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Implementation Interactive Learning for Massive Open Online Course (MOOC) Initiation Based on Student Centre Learning

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Abstract. The student achievement for Operation Research courses in the last semester was unsatisfied, this indicated that the learning process has not been successful. Operations Research is a compulsory subject with mathematical calculations as the basis, the root of the problem of students' lack of enthusiasm in capturing lecture materials for Operations Research. One of the challenges faced in the teaching and learning process of this course is how to make students really understand both theoretically and practically in real life as a form of implementation of the knowledge contained in the Operational Research course. The purpose of this study is to improved students achievement that have grades below C. One method that can be done to overcome this problem is to package lecture material in the learning video. This learning video will be an initiation in other study programs, especially at the Islamic University of Indonesia to apply video making as a new form of learning media and can be used as an example of MOOC-based lectures as a form of globalization of UII's work to get a position in the world global education. Based on the results of student assessment it was found that the average for all aspects of making learning videos received a pretty good assessment, but there was still one aspect that received very little value, namely the aspect of writing. This learning video method is able to overcome the problem of obtaining scores below C, which is a decrease in the percentage of the number of students who score below C from 17% in the 16/17 Academic Year to 11% in the 2017/2018 Academic Year.

1. Introduction

The development of the era at this time requires humans to quickly adapt to the new environment, one example is the use of technology in various fields, such as education field. Some online products are produced in order to bridge the needs of students outside of lecture hours. Openness of access to learning on the internet is one of solution for students who want to learn more and to add knowledge that might be missed during lectures face to face with lecturers.

Based on research, it has been found that the network logs are easy to use, have an effective teaching and learning potential, which improves the leaning performance of the students. When the material can be accessed through the e-learning system, students can learn anytime they wants and when they forgot the passed material, the material is still available on the internet [1]. Massive Open Online Courses (MOOCs) are a recent popular trend in the online learning landscape that has its roots in the ever expanding repertoire of Open Educational Resources (OER) and distance learning technologies [2].

The operational research course is a compulsory subject of 3 credits with a minimum grade of C and is the core subject of the Statistics FMIPA UII study program curriculum. In a number of years the

percentage number of student that get grade under C changes occurred. The following are the results of the percentage of the acquisition of several compulsory subjects held at the Statistics Study Program from the 2015/2016 academic year and the 2016/2017 academic year.

Table 1 Percentage Number of Student that Get Grade Under C in 2 Years

Academic Year 2015/2016		Academic Year 2016/2017	
Subject	**%**	**Subject**	**%**
Calculus II	57%	Statistics Method II	37%
Introduction to Probability	27%	Introduction to Statistics Mathematics II	30%
Statistics Method II	17%	Operation Research	17%
Introduction to Statistics Mathematics II	17%	Introduction to Probability	16%
Geology & Geomorphology of Disasters	12%	Cost Accounting	15%
Geographic Information System	10%	Introduction to Financial Statistics	12%
Applied Multivariate Statistics	8%	Time Series Analysis	10%
Data Base	7%	Official Statistics I	9%
Operation Research	6%	Geology & Geomorphology of Disasters	8%

Based on Table 1. it was concluded that there was a significant increase in the percentage of students under C about 11% for the Operational Research course, this indicates the need for an evaluation of the learning process. Operations Research is a compulsory subject on the basis of mathematical calculations as its basis. This is the root of the problem of students' lack of enthusiasm in capturing lecture materials for Operations Research. This was identified from the density of lecture material that made the lecturers unable to repeat the material.

The Operational Research I course in the 2017 Curriculum is given to fourth semester students. Operational research courses are compulsory courses of 3 credits with 2 regular tuition and 1 credit is a practicum. This course is held in even semester for 4th semester students with a minimum grade of C. This course is a compulsory subject with prerequisites for Mathematics Statistics I. Operational Research Course I aims to support the Learning Outcomes Graduates in the form of mastery of knowledge about several methodologies (methods and models) statistics to be used in solving problems in several fields and specific skills in analyse several alternative solutions available in the field of statistics to solve problems and be able to present conclusions of analysis for appropriate decision making.

Based on the problems that have been explained, the challenge in terms of teaching and learning in this case is how to increase the value and level of understanding of students in attending lectures and how to make students more enthusiastic in receiving material in lectures. Based on some general descriptions and problems that have been explained and to achieve the learning achievement of the course (CPMK), this research will be carried out an innovation that is to make a you-tube channel that contains lecture material that is packaged using animation. The hope of this innovation is to help students in the learning process, because it is possible that when the lecturer explains only with slides that contain writing or points from learning, there are still students who feel missed. With this video, students can play videos over and over and even download videos in the channel so that they are expected to improve students' ability to understand this lecture material. The final goal of the results of this study is the reduced number of percentage of students who get under C.

Lecture evaluation will be carried out with a competency exam in accordance with a predetermined schedule. This is expected to ease the burden of students in studying operational research lecture material which is technically a solid subject. Based on the background of the above problems, the following is the formulation of the problem that I raised in the teaching of Even 2017/2018 semester:

1. How is the implementation of the use of learning videos as MOOC initiation in the course of Operations Research?
2. What is the level of effectiveness of learning using learning videos of operational research courses?
3. What is the result of the implementation of the use of learning videos with student scores in the previous school year?

2. Literature Review

Student Centered Learning is a learning model based on students. In the approach of teaching and learning process, the teacher must be able to carry out his role in addition to being a teacher but also as a motivator, facilitator and innovator [3]

E-learning is all that includes the use of computers in supporting the improvement of the quality of learning, including the use of mobile technologies such as PDAs and MP3 players. Also use of web and hypermedia based teaching materials, multimedia CDROM or web sites, discussion forums, collaborative software, e-mail, blogs, wikis, computer aided assessment, educational animation, simulations, games, learning management software, electronic voting systems, and others. It can also be a combination of different media uses.

A typical eLearning definition refers to technological platform that facilitates learning environment for students at their own pace and time through network services like, live chats among groups of students and teachers, online assignments, online answers and questions method, discussion boards, and email support. [4]

In the process of implementing e-learning, there are at least three factors forming e-learning, namely:

a. e-learning infrastructure, in the form of personal computers, internet networks and multimedia equipment. This includes equipment for teleconferences (in this case to conduct lectures online)
b. e-learning systems and applications, namely software systems that simulate conventional teaching and learning processes. For this research, google classroom is used which has been provided by the campus.
c. e-learning content, namely the content and teaching materials that exist in e-learning systems. This content and teaching materials can be in the form of multimedia or text based content (text-shaped contentsuch as textbooks.

Massive Open Online Courses (MOOCs) learning with models deliver online learning content to everyone who wants to take courses, without specific schedules [5]

3. Methodology

The study was conducted in a Department Statistics of Islamic University of Indonesia serving 111 student divided by 3 class. Data source for this research are grades achievement for every learning outcome each student and questionnaire from student to gathering level of satisfied from learning video. There are 2 kind of courses learning outcome it called with “Capaian Pembelajaran Mata Kuliah” in Bahasa. Resource for this courses learning outcomes from kemenristekdikti. KU (Kemampuan Umum) code means general ability for student, PP (Penguasaan Pengetahuan) code means acquisition of knowledge for student. The other hand, assessment was also conducted for lecturers on their teaching performance, it called NKMD (Nilai Kinerja Mengajar Dosen). There are 17 aspect assessment.

To measure the success of the implementation of this research, the process of measuring the performance of the program was carried out in several parameters that were used as indicators of program performance. This section contains a description of the grant program evaluation method to be implemented along with the arguments and indicators. Table below shows the relationship between problem formulation, measurement methods and performance indicators.

Table 2 Measurement Methods

Formulation of Problem	Measurement Method	Performance Indicators

How is the implementation of the use of video learning as an MOOC initiation in the course of Operations Research?	See the results of the learning videos that have been made	There are 14 learning videos for Operations Research courses
How is the level of effectiveness of learning using learning videos of operational research courses?	Survey to students about lectures	Achieving student satisfaction with learning using video
How is the result of the implementation of the use of learning videos with student scores in the previous school year?	Assessment of achievement of learning per competency.	Decrease the percentage of student scores below C

Following are the targets of the grant program performance indicators based on the achievement of CPMK Operations Research. The Operational Research course has 4 CPMK and the percentage for each CPMK is as follows:

Table 3 Performance Indicator Each Learning Outcome

Performance Indicators	Baseline
Level of achievement / fulfillment CPMK PPb1	10 %
Level of achievement / fulfillment CPMK PPb2	25 %
Level of achievement / fulfillment CPMK PPb3	40 %
Level of achievement / fulfillment CPMK KUa1	25 %

The map of learning outcome for this course as follow (figure 1). The lecturer upload learning video in youtube channel for each material, and student can play the video as well to gathering information that could not repeated in class. After student watch the video, they have to fill the questionnaire.

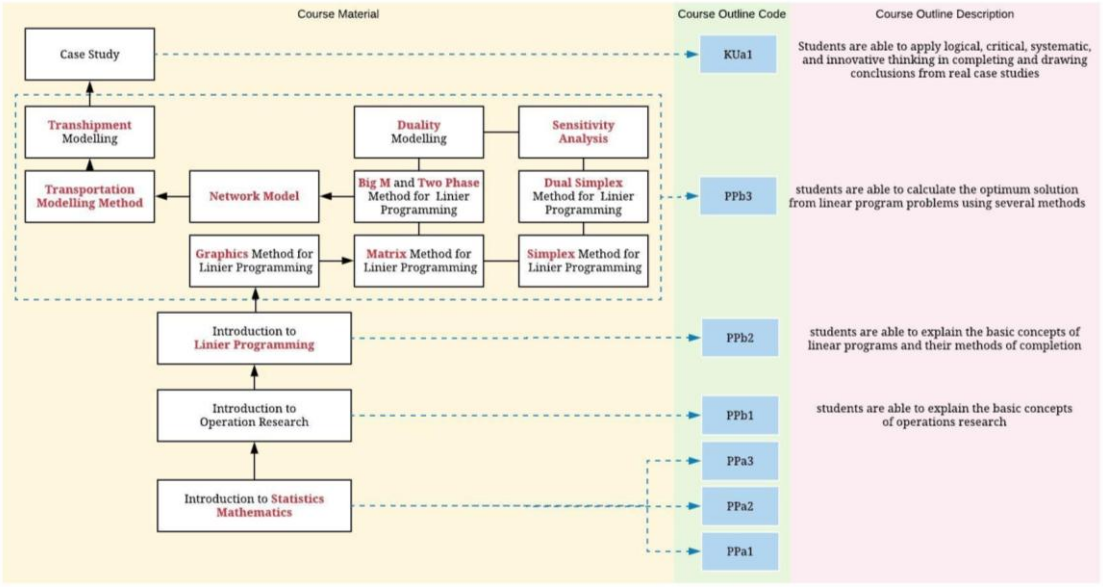

Figure 1 Course Learning Outcome

4. Result and Discussion

4.1. A. Results of Lecturer Assessment (Lecturer Teaching Performance Value)

The evaluation process of the learning process is done by looking at the results of the student's assessment of the lectures given by the lecturer, with the details of the questions as follows:

1. Readiness to give lectures and / or practice / practicum
2. Regularity and order in the administration of lectures
3. Ability to turn on the classroom atmosphere
4. Clarity in the delivery of material and answers to questions in class
5. Utilization of media and learning technology
6. Diversity in how to measure learning outcomes
7. Giving feedback on learning evaluation results (exams, assignments, quizzes, etc.)
8. Ability to explain topics / topics correctly
9. Ability to provide relevant examples of concepts taught
10. Ability to explain the relationship of fields / topics taught with other fields / topics
11. Ability to explain the linkages of fields / topics taught with the context of life
12. Mastery of current issues in the field being taught
13. Provision of open discussion facilities inside and outside the classroom
14. Ability to use various communication technologies
15. Become an example and be polite in behaving and behaving
16. Wisdom in taking care of students
17. Touch of Islamic values in the learning process

The following picture is the result of the assessment of students in class A, B and C on lectures given by lecturers. To get the results for the overall assessment of the NKMD Operational Research courses, here is the average value of the NKMD results for 17 questions:

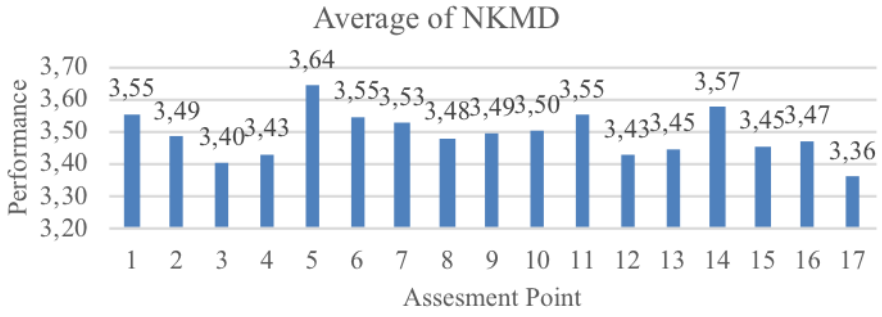

Figure 2 Average of NKMD

Based on Figure 2. It was concluded that the highest assessment was found in item 5 and the lowest value was in question 17.

5. Assessment of Student Center Learning Using Video

There are 6 aspects in this research that collect information from student about component in the education video learning. There are two type of video in this research, one is kind of animation video, second is recording video that contain lecturer video in a class. Following are the 8 video that uploaded in the you-tube channel

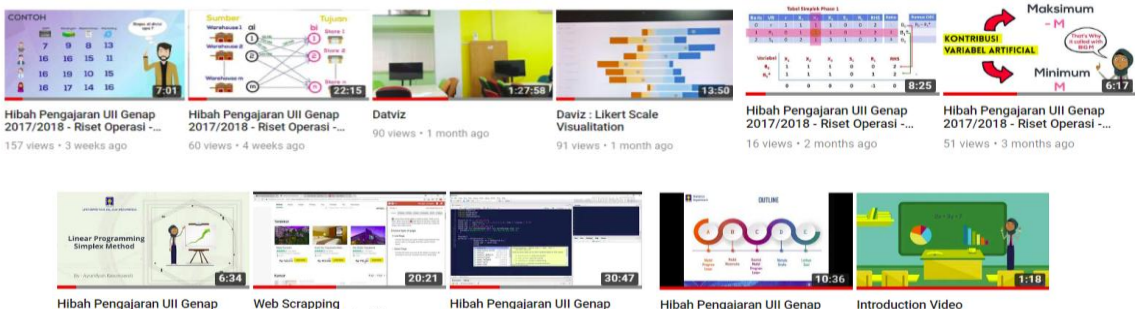

Figure 3 Learning Video on Youtube Channel

Following are the results of a video assessment for each question.

5.1. Voice

Voice in learning videos is one of the important aspects in making learning videos. There are two questions for this aspect of sound, namely: The voice of the narrator is heard clearly, the language used is communicative, and the use of words in this video is in accordance with the audience's understanding. The following is the result of the student's assessment of aspects of sound in the learning video.

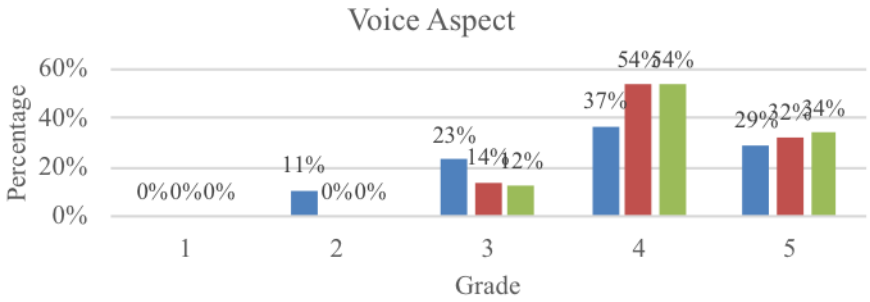

Figure 4 Voice Aspect Grade

Based on the results figure 4. of the student's assessment of the sound aspect for this learning video, the average student answers at point 4, that is the voice of the narrator is clear, the language used is communicative, the use of words in the video is in accordance with the audience's understanding. This indicates that all three points get good grades.

5.2. Backsound Music

The background music in a learning video is also important to stimulate the mind to be more relaxed in watching. The music background application consists of two questions, namely the use of music in accordance with the video presented and the music volume is appropriate or not. The following is the result of students' assessment of aspects of music background.

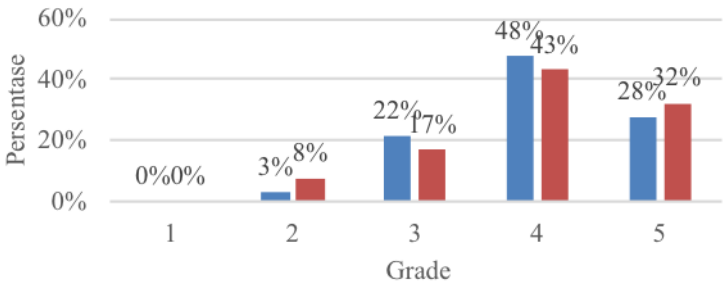

Figure 5 Voice Aspect Grade

Based on Figure 5, the results show that the average student gives a score of 4, which is good for the two questions given. This can be identified as a student.

5.3. Narative

The narrative aspect in question is the narrative in making the material that will be displayed in the video. Assessment in the narrative aspect is divided into 2 questions, namely the intonation of the delivery of the narrative is appropriate or not and the narration in the video can explain the material presented. The following are the results of the assessment of students.

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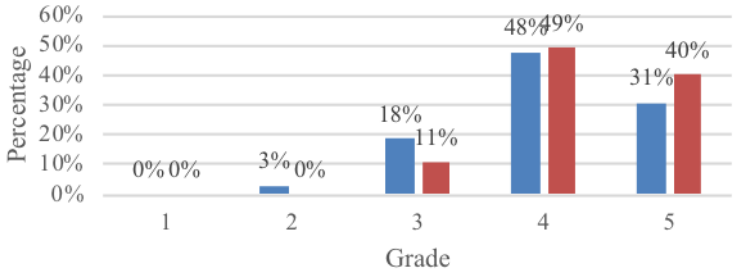

Figure 6 Voice Aspect Grade

Based on Figure 6, it can be concluded that students have been good enough to assess the aspects of narrative. This is identified from the value given by students, that is an average of 4 means is good. However, there are some students who feel that this narrative aspect is not very good, that is, 3% of students stated this.

5.4. Transfer Knowledge

Assessment for aspects of material delivery consists of 2 questions, namely whether the material presented in the video is correct, both in terms of adequacy and in the material and the order of delivery of the learning material in the video is appropriate or not. The following are the results of student assessments.

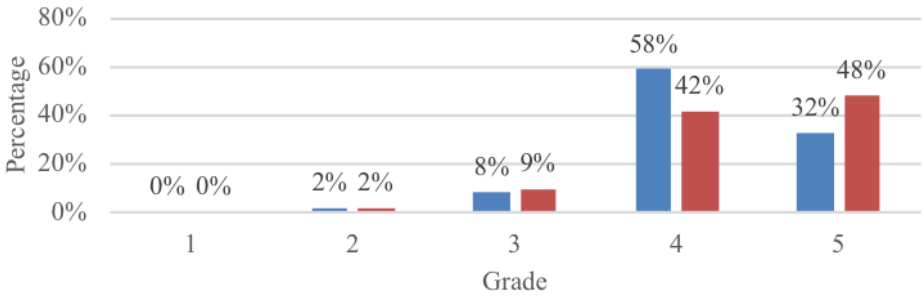

Figure 7 Material Grade

Based on Figure 7, it can be concluded that the average student gives a good assessment of this aspect. For the accuracy of the material presented in the video, both in terms of adequacy and depth are appropriate and get an assessment of 58% with a value of 4 and as many as 48% of students give a rating of 5 for the conformity of the delivery order of the appropriate learning material.

5.5. Writing Letters

Some of the videos used in this learning video use animation and in the animation there are writings that explain the lecture material. The use of writing is also one of the important things in making learning videos. The aspects in the writing assessed in the learning video that have been made consist of 2 questions, namely whether the size, type and colour of letters in the video are proportional or not. The second question is the colour integration between components increases interest in the audience. The following is the result of student assessment of aspects of writing.

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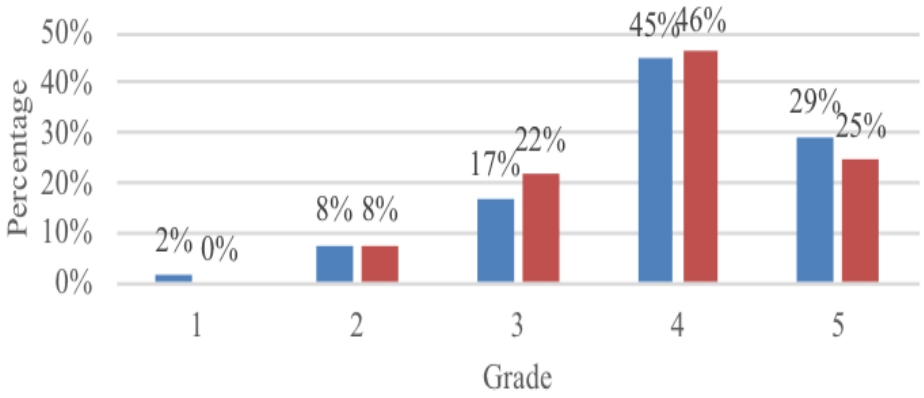

Figure 8 Writing Grade

Based on Figure 8, it can be concluded that the average student gives a score of 4 as much as 45% for the size, type and colour of letters on proportional video. While the same value, as many as 46% of students gave a score of 4 (good) for the aspect of colour integration between components increased the interest of the audience.

5.6. Video Presentation

Video presentation is also an important aspect in making learning videos, whether using animation or using videos with human models. There are 2 questions that are given for the aspect of presenting video, namely the time duration of the video is appropriate and the video presentation format that has been displayed is interesting or not.

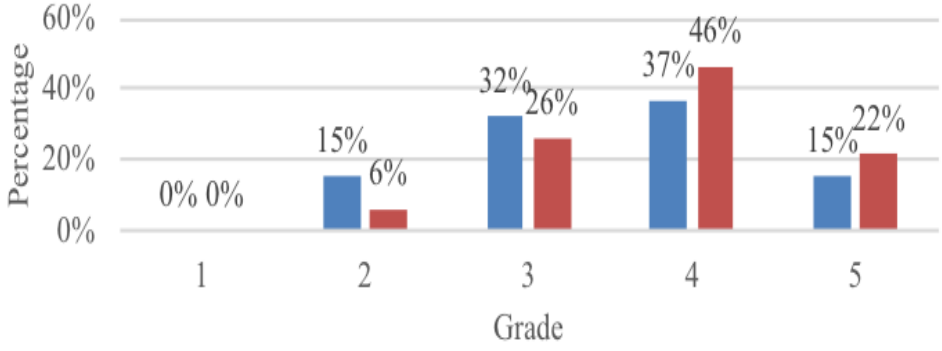

Figure 9 Material Grade

Based on Figure 9. it was concluded that as many as 32% of students gave a score of 3 (Good enough) for the aspect of the duration of the time the video was appropriate or not. Some students also gave suggestions in this video that the video should be made no more than 15 minutes, because if it takes too long then students will be bored to watch the video. Whereas for the aspect of video presentation format as many as 46% of students give a score of 4 (good), it can be interpreted that the video presentation format displayed is interesting.

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6. Achievement Assignment

6.1. Achievement of Subject Learning

The following are the results of the learning achievement of the subjects for each assessment.

Table 4 Learning Outcome Grades

Competent Assesmnet	CPMK	Complete									Uncomplete					Achievement CPMK
		A	A-	A/B	B+	B	B-	B/C	C+	C	C-	C/D	D+	D	E	
I	ppb2	114	0	0	0	0	0	0	0	0	0	0	0	0	1	99%
II	ppb3.1. dan ppb 3.2	27	1	39	12	11	0	14	0	7	0	0	0	0	4	97%
III	ppb 1 dan ppb 3.3.	7	0	0	0	5	0	7	0	16	9	13	18	9	31	30%
IV	ppb3.4., 3.5, 3.6.	16	0	11	0	9	0	14	0	17	13	10	5	7	13	58%
V	ppb3.7 dan ppb 3.8.	1	0	1	0	5	0	7	0	15	12	9	10	13	42	25%

Based on Table 2, it can be concluded that there are 3 CPMK that were not achieved, namely Competency Test III, IV and V. This is because CPMK III, IV and V are the heaviest material in the Operational Research course. The initial design is only 3 Competency Exams but it is felt that the implementation will be too much for students due to overcrowding. So the competency exam was broken down into 5. However, in its implementation, the results obtained did not meet CPMK's graduation points, namely that there were still many students who received scores below C for each material.

6.2. Achievement of Course Graduation

The following are the results of the overall acquisition of scores for the Operations Research course.

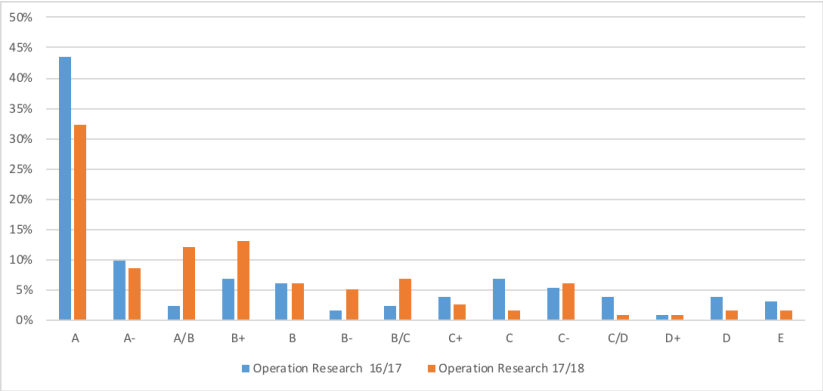

Figure 10 Material Grade

Based on Figure 10, it can be concluded that the percentage of students who get scores below C has decreased from 17% in the 16/17 Academic Year to 11% in the 2017/2018 Academic Year

7. Conclusion

Based on the results of the discussion above obtained the following conclusion:

- Based on the results of the student assessment it was found that the average for all aspects got a pretty good study, but there was still one aspect that received very little value in the aspect of writing.
- Overall for this treatment using learning video was success indicated by The percentage of students who get scores below C has decreased from 17% in the 16/17 Academic Year to 11% in the 2017/2018 Academic Year

8. Acknowledgment
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