

DESIGN AND DEVELOPMENT OF PROGRAMMING LEARNING PLATFORM BASED ON HEURISTIC APPROACH IN COURSE MANAGEMENT MODULE WITH ITERATIVE AND INCREMENTAL METHOD CASE STUDY: INFORMATION SYSTEM TELKOM UNIVERSITY

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Abstract — Programming algorithm is one of course that must be taken by computer science' students. In fact, Computer science' student of computer science forced to familiar with programming skill. Not only student as novice programmer but also, programming algorithm is not just a single programming skills, but involve more than one different processes. LMS is one of e-learning technology that facilitate lecturer to managing course. It can use to help lecturer familiar with e-learning technology. The research aims to develop a heuristic learning Platform that called CIDEK PLATFORM focused in course management module. This platform can help lecturer to implement e-learning based on LMS technology. In this platform provide heuristic learning to find good solutions to an optimization problem. For platform develop, it will use iterative and incremental method made in four iteration by involving business modelling, requirement analysis, analysis and design, implementation, and testing. Platform based web application is built with by using concept Model-View-Template (MVT) which utilize Python programming language within Django Framework and MySQL database. The result of research is Programming Learning Platform.

Index Terms— Course management module, CIDEK Platform, heuristic learning, iterative and incremental method

I. INTRODUCTION

Programming algorithm is one of critical course in computer science because that student of computer science forced to familiar with programming skill. Not only, student forced to understand programming algorithm, but also student is novice programmer that have new experience about programming skill. [1]. Programming algorithm that courses must be learned by computer science' students. But in fact, programming algorithm is difficult to learn. According to survey from [2] shown 559 novice programmers and 34 lecturers at 6 different colleges in Finland difficult for evaluation of basic programming algorithms.

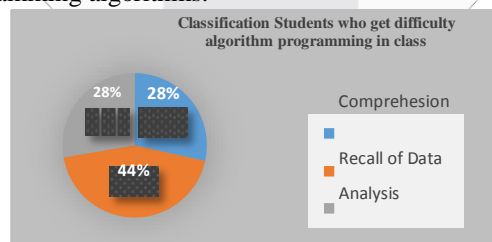


Figure I-1 Classification students who get difficulty algorithm programming in class

In addition, based on survey result that have been obtained from 179 students Information System Telkom University who become respondent in first years college. In figure I-1 show student difficulties in learning programming algorithm situated in analytical skill and comprehension. Programming algorithm is not just a single programming skills, but involve more than one different processes. At the level of lower-level programming, students defines the problem into the algorithms, then poured it into the syntax of programming algorithm. [3] In recall of data students know about knowledge problem already defined but for poured it into the syntax of programming

having trouble. Thus, students need a lot of practice algorithm programming. Lecturers can give more practice and exercise to students in class. When students doing exercise, lecturers has an important role in guiding a students. But, one of the problems lecturers to guide students that limitations of distance and time.

E-learning is a new transformation concept in education learning into digital form, both in terms of content and system. It can changes habit lecturer teach student in the class room transform in virtual class. But, for implement e-learning is not easy because lecturer unfamiliar with e-learning technology. [4].

Learning Management System is one of technology in e-learning. The LMS can automates the administration of training events, manages the registers users, manage course, record data student activity , and provide reports to management lecturer with a way to create and deliver the course content, assess student performance and monitor student involvement. [5]. By using LMS, e-learning have feature that can facilitate lecturer to managing course.

II. COURSE MANAGEMENT IN PROGRAMMING LEARNING PLATFORM

Course management have facilitate lecturer to implementation e-learning based LMS. Previously, e-learning that unfamiliar to used, in course management lecturer did need administrator to customize it. Course management facilitate to manages the registers users, manage course, record data student activity , and provide reports to management lecturer with a way to create and deliver the course content, assess student performance and monitor student involvement. Not only, course management based on LMS but also course management in CIDE Platform have heuristic module which are course gamification, assessment, and live code to facilitate lecturer make a course based on own perspective. Thus, in heuristic approach course management able to provide student know about own ability with progress board and student can able to improve own fault. [4, 5]

III. METHODOLOGY

In the preparation of this thesis, a chart that describes the steps that must be done in completing the study can be seen in Figure III.1. The stages are passed on making CIDE Platform Module Management Course are as follows:

1. Identification Phase

Identification phase is combine conducted study of literature and comparative study. The study of literature is to do with the study of the heuristic method. Comparative study is doing benchmarking against some of the e-learning which already exist in internet. Then will be the identification problem and determine the research limitation in order to achieve the desired research benefit.

2. System Development Phase

This phase is divided into 4 phases more specific, namely inception phase, elaboration phase, construction phase, and transition phase.

- Inception phase
Researchers defining the boundaries of activities, analyze application system need to be built. At this phase the researcher do two activities which are business modeling and requirements analysis, and do preliminary design software (architectural design and use case).
- Elaboration phase
In this phase doing analysis and development CIDE Platform management course modules began to from specify features until the release of the beta version of the prototype.
- Construction phase
In this phase will be carried out implementing web-based platform to end version as and then make documentation.
- Transition phase
In this phase will be carried out testing web-based platform to end version as and then make documentation. The testing process performed using a black box testing. The software will be tested whether in accordance with the requirements previously determined.

3. Conclusion and Suggestion Phase

At this phase, CIDEC Platform course management has been created and will re-evaluated as a whole in order to be concluded and suggestion improvements for the development of a better system.

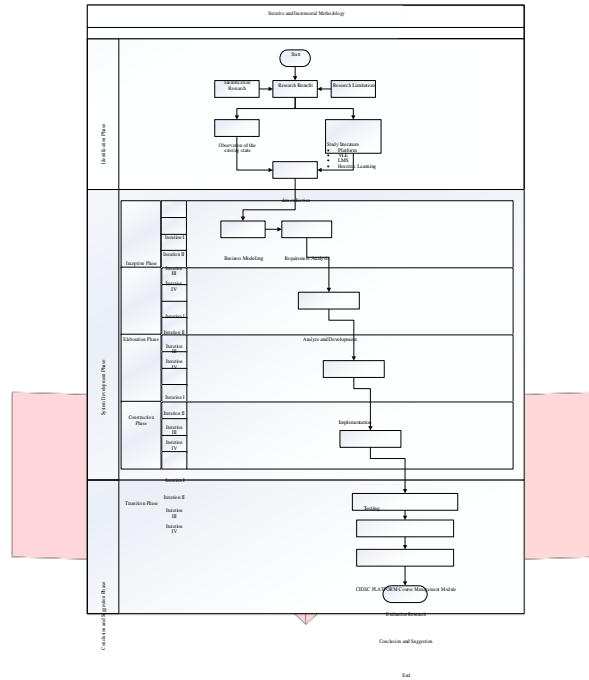


Figure III-1 Research Systematics by Using Iterative and Incremental Method

IV. SYSTEM ANALYSIS AND DESIGN

The platform of this research is develop for e-learning based on heuristic approach, called CIDEC. It will be absolutely focused more on course management side in which becoming front-end to interact directly with other module which is: live-code, gamification, and assessment. Course management is built surely after doing some previous observations. With this application, Not only lecturer can manage course without administrator but also lecturer can make attractive course with other module in CIDEC PLATFORM.

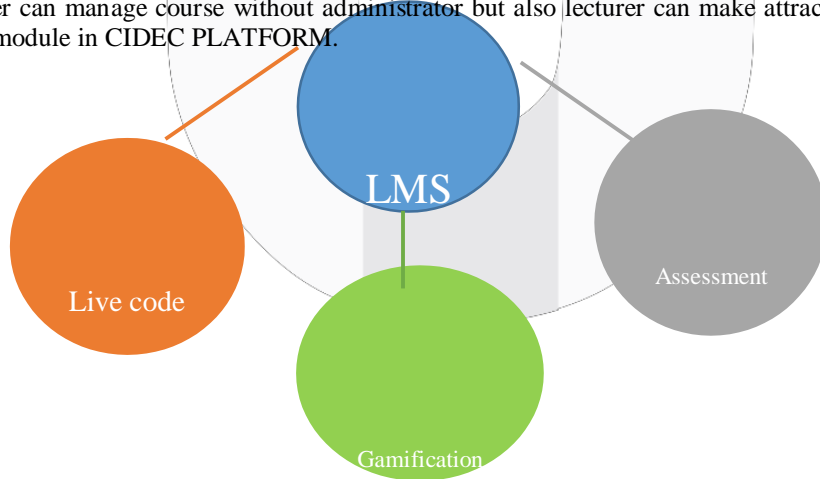


Figure IV-1 Architecture of CIDEC

1. Course Management. This feature is a main function used to create, publish, edit, and delete course. Lecturer have permission to manage course who already created in specific class group. In this case, course represent one chapter in course material. Not only lecturer can able upload course material with format pdf or ppt but also lecturer can make course's story board with exercise.
2. Class group management. Courses are already registered in the system must be listed in the class group to facilitate lecturer in group by students who are members of the course.
3. View reporting students. Cidec have feature for lecturer to view result report's graphic student who already finished the course.
4. Student Course. Cidec have feature for student can able to join course and doing a course mission.
5. View Student Report. Student can able to view report that already do in course mission
6. View Student Analysis Result. Lecturer can analyze result report's graph student and determine exact approach for student.

A. Core Business Process

Core business process is focussed when lecturer create course there are decision lecturer can able upload file with format pdf and ppt and then lecturer make course's story board . After that lecturer can view list of course that already register in system. Cidec have feature especially for lecturer can add exercise and add assessment for measure student's ability.

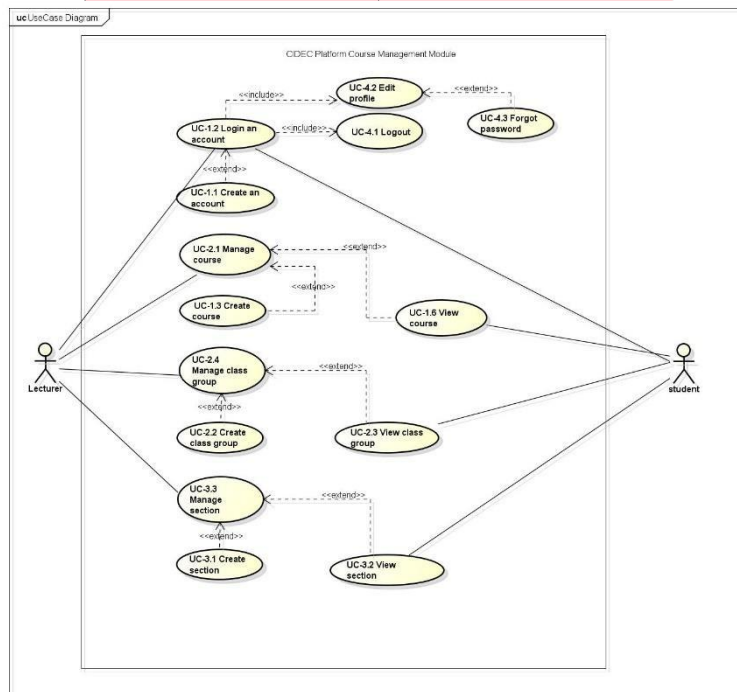


Figure IV-2 Use Case Diagram

B. Result of Application

The following is the result of application interface on CIDEC in form of platform for e-learning based on heuristic learning focused on course management. Only some interfaces will be displayed below.

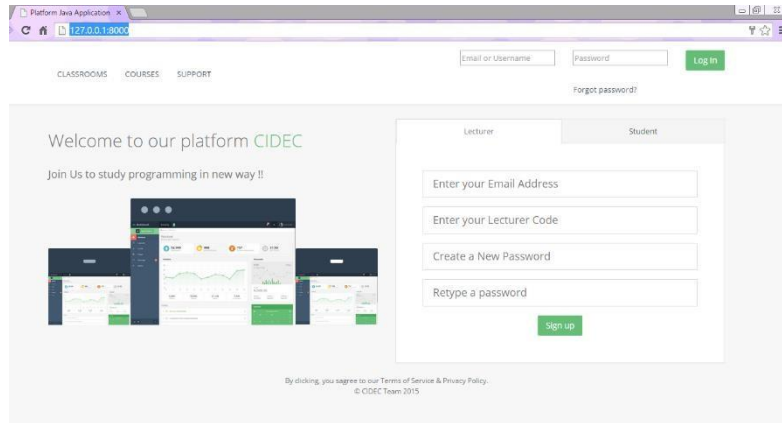


Figure IV-3 User Login

Figure IV-3 shows one main function existing on CIDEC, user can able login who already registered in database

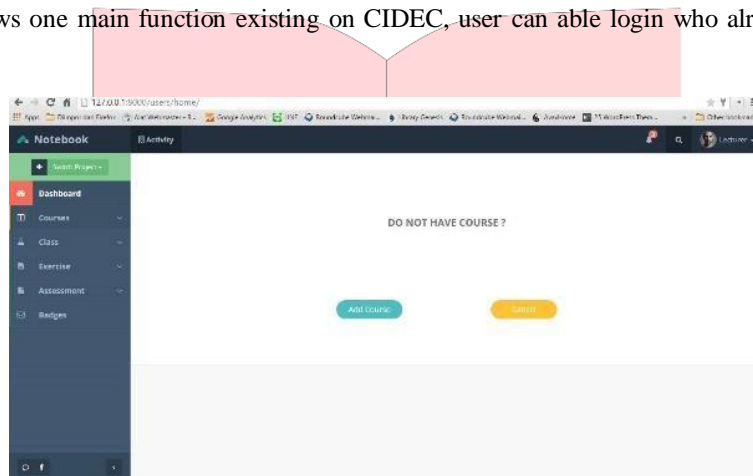


Figure IV-4 Home

Figure IV-4 shows one main function existing on CIDEC, This page first appearance for new user. In this case user do not have course and CIDEC direct user for create course.

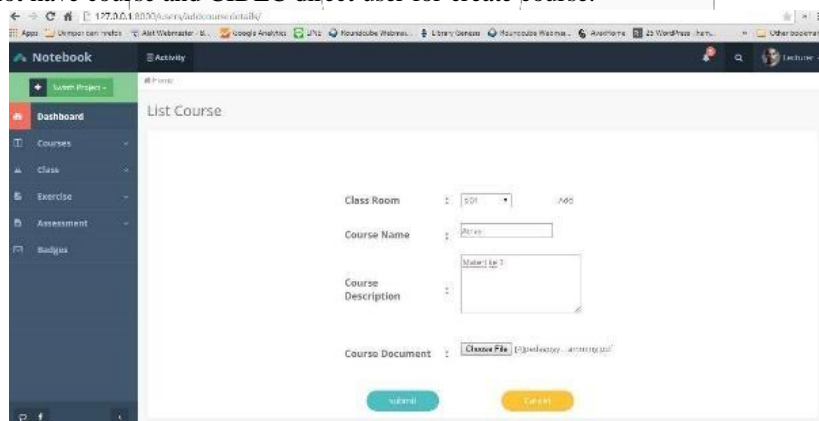


Figure IV-5 Course Description

After Figure IV-5, lecturer complete the field in page Figure IV-6.

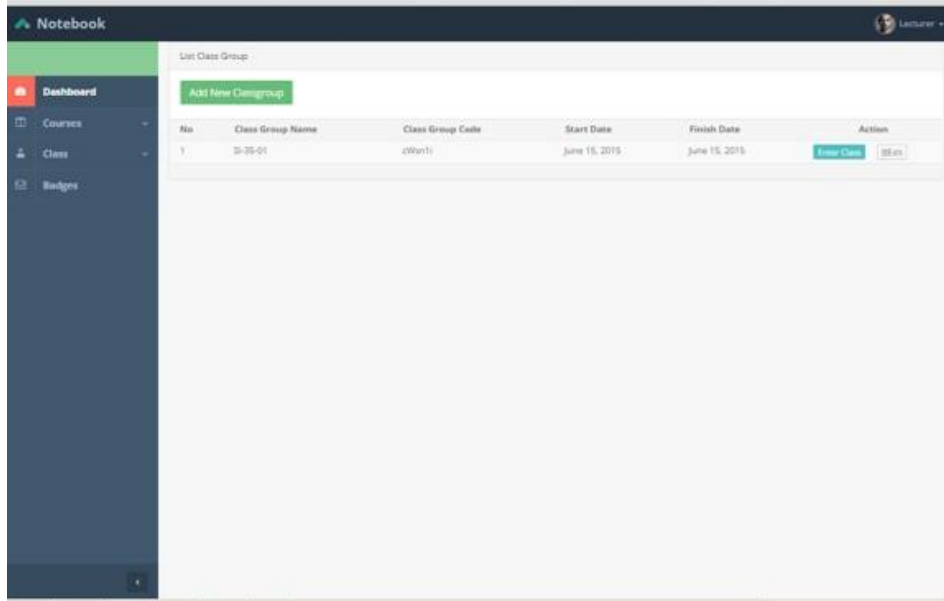


Figure IV-6 List Class group

In figure IV-6, shows the list of course that already registration in system. In figure IV-7 lecturer can add class group for specific course.

V. IMPLEMENTATION AND TESTING

To ensure that functionality work properly, the research take some testing to ensure the platform free from error. CIDEC in focussed on course management specifically is built by using programming language of python with Django framework, MySQL for database, and Apache for web server. This application has been tested on some web browsers, namely Google Chrome version 43.0.2357.132, and Internet Explorer 11. The result is CIDEC Platform in Course management still work well. For tests performed use black box testing. The result of testing for CIDEC for course management is shown in Table 1.

Table 1 Test Result Of CIDEC (Course Management)

No	Test	Expected Result	Result
1	Registration	Can Register user in system	Passed
2	Login	Can login who already register in system	Passed
3	Add Course	Can add new course	Passed
4	Add Class Room	Can add class room and add course and student	Passed
5	Edit profile	Show notification whether editing is successful or not	Passed
6	View the student's report	Show all student's reporting	Passed
7	List Course	Show list of course and section	Passed
8	Edit Course	Can edit course add exercise and assessment	Passed

VI. CONCLUSION

Conclusions for this research are as follows:

CIDEC Platform Course Management module is part of CIDEC Platform that able to facilitate lecturer managing course. Course management have feature which are manages the registers users, manage course, record data student activity , and provide reports to management lecturer with a way to create and deliver the course content, assess student performance and monitor student involvement. Class group is one of feature that can coordinate specific course within lecture and student. Class group can grouping student that take course and lecturer can know about student progress based on course.

CIDEC Platform Course Management module, student can interaction with lecturer in specific course with class group feature. Student can able to get course material and know feedback for course with progress board, it can use to know about own ability. Student know own ability with own experience. Lecturer gave an instruction to facilitate student found their answer and student must try a problem until found their answer based on lecturer instruction.

For lecturer side, lecturer did not need administrator to implement e-learning for managing course because in CIDEC PLATFORM Course Management module provide e-learning based LMS technology. On the other hand, lecturer can know student progress from progress board, it can use to student feedback and lecturer can know about student ability in course.

REFERENCES

- [1] N. M. A. S. F. Norwawi and C. F. S. B. M. Hibadullah, "Classification of Students' Performance in Computer Programming Course According to Learning Style," *IEEE*, p. 37, 2009.
- [2] E.Lahtinen, K.Ala-Mutka, HM.Järvinen, "A Study of the Difficulties of Novice Programmers," *ACM SIGCSE Bulletin*, pp. 14-18, 2005.
- [3] R. E. Mayer, "he psychology of How Novice Learn Computer Programmer," *ACM*, 1981.
- [4] N. S. N. A. M. Z. I A Almarashdeh, "Heuristic Evaluation of Distance Learning Management System Interface," *IEEE*, 2011.
- [5] I. A. Almrashed, "Distance Learning Management System Requirements From Student's Perspective," *Journal of Theoretical and Applied Information Technology*, 2011.

