022/2023 Genap	2101004	ANTONIO WIRASAGA	ILMU PELAYARAN DATAR	N2A	B
Aksi	2022/2023 Genap	2101004	ANTONIO WIRASAGA	ISYARAT DAN VISUAL	N2A	A

Showing 1 to 10 of 4,029 entries (filtered from 21,520 total entries)

Previous 1 2 3 4 5 ... 403 Next

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Figure 9. List of student score

The user menu displays a list of users who can log in to the KHS information system, where currently there are only two types of users including administrators and students as shown in Figure 10. Each type of user has its own privileges in accessing the menu. Where the administrator user type has access to all pages and features in the KHS information system, while student users can only access the student's details page depending on the student associated with the account.

Tambah Pengguna

Jenis *
Administrator

Nomor Induk Peserta Didik

Username *
Username

Nama *
Nama

Password *
Password

Email *
Email

Simpan Batalkan

Figure 10. User form

The login page is the initial gateway to access the KHS information system, where there are two inputs that must be entered, including username and password as in Figure 11. If the user enters the correct username and password and is registered in the information system, the user will be directed to the information system

dashboard page, to be able to explore the existing features. Meanwhile, if the user enters the wrong username and password, the login page will display a description of the error.

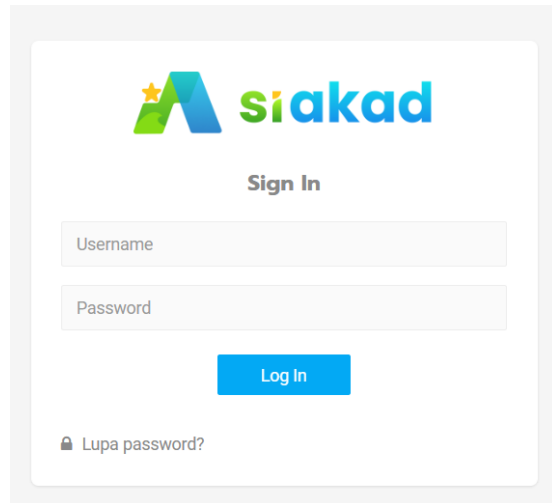


Figure 11. Login page

Information System Testing Using Blackbox Testing

Testing and evaluation of the information system was conducted using the blackbox method, where the test respondents were stakeholders directly involved in the KHS information system business process in the River, Lake and Crossing Transportation Polytechnic environment. Meanwhile, the testing instruments are listed in Table 2.

No	Unit Pengujian	Hasil
1.	The program can display the dashboard page according to the user's role.	Success
2.	The program can display courses, grades, students, and classes.	Success
3.	The program can add data for courses, grades, students, and classes.	Success
4.	The program can edit data for courses, grades, students, and classes.	Success
5.	The program can delete data for courses, grades, students, and classes.	Success
6.	The program can synchronize data with Neo-Feeder.	Success
7.	The program can print the Study Result Card (KHS).	Success
8.	The program can print the Study Plan Card (KRS).	Success

Based on the tests conducted, the test results obtained a success rate of each feature reaching 100 percent. Where this shows that the program's functionality is running well and in accordance with the predetermined planning. Meanwhile, no program functions were found to be not functioning.

4. CONCLUSION AND SUGGESTION

4.1. Conclusion

Based on the results of the research that have been presented, the following conclusions can be drawn:

1. Based on the results of testing and evaluation using the waterfall method, it can be concluded that the development of the Study Result Card (KHS) information system in the River, Lake and Crossing Transportation Polytechnic environment requires the development of a website-based information system that can manage student study results integrated with Neo-Feeder.
2. Based on the results of testing the functionality and efficiency of the information system, it can be concluded that the information system developed is feasible to operate.
3. Information system planning utilizes audio with the waterfall method in the conclusion of the development of the Study Result Card (KHS) information system in the River, Lake and Crossing Transportation Polytechnic environment can be used in the development of similar information systems with good test results.

4.2. Suggestion

Based on the conclusions that have been described, suggestions can be formulated in the development of the Study Result Card (KHS) information system in the River, Lake and Crossing Transportation Polytechnic environment by taking into account the audit of the readiness of information system development using methods such as The Open Group Architecture Framework (TOGAF) so that planning is more objective and more focused. In addition, testing the effectiveness of the information system being developed can also be carried out.

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