Camtasia-assisted computer statistics application practicum learning video in online classes to improve students' mathematical understanding

Sri Sukmawati, Tia Fitria Saumi and Anton Nasrullah

Universitas Bina Bangsa, JL Raya Serang - Jakarta, KM. 03 No. 1B, Panancangan, Kec. Cipocok Jaya, Kota Serang, Banten 42124 Indonesia

Email: sri.sukmawati@binabangsa.ac.id

Abstract. The learning environment by relying on lectures and practice in class causes students to have a tendency to forget so that it can cause a lack of understanding ability, in fact, the understanding ability is a learning challenge to face the needs of the industrial revolution 4.0. The purpose of this research is to find out whether the achievement and improvement of understanding of students who learn with Camtasia-assisted learning videos are better than students who learn by not using learning videos. The method used is a quasi-experiment and the design used is a non-equivalent control group design. Samples were taken two classes purposively. The selected research sample consisted of two classes, 32 students from the experimental class and 48 students from the control class. The research instrument used was a comprehension ability test. The results of the study found are the achievement and improvement of understanding of students who learn with Camtasia-assisted learning videos better than students who learn by not using learning videos.

1. Introduction

Learning is a combination of arrangements including human elements (students/students and teachers/lecturers), materials (learning devices), facilities (rooms, audio-visual classes), and processes that influence each other in achieving goals [1]. The role of the lecturer as a facilitator who leads students to reach the cognitive, affective, and psychomotor domains according to learning indicators. One important aspect of the learning process is learning resources. One important aspect of the learning process is learning resources. Known learning resources are textbooks, whereas learning resources that can be utilized in the teaching and learning process such as radio, television, video, internet and multimedia as supporting material and student feedback [2].

The interaction of lecturers and students in the teaching and learning process is one source of learning to achieve the expected learning outcomes [2]. While knowledge and skills about strategy, analyzing, choosing, and utilizing learning resources by educators are generally inadequate. This can be seen in the practical learning of computer statistical applications that are used only by using books, SPSS software, and learning environments by relying on class lectures and practice only in the classroom. Learning lectures in class and practice only in the classroom cause the impact of problems, namely students have a tendency to forget, lack of ability to understand and solve problems. In fact, the ability and skill to solve problems is a learning challenge to face the needs of the industrial revolution 4.0. The results of previous studies explain that learning using Camtasia can improve student learning outcomes [3,4].

One source of learning that can help and as a form of an effort to improve understanding skills is by using Camtasia software. Camtasia is a software developed by TechSmith Corporation. Camtasia is used...
to record all activities on a computer desktop [5]. Camtasia software can be utilized for the teaching and learning process. Camtasia is software that can be installed on a computer (laptop) so that it can record presentations into training videos [6].

One application that can create, record and edit videos are the Camtasia / Camtasia Studio application, which is an application program that is packaged for recording, editing, and publishing in making video presentations on a computer screen [4]. Camtasia Studio is a software that can record everything that is happening on the monitor screen; therefore, this software is usually used to make video tutorials or video presentations [7]. The indicators of students' mathematical understanding ability in learning practical computer statistic applications are making examples, making non-examples, comparing, identifying, changing shapes, and presenting [8].

Camtasia Studio software can record learning explained by the lecturer, so students can playback the recorded results of practicum outside the classroom. The learning of practicum application of Camtasia-assisted computer statistics is expected to make it easier for students to understand the subject matter so that it can have an impact on improving the ability of students to understand the practicum of computer statistics application practicum. Camtasia's software-assisted learning process environment is one form of effort to increase the competency of students, namely the ability to understand in facing the needs of a dynamic industrial revolution 4.0.

2. Method
The research was carried out at Bina Bangsa University majoring in management which manages economics statistics courses by applying computer statistical applications (SPSS) as a population. The study was conducted in an existing class of as many as two classes. The first class (experimental) was given the treatment of Camtasia-assisted learning and the second class (control) was given treatment not using video learning. The sample involved as many as 80 students, 32 experimental class students who were given Camtasia-assisted learning videos, and 48 students who were not given learning videos (control class).

Before and after the treatment is given a mathematical understanding ability test (Research design: non-equivalent pre-test post-test). The mathematical understanding ability test is in the form of a description test of five questions in a computer statistics practicum course. Understanding ability tests have passed the stages of validity, reliability, level of difficulty, and distinguishing features so that they are suitable for use in research.

Data collection techniques in research through the following stages: 1) preparation of storyboards for learning videos, making learning videos and instruments used in research; 2) the research instrument is validated by lecturers who have competence in the content of mathematics, language and indicators of understanding ability; 3) conducting research instrument trials; 4) test instruments (pre-tests) are given to the experimental and control classes before being given treatment; 5) the research sample is given treatment; 6) comprehension test (post-test) is given to students after treatment; 7) analyzing data on comprehension ability test results (pre-test and post-test) [8].

The research data analyzed were the result data before the treatment (pre-test) and after treatment (post-test) which were described based on aspects of students' understanding abilities in the form of descriptive analysis. Understanding ability tests (pre-test and post-test) in the form of five questions as many as five questions (ideal maximum score = 100). Next, the score was analyzed using t-test differences, Mann-Whitney U and N-Gain classification with high category (g> 0.7); middle category (0.3 <g ≤ 0.7); low category (g ≤ 0.3) [8].

3. Result and Discussion

3.1. Achievement of Students' Mathematical Understanding Ability
The pre-test and post-test core analysis is used to determine whether there is an achievement of understanding of students who learn with Camtasia-assisted learning videos better than students who learn by not using learning videos.
The pre-test statistical test results showed that the control class students got an average of 43.00 and the experimental class students got an average of 42.41 (Table 1). It is seen that the control class has an average higher than the experimental class.

### Table 1. Descriptive Statistics of Pre-Test and Post-Test Scores Achievement of Mathematical Understanding Ability

|         | Pre-Test | Post-Test |
|---------|----------|-----------|
|         | Mean     | SD        | Sig. | Mean     | SD        | Sig. |
| Experiment | 42.41    | 5.78      | 0.926| 76.63    | 8.39      | 0.000|
| Control  | 43.00    | 10.43     |       | 64.29    | 11.57     |       |

Before being given treatment both the experimental class and the control class were pre-tested. The results of the pre-test were analyzed to compare and ensure that the values of their initial understanding abilities in learning practicum in computer statistical applications are the same. The results showed an abnormal distribution in the control class (pre-test), then using Mann-Whitney U to test the difference in a sample means. Mann-Whitney U test results showed that the two groups did not have a significant difference in the initial tests of the two groups (Table 2). This shows that both classes have the initial ability of the same mathematical understanding ability of students, so it can be continued by giving both experimental and control class treatment. Next is to provide a post-test.

### Table 2. Pre-Test Score Achievement of Mathematical Understanding Ability

|         | Mann-Whitney U | Z      | Sig   |
|---------|----------------|--------|-------|
| Pre-test| 758.5          | -0.093 | 0.926 |

After being treated both the experimental class and the control class were given a post-test. The results of the post-test were analyzed to compare and ensure that the value of their final understanding of abilities in learning practices in computer statistical applications is the same or not.

The results showed an abnormal distribution in the control class (pre-test), then using Mann-Whitney U to test the difference in a sample means. The Mann-Whitney U test results showed that the two showed that the experimental group students had better mathematical understanding abilities than the control group (Table 3).

### Table 3. Test Difference in Average Post-Test Score Achievement of Understanding Ability

|         | Mann-Whitney U | Z      | Sig   |
|---------|----------------|--------|-------|
| Post-test| 244.5          | -5.148 | 0.000 |

3.2. Analysis of Improvement of Students’ Mathematical Understanding Ability

N-Gain score analysis of mathematical understanding ability is done to find out whether the improvement of students' mathematical understanding ability learning with Camtasia-assisted learning videos (experimental class) is better than students who study by not using learning videos (control class). But before analyzing the N-Gain score a prerequisite test for normality and homogeneity must be done in both classes. The results of the average N-gain score test is the abnormal distribution (control class), then using Mann-Whitney U.

### Table 4. N-Gain Score Improved Mathematical Understanding Ability

|         | Mann-Whitney U | Z      | Sig   |
|---------|----------------|--------|-------|
| N-Gain  | 187.5          | -5.742 | 0.000 |

Sig = 0.00 is smaller than the significance level of 0.05, it is concluded that the increase in mathematical understanding ability of students who learn with Camtasia-assisted learning videos
(experimental class) is better than students who learn by not using learning videos (control class) (Table 4) and has a medium category in the quality of understanding improvement (Table 5).

| Table 5. N-Gain Category Improvement of Mathematical Understanding Ability |
|-----------------------------|-----|-----|-----------------------------|
| Experiment                  | 32  | 0.601 | 0.141 | Middle                     |
| Control                     | 48  | 0.386 | 0.120 | Middle                     |

Achievements after being given treatment (post-test results) showed that the class achievement score was 76.63 (experimental) and 64.29 (control class) (Table 1 and Figure 1). This shows that the experimental class has a higher average value increase in the ability of mathematical understanding, however, in the category of increasing N-Gain (experimental and control) has a moderate category (Table 5). The results of the study recommend that learning videos show that lecturers must be approached and encourage students to ask for their help at any time, as well as remind them to work harder on the Internet [9] thereby increasing student competency.

![Figure 1. Average Mathematical Comprehension Ability of Experiment Class and Control Class.](image)

When given a problem regarding the data processing practicum in statistics and video learning is given students are enthusiastic in learning practicum computer statistical applications using Camtasia-assisted learning videos. This is because the application of Camtasia-assisted learning video learning can involve students actively in the learning process, namely, students make assignments by explaining also in the form of videos. In addition, students can overcome forgotten steps in practicing computer statistical applications by playing back the video learning provided by the lecturer so that it impacts on achieving students' understanding ability (Table 3) and increasing comprehension ability in the experimental group (Table 4). This finding is in line with the results of research which states that learning in the form of instructional videos can improve student abilities [10,11]. Based on the video learning research findings, one of the practicum applications of computer statistics has an impact on students' academic abilities, namely the achievement of students' mathematical understanding abilities (Figure 1), and increasing students' ability in understanding (Figure 2) and facts in the field in the learning process of students can reveal their understanding in the form of video in a given assignment. The results of the study are in line with previous research which revealed that the impact of learning videos can provide students with competence in speaking skills [12] and better student problem-solving abilities [13].
Based on the results of research in practicum learning statistical computer applications using video learning rocky Camtasia can help the achievement and improvement of students' understanding abilities. Even so, the use of video learning must be careful because given the disadvantages. The finding of deficiencies in the use of learning videos is that the process of making videos is quite expensive, it takes a long time to complete a video. Another weakness of video is in the manufacturing process that is that video cannot stand alone, a program which is part of a series of video production activities and the assistance of other media such as computers, sound speakers are needed [14,15]. Some of the presentations of the results of the study suggested that teacher/lecturer educators in using learning videos must pay attention to planning well according to the learning objectives in making videos. Learning videos require more time in preparation than usual learning. Although it has many advantages in its use, video cannot be used as a learning medium for every meeting or face to face. This is because it will present something monotonous and boring [9].

4. Conclusion
The results of the research on the application of peer tutors can be concluded that the achievement and increase in understanding of students who learn with Camtasia-assisted learning videos are better than students who learn by not using learning videos. Camtasia-assisted learning videos can be used as alternative learning. The use of Camtasia-assisted learning videos, lecturers must pay attention to providing learning tools and time allocation so that students' competency goals can be increased.

5. Acknowledgments
The researcher would like to thank the Ministry of Research and Technology / National Research and Innovation Agency and Bina Bangsa University for providing research funding support. Researchers would like to thank the Editor of the Journal of Physics: Conference Series and the International Seminar on Applied Mathematics and Mathematics Education (ISAMME) 2020 which have helped in research publications.

6. References
[1] Hamlik Oemar 2010 Kurikulum dan Pembelajaran (Jakarta: PT Bumi Aksara)
[2] Abdullah R 2012 Pembelajaran berbasis pemanfaatan sumber belajar Jurnal Ilmiah Didaktika: Media Ilmiah Pendidikan dan Pengajaran 12 216–31
[3] Subekti E E, Cahyadi F and Fajriah K 2017 Multimedia Pembelajaran Berbasis Camtasia Studio dalam Mata Kuliah Matematika 1 untuk Mahasiswa PGSD Journal of Medives: Journal of Mathematics Education IKIP Veteran Semarang 1 134–40
[4] Durri A A, Raharjo H and Muchyidin A Applications of Mathematics Charged Islamic Values by Using Macromedia Flash and Camtasia 2016 Information Technology Engineering Journals 1
[5] Mulyana V and Tuah S 2017 Pengembangan Media Pembelajaran Praktikum Kimia Menggunakan Camtasia Studio 8 di SMA Negeri 1 Sipirok Tahun AJARAN 2016 – 2017 PeTeKa 1
[6] Latif Y, Ilma R and Putri I 2013 Pengembangan Bahan Ajar Berbantuan Camtasia pada Pokok Bahasan Lingkaran melalui Edmodo untuk Siswa MTs Kreano, Jurnal Matematika Kreatif-Inovatif 4 105-114

[7] Lodang H and Paramma I A 2014 Hasil Belajar Biologi Materi Ekosistem Siswa yang Dibelajarkan dengan Menggunakan Media Camtasia Studio dan Media Powerpoint pada Kelas VII SMP Negeri 1 Sungguminasa bionature 15

[8] Rosdianwinata E, Rifa’i R and Nasrullah A 2019 Implementation of peer tutor learning in improving students’ mathematical understanding ability. In Journal of Physics: Conference Series 1315.

[9] Galindo C, Gregori P and Martinez, V 2020 Using videos to improve oral presentation skills in distance learning engineering master's degrees International Journal of Mathematical Education in Science and Technology 51 103-114

[10] Nurdin E, Ma’aru’f A, Amir Z, Risnawati R, Noviarni N and Azmi M P 2019 Pemanfaatan video pembelajaran berbasis Geogebra untuk meningkatkan kemampuan pemahaman konsep matematis siswa SMK Jurnal Riset Pendidikan Matematika 6 87-98

[11] Rahmad R, Yuniastuti E and Wirda M A 2018 Pengembangan Media Pembelajaran Video Tutorial Menggunakan Camtasia Studio 8.5 Pada Matakuliah Sistem Informasi Geografi (SIG) Jurnal Ilmiah Pendidikan dan Pembelajaran 2

[12] Adnyani L D S 2014 Penerapan Teknik Role Play Dengan Bantuan Video Pada Mata Kuliah Speaking 2 Untuk Meningkatkan Keterampilan Berbicara Mahasiswa Jurusan Pendidikan Bahasa Inggris Undiksha Tahun Ajaran 2011/2012 JPI (Jurnal Pendidikan Indonesia) 3

[13] Sudiarta I G P and Sadra I W 2016 Pengaruh Model Blended Learning Berbantuan Video Animasi Terhadap Kemampuan Pemecahan Masalah dan Pemahaman Konsep Siswa Jurnal Pendidikan dan pengajaran 49 248-58

[14] Johari A, Hasan S and Rakhman M 2014 Penerapan Media Video Dan Animasi Pada Materi Memvakum dan Mengisi Refigran Terhadap Hasil Belajar Siswa Journal of Mechanical Engineering Education 1 8-15

[15] Hamzah A and Muhlisinarini M 2014 Perencanaan dan Strategi Pembelajaran Matematika (Depok: Raja Grafindo Persada)