

# XP Model for Information Systems Recording Academic Data

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**Abstract**— Fulfillment of academic information to support a decision in a college is very necessary, especially to support an academic planning and evaluation in higher education. Often management asks the student academic bureau to find out the number of students based on their class, period, number of graduates, class schedules to student grades. This encourages the student academic bureau to create a desktop-based application that can be used to find out more quickly the needs requested by management. By using the extreme programming (XP) model, it can accommodate the academic information needs of student affairs in universities in the form of a recap of academic data that can be presented in real time and quickly for the upper level management.

**Keyword**— Recording Akademik Data, Information System, Extreme Programming (XP)

## I. INTRODUCTION

Student academic data contained in the information system of student academic institutions at the ARS International School of Tourism Management (STP ARS) for the purposes of planning and evaluation carried out by management is very necessary, in work meetings that discuss student academics there are some data needed such as data on the number of students who are accepted, active, leave and graduate. To evaluate lecture activities, data on class schedules and grades obtained by students each semester are needed.

STP ARS has an academic information system that processes student academic field data, this application can process student data which will be updated every semester at the beginning of new teaching. This application is more supportive for academic operational activities only, so that it has not presented information to management specifically and quickly. In fulfilling the needs for management, more is presented in the form of paper and oral documents from academic bureau employees who usually require a long time, so that in making good decisions strategic plans and evaluations also require a long time.

This is the basis for creating an information system for recapitulating academic data using extreme programming (XP) models which only require a small team to create an application for the academic data recap that is intended to overcome unclear requirements and change requirements very quickly within them [9].

There are several studies regarding this research, for example:

1. According to Yulsilvia and Yusnita [10]: "Information systems in the world of education have a role to make the teaching and learning process more creative and competitive, besides that in education utilizing existing technological advances to deliver information can be more effective and easily conveyed to the intended, namely students and academics. Especially for educational institutions which aims to create experts in the field of information and technology, naturally it is capable of utilizing and implementing a better information system so that information is more easily conveyed."

The shortcomings in the system are as follows:

a. In the design that is made only intended for the academic and student affairs operational part, there

is no fulfillment for the level of college management.

- b. In the research conducted, it does not discuss the operational activities that are carried out daily with regard to conditions, class schedules and grades
- b. One solution to the problems of existing academic services.
- c. This application is website based, making it easier to do services faster and more efficiently.

2. On the other hand, according to Putrama, Divayana [8] suggests that:

“The research aimed to produce information system design related to student data management specifically to meet the information needs needed in the preparation of department accreditation forms at the Engineering and Vocational School at the University of Education Ganesha. In this study, the system was built using the method of developing Software Development Life Cycle (SDLC) with the Waterfall model. The system design is made using object-based system analysis by fulfilling several system modeling using UML and through the stages of system requirements analysis, design, implementation and verification. The output of this research is a web-based information system that is connected to a data warehouse system that is made for the needs of the overall accreditation form at Undiksha FTK.”

The shortcomings in the system are as follows:

- a. The system created is only intended for accreditation programs that are conducted every few years, so that data updates need to be reviewed if there is an upcoming accreditation.

carried out directly on the web or through other applications.

The advantages of this system are:

- a. Reducing academic related services in front of academic and student offices.
- b. It is only limited to system design that has not been implemented for the implementation of accreditation carried out by universities.

The advantages of this system are:

- a. Reducing the length of time in the process of making document forms when submitting or visiting Dikti.
- b. In the application that was designed it was enough to include the data needed in filling out the standard three accreditation forms which were indeed related to student data.
- c. This website-based application facilitates direct viewing when needed both in the form-making process and during visitations by the Higher Education.

## II. LITERATURE REVIEW

Extreme programming (XP) is a software development model that simplifies various stages of system development to be more efficient, adaptive and flexible [4]. In the development process using XP follows the principles of Agile development because XP is part of Agile itself [2]. Agile method is a software development methodology that is based on the same principles or the development of a short-term system that requires rapid adaptation of the developer to changes in any form whose steps consist of planning, implementation, testing, documentation, deployment and maintenance [7].

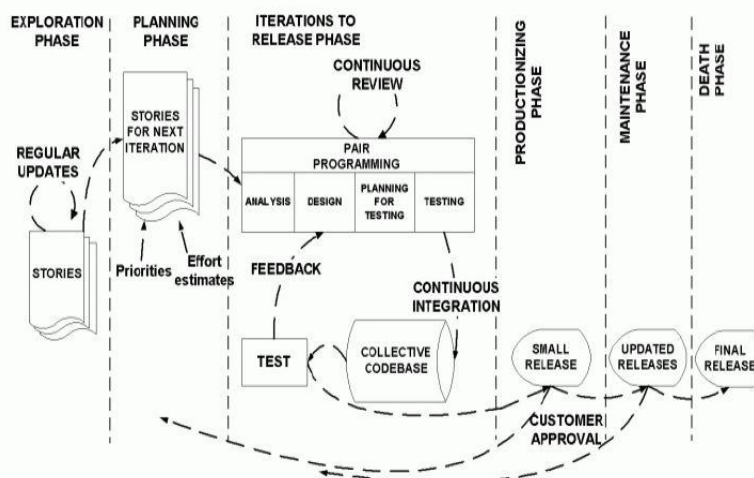


Fig.1. Stages of Extreme Programming  
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Phases or stages of system development using the XP model include exploration phase, planning phase, iteration to release phase, productionizing phase, maintenance phase, death phase [6].

1. Exploration phase, the developer is discussing with the user to discuss what is needed by the user to be involved in the development of the system to be built both the software requirements and the technology used. In addition, the developer also determines the scope of the information system to be built so that the direction of the goal is clear. This need is documented so that it can be used for the next phase.
2. Planning Phase which is a continuation of the previous phase by planning on what has been identified in the exploration phase. Started making a plan for the system development that was implemented in the project schedule to be implemented up to the planning of the needs of users involved in the system being developed.
3. Iteration to release phase, in this phase the workmanship of the architecture and prototype starts to be done, the results of the prototype are discussed with the user so that if there is a special request from the user the prototype can be improved. The prototype is built in the programming language proposed by the developer. The program is a statement arranged into a single unit procedure in the form of a sequence of steps arranged logically and systematically to solve problems [5].
4. Productionizing phase is the fourth phase is the phase to test the results of the iteration phase. Software or applications that have been built are tested as a whole by involving the user. If there is no request from the user to be improved, the software is ready to be integrated.

5. Maintenance phase, in this phase the application or software that has been integrated and used by the user is evaluated based on feedback from the user during the use of the software. Furthermore, if needed to repair and develop software based on user feedback and release the latest software version according to user needs.
6. Death phase is the last phase, namely by releasing the latest application or software that is ready for use. Of course this software is an improvement from the previous version that has been adapted to user needs.

### III. PROPOSED METHOD

The use of the XP method on the construction of the system recap academic data is an appropriate selection, this can be seen at each stage of development that is in the XP method starting from the exploration stage which thoroughly examines what the client needs and does not forget to do documentation. In the next stage, the planning that identifies the results of the exploration phase in the form of a development schedule. In the iteration stage of system development, there is a system analysis, system design and system testing. Then at the production stage will produce an output design module applications that are used in the academic data recap system. System maintenance is carried out periodically on products that will be applied to users, then a review of the responses of system users will be processed quickly. If all stages have been carried out then the final stage is to implement the system which will be operated as a whole.

The following are the users involved and their roles and responsibilities [1].

Table 1. Parties and their role in Extreme Programming

Side	Role
Programmer	The party that plays the role of making the program and keeping it as simple as possible. The key to XP success depends on the communication that occurs with internal and external programmers.
Customer	The party who writes the user's story, makes a trial of a functional system and determines when the user's story has been implemented according to their needs. This user's story also determines which priorities need to be done first.
Tester	The party helps the Customer to conduct system functional tests, deliver the results, and maintain the tools and data needed in the test.
Tracker	Pihak ini berfungsi untuk memberikan umpan balik dalam metode XP. Tracker mengevaluasi estimasi waktu dan sumberdaya yang dibuat oleh tim dan memberikan saran seberapa akurat estimasi tersebut dibandingkan dengan kondisi riil yang terjadi.
Coach	This party serves to provide feedback in the XP method. The tracker evaluates the estimated time and resources made by the team and gives advice on how accurate these estimates are compared to the real conditions that occur.

Consultant	This party is an outsider who has knowledge of a specific area and provides direction to team members to resolve problems that may arise in their area of competence.
Manager	This party is the decision maker during the process. To be able to make decisions, managers need to communicate with team members about the current conditions, whether there are difficulties or inefficiencies during the process.

Communication that focuses on good communication between programmers and users and between programmers is the basic value of the method of extreme programming, courage, namely software developers must always have confidence and courage and integrity in carrying out their duties, simplicity is to do it all simply, reliable feedback so that qualified team members are needed, quality work is a quality process that has implications for quality software as the end result [4].

#### IV. CONCLUSION AND SUGGESTION

##### A. Exploration

In this phase can be generated in the form of previous system analysis that runs on academic students, estimation of the development of risk identification software, software architecture documentation and documentation of technology and tools needed in the construction of an academic data recap information system. Overall, this is well documented and neat.

##### B. Planning

At the planning stage is a continuation of the exploration phase. At the planning stage can be generated in the form of a schedule for the implementation of information systems academic data recap. With the implementation of a system development schedule that is made has clear objectives in the form of a description of how long the implementation is needed to carry out system development. This makes the implementation of the system development scheduled well and regularly. Determining the length of time the construction of a well-scheduled document filing information system is intended to be a time limit in each stage of the development process. So that during the development of the system it is expected that communication and interaction between developers and clients will become clearer and the implementation time of each development process becomes well-organized.

Table 2. Schedule of Development of Academic Data Recap Information System

No	Stages of Activity	Week -																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Eksplorasi a. Conventional system analysis b. Early identification of system requirements by clients c. System architecture design built d. Determination of technology & system tools				X																					
2	Planning a. System analysis documentation based on the exploration phase b. Making an information system development schedules				X																					
3	Iteration Development System Part 1 a. System analysis b. system design c. Test system d. System production					X																				
4	Iteration Development System Part 2 a. System analysis b. system design c. Test system d. System production							X																		
5	Iteration Development System Part 3 a. System analysis b. system design c. Test system d. System production									X																
6	Final Production a. Test the system by the client b. System approval by the client																						X	X	X	X
7	Maintenance a. Approval of system maintenance by clients											X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

**C. Iteration To Release**

In the information system development iteration, the recapitulation of academic data taken is system analysis, system design and system testing. From the

results of system testing involving users, feedback will be received from users of user enhancements before the system release.

Table 3. Iteration Stage of Development of Academic Data Recap Information System

Iteration	User	System analysis	System Design	System Test	Feedback
1		User authorization documentation in the system, documentation of user requirements, determination of the right technology to be used on the system built.	System design (procedures & files), interface display design (GUI), system architecture design	Test the entire system, both technology and system architecture up to the modules (GUI) that have been built.	Developers provide each documentation made at this stage to the user. Submission of module revisions especially in the input data and output section by the user
2		System change documentation, system validation documentation, system output documentation	Revise the system design in the 1st iteration stage, validate each module (GUI) that has been built in the 1st iteration, design the system output design.	Test the system parts that have undergone changes including validation in the application module.	User approves changes, revision requests on the output data generated by the module
3		Overall System Documentation.	System revisions to output, overall revision and system checking.	Final system testing.	Developers show the results of overall system improvements, system simulations or trials involving all levels of users

**D. Producing**

At the production stage, the developer shows the results of the entire information system, recapitulation of academic data to the client, in this case is the level of foundation management and application installation of the information system built. Module enhancements are made so that the information system built can be operated.

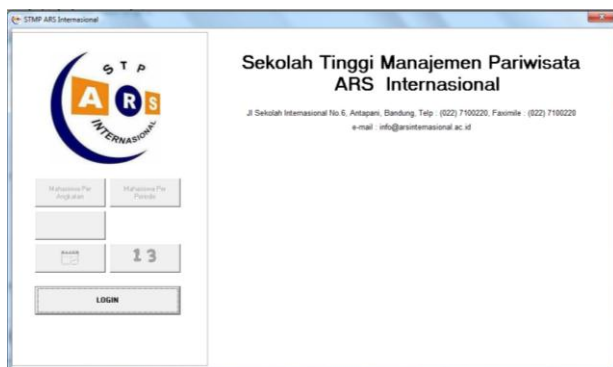


Fig. 2. Login module

The login module is built to limit who (the user) can access the information system academic data recap. This is also to prevent people who are not responsible for entering the system. So that the documents stored in the information system are maintained and the confidentiality of the data.



Fig. 3 Main menu module

The initial display module to display the recap of academic data, provides a recapitulation menu of student conditions, graduates, active lecturer data, and academic values from students.

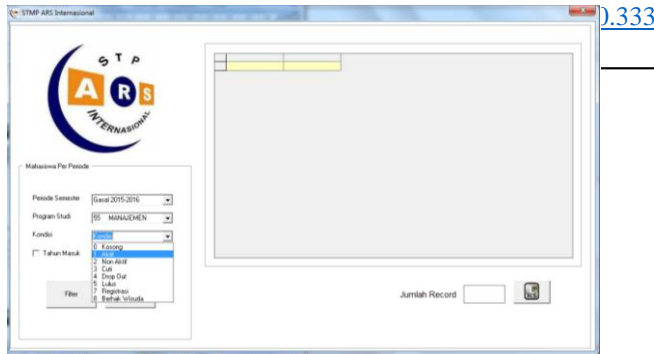


Fig. 4. Student condition module

In the student condition module, displays a recap of various conditions of students from active conditions to drop outs. The module can also see the number of students according to the conditions chosen. And also can transfer in the form of an document files according to user needs.

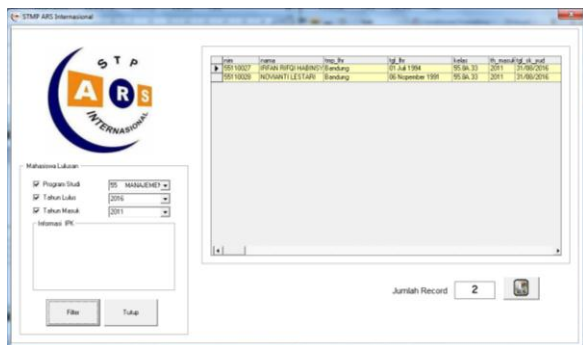


Fig. 5. Graduate module

In the graduate module displays the number of graduates per class and year of graduation, this makes it easy to see how much the graduation rate is obtained by the device.

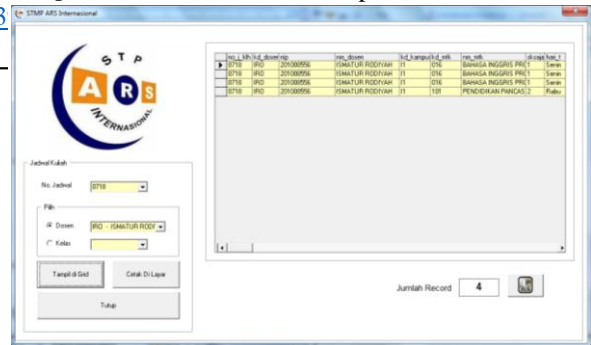


Fig. 6. Module recap lecturer teaching data

For the next module, displaying a recap of lecturer teaching data for each semester, this can monitor the teaching activities of a lecturer each semester.

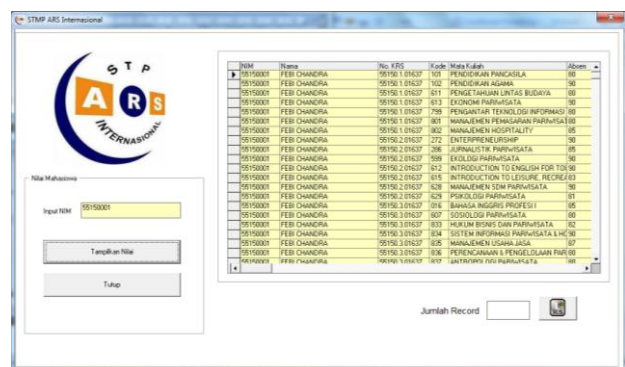


Fig. 7. Student value module

The value module displays each value obtained by students by searching based on the existing nim. Starting from courses, absences, assignments, midterms, final semester exams to the final grade obtained.

After the modules supporting the information system, the academic data recap is completed, then testing the modules with blackbox testing.

Table 4. Black Box testing information system recapitulates academic data

Modul	Aktifitas	Feedback	Test result
Login	Input username dan password	1. If the User or password is still empty, then the message "User or password is still empty" appears. 2. If the user and password are input incorrectly, the message "data input is incorrect" appears. 3. If the username and password are correctly input, then the academic data recap menu appears.	valid
Condition	Options based on year entry criteria	If the requested data is available based on the student's entry year, it will appear according to the criteria selected.	valid
Graduate	Choice based on the criteria for the year of graduation and year of entry	If the requested data is available based on the year of graduation and the year of entry of students, it will appear according to the criteria selected.	valid
Lecturer	Options based on schedule numbers every semester	If the requested data is available based on the schedule number which is the database code for class scheduling, then select the lecturer code or class then it will appear according to the selected criteria.	valid
Value	Input based on student	If you enter the student ID number students correctly, all grade data	valid

## E. Maintenance

Information system for recapitulating academic data that has been built and implemented directly must be carried out periodically maintenance. Each module that has been integrated into the system and is used by the user must be maintained, besides that back feedback from the user whether the module used in the information system recapitulated academic data can accommodate all the request activities for data recapitulation on academics and submitted to management. The modules used by the user are also maintained, if there are still bugs or errors in the module, the user gives feedback to the developer as soon as possible so that they can immediately check and process the module repair. So that the feedback given at this stage can be used as the final refinement of the entire information system to recapitulate academic data before entering the final phase of the death phase. In addition, the developer also made improvements to other modules that support the information system for academic data recap.

## F. Death

Death phase is the final stage of the information system recapitulation of academic data that has been implemented operationally thoroughly and carried out maintenance. Including final improvements to the software and modules (GUI) that have been used by the user. If the final settlement or refinement has been done, the information system for recapitulating academic data can already be operationalized as a whole. And at this stage there is no more system development, this is related to finance and the implementation schedule of information system development to recapitulate academic data.

## V. CONCLUSIONS AND SUGGESTIONS

From this study it can be concluded that extreme programming can be used in making information systems design academic data recapitulation with good communication between clients and among fellow team members as a top priority. The information system for recapitulating academic data can accommodate all requests for data recapitulation regarding academics and presented to management. The process of recapitulating academic data digitally is considered more practical, efficient and safe compared to the recapitulation carried out conventionally which requires a long time in the process.

For the development of information systems, the recap of academic data in the future can be found ways to be online by management wherever they are,

considering that one of the things that hinders the information system of academic recap is confidential and is only internally consumed by ARS STP management.

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