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Easily Understanding on Post-Harvest Handling Subject Through Video-based Learning: A Study on Agriculture Students at UiTM Melaka, Malaysia

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Article History	Abstract
<p>Article Submission 22 August 2021</p> <p>Revised Submission 18 October 2021</p> <p>Article Accepted 21 November 2021</p>	<p>Video-based learning (VBL) is an attractive teaching approach that comprehensively prepares students to solve problems. This study explores the effectiveness of video-based learning media in increasing students' knowledge about post-harvest handling. The research method used is a quantitative descriptive survey. Research respondents were year three students of Undergraduate Plantation Technology and Management from Universiti Teknologi Mara (UiTM) Melaka, Jasin Campus. Random distribution of questionnaires using Google form. Samples were taken based on a purposive sampling technique, namely those taking post-harvest handling courses. The survey was conducted using research instruments to measure students' understanding before and after being given treatment (watching videos). Data analysis with t-test ($\alpha = 5\%$) shows differences in pre-test and post-test scores, namely differences in knowledge before watching videos and watching videos. The results show that the post-test result score is higher than the pre-test score and can be categorized as high. This treatment indicates that students can understand well the subjects of post-harvest handling. The t-test result shows that the application of VBL had a significant effect on students' understanding of post-harvest handling. Video-based learning can be used as an alternative to learning in the era of the industrial revolution 4.0 to increase students' knowledge of a learning topic.</p> <p>Keywords: Economic Education, Education for Sustainable Development, Local Values, Local Wisdom.</p>

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1. Introduction

The successful implementation of Education 4.0 would not be achieved without developing information technologies in education [1]. The aims of Education 4.0 are aligned with the requirement or demand of Industrial Revolution 4.0. Demands are still possible in the real world. Continuous technological advances are made by considering the world's basic principles through observation and action [2]. Learning by utilizing technology does not cause obstacles for students. Students can get any information and anywhere by using technology. Modern technology now supports teaching and learning [3]. According to [4], the development of media and technology in education can improve the teaching and learning process quality, connect students' prior knowledge to learning objectives, and increase students' creativity. Education 4.0 can significantly improve humankind's quality of learning, resulting from ICT development throughout the year [5].

Technological developments have influenced the teaching and learning process in schools. These changes are the effect of the revolution of the internet [6]. The internet's existence makes it easy to find information because it functions as a virtual library in various types of information [7]. Video-based learning is one of the best ways of teaching. Learning advantages of video-based learning can trigger people to think according to knowledge, reduce conventional teaching types, such as paper costs, and allow access through several devices at once. Video-based learning (VBL) is also an exciting teaching approach that can be used by lecturers as VBL tools have been increasingly developed recently [8]. VBL is a dynamic and powerful approach to enhance learning outcomes and students' satisfaction [9]. Many higher education institutions and companies implement VBL as a learning medium to intensify the learning process [10]. In the twenty-first century, digital media technology is the development of a massive moving image or video as a visual aid [11]. With the rapid growth of technology, students are eager to use technology devices for learning.

Applied to learn such as science consists of facts and figures, legal formulation, problem-solving, understanding of basic scientific principles of concepts, and observed concepts and phenomena [12]. Therefore, an appropriate teaching approach should be used by the lecturer in providing the students with a better understanding. Post-harvest handling is one of the branches of agricultural science. Post-harvest technology relies on many relevant disciplines, such as plant biology, engineering, agricultural economics, food processing, food safety, and environmental conservation [13]. Visual explanations can show a complex system's parts and processes directly and quickly understood [14].

Many factors influence fresh post-harvest produce. Typical post-harvest handling is designed to maintain quality, such as temperature, relative humidity, storage under a controlled atmosphere (CA) or modified packaging atmosphere (MAP), and processing at phytochemical content [15].

One of the most critical aspects is understanding the basic concepts and principles in the field. A comprehensive understanding is essential for preparing students to solve problems in the form of problem-solving exercises. The facts, principles, and concepts should be memorized. However, students are often unable to relate these words to real situations, which means teaching is never done. This study aims to see the effectiveness of video-based learning media in increasing students' knowledge about post-harvest handling.

2. Materials and Methods

In this study, a quantitative descriptive survey used 21 number of the sample taken among 5th-semester student of Bachelor Science in Plantation Technology & Management from UiTM Melaka, Jasin Campus. In this study, the sample was selected based on the purposive sampling technique [16]. This sample was chosen for this study because they take this subject during year 3. An instrument that has been used in this study is a 5-point Likert-scale.

Table 1. Scale Likert for Instrument

Scale	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Score	1	2	3	4	5

The distribution of the questionnaire is by using Google Form. The type of distribution is random distribution. The questionnaire is divided into two-part, which is demography, and consisted of 6 questions. There are pre-test and posttest involved in this study [17]. The data were then analyzed using the t-test ($\alpha= 5\%$) to compare the mean between the two independent groups [18], before and after being given treatment; in this case, an educational video was given to students.

3. Result and Discussion

The result obtained from the questionnaire is divided into three-part, which is demography, pre-test, and post-test.

Table 2. Demography of Respondents

Item	Description	Frequency	Percentage
Gender	Male	12	57.1 %
	Female	9	42.9 %
Total		21	100 %
Age	21 years old	6	28.6 %
	22 years old	9	42.9 %
	23 years old	6	28.6 %
Total		21	100 %

Table 2 shows the respondent's gender, which consists of only two genders, male and female. The results showed that the number of male respondents was more than female respondents. The number of male respondents is 57.1%, while the number of female respondents is stood at 42.9%. This figure resulted from random sampling. Respondents were selected based on 5th-semester students of S1 Technology Science & Plantation Management at UiTM Melaka Jasin Campus aged 20-23. The total number of 21 years old is 28.6%, 22 years old is 42.9%, and 23 years old is 28.6%. This result aligns with the fact that 5th-semester students of Bachelor Science in Plantation Technology & Management from UiTM Melaka, Jasin Campus, age range from 20 to 23.

Table 3. The Mean Score of Pre-test and Post-test Answer's of Respondents

No Item	Description	Mean Score	
		Before	After
1	I understand the definition of post-harvest handling	1.57	4.85
2	I can outline the basic principles of post-harvest handling	1.57	4.71
3	I understand when to handle post-harvest handling	1.28	4.71
4	I can state the purpose of post-harvest handling	1.42	5.00
5	I understand how to carry out post-harvest handling theoretically	1.42	4.42
6	Post-harvest handling is vital in agriculture	1.42	5.00
Average Mean Score		1.44	4.78

The pre-test results were taken before students watched the educational video. The post-test is taken when students watch the learning video. The questionnaire to analyze students' level of understanding can be seen, as shown in Table 3.

The total min average of pre-test data is 1.44. This score showed that the understanding level of students toward the Post-harvest Handling subject is at a low level. We can say that students cannot understand the basic principle of post-harvest handling, the benefits, and the importance of post-harvest handling. The item with the lowest min score is item no 3, "Do you know when to do post-harvest handling?". This question shows that students have a problem identifying when the exact time post-harvest handling activities have been done.

Results of the post-test show that the total min average is 4.78. A score that is higher than 3.8

is categorized at a high level. A high level indicates that students can understand well the subjects of post-harvest handling. This learning includes an understanding of post-harvest handling, basic principles, interests, and learning objectives. The post-test result shows that items number 4 and 6 have the highest min score, which is 5.00. This information explained that the students now can fully understand the purpose and the importance of post-harvest handling in any agriculture activities.

Table 4 shows a significant difference between the pre-test and post-test scores (sig. < 0.05). This information means a difference in students' level of knowledge after being given an educational video. This information is in line with previous research. The VBL method significantly affects student motivation and psychomotor abilities when viewed from the practicum score and practicum observation [19]. Students who undergo multimedia-based learning have higher scores when compared to ordinary learning [20]. The Pre-Test and Post-Test assess the acquisition of knowledge that students acquire [21]. Video-based learning can be a teacher's choice to reduce deficiencies in traditional classrooms [22].

VBL is a powerful approach used in education to improve learning outcomes [23]. Video-based learning has the advantage of consistently presenting the knowledge to students through videos [9]. Video-based learning is a rich and robust model for improving learning outcomes and student satisfaction [24]. The advancement of video technology in education is becoming increasingly acceptable to both students and teachers because it has various positive effects [25]. This study is also in line with [26], which illustrates that incorporating multimedia content can improve student learning achievement. Effective multimedia learning media can improve communication and retention of learning content and increase student attention and curiosity during learning [27]. Video-based learning strategies allow students to prove the concept of a material idea and can be an active alternative to learning in improving student learning outcomes [28]. The use of the Video Modeling Package also improves respondents' assessment of social skills [29].

Table 4. Paired Samples Test for Pre-test and Post-test Mean Score

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Dev	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test - Posttest	-3.33500	0.23763	0.09701	-3.58438	-3.08562	-34.377	20	0.000

Losses in post-harvest quality can be affected by various things, such as the type of plant and its handling practices [30]. Failure to comply with post-harvest handling practices will be costly [31]. Post-harvest losses contribute to food and nutrition security [30], which impacts poverty levels [32]. Therefore, improving post-harvest handling practices must be considered. One of them is by increasing agricultural students' knowledge about post-harvest handling. Based on these findings, the VBL method has a significant effect on improving student knowledge. Through the VBL method, students can contribute to post-harvest handling in their country. Thus, students can contribute to their country in food security by improving post-harvest handling practices.

4. Conclusions

Video-based learning can be a successful teaching aid because the results of this study proved to be very decisive. There is a significant increase in the level of students' understanding of the subject of post-harvest handling. The term understanding explains that after watching the post-harvest handling video, students can understand the meaning of post-harvest handling compared to before watching the video. Students can describe all the basic principles in post-harvest handling and identify the right time to carry out post-harvest handling. Students understand the purpose of post-harvest handling in agricultural activities. All students agree on the importance of post-harvest handling in every agricultural activity. Video-based learning should be carried out in post-harvest handling teaching and learning sessions. Lecturers must consider the positive impact shown in this study. Further research can be carried out on lecturers' perceptions of video-based learning or educational videos during post-harvest handling teaching and learning sessions for undergraduate students in Science of Technology & Plantation Management from UiTM Melaka, Jasin Campus.

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