

Design of Web Based Learning System Using Cooperative Learning Model Approach

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Abstract

In the effort to increase quality of education to result in high graduate acceptable in industrial and business environment, the improvement of quality both facilities and teacher is required, in addition to improvement of facilities and quality as well as quantity of teachers along with the growth of students. Lack of interaction between teacher and student due to limited facilities and time of interaction became the main restriction. One alternative solution is to use web based learning system, in addition to the need to develop learning model of cooperative learning to prepare the graduate as to have the ability of hard skill and soft skill according to demand by industrial and business environment.

The design includes literature study, requirement analysis, prototyping, implementation of prototype and testing of the prototype with UML modeling system. By the using the facility of web domain as maximum as possible, learning using web cooperative learning model

is expected to increase the motivation and collaboration in learning activity, so that the improvement of ability of hard skill and soft skill can be reached.

Introduction

The growth of internet in the last few years enables the education sector to use internet in teaching and learning process. In the effort increasing quality of education in Vocational High School (SMK), to enable to have high quality graduates who are acceptable in industrial and business environment, improvement of quality both facilities and teacher is required. Thus far, the improvement of facilities and teachers has been disproportionate with growth of students, so the quality education cannot be reached. Lack of interaction between teacher and student and also the limitation both facilities and time of interaction became main restrictiveness. In this case we need other method of which can handle the condition. One of them is learning system by using internet while still referring to Vocational High School (SMK) curriculum. One of main element which must be present in learning using internet is the interaction between students with teacher.

Interaction can be conducted easily using the facility in internet. However, the learning model must also be changed. The general learning model applied are mostly teacher centered learning model. This is usually one way teaching process in face to face classroom, where students don't have any opportunity to present different challenges to stimulate more active learning on the part of the students. Besides, the learning model applied by teacher generally uses competition and individual learning model, so the students would compete among members of class. In one side it is positive, so the student is competing to be the best, but the negative side is student doesn't have social skill and unable to respect the differences between students and does not have tolerance, whereas the graduated student is expected to be prepared to work which is not only demanding the technical/hard skill but also soft skill including to work together in

team and to communicate. Therefore, it is important to designed web based learning system which integrates the elements of cooperative learning model.

Definition e-learning

Many experts explained the definition of e-learning from various viewpoints. Definition that is often applied includes many parts that are enabling teaching learning process for example the student to use of internet, intranet or computer network media .

From the various definition it can be concluded that e-learning is the system of education to use information technology in process of learning and teaching.

The advantages of applying e-learning:

- economizes time of learning teaching process
- decrease traveling expense,
- to economizes the cost of education as a whole (infrastructure, equipments, book),
- reach broader geographical region,
- To trains student more self-supporting in acquiring knowledge.

The Benefit of Internet as Educational Media

At this moment internet technology is a multifunction media. Communications through internet can be done at interpersonal level (for example e-mail and chatting), recognized as one too many communications (for example mailing list). Internet also can present in real time audio visual similar to conventional method with the application of teleconference.

Internet as education media has special characteristics as follows:

- Functioning as interpersonal and mass media
- have interactive character of
- enable synchronous and also asynchronous communications.

This characteristic enables student to communicate scientific information widely if compared to only applying conventional media.

Based on above description, it can be said that internet is not substituting education system, but internet is more complementing to education system. Conventional method remains required, but modification is also possible. .

The Concept of Cooperative Learning

Cooperative learning (CL) is a learning strategy with a number of students as members of a group which has the different ability. In finalizing the group assignment, every member of the group shall cooperate and help each other to comprehend the lesson . In CL, learn is not finished if one of student in the group has not mastered the lesson. Basic elements in CL is as following: (2)

- a. The students must have responsibility to other student or participant in the group, besides responsibility to their self in studying the subject.
- b. The students must think that they are all have the same purpose.
- c. The students divide assignment and shares responsibility among members of group.
- d. The students are given one evaluation or appreciation which will have an effect on to evaluation of group.
- e. The students shares leadership and they get the skills to cooperate during learning activity.
- f. Every student will be asked to have individual responsibility in cooperative group.

The Objective and Principles of Cooperative learning

CL was developed to reach in any case three aspects are academic

achievement, acceptance to individual difference and social skills. Whereas principles of cooperative learning are positive interdependence, individually accountability, face-to-face interaction, participation and communications.

Cooperative Learning Type Jigsaw

CL jigsaw type is a type of CL consists some members in a group who are responsible for the assigned part of learning materials and then can teach each other on the assigned part in group(1). CL jigsaw type contains home group and focus group. Home group is the group of student having members with different ability, origin, and background. Focus group is the group of students originally member of the Home group and assigned to study and focus on a certain topic, and finalize assignment relating to the topic which is to be explained to members of the home group. Relation between Home group and focus group is described as follows [1].

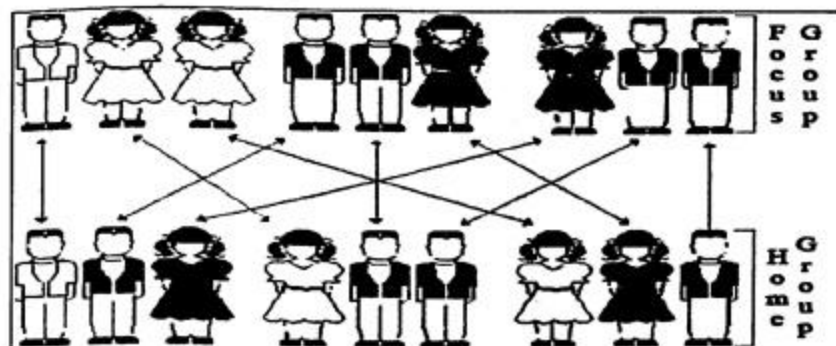


Fig.1. Illustration of jigsaw group

The Advantages of Cooperative Learning

The advantages of CL as a strategy of learning are as follows:

- a. through CL student will not too dependent CL on teacher, however can add self confidence, allow students to find information from various sources and even learning from other students,
- b. CL can develop student's ability to express ideas, argue, and compare with other ideas verbally,
- c. CL can assist student to respect others and tolerate differences and individual limitations,
- d. CL can assist the student to be more responsible in learning,
- e. CL is a strategy to increase academic achievement and also social skills, including developing self respect, interpersonal relations, time management skills, and positive perception toward schools,
- f. CL can develop ability of student to test his own idea and understanding, and receive feedback. Student can practice solving the problem without fear to make mistake, because the decision made is responsibility of the group,
- g. CL can increase ability of student applies information and abstraction ability to learn becomes reality,
- h. interaction during cooperative activities can increase motivation and give stimulation to think. This is good for education process.

System Analyses and Design: Design Descriptions of Cooperative Web Based Learning Model.

Based on the activity of teacher and student in CL approach, there are six component of CL in web-based CL as follows:

- state objective,
- presents information,
- organize student in batches,
- implementation of activity,
- presentation, reflection and publication,
- assessment and evaluation.

Requirement Analysis

These are the description and analysis from design of web-based learning system to support learning process with CL approach. Human resources related to the study (actor) and role in this activity is shown in Table 1.

Actor	Roles
Student	Follows the learning of model CL Exploring of information source Submits question
Actor	Roles
	Collaborating in group Active in discussion Interaction with other student either face-to-face and or through e-mail Communicates with teacher, practitioner or expert.
Teacher	Plans of learning process Arranges source of learning and related sites. Presents and updating information of study Gives discussion topic Gives correction (either face-to-face or through e-mail) Gives suggestion to student Assess student monitoring student progress Makes and arranges group
Administrator	Arranges learning facility Arranges data user Serves technical support

This design enriches teaching method where student are the central focus (student centered learning); the role is based on cognitive theory emphasizing exploration activity, and constructive in troubleshooting. Student is expected to explore and choose available information according to his own step and his own need. Teacher only serves as facilitator and guide the students learning process.

Modeling of system

a. The Use of case and Actor

- The use of case and actor related to this system, needs consideration on the role and function as elaborated in the previous table. The scenario of the learning process is as follows:
- Student must register and fill in complete information into system as to create the learning profile which enable him/her to follow study activity. Student must also follow the learning activity procedure, schedules, do the assignment, answer question, make report or presentation, and do other activity to support learning process according to teacher reference.
- Teacher is having responsibility in making learning framework from their subject area, related resource, important note, and evaluation, test items, result presentation, assignments and student report. Also, teacher is responsible to check the appropriateness of assignment deadlines.
- Administrator is given high authority in the making of the virtual class, adding new teacher and student to database, registering certain subjects, and arranging student list particular subject and teacher.

b. Use case Diagram

Case specification will result in object and core design of object oriented design. Case describes condition of attribute/property.

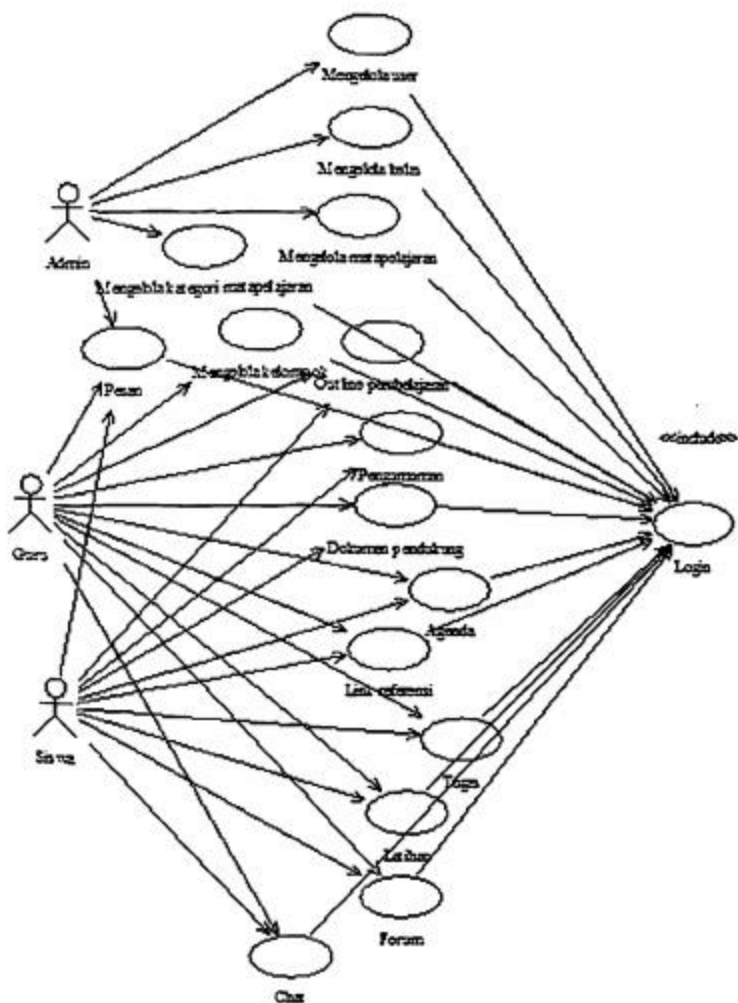


Fig.2. Use Case Diagram Of System

c. Activity diagram

Activity diagram describes various activity flow in system being designed, how each flow is initiated, decision that is possibly happened, and how it is ending. An activity can be realized by using one or more cases. An activity describes a running process The use

of case describes how actor use the system to do activity. Example of activity diagram as follows.

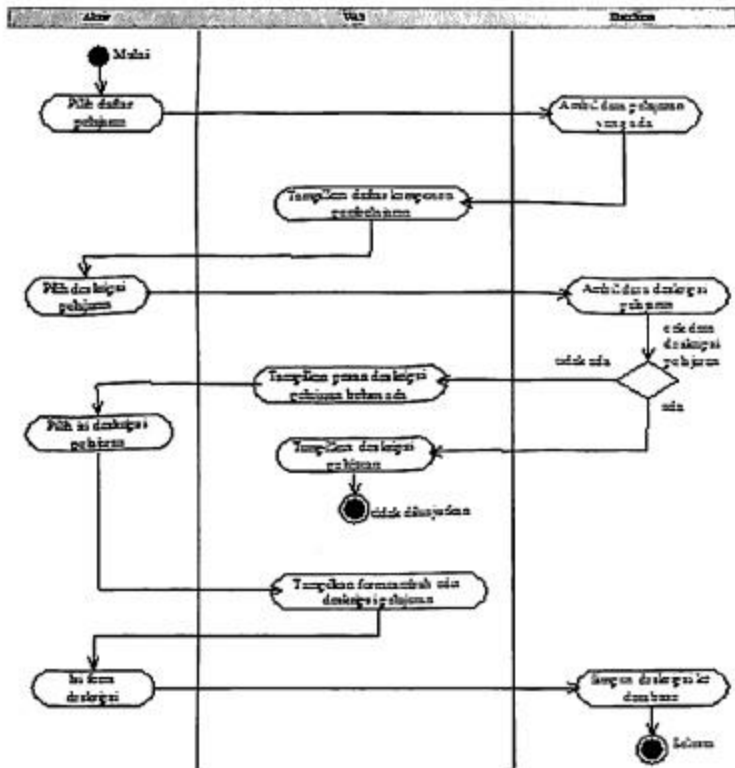


Fig. 3. Activity Diagram of Use Case Subject Description

d. Class Diagram

Class is a specification that will result in an object and core design of object oriented design. Class describes the condition of attribute/property of a system, at the same time offers manipulation of the situation to (method/function).

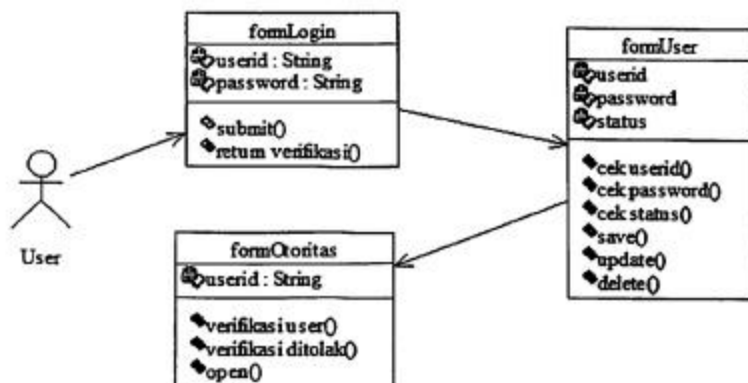


Fig.4. Class Diagram of Use Case login

a. Sequence Diagram

Sequence Diagram is used to describe scenario or a set of step done as response from an event to result in a certain output. Started from what is triggering the activity, any process and change that happened internally and resulted in output. Example of diagram sequence is as follows.

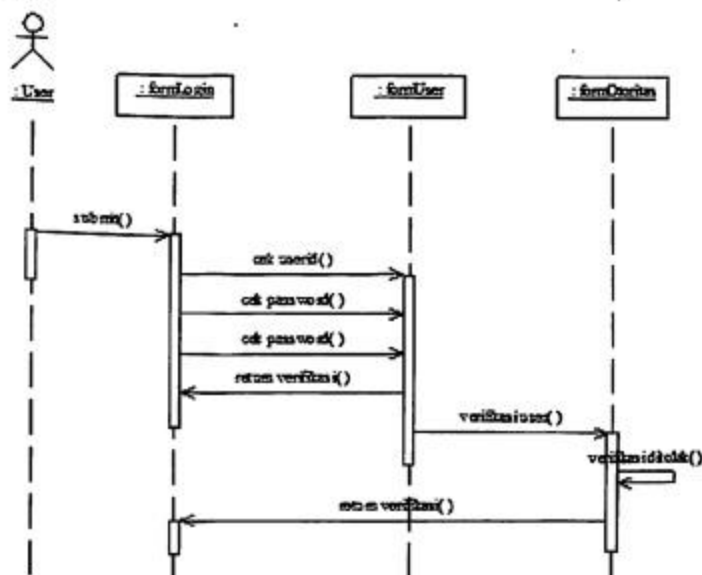


Fig. 5. Sequence Diagram of Use Case Login

E. Implementation and Testing of System

At this step, system application of web based CL learning model is implemented based on the plan. Prototype of the application as designed has been implemented via intranet at the Vocational High School (SMK) Negeri 25 Jakarta.

Beginning Modules

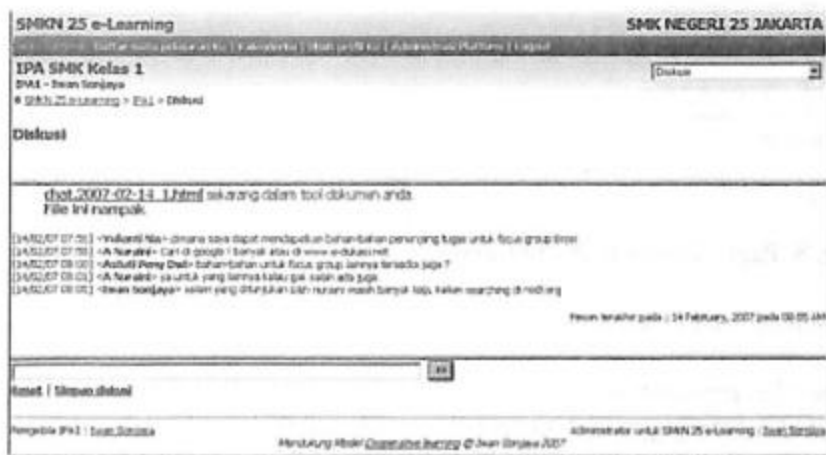
When the site is opened, user will be given the information of categorized subject and other infoavailable in the web. User is also provided with login form for guest as well as internal user.



Fig. 6. Home Page of Web Sites

Expansion of Module

In expansion models, student can apply web to communicate with members of group according to CL model, besides student can communicate with practitioner or expert having experience and knowledge in a given Lesson or topic, and by using e-mail, chat room, or forum to do communications with others either individually and or group



The screenshot shows the interface of the SMKN 25 e-Learning forum. At the top, it displays 'SMKN 25 e-Learning' and 'SMK NEGERI 25 JAKARTA'. Below this, there is a navigation bar with links like 'Beranda', 'Daftar Pengguna', and 'Akses ke Platform'. The main content area is titled 'IPA SMK Kelas 1' and shows a list of forum posts. The most recent post is from 'dhot_2007-02-14_174m' with the subject 'sekarang dalam tool dikunin anda'. The post content includes a question about a group and a link to a website. Below the post, there are several replies from users like 'A Nurahli' and 'A Nurahli' with timestamps. The forum interface includes a search bar, a 'Post' button, and a footer with contact information and a copyright notice.

Fig. 7. Page of expansion module

Complement Module

In this module, student can do exercise/quiz to describe the comprehension and or mastery level of a given topic. After completing the quiz, students can see the result to the problems given by teacher randomly and restricted in time (date of activation, repetition maximum permitted and duration of practice). Teacher can see progress or activity of a student through student path which is visible to each teacher responsible of each subject.

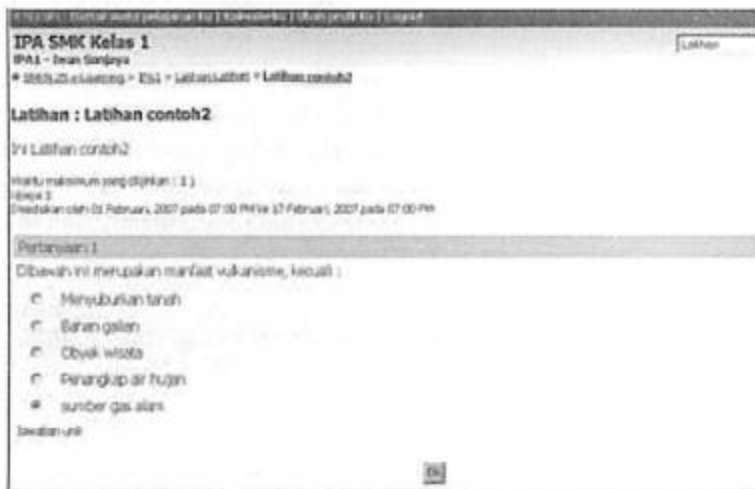


Fig. 8. Page of complement module

Result of Data Processing

From the questionnaire distributed after the application of web-based CL learning model, especially part A and B, it is clear that the average value given by respondents is above 3,0 in a scale of 5. As such, we can conclude that the application of web-based CL learning model brings positive impact to learning process, both from academic side and the soft skills side.

F. Conclusion

Based on the arising problem, the result of analysis and scheme and examination of study system bases on web-based CL, and the implementation of a prototype of web-based CL model, we can conclude that:

1. The application of web-based CL model will complement and enrich the existing teaching and learning method and model.
2. The application of web-based CL model will motivate student to stand actively in learning process, which is in line with student-

centered learning paradigm.

3. The application of web-based CL model besides increasing academic achievement, also develop and train student in social skills, such as team working, and communication skills.
4. The application of web-based CL model provides an alternative solution to the lack of interaction between students and teachers as result of the limited supporting facilities and teacher to support learning process.

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