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Implementation of Project-Based Learning and Its Assessment in ICT and Multimedia for Agribusiness Course

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Abstract: Numerous researches have been conducted to develop effective teaching methods, thus allowing higher education to achieve its purposes. Project-based learning is one of the student-centered approaches in teaching and learning process. As an instructional model, project-based learning provides several benefits to the learning process. At the same time, it also brings challenges to both teachers and students in its implementation. The objectives of this study is to describe and assess the implementation of project-based learning in ICT and multimedia for agribusiness course. The paper discusses the challenges faced in implementing project-based learning. Project-based learning implemented in ICT and multimedia course consists of five main stages namely identification of the project topic, project planning (how to apply theory and concepts into the project), project investigation on the selected topic, preparing the product of the project, presentation of the product and evaluation of the process. Seventeen participants were involved in of this course. The assessment includes a weekly report, self-assessment, and product performance. Despite some challenges such as creating the nature of collaboration and creativity among the participants, project-based learning is an appropriate teaching method for ICT and multimedia course. Most of the participants agreed that they have learned and developed ideas, use available resources to accomplish their projects within time restrictions.

1 INTRODUCTION

Numerous researches have been conducted to develop effective teaching methods, thus allowing higher education to achieve its purposes. Project-based learning is one of the student-centered approaches in teaching and learning process. The studies include assessment of project-based learning effectiveness (Gallagher & Rosenthal, 1992; Stepien et.al 1993; Shepherd,1998), the role of student characteristics in project-based learning (Gardner, 1991; Meyer et.al., 1997; Rosenfeld and Rosenfeld, 1998). As an instructional model, it provides several benefits to the learning process.

This study discusses the implementation of project-based learning in an undergraduate course, namely ICT and multimedia for Agribusiness. It is one of the elective courses in agribusiness study program offered in the fourth semester. The course supports the curriculum in the study program in three ways. First, the course helps students understand that agribusiness development requires ICT and multimedia. Second, this course gives students the

ability to identify and choose ICT and multimedia that are appropriate to be used for business objectives. Thus, students can choose and use the right media to improve effectiveness of the media used. Third, this course also provides understanding to students in assessing and evaluating the use of selected media. As a result, students can assess ICT and multimedia used in existing agribusiness development.

The combination of teacher-centered learning and student-centered learning (small group discussion) has been applied in the course. Learning outcomes of the course were inadequate. Students should have been able to develop their skills and learning experience through the course. Some drawbacks from previous learning process show that students lacked ability in planning, choosing appropriate media for the marketed product and evaluating produced promotional media regarding its limitation. Furthermore, learning outcomes of the course have been achieved from cognitive and affective aspects. Students' psychomotor of the students was not fully developed.

This study was conducted to improve teaching and learning method for ICT and multimedia course, which in turn will improve learning outcomes. Specifically, this study aims to implement project-based learning, and assess its implementation in ICT and multimedia course. The study discusses the challenges in implementing project-based learning. This study is expected to contribute in the development of course learning plan and to improve course learning outcomes.

The implementation of project-based learning in teaching and learning process is essential to improve students' ability to think critically and to provide them a sense of independence in learning. Project-based is a learning method derived from the constructivist approaches that lead to problem-solving efforts (Doppelt, 2003). Constructivism provides independence to students to plan and implement their learning or collaborate under the coordination of lecturers. In such learning contexts, students are required to have good self-regulated learning as the primary modality in constructivist learning.

As a constructivist learning, project-based learning provides learning in real problem situations for students so that they can produce permanent knowledge (Rais, 2010). Project-based learning is a project that focuses on product development or performance, where students conduct group-learning activities, studies or research, solve problems, and synthesize information.

Project-based learning is one of the student-centered learning systems where students actively involve in completing projects independently and work in teams to solve real and practical problems. Rais (2010) found that 90% of students who were involved in project-based learning were confident and optimistic that they could implement project-based learning in working environment and could improve their academic performance (Koch and Klandt, 2006). Lasonen and Vesterinen (2000) also confirmed that 78% of students believe that project-based learning curriculum can help them prepare themselves for real working experience, because they learn not only the theory but also the practice.

Project-based learning involves students mentally and physically, it strengthens their social skills by constructing knowledge based on their own experience through actions in the project (Sulvian, 2008). Students are required to share information and respect other people, as well as cooperation in groups. Thus they can be motivated and active during the learning process. It emphasizes contextual learning through complex activities. This model focuses on the

central concepts and principles of discipline, it involves students in problem-solving activities and other meaningful tasks, it also provides opportunities for students to work autonomously in constructing their learning, and culminating valuable student work products (Okudan and Sarah, 2004).

Buck Institute for Education in Rais mentions several things related to the characteristics of project-based learning, including: (a) students as decision makers, and designing frameworks, (b) there are problems whose solutions are not predetermined, (c) students plan and design process to achieve results, and (d) students are responsible for obtaining and managing the information collected (Rais, 2010). Also, Thomas (2000) defined the five criteria of project-based learning namely centrality, driving questions, constructive investigation, autonomy, and realism.

2 METHODS

2.1 Research Design

The main objective of the course is to develop students' ability to analyze, plan, design and implement information, communication and technology (ICT) in agribusiness, particularly in the post-harvest sub-system. Groups of students are required to develop and implement appropriate ICT in agribusiness product marketing. Thus project-based learning was implemented to lead the students in achieving the goals of the course.

Qualitative approach was applied in order to get students' thoughts, behaviors and difficulties in the implementation of project-based learning. Data collection includes analysis of assignments, final products, and interviews with students and course evaluation forms.

2.2 The Participants

The participants of the study are students of ICT and Multimedia for Agribusiness course in 2017/2018 academic years. The number of students is 17 (5 males and 12 females). The students were divided into five groups.

2.3 Instruments

Students' perception about the implementation of project-based learning in ICT and multimedia course was assessed by using a semi-structured interview. The questions include their involvement in every

stage of the project, problems and difficulties faced, recommendation for future learning method in the course. Peer-assessment was also conducted. Some questions were developed to measure learning outcomes from domains of learning. Project assessment sheets evaluated the final product of the project.

3 RESULTS AND DISCUSSIONS

3.1 Project-based Learning in ICT and Multimedia for Agribusiness Course

Project-based learning implemented in this course is based on the stages proposed by Slavin (2008). Project-based learning (PjBL) model implemented in ICT and multimedia course consists of five main stages.

3.1.1 Identification of the project topic

All stages of the project were discussed in the first week of the course. Students were informed about the method to apply during the whole session of the course. All stages of the project were explained and how they could be used for the course project. In addition, theory and concepts related to the project were also discussed. During this stage, topic 1, 2 and 3 were discussed.

Table 1: Topics of ICT and Multimedia for Agribusiness Course

No	Course Topic
1	Development of ICT and multimedia in supporting agribusiness
2	The concept of ICT and multimedia in agribusiness
3	Types of ICT and multimedia, and their effectiveness in agribusiness
4	Designing and developing ICT-based media in agribusiness
5	Implementation of ICT-based media in agribusiness
6	Evaluation of ICT and multimedia implementation

3.1.2 Project planning (how to apply theory and concepts into the project)

This stage started with the grouping of the participants. The groups were formed students' heterogeneity and study environment preferences. Thus, Perry's model adapted from Moore and Fitch were used in grouping the participants (woods, 1994).

Each group consists of 4 – 5 students. In this stage, each group presents their project topic and the plan for project implementation (action plan and timetables).

3.1.3 Project investigation on the selected topic

Each group was assigned to do preliminary research on the selected topic. The research includes detail information about the agribusiness products that will be marketed, what are the existing marketing methods, what are the constraints and plan for improvement. Students visited an agribusiness and talked to the owner, employees, and other related resource person regarding their products, marketing system, current promotional media used, and constraints and problems in selling their products.

3.1.4 Preparing product of the project

Once the students get enough information from selected agribusiness, they should determine and design the types of ICT and multimedia used for product marketing. They might revise some of the proposed plans during the project planning based on the empirical data.

Table 2: Types of agribusiness product and ICT and multimedia used for marketing

Group	Types of agribusiness	ICT and multimedia for marketing
1	Purple sweet potato-based snacks	Pamphlet, short video
2	Organic vegetables	Pamphlet, short video, logo
3	Hydroponic vegetables	Brochures, short video
4	Organic rice	Brochures, short video
5	Mini cactus	Brand design for packaging, short videos

Most of the group produced brochures, short videos containing information about the products and leaflets. The promotional media produced is mainly aimed to be posted on social media such as Instagram, Facebook, and blogs. Students agreed that social media is the most efficient mode of transferring information about a particular product.

3.1.5 Presentation of the product and evaluation of the process.

Each group presented their whole project including background, problems, methodology, and types of ICT and multimedia chosen, challenges faced during project preparation. The presentation was conducted three times. The first and second presentations were a draft of the product, and the last presentation was the revised version of the product. This stage was followed by evaluation or assessment of the process and the product of each group.

3.2 Assessment of Project-based Learning in ICT and Multimedia for Agribusiness Course

The whole process of project-based learning in the course was assessed by using peer-assessment by the students; developing questionnaires to evaluate students' perception on the method applied. Evaluation of promotional products produced by the group was also part of the assessment. Overall assessment was given by grade for each student. Table 3 shows the grade of student who participated in the class.

Table 3: Distribution of students' grade

Grades	Number of students (%)
A-- A+	82
C+	12
D	6
Total	100

Table 3 depicts that most of the students (82%) have successfully gained the best grade, while some others are still below the expected output. This is due to low participation in class, ignorance of some tasks assigned by the group member in preparing the projects. Moreover, attendance frequency was also low. Domains of learning among the students regarding cognitive, affective and psychomotor aspects were evaluated (Figure 1).

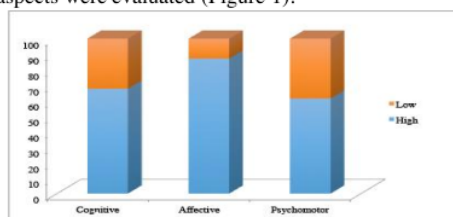


Figure 2: Domains of Students' Learning

The figure shows that project-based learning can increase the three domains of students' learning namely cognitive (67.7%), affective (87.1%) and psychomotor aspect (61.3%). It indicates that students have been motivated to improve their knowledge regarding planning agribusiness commodity marketing, choosing appropriate promotional media and designing. This is in line with a research conducted by Made et al. (2014) that project-based learning has been able to improve learning outcomes and students' ability compared to the conventional method.

Students were encouraged to find more information from various sources such as books, internet, journal articles related to their project. Furthermore, students were actively involved in class discussion, convey their opinions, and asked questions. This reveals that the use of the project-based learning method can improve the cognitive aspects or knowledge of students in ICT and Multimedia courses, as pointed out by (Purnamasari et.al, 2016). From an affective aspect, students were encouraged to deliver and develop ideas on the project being done. Students also learned to appreciate the opinions and project outputs of other group members.

In addition to cognitive and affective aspects, project-based learning can also improve the psychomotor or behavior of students in teaching and learning activities in ICT and Multimedia course. Students enhanced their ability in planning, choosing and designing promotional media of the chosen agribusiness product. Thus, improving product marketing. Students are capable of finishing their project although some problems were encountered during the process. It has helped achieved some of the project-based learning objectives namely the creation of a product and strengthening strategies and problem solving (Baden, 2004).

3.3 Challenges Faced in Implementing Project-based Learning

Although project-based learning has helped students with active learning in preparing their project, some challenges and constraints were found such as (i) time constraints: project takes longer than planned. Students need longer time to comprehend the course materials and how it is implemented in the project planned. In addition, lecturers also need to restructure the time to cover all the course subjects and supporting project preparation. Hertzog (Hertzog, 1994) also identified time problem in evaluating project-based learning. (ii) Classroom management

and control: sometimes lecturers were faced with hesitation as to either control the class, in particular when students faced confusion and problems in preparing their project or let the students build their understanding, (iii) support of student learning or students' participation. Some students seem reluctant to participate in the creating nature of collaboration and building creativity among participants. Some students played an active role and controlled the flow of discussion.

4 CONCLUSIONS

Based on the implementation of project-based learning, some important points have been pointed out as the lessons learned of project-based learning as a teaching and learning method:

- Project-based learning has been implemented in six main stages: identification, planning, investigation, preparation, presentation, and evaluation.
- Project-based learning can have a positive effect on students' critical thinking skills, increased confidence and learning
- In general, the three domains of learning (cognitive, affective and psychomotor) have improved in the students
- Despite some challenges such as creating nature of collaboration and creativity among the participants, project-based learning is an appropriate teaching method for ICT and multimedia course.
- Most of the participants agreed that they have learned and developed ideas, use available resources to accomplish their projects within the time restrictions.

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