Analysis of student interaction with learning objects on blended learning course applying cooperative learning together method on Moodle learning management system

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Abstract. The purpose of this study is to determine the results of implementation of blended learning on Marketing Research Techniques course using cooperative learning together method, and how the interaction between students and learning objects on blended learning course using Learning Management System (LMS) of Moodle. Class activities using cooperative learning together method include group assignments in accordance with the topic set by lecturer, presentation of group work results, inter-group discussions, and continued with improvement of group assignments based on the results of discussion. Student activities in accessing learning objects in the form of URL viewed from student log activities on LMS, showed only 11.42% of students were enrolled from total of 35 students with an average access of 1.47 views. Student interactions with objects in the form of text, accessed by 29.10% of students with an average access of 2.33 views. Presentation slides is accessed by 12.85% of students and images/maps/charts is accessed by 6.66% of students. Unlike only the learning objects in the form of assignments and quizzes, accessed by almost all students with a high average number of accesses. The learning object in the form of quizzes is accessed by 99.44% and assignments accessed by 95.37% of students.

1. Introduction
The learning problem that has become an issue so far is the lack of cognitive abilities of students, especially at the level of understanding, application, analysis, synthesis, and evaluation in Marketing Research Techniques course, as well as subjects related to research problems in general. In addition, today's job market requires a variety of skills combinations, leadership skills, being able to work well in teams, and the ability to read, analyse, and use information (big data) in the digital world. The effort that can be made by universities for data and technology literacy is to apply through elective courses.

Based on the problems and needs above, this Marketing Research Techniques course is important to be developed more innovatively and to improve its quality through student-centered learning (SCL) with the use of information and communication technology, so that it can overcome existing learning problems and can fulfill demands of college graduates in the era of the Industrial Revolution 4.0 who master new literacy.
Advances in information and communication technology have transformed marketing research through: (1) The role of social media Twitter, Facebook, LinkedIn, and Google+ has expanded the area where market research is conducted. Using social media to conduct marketing research requires expertise. Students need to have knowledge of how to use social media for marketing research; (2) Improved data collection methods, software or applications that can be used for data collection in the field, outside of traditional methods such as paper surveys, interviews, and focus groups. Technological developments allow researchers to be more targeted in what they measure and how quickly feedback can be received, such as the use of online surveys, Google Forms, and other applications; (3) Advances in data analysis. As the flow of data to collect increases, the ability to analyze data is equally important. Technology makes data analytics easier and more sophisticated by utilizing various updated software; (4) Big Data as information in research. The large amount of data that comes in from online and offline methods provides the researcher with a big data set for analysis. The availability of big data increases the need to filter data and remove irrelevant portions, with big data market research can be done with a solid data warehouse. Technology has had a huge impact on how to approach market research with sophisticated capabilities and evolving approaches to data; and (5) Social media as a research methodology in marketing research.

The learning objectives of Marketing Research Technique course are that students can identify marketing research problems; able to apply the stages of marketing research; able to apply marketing research practices in solving marketing problems; able to compile a marketing research proposal; and be able to apply the marketing research stages to complete a marketing research project and compile it into a marketing research report. The learning objectives of this course are formulated from competencies in the curriculum, analysis of user needs, practical experience in the form of learning difficulties experienced by learning participants, and analysis of the job market needs of the competencies of graduates who have the ability to do research work and master new literacy.

The Marketing Research Techniques course studies the basics of marketing research as a basis for providing understanding to students for conducting marketing research. The stages of marketing research studied in this course start from determining research problems; research design determination; method of collecting data; determination of question design, scale, and analysis tools; scaling up in marketing research; sampling method; marketing research proposal; data collection; editing, coding, and data input; analysis and interpretation of research results; and presentation of research reports.

Based on the above background and paying attention to the advantages that will be obtained by developing this course into a blended learning course by implementing Student Centered Learning in this case by applying the cooperative learning method that is applied using the Udayana University Learning Management System of Moodle, then this research is important to do.

In implementing this learning method, several research questions emerged, including: What are the results of the implementation of the blended learning course using the cooperative learning together method at LMS Moodle?; How can the effectiveness of the blended learning course using the cooperative learning together method improve student learning outcomes?; What factors influence the implementation of the blended learning course using the cooperative learning together method in improving student learning outcomes?; How is the interaction between students and learning objects on the blended learning course using the cooperative learning together method on the LMS Moodle?

Based on some of the research questions above, specifically, the problems that will be discussed in this paper are how the results of the implementation of the blended learning course using the cooperative learning together method, and how the interaction between students and learning objects on the blended learning course uses the cooperative learning together method on LMS Moodle.

Cooperative learning is learning that emphasizes the social aspects of students in a heterogeneous group. Slavin [1] suggests that a cooperative learning model is developed to achieve at least three important learning objectives, namely: academic learning outcomes, acceptance of diversity, and the development of social skills.

Besides covering social goals, cooperative learning also aims to improve student performance in academic tasks. Cooperative learning is a form of collaborative learning in small groups, where students work together in small groups to complete a given task. In cooperative learning show students
to be able to cooperate in a group, to learn to be responsible for obtaining the learning outcomes for both individuals and group.

There are four characteristics of cooperative learning, namely: (1) students work in groups cooperatively to complete the learning material; (2) groups are formed from students who have high, medium, and low abilities; (3) whenever possible, group members come from different races, cultures, ethnicities and genders; and (4) rewards are more group-oriented than individuals [2]. There are seven cooperative learning models commonly applied by teachers, namely: Student Teams-Achievement Divisions, Teams-Games-Tournaments, Team-Assisted Individualization, Jigsaw I, Jigsaw II, Learning Together, and Group Investigation [1].

In the cooperative learning together model, members are heterogeneous and solve a problem together, and if successful, they will get a positive reward as a group [1]. The cooperative learning together model can be applied repeatedly on condition that students must have the same opportunity in their groups, so that each student can make the same contribution maximally to the group. There are several factors that influence students in groups, namely: the intelligence level of group members, the relationship between group members, the experience of group members regarding the problems they face, the motivation of group members in completing tasks, the size of group members, the ability of group leaders to lead their members, and skills and active group members in solving problems.

Blended learning courses are a combination of face-to-face and online learning processes that are organized in order to provide quality online learning/lecturing services that are open and integrated, which are held for internal students at the organizing college. This developed course is uploaded at LMS Udayana University, using the open source Moodle.

LMS is a great way for teachers to organize, manage and deliver course materials. From the didactic point of view, the usage of multimedia tools to create attractive activities makes the learning process friendlier for students [3]. Moodle is an open source LMS that more than 30,000 educational organizations around the world currently use Moodle to deliver online courses and to supplement traditional face-to-face courses [4]. Moodle is an ideal learning management system that comprises much functionality and those could be achieved through simple architecture [5].

Learning objects play a very important role in Web-based learning, because students will interact more with learning objects online through Web pages. Thus, the learning object must be designed in such a way as to motivate and spur students to learn actively [6]. To support the learning process, materials are needed, including guides for learning participants, instructor guides, learning materials (teaching objects that can be in the form of modules, power point presentations, videos, pictures, animations, simulations, and others), and assessment tools (assignments, tests, quizzes, etc.).

2. Method

2.1. Blended learning course development

The scope of the development of the blended learning course includes several stages, namely: the analysis, design, development, implementation, operation, and evaluation stages. The analysis phase includes: Identifying learning problem issues, analysing user needs, clarifying problems and learning objectives, and analysing learners and context. The design stage includes: establishing learning objectives/outcomes, basic competencies and achievement indicators, determining the required learning materials and activities, translating the results of instructional designs into the form of program maps, compiling program maps, and preparing Semester Learning Plans.

The development stage, includes: developing digital learning objects (teaching materials, quizzes, assignments, exercises, and exam questions in the form of text, graphics, images, videos, and multimedia) and uploading digital learning objects into the system. This development stage is the process of realizing a concept or design, including: material realization, media realization, design realization, technical realization, maintenance, and repackaging.

2.2. Learning implementation method

The learning implementation for the Marketing Research Techniques course combines student centered learning and blended learning. The approach used is the cooperative learning together method. In the process of implementing learning, the lecturer who teaches courses classifies students
into 5 groups consisting of 7 students in each group. Members in each group are heterogeneous in terms of level, gender, race, and academic ability. In groups, students are assigned to complete group assignments together, and the awards given are oriented towards group awards. This learning model emphasizes teamwork coaching activities, before students begin to work together and have scheduled discussions in groups about how far they are successful in working together.

Work on group assignments in the cooperative learning together model is applied seven times, namely group work to complete group assignments on the topics: 1) Determination of marketing research problems, 2) Data collection methods, 3) Determination of question design, scale, and analysis tools, 4) Sampling methods, 5) Analysis and interpretation of results, and 6) Presentation of research reports. This task carried out in groups is a project task that is carried out by each group from the initial determination of the research problem to the preparation of the project report being undertaken.

Class activities with the cooperative learning together method include group work working on group assignments according to the topics set by the lecturer, presentation of group work, discussion between groups (development of inter-personal skills), and continued with improving group assignments based on discussion results. The results of group work are then uploaded into the group assignment media provided in the LMS of this course according to the set time.

3. Result and Discussion
3.1. The results of developing a blended learning course
All stages of design have been designed in as much detail as possible, starting from formulating subject learning outcomes, final ability of students, outcome criteria/indicators, learning materials, learning forms and methods, learning time load, learning assessment, learning experience/student activities, learning media, both asynchronous and synchronous, list of references, organization of study materials, determine the most relevant learning settings for SCL-based blended learning courses. In this case, all design stages have been designed to achieve the specified learning outcomes of the subjects.

After designing the Semester Learning Plan, the next step is to develop content and learning media. Multimedia-based learning content and media in the form of interactive multimedia or learning videos, and presentation slides. Content and learning media have been developed by course instructors and obtained from other sources. Online learning resources in the form of presentation slides, text, pictures, and learning videos were developed by the course instructor and the team. Meanwhile, the rest of the learning videos are obtained from other sources (YouTube). The video tutorials developed by the team include the following video tutorials: Chi Squared https://youtu.be/WVDzMvsFR_g; Percentage Distribution https://youtu.be/9TbLmgLYnWE; Descriptive Analysis https://youtu.be/A9OSZL9ZJro; One Sample t-test https://youtu.be/ErI7VIXQLF0; Sampling Technique https://youtu.be/2qj-uUaGVR8; One Way ANOVA https://youtu.be/PUsnzOPuLeE

All of these online learning objects become learning resources for students that students learn every week to prepare for face-to-face sessions at the next meeting. In face-to-face sessions apply the cooperative learning method of learning together to complete marketing research projects assigned to students in groups.

Content and learning media that have been developed by the teaching team or obtained from other sources have been uploaded to the LMS https://mooc.unud.ac.id/ which is the moodle-based e-learning portal of Udayana University, with a link course https://mooc.unud.ac.id/course/view.php?id=98. The learning objects used in blended learning are text, presentation slides, video, audio, images, URLs, and other supporting applications.

The assessment mechanism is carried out in: direct synchronous with the quiz, virtual synchronous by using the forum feature so that it can provide flexibility for students to discuss topics that are less understood freely. Asynchronous through the quiz and assignment features provided in the LMS given according to the topic in order to measure the ability of learners. In addition, it is given the opportunity for learners to work several times up to the specified passing standard. All assessments that are carried out are immediately given feedback and for assignments use an assessment instrument in the form of an assessment rubric so that the assessment can be carried out objectively.
3.2. The results of the implementation of the blended learning course

The learning is carried out in 16 weeks using blended learning, namely 7 times synchronous (direct) and 7 times asynchronous (independently), the mid-semester examination, and the final semester examination. Synchronous (direct) and asynchronous (independent) blended learning is carried out by uploading materials, assignments, and quizzes to the LMS according to the semester learning plan which has been made. In synchronous, applying the cooperative learning together method includes group work working on group assignments according to the topics set by the lecturer, presentation of group work, discussion between groups, and continued with group assignments based on the results of the discussion. The results of group work are then uploaded into the group assignment media provided in the LMS Moodle for this course according to the set time.

Face-to-face sessions with the cooperative learning together method were carried out 7 times (1 time face-to-face introductory lecture and 6 times face-to-face group work) from 16 planned meetings, namely group work to work on the task of determining marketing research problems, data collection methods, defining question design, scales, and analysis tools, sampling techniques, analysis and interpretation, and preparation of research reports. The entire group work (6 times) is aimed at completing a marketing research project with an output in the form of a marketing research report.

The number of participants in this course consists of 36 students, consisting of 1 lecturer and 35 students. For face-to-face work on group assignments, students were divided into 5 groups consisting of 7 students. In each group work implementation, the lecturer begins by giving directions on what tasks will be completed by students in groups.

For process assessment, based on the results of observations during the learning process, namely giving group assignments, it appears that during the process of working on group assignments, all students in the group have a good performance in completing the assigned assignments. Acceptance of individual differences can also be seen from the results of observations of the five existing student groups. The relationship between students in the group is mutual acceptance of differences in level / generation, race, gender, ability, and disability. The results of observations show that in completing group assignments, each group member works well together to complete the assignment received in an effort to achieve collective and personal academic achievement.

![Figure 1. Grade distribution chart for groups assignment](image)

The results of student learning assessments after being given treatment in the form of group assignments implemented with the cooperative learning together model obtained learning outcomes as presented in the assessment distribution in Figure 1. The distribution of student scores in doing group assignments shows that from the 6 assigned group assignments, in general the distribution is obtained. lowest grade 70 and highest grade 90.

The results of independent asynchronous learning in doing the 7 individual assignments given, it was found that of the 7 assignments given, in general there were 5 individual assignments with the distribution: lowest grade 50 and highest grade 95, with details of 9 Students with grades inferior or
equal to 85 (25%), 18 Students with grades inferior or equal to 90 (50%), and 27 Students with grades inferior or equal to 95 (75%). For the other 2 individual assignments, with the distribution of values: the lowest value is 70 and the highest score is 90, and the distribution: the lowest value is 50 and the highest is 100.

The assessment distribution for student learning outcomes in doing the five quizzes given is obtained the distribution of scores with the lowest grade 37 and the highest grade 100. The assessment distribution for student learning outcomes in the mid-semester examination is obtained the lowest grade 50 and the highest grade 95. Meanwhile, in the final semester examination with distribution of lowest grade 80 and highest grade 90.

3.3. Interaction between students and learning objects in blended learning course

The online learning objects used in this blended learning course are in the form of text (teaching objects in the form of teaching materials and presentation slides, video, audio, images, URLs, and others, as well as learning objects for assessment in the form of assignments, quizzes, and forums. The content and learning media are uploaded to the institutional LMS https://mooc.unud.ac.id/ which is the Moodle-based learning portal of Udayana University, with the course link: (https://mooc.unud.ac.id/course/view.php?id = 98). All of these learning objects are learning resources for students, which are studied by students every week to prepare for face-to-face sessions at the next meeting. How is the interaction between students and learning objects on the blended learning course? The following will present how student interactions with learning objects for 16 meetings, with an access period of 3 June 2019 to 5 January 2020.

Student activities in accessing learning objects in the form of URLs seen from the student log activity on LMS Moodle, showed that it was only accessed by 11.42% of students from a total of 35 students with an average access of 1.47 views. In this course, the URL is presented as a supporting reference that can be accessed by students to enrich reading sources on each topic of discussion per week. Student interaction with objects in the form of text, accessed by 29.10% of students with an average access of 2.33 views. Learning objects in the form of text on this course include teaching materials in Words and PDF file formats. The learning object in the form of presentation slides (PPT file) was accessed by only 12.85% of students, with an average access of 1.16 views. In the learning object, the type of image/map/chart was only accessed by a small proportion of students, namely 6.66% with an average access of 1.14 times. The object in the form of a discussion forum was accessed by 62.85% of students, with an average of 3.27 views. It is different only from the learning objects in the form of assignments and quizzes, which are accessed by almost all students with a high average number of accesses. Learning objects in the form of quizzes were accessed by 99.44% of students with an average view of 16.44 views per student, and assignments were accessed by 95.37% of students with an average access of 16.37 views per student.

The analytical graphs for assignment submissions carried out by students for all assignments given to students, namely group assignments, individual assignments, final semester exams, and midterm exams obtained an average submission ratio of 0.92 and an On time submission ratio of 0.92. Details regarding in time submission, late submission, No submission, submission ratio, and on time ratio are presented in Table 1.

The lecturers' understanding of the cognitive processes of students, the importance of interaction in learning arrangements, and the ability of lecturers to evaluate learning objects, including the selection of teaching materials, activities, and assessment methods are important things that lead to better learning designs. Good instructional design makes students comfortable and more accepting of content [7]. The use of learning objects in different modes is important [8]. In addition, learning objects are important because they allow learners to get what they need to learn, and not information that they may have learned in the past. Where this will save time in lectures and productivity for students [9].

Four critical challenges that educators face when choosing learning objects, include learner cognitive processes, levels of interaction, evaluation, and instructional design. Web-based teaching requires an active learner relationship not only with the written word, but also with changing content, as well as content that demands more than the role of passive reading [10]. Effective learning object deconstruction allows the instructor to successfully find the learning object needed and reuse it in new
learning units [11] and also the use of reusable learning objects has a positive impact on students' learning behavior, engagement, and knowledge retention [12]. Moore [13] argues that interaction is the key to effective learning, which includes three interactions, namely learner-instructor, learner-learner, and learner-content interaction.

**Table 1.** Assignment submissions for group assignments, individual assignments, final semester exams, and midterm exams

| Category                                               | In time submission | Late submission | No submission | Submission ratio | On time ratio |
|--------------------------------------------------------|--------------------|-----------------|---------------|------------------|--------------|
| Worksheet 1_Determining research design                | 30.00              | 0.00            | 5.00          | 0.86             | 0.86         |
| Worksheet 1_Determining research problems              | 30.00              | 0.00            | 5.00          | 0.86             | 0.86         |
| Worksheet 1_Data collection methods                    | 26.00              | 1.00            | 8.00          | 0.77             | 0.74         |
| Worksheet 1_Defining question design                   | 30.00              | 0.00            | 5.00          | 0.86             | 0.86         |
| Worksheet 2_Defining question design                   | 28.00              | 7.00            | 0.00          | 1.00             | 0.80         |
| Midterm exam                                           | 32.00              | 0.00            | 3.00          | 0.91             | 0.91         |
| Worksheet 1_Sampling methods                           | 27.00              | 2.00            | 6.00          | 0.83             | 0.77         |
| Worksheet 2_Data collection methods                    | 28.00              | 7.00            | 0.00          | 1.00             | 0.80         |
| Worksheet 2_Determining research problems              | 28.00              | 7.00            | 0.00          | 1.00             | 0.80         |
| Worksheet 2_Sampling methods                           | 28.00              | 7.00            | 0.00          | 1.00             | 0.80         |
| Worksheet 2_Analysis & Interpretation                  | 35.00              | 0.00            | 0.00          | 1.00             | 1.00         |
| Final exams                                            | 32.00              | 2.00            | 1.00          | 0.97             | 0.91         |
| Worksheet 1_Analysis & Interpretation                  | 31.00              | 0.00            | 4.00          | 0.89             | 0.89         |
| Worksheet 1_Presentation of research reports           | 30.00              | 1.00            | 4.00          | 0.89             | 0.86         |
| Worksheet 2_Presentation of research reports           | 21.00              | 14.00           | 0.00          | 1.00             | 0.60         |
| Mean                                                   |                   |                 |               | 0.92             | 0.92         |

Figure 2 presents the analytics graphs for the quiz submissions carried out by students for the five given quizzes, the submission ratio is obtained and the on time submission ratio is the lowest ratio of 0.83 and the highest is 1.

![Figure 2. Analytics graphs for the quiz submissions](image)

4. Conclusion

The implementation of the blended learning course uses the cooperative learning together method, in its implementation there are several obstacles faced including: First, it is rather difficult to determine
the accuracy of the learning object selected for use so as to produce optimal learning. Second, the relevance of the material to the assignment given, needs to be evaluated whether the assignment given has been supported by adequate learning materials/resources? whether it is in the form of material with examples of practice questions equipped with feedback or learning resources in the form of video/audio/animation that is complete so as to allow the user to work on the assignment questions given optimally.

The interaction between students and learning objects, the largest percentage of students obtained was in accessing learning objects in the form of text (modules/materials/teaching materials prepared by lecturers), namely 29.10%, while there was a small percentage of students accessing learning objects in the form of URLs (11.42%), presentation slides (PPT) (12.85%), pictures/folders/charts (6.66%). It is different only from the learning objects in the form of assignments and quizzes, which are accessed by almost all students with a high average number of accesses.

Acknowledgments

High appreciation to the Directorate of Learning, Directorate General of Learning and Student Affairs, Ministry of Research, Technology and Higher Education of the Republic of Indonesia and Udayana University for funding this program through the Information and Communication Technology Based Student Centered Learning Assistance Program, with Contract Number 04/B2.1/PPK/SPPK/SCL/2019 July 2, 2019.

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