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Practical Learning Innovation: Real Condition Video-Based Direct Instruction Model in Vocational Education

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Abstract. *This study aims to improve student learning outcomes through the implementation of direct learning models that are supported by learning videos. Class action research refers to Kemmis and McTaggart's designs, which are carried out over two cycles. The subjects of the study were students of class X LVE 7 at VHS Dharma Bahari Surabaya. Data were collected using test and observation instruments. Test and observation data were analyzed descriptively based on standardized study completeness criteria. The results of this study found that student learning outcomes consistently increased from the pre-test scores, the value of the first cycle, to the value of the second cycle. Based on the pre-test score data, it is known that there are 16 or 53% of 30 students who reach the complete category. Learning outcomes are then improved in the first cycle, where there are 19 or 63% who reach the complete category. Meanwhile, in cycle II there were 23 or 77% of students who reached the complete category. This increase occurred consistently so that it was concluded that the use of direct learning models supported by learning videos was very effective for the learning of class X LVE 7 students at VHS Dharma Bahari Surabaya.*

Keywords*: direct instruction models, instructional videos, classroom action research, vocational high schools, student learning outcomes*

INTRODUCTION

Vocational High School (VHS) is an institution or level of education organized to produce skilled workers who are ready to compete in the world of work. Through VHS, students are expected to be not only able to master a competency from the cognitive domain, but also be able to master from the psychomotor domain.

In the era of the industrial revolution 4.0 as it is today, having skilled human resources (HR) according to their field of expertise is one of the main components of the world of work (Oketch, 2009). Vocational High Schools, as educational institutions at the secondary level, are continually being demanded to be able to provide labor by the needs of the world job market. Various ways have been done together to meet these demands. Some methods are done, such as conducting an MoU, aligning the curriculum, to fulfilling facilities in schools to be able to replicate existing conditions in the world of work (Billett, 2009).

The learning process that is conceptualized and has clear objectives will certainly have a positive impact on the quality of student learning. In this case, education is said to be of quality if the teacher can show and direct students to work according to procedures that apply in the world of work (Pavlova, 2009). Besides that, professionalism, such as responsibility and totality ability at work, must really be developed in students so that students will not be surprised when they actually enter the workforce against the pressures and demands given (Hu et al., 2016).

Good learning outcomes can not only be measured based on students' scores from the cognitive and affective domains. But also must be measured from the psychomotor realm, in this case in the automotive field includes the ability of students to perform maintenance, repair, and analyze the damage to a vehicle (Bakar, 2018). Also, the selection of models and instructional media used as a reference for teaching teachers is important. Competent teachers will certainly use the right models and media by the competencies that will be prepared for students. Students' interest in learning will grow so that the learning process becomes effective and efficient (Nurtanto, 2018a; Serdyukov, 2017a).

Some learning models can be used by teachers when teaching. Especially for basic material that is procedural, teachers can use the direct instruction model (DI). DI is considered very appropriate to apply because this model is designed to improve students' procedural and factual knowledge through step-by-step learning (Arends, 2012). (Eggen & Kauchak, 2012, p. 363) explain that many teachers use DI because its implementation combines demonstration and explanation. Meanwhile, (Al-Makahleh, 2011) said that the application of DI could run well if it has neat and organized planning. It is intended that students are able to achieve the targets that must be completed.

In addition to the use of appropriate learning models, learning media support is also important in improving student learning outcomes. Many learning media that can be used by teachers both in the form of engine trainers and applications such as Microsoft Power Point, Macromedia Flash/Adobe Flash, Virtual, Adobe Captivate, and others (Marpanaji et al., 2018) (Nurtanto, 2016). In addition, the development of internet services also provides many types of learning media that are ready to be downloaded and used such as video tutorials from Youtube (Lalian, 2018; Rabiman et al., 2020; Sakat, 2012). In this case, MPL implementation is felt to be more suitable when combined with media in the form of learning videos. Learning videos can be used as an introduction before students do the practicum. Thus students are expected to be more motivated in learning and can play an active role during the learning process (He et al., 2012).

Previous researchers have revealed the success of learning using videos that effectivity, increased learning outcomes are expressed in research results. Among them, micro-teaching with video effectively improves teacher teaching skills (Sofyan et al., 2019). Furthermore (Stieff et al., 2018) through the results of his research showed that the use of online pre-college videos has very significant potential in improving student learning. Interactive video learning media on the EFI tune-up engine (Izzudin et al., 2013) results are better and the learning process is more precise. In line with research (Muslim et al., 2019) improve student learning outcomes. Qualitative analysis conducted (Sung et al., 2016) the use of seller devices in education becomes a learning tool with great potential. Video-assisted learning is effective in improving learning outcomes in various aspects.

The development of video as a learning tool is applied to the direct learning model (DI). In the experimental group in the study (Susiana & Wening, 2015) assisted by video-multimedia proved to be effective with 75% completeness in class compared to only 33% in the control class. Through his research (Sudarmin et al., 2018) has implemented a direct learning model and the results show a positive interest in the cognitive realm and critical thinking. A similar study (Hutami & Maspiyah, 2019) by carrying out the DI model at the end of the cycle obtained an average of 81.6 with 100% completeness of students. (Yuliana Dharmayani et al., 2019) has concluded a similar thing, with the DI model assisted by higher and increasing learning outcomes. Various opinions expressed by researchers provide a strong assumption that learning using video with the application of the DI model has a positive impact on learning outcomes.

However, the results of the study did not describe in detail the intended video. Researchers in using video apply the rules that learning is adapted to the conditions. This means that the video has been developed using a media trainer that students use in learning to use the same trainer. However, learning media needs to be innovated (Serdyukov, 2017b) and video innovation in accordance with the actual conditions (Nurtanto, 2018b) to make students able to adapt to their environment quickly. The formulation of the problem offered in this action research is how to improve student learning outcomes after applying a direct learning model supported by video on the competency of measuring instruments? The big objective of this research is to analyze the improvement of student learning outcomes through a cycle that is reflected at the end of each stage.

METHOD

This research is a classroom action research that is generally defined as a teacher's scientific project through a particular model or method to capture phenomena in the classroom (S.A. et al., 2011; Wulandari et al., 2019). The classroom action research design used refers to the Kemmis and McTaggart models. (Kemmis & McTaggart, 1988) characterize class action research as life that requires a cycle of planners to make a reflection (Rahayu et al., 2018).

The steps of this study consist of planners, actions, observations, and reflections (Fernández-Díaz et al., 2019). The class action research design referred to in this study, is described as a cycle that runs in a spiral, as shown in Figure 1.

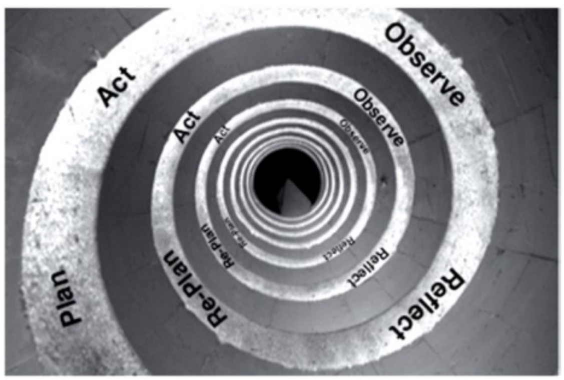

Figure 1. Spiral Action Research *Source*: (Kemmis et al., 2014)

From Figure 1, it is known that the action research spiral consists of four steps in each cycle. The first step is planning. In this step a plan is prepared based on the results of the identification of problems during initial observation. Based on the results of the identification then proceed with making teaching materials, learning plans, methods, strategies, approaches, techniques, and instruments that are appropriate for problem-solving (Arsana et al., 2019). The second step is the implementation of the action. In this step, the teacher conducts the application of learning using DI, which is supported by learning videos on the competence of mechanical measuring devices. The implementation of these actions is a process of learning activities in the classroom as a realization of the theory and problem-solving solutions that have been prepared (Adnyani et al., 2018). In each cycle of the material taught to students is not the same. This is done to get good student learning outcomes (Uztosun et al., 2014).

Next, the third step is observation. In this activity, the observer makes observations or observations of students during the implementation of the action takes place. The main objective of the observation activity is to measure or analyze whether changes occur during the action (Kijkuakul, 2019). The next or fourth step is reflection. This activity is used by researchers to study, see, and consider the results or effects of actions taken from various criteria (Nasrollahi et al., 2012). Based on the results of reflection, researchers and teachers as observers can find weaknesses and weaknesses in each cycle. Then these deficiencies and weaknesses can be used as a basis in the preparation of action plans in the next cycle (Merona, 2019). All four actions are implemented in each cycle, where the cycle will be declared over when the indicator of success has been achieved (Kemmis et al., 2014).

The subjects of this study were students of Light Vehicle Engineering (LVE) expertise programs. The class used was X LVE 2 Vocational High School Dharma Bahari Surabaya in the odd semester of the 2019/2020 school year, totaling 40 students. The subjects taught in this study are the Basic Work of Automotive Engineering (BWAE), specifically the competence of mechanical measuring devices (Oppong, 2014; Sindu & Paramartha, 2018). Data collection of student learning outcomes is done by using two instruments, namely test and observation instrument techniques. Test instruments are used to measure students 'cognitive abilities, while observation instruments are used to measure students' psychomotor skills in each cycle (Miskovic et al., 2012; Nurtanto, 2020). Then the test results and observation data were analyzed descriptively based on standardized learning completeness criteria (Suprihatien et al., 2019). A class is said to achieve classical completeness when ≥ 80% of students have achieved mastery learning individually. Meanwhile, students are supposed to achieve mastery learning individually if the value obtained > 75 (Khoiriah & Arsana, 2017).

RESULTS AND DISCUSSION

Results

Planning Steps Cycle I Action Research. The first cycle of classroom action research was conducted during two meetings. Before carrying out this research cycle, researchers conducted several stages of preparation as follows. First, identify the problem and plan the steps of implementing cycle I. Second, make the learning device in accordance with the existing problem. Third, develop learning scenarios through a direct instruction model (DI), which is supported by learning videos. Fourth, prepare learning resources and learning media supporting the learning process such as LCD projectors, laptops, cylinder blocks, dial indicators, and others.

Action and Observation Steps. This step is carried out by implementing DI which is supported by learning videos as planned. At the first meeting, students learn the competence of mechanical measuring devices, especially using the indicator dial measuring instrument to measure the balance of the camshaft and crankshaft shaft. The action steps are carried out based on the phases of the DI. The DI phase consists of an orientation, presentation, structured practice, guided practice, and independent practice phases (Joyce et al., 2015). The orientation phase is carried out by the teacher by providing explanation related to goals and procedures that must be carried out by students during the learning process. After that, the presentation phase is carried out by showing a video about the use procedure and the measurement process of the camshaft shaft and crankshaft shafts using a dial indicator.

Students show less enthusiasm when the teacher shows the video, and this is due to the video being shown lacking in detail in providing explanations. In addition, because the relatively short video duration makes it difficult for students to understand the competencies delivered. The video is finished playing, then the teacher continues the structured practice phase by demonstrating firsthand how to measure the balance of the camshaft and crankshaft shaft using a dial indicator gauge. But ± 15 minutes when the teacher does the demonstration, there are some students doing activities outside of learning. Then the teacher gives a reprimand to the student, and the class conditions return conducive. After the teacher shows the video and demonstrates the practice of measuring the balance of the camshaft and crankshaft shaft using a dial indicator, next the teacher carries out the fourth phase of DI, the guided practice technique. Through this phase, under the supervision of the teacher, students are allowed to practice in turns. The teacher observes student activities during the practicum. Also, students are allowed to ask questions when experiencing difficulties. Meanwhile, the teacher occasionally gives feedback if needed.

The first meeting was only able to implement the four DI phases, namely the orientation phase, presentation, structured practice, and guided practice. Then the meeting continued with the implementation of the fifth phase, namely independent practice. At this meeting, the teacher allows students to practice the measurement of the camshaft and crankshaft shaft balance using a dial indicator measuring instrument independently or individually. In this independent practice phase, the teacher also assesses the ability of the student psychomotor domain (MC 4.1) in measuring the balance of the camshaft and crankshaft using a dial indicator measuring tool by the procedures that have been learned. When all students have conducted independent practice, then proceed with cognitive tests (MC 3.1) to determine student learning outcomes after carrying out a series of learning process activities in cycle I.

Assessment of MC 3.1 and MC 4.1 students has been completed, and the next step is to do a calculation of each student's grades. Both MC 3.1 and MC 4.1 assessments were carried out at the end of Cycle I. The purpose of the assessment was to analyze the extent to which student learning outcomes improved after being applied in DI supported by learning videos with a minimum specified completeness criteria (MCC). The values of MC 4.1 and MC 3.1 in cycle I can be seen in Table 1.

Table 1. Student Learning Outcomes Cycle I

No	SIN	Competence		Average	Category
		MC 3.1	MC 4.1		
1	3097	75	65	70	NC
2	3100	75	70	72,5	NC
3	3112	70	67	68,5	NC
4	3113	78	75	76,5	C
5	3115	77	76	76,5	C
6	3120	75	65	70	NC
7	3136	78	77	77,5	C
8	3138	80	76	78	C
9	3142	76	75	75,5	C
10	3144	76	75	75,5	C
11	3148	75	67	71	NC
12	3152	75	75	75	C
13	3153	78	75	76,5	C
14	3155	75	70	72,5	NC
15	3161	75	75	75	C
16	3162	75	80	77,5	C
17	3169	80	77	78,5	C
18	3170	76	75	75,5	C
19	3176	76	75	75,5	C
20	3179	77	76	76,5	C
21	3188	65	70	67,5	NC
22	3193	78	77	77,5	C
23	3195	71	75	73	NC
24	3201	63	80	71,5	NC
25	3218	75	75	75	C
26	3226	75	78	76,5	C
27	3229	79	76	77,5	C
28	3230	70	70	70	NC
29	3237	78	78	78	C
30	3241	70	70	70	NC
Average				**74**	

The NC category is not complete, while the C category is complete. By the learning outcomes of students in cycle I in Table 1, if a score is a recap based on the completeness of student learning outcomes, the results can be seen in Table 2.

Table 2. Recapitulation Completeness Student Cycle I

No	Category	Frequency	Percentage
1	Complete	19	63%
2	Not Complete	11	37%
	Total	**30**	**100%**

Based on the results of the first cycle of students' learning completeness, it is known that from 30 students, there were only 19 or 63% of students who had reached MCC and were in a complete category. While 11 students or 37% of students have not achieved MCC and are in the incomplete category. Therefore, it can be concluded that student learning outcomes in the first cycle have not been able to meet the success indicators that are at least 75% of students must reach MCC (75).

Reflection Steps. This step is a stage to parse the information and assess the weaknesses and weaknesses during the learning cycle I. Thus, the results of the study can be used as a reference for subsequent cycle improvement. The shortcomings in the implementation of the first cycle are (1) low video quality, so it is less sharp and looks broken when aired; (2) the video duration is relatively short so that it makes the information conveyed less detailed and makes it difficult for students to understand the competencies delivered; and (3) some students pay less attention when explained by the teacher.

Planning Steps Cycle II. The implementation of the Cycle II Classroom Action Research was conducted in two meetings. Like cycle I, in cycle II also some preparations were made based on some reflection results in cycle I. The activities carried out in the planning phase of cycle II are as follows. First, identify weaknesses of cycle I and make more perfect planning as one of the steps in implementing cycle II. Second, make learning tools according to the solution that will be given to students. Third, develop learning schemes and scenarios through a direct instruction model (DI), which is supported by instructional videos. Fourth, prepare learning resources and learning media supporting the learning process such as LCD projectors, laptops, cylinder blocks, dial indicators, and others.

Action and Observation Steps. This step is carried out by implementing DI which is supported by learning videos as planned. At the third meeting, students learned the competence of mechanical measuring devices, especially using the cylinder bore gauge to measure the wear and tear of the engine cylinder block. In cycle II the action steps are carried out based on the DI phase which includes the orientation phase, presentation, structured practice, guided practice, and independent practice (Joyce & Weil, 2003). The orientation phase is carried out by the teacher through an explanation of the objectives and procedures that need to be considered by students during the second cycle. Furthermore, the presentation phase was carried out through the display of learning videos related to the use procedure and the process of measuring the wear of the cylinder block engine wall using a cylinder bore gauge.

At this third meeting, students showed more enthusiasm in paying attention to the learning video shown. This is due to the high quality of the learning video shown so that the image becomes sharp and clear. The duration of the video is longer, so the information delivered is relatively more detailed. Therefore, students find it easier to understand the use procedures and the process of measuring cylinder wall wear of the engine block using a cylinder bore gauge. After the learning video is finished showing, students become more enthusiastic. That is because, in addition to learning videos, the teacher also demonstrates. The demonstration was carried out in the structured training phase, where the teacher showed the procedure for measuring the wear of the cylinder block engine wall through a direct demonstration using a cylinder bore gauge on the cylinder of the Toyota Kijang 4K engine block.

During the structured training phase, overall students pay close attention, none of the students do deviant activities, making it easier for teachers to provide explanations. After the teacher shows the video and demonstrates the practice of measuring cylinder wall wear of the engine block using a cylinder bore gauge. Next, the fourth phase of the DI is carried out by carrying out the guided practice. In this phase, students are allowed to practice the wear and tear testing of the engine cylinder block using a cylinder bore gauge under the teacher's supervision. The opportunity to practice is given to all students, which means that the practice is carried out by students in turns. During the guided practice process, the teacher also directly observes. Observations need to be made by the teacher to observe the progress of student learning before and after being given a stimulus in the form of showing video learning and demonstration. During the guided practice, students are also allowed to ask questions if they experience difficulties. Meanwhile, the teacher also occasionally provides feedback and reinforcement if needed.

As in the first cycle of the first meeting in the second cycle of the third meeting, the teacher was only able to implement four of the five DI phases. Therefore, the fifth or independent practice phase can be carried out at the fourth meeting. At this meeting, the teacher directs students to practice the wear measurement of the cylinder block of the engine block using the cylinder bore gauge independently, which is also part of the students' psychomotor 2 (MC 4.2) assessment. After all students have completed the MC 4.2 assessment, furthermore students conduct cognitive tests 2 (MC 3.2), which is done to measure student learning progress after carrying out a series of learning process activities in cycle II. Assessment of MC 3.2 and MC 4.2 has been completed, then the calculation of each student's grade is carried out. The MC 3.2 and MC 4.2 assessments are conducted at the end of the second cycle. The purpose of the implementation of the assessment is to analyze the improvement in student learning outcomes after being applied in DI, which is supported by learning videos with a specified MCC. The MC 3.2 and MC 4.2 values in the second cycle can be seen in Table 3.

Table 3. Student Learning Outcomes Cycle II

No	SIN	Competence MC 3.1	Competence MC 4.1	Average	Category
1	3097	75	78	76,5	C
2	3100	75	77	76	C
3	3112	68	70	69	NC
4	3113	76	77	76,5	C
5	3115	85	80	82,5	C
6	3120	70	75	72,5	NC
7	3136	78	79	78,5	C
8	3138	76	78	77	C
9	3142	80	80	80	C
10	3144	80	80	80	C
11	3148	65	75	70	NC
12	3152	77	78	77,5	C
13	3153	79	80	79,5	C
14	3155	80	78	79	C
15	3161	80	75	77,5	C
16	3162	80	80	80	C
17	3169	76	78	77	C
18	3170	80	79	79,5	C
19	3176	80	75	77,5	C
20	3179	77	78	77,5	C

No	SIN	Competence		Average	Category
		MC 3.1	MC 4.1		
21	3188	80	80	80	C
22	3193	77	79	78	C
23	3195	65	77	71	NC
24	3201	68	75	71,5	NC
25	3218	75	78	76,5	C
26	3226	80	75	77,5	C
27	3229	78	80	79	C
28	3230	72	75	73,5	NC
29	3237	80	80	80	C
30	3241	70	75	72,5	NC
Average				**77**	

The NC category is not complete, while the C category is complete. By the learning outcomes of students in cycle II in Table 3, if a score is a recap based on the completeness of student learning outcomes, the results can be seen in Table 4.

Table 4. Recapitulation Completeness Student Cycle II

No	Category	Frequency	Percentage
1	Complete	23	77%
2	Not Complete	7	23%
	Total	**30**	**100%**

Based on the results of tests in the second cycle, it is known that of 30 students there were 23 or 77% of students who had reached the MCC and were in a complete category. Meanwhile, 7 or 23% of students have not yet reached the MCC and are categorized as incomplete. Therefore, it can be concluded that the research in cycle II can be declared successful. This is because most students have achieved indicators of success, at least 75% of students must reach the MCC.

Reflection. The use of DI, which is supported by video learning in the competence of mechanical measuring instruments, especially the cylinder bore gauge in cycle II, has been optimally implemented. This is shown by the enthusiasm of students when watching learning videos and demonstrations of the use of measuring instruments that were demonstrated by the teacher. Also, if seen from the achievement of student learning outcomes in both the cognitive and psychomotor domains, in cycle II the acquisition of student grades is relatively higher when compared to the results of the assessment of cycle I.

Based on the observations and discussions made by the teacher and observer, it was stated that the effort to repair the weaknesses in the first cycle was categorized as successful. Also, in the second cycle the acquisition of student grades was able to achieve success criteria, which required that at least 75% of students be able to achieve MCC. Meanwhile, the results of cognitive and affective domain tests can also be seen that students can achieve MCC in the second cycle. In this case, there were 23 or 77% of students in the complete category, while 7 or 23% of students were in the incomplete category.

Discussion

Implementation of Instruction Model (DI) supported by Learning Video

Implementation of Classroom Action Research (CAR) is one way to solve existing problems during the learning process. With the presence of CAR, the quality of learning will be better and therefore will have a positive impact on increasing student competency. In this study, the model used during the learning process is the Direct Instruction Model (DI), which is supported by learning videos. Characteristically DI is an ideal learning model if it is used to learn initial knowledge or skills. It is based that to teach the initial ability, ideally the teacher not only provides an explanation, but also demonstrates the ability to use actual media.

This opinion is in line with (Wenno, 2014), which explains that in applying DI, the role of the teacher is more dominant. In addition, in teaching certain competencies, teachers are required to do it step by step. (Pereira et al., 2016), through their scientific articles, stated that in the application of DI there are several phases that direct students to conduct exercises both structured, guided, and independently. These phases are beneficial for students because practicing repeatedly, and it will undoubtedly make it easier for them to remember material that they have learned firsthand. On the other hand, the teacher is directed to provide some useful feedback for students.

Besides referring to the implementation of the learning model, in this study, the application of DI is also supported by the existence of a learning video. The learning video is shown before the teacher demonstrates the use procedures and the process of measuring the wear of the cylinder block engine wall using a cylinder bore gauge. This method proved quite effective. Students show interest through enthusiasm when the teacher shows the learning video. Unfortunately, the video shown in Cycle I had several disadvantages such as low video quality and relatively long video duration so that the information conveyed became less detailed. However, in cycle II these weaknesses have been corrected, and students show interest in learning.

These results are in line with the research of (Mendoza et al., 2015), which states that instructional videos prove to be effective when used to learn, understand and compare concepts. Video-based learning has a positive impact on increasing student creativity and collaboration. Also, the use of instructional videos can also attract student motivation in creating different contexts for their learning experiences. Meanwhile, (Brame, 2016) explains that video learning has become an important part of the education system. Video can be used effectively if the teacher can pay attention to three important elements, namely (1) management of video content that is suitable to the needs of students; (2) maximizing student involvement; and (3) able to promote active learning through videos that are aired.

Then (Kurniati, 2016), through her scientific article explained that the use of video in the learning process is one way to produce effective learning. The learning process becomes more fun and interesting because many possible things can be shown in the video, such as animation, sound, images, dialogues, colors, and others.

Student Learning Outcomes. Implementation of Classroom Action Research (CAR) is one way to solve existing problems during the learning process. With the presence of CAR, the quality of learning will be better and therefore will have a positive impact on increasing student competency. In this study, the model used during the learning process is the Direct Instruction Model (DI), which is supported by learning videos. Characteristically DI is an ideal learning model if it is used to learn initial knowledge or skills. It is based that to teach the initial ability, ideally the teacher not only provides an explanation, but also demonstrates the ability to use actual media.

Learning outcomes are a description of what has been achieved after the learning process ends (Mahajan & Singh, 2017). Another definition explains that learning outcomes relate to what students should know or can do as a result of the learning process (Dias, 2018). In this study, student learning outcomes are measured or assessed using tests and observation instruments. The test instrument was used to measure students' abilities in the cognitive domain, which consisted of 25 multiple choice questions and five essay questions. Observation instruments are used to measure students' abilities in the psychomotor domain. In this case, the observation instrument used consisted of 15 assessment indicators. Cognitive domains are assessed at the end of each cycle, both in cycle I and cycle II. Meanwhile, the psychomotor domain assessment is carried out when students practice independently both in cycle I and cycle II.

The results showed that the application of DI supported by learning videos was able to improve the learning outcomes of Grade X LVE students on the competence of mechanical measuring devices. The percentage increase in student learning outcomes in full can be seen in Figure 2.

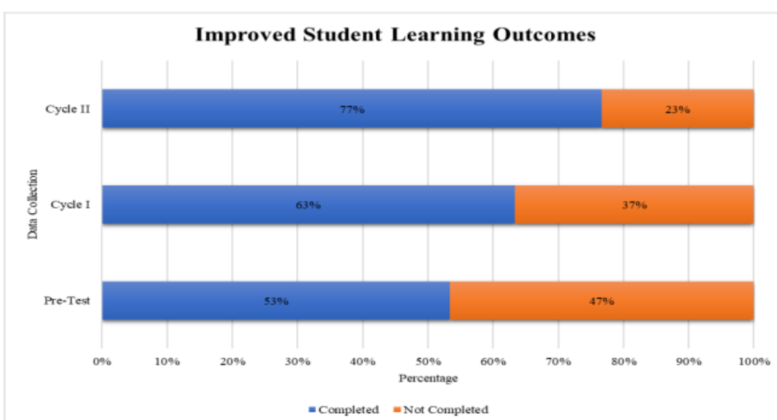

Figure 2. Percentage Diagram of Improvement of Student Learning Outcomes

Based on Figure 2 above, it is known that student learning outcomes consistently increase from pre-test scores, grades of the cycle I, to cycle II. Determination of improvement in student learning outcomes, based on the MCC used as a reference in this study that is equal to 75. From the results of pre-test data collection, it is known that there are only 16 or 53% of students in the complete category, while 14 or 47% of students are in the unfinished category. In the first cycle, learning outcomes become more improved. This is evidenced from the acquisition of student learning outcomes which indicate that there are 19 or 63% of students in the complete category. Then the number of students entering the complete category decreased to 37% or only 11 out of a total of 30 students. Meanwhile, in the second cycle consistently student learning outcomes also improved. This is evidenced by the data of student learning outcomes, which show that in this cycle the number of students entering the complete category increased to 23 or 77% of students. Then the number of students entering the incomplete category decreased to 23% or only as many as seven students.

Based on the discussion of student learning outcomes, it can be stated that there is an increase in student learning outcomes after being implemented in DI supported by learning videos. The results of this study are in line with (Lestari, 2015) research, which found that the use of instructional videos (tutorials) in the learning process provides more interesting learning concepts. This is due to the material presented to be more interesting because it utilizes elements of text, sound, video to clarify the material to make it more meaningful (Barzegar et al., 2012). (Meij & Meij, 2016), through their scientific articles found that learning videos (tutorials) contribute significantly to procedural knowledge and student motivation. Then the results of this study are in line with the research of (Nouri, 2016), which concluded that the use of video in the learning process is highly correlated to the improvement of motivation, involvement, and improvement of effective learning.

CONCLUSIONS

The results of this study found that student learning consistently increased from the pre-test scores, the value of the first cycle, to the value of the second cycle. Based on the pre-test score data, it is known that from 30 students, there were only 16 or 53% of students who entered the complete category. The learning outcomes then improved in the first cycle, where in the first cycle as many as 19 or 63% of students were in a complete category. Meanwhile, in cycle II student learning outcomes also improved consistently. This is evidenced by the acquisition of student learning outcomes data, which shows that there are 23 or 77% of students who enter the complete category.

REFERENCES

Adnyani, N. L. P. S., Sari, R. A., Suputra, P. E. D., Pastika, I. W., & Suparwa, I. N. (2018). Implementing ICT-Based Phonology Learning Material Using Blendspace Through Classroom Action Research. *Aksara*, *30*(2), 319. https://doi.org/10.29255/aksara.v30i2.76.319-330

Al-Makahleh, A. A. A. (2011). The effect of direct instruction strategy on math achievement of primary 4th and 5th grade students with learning difficulties. *International Education Studies*, *4*(4). https://doi.org/10.5539/ies.v4n4p199

Arends, R. I. (2012). *Learning to teach* (9th ed.). McGraw-Hill.

Arsana, I. M., Susila, I. W., Hidayatullah, R. S., & Ariyanto, S. R. (2019). Implementation of Troubleshooting Teaching Method to Develop Student's Competency in Conducting Motorcycle Tune-up. *International Conference on Education, Science and Technology 2019*. https://doi.org/10.1088/1742-6596/1387/1/012096

Bakar, R. (2018). The influence of professional teachers on Padang vocational school students' achievement. *Kasetsart Journal of Social Sciences*, *39*(1), 67–72. https://doi.org/10.1016/j.kjss.2017.12.017

Barzegar, N., Farjad, S., & Hosseini, N. (2012). The Effect of Teaching Model Based on Multimedia and Network on the Student Learning (Case Study:Guidance Schools in Iran). *Procedia - Social and Behavioral Sciences*, *47*, 1263–1267. https://doi.org/10.1016/j.sbspro.2012.06.809

Billett, S. (2009). ChangingWork,Work Practice: Consequences for Vocational Education.

In *International Handbook of Education for the Changing World of Work*. Springer Netherlands. http://dx.doi.org/10.1007/978-1-4020-5281-1_114

Brame, C. J. (2016). Effective Educational Videos: Principles and Guidelines for Maximizing Student Learning from Video Content. *CBE—Life Sciences Education*, *15*(4), es6. https://doi.org/10.1187/cbe.16-03-0125

Eggen, P., & Kauchak, D. (2012). *Strategies and models for teachers: Teaching content and thinking skills* (6th ed.). Pearson Education, Inc.

Fernández-Díaz, E., Gutiérrez Esteban, P., & Fernández Olaskoaga, L. (2019). University-School Scenarios and Voices from Classrooms. Rethinking Collaboration within the Framework of an Interuniversity Project. *Journal of New Approaches in Educational Research*, *8*(2), 79. https://doi.org/10.7821/naer.2019.7.372

He, Y., Swenson, S., & Lents, N. (2012). Online Video Tutorials Increase Learning of Difficult Concepts in an Undergraduate Analytical Chemistry Course. *Journal of Chemical Education*, *89*(9), 1128–1132. https://doi.org/10.1021/ed200685p

Hu, W., Wang, Q., & Guo, Q. (2016). Research on the impact of higher education professionalization on specialized master education development. *SHS Web of Conferences*, *25*, 01005. https://doi.org/10.1051/shsconf/20162501005

Hutami, L. N. N., & Maspiyah. (2019). Peningkatan Hasil Belajar Siswa pada Kompetensi Dasar Perawatan Kulit Kepala dan Rambut melalui Penerapan Model Pembelajaran Langsung dengan Media Video. *Jurnal Tata Rias*, *8*(1), 126–131.

Izzudin, A. M., Masugino, M., & Suharmanto, A. (2013). Efektivitas Penggunaan Media Pembelajaran Video Interaktif Untuk Meningkatkan Hasil Belajar Praktik Service Engine dan Komponen-Komponennya. *Automotive Science and Education Journal*, *2*(2), Article 2. https://journal.unnes.ac.id/sju/index.php/asej/article/view/1910

Joyce, B., & Weil, M. (2003). *Models of teaching* (5th ed.). Asoke K. Ghosh.

Joyce, B., Weil, M., & Calhoun, E. (2015). *Models of teaching* (9th ed.). Pearson Education, Inc.

Kemmis, & McTaggart. (1988). *The action research planner*. Deakin University Press.

Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The Action Research Planner*. Springer Singapore. https://doi.org/10.1007/978-981-4560-67-2

Khoiriah, H. N. L., & Arsana, I. M. (2017). Penerapan model pembelajaran kooperatif tipe group investigation (GI) untuk meningkatkan hasil belajar siswa kelas X TPM pada kompetensi besaran & satuan di SMK Dharma Bahari Surabaya. *Jurnal Pendidikan Teknik Mesin*, *6*(2), 81–88.

Kijkuakul, S. (2019). Professional changes of primary science teachers: Experience on collaborative action research in Thailand. *Asia-Pacific Science Education*, *5*(1), 1. https://doi.org/10.1186/s41029-019-0030-2

Kurniati, K. (2016). The Effectiveness Of Animation Video In Teaching Speaking To Junior High School. *JELE (Journal of English Language and Education)*, *2*(1), 33. https://doi.org/10.26486/jele.v2i1.220

Lalian, O. N. (2018). The effects of using video media in mathematics learning on students' cognitive and affective aspects. *The 9th International Conference on Global Resource Conservation (ICGRC) and AJI from Ritsumeikan University*, 030011. https://doi.org/10.1063/1.5061864

Lestari, A. S. (2015). Application of Computer Based Learning Model Tutorial as Medium of Learning. *American Journal of Educational Research*, *3*(6), 702–706. https://doi.org/10.12691/education-3-6-6

Marpanaji, E., Mahali, M. I., & Putra, R. A. S. (2018). Survey on How to Select and Develop Learning Media Conducted by Teacher Professional Education Participants. *Journal of Physics: Conference Series*, *1140*, 012014. https://doi.org/10.1088/1742-6596/1140/1/012014

Meij, H. van der, & Meij, J. van der. (2016). Demonstration-based training (DBT) in the design of a video tutorial for software training. *Instructional Science*, *44*(6), 527–542. https://doi.org/10.1007/s11251-016-9394-9

Mendoza, G. L. L., Caranto, L. C., & David, J. J. T. (2015). Effectiveness of Video Presentation to Students' Learning. *International Journal of Nursing Science*, *5*(2), 81–86. https://doi.org/10.5923/j.nursing.20150502.07

Merona, S. P. (2019). Penggunaan Modul Statistika Matematika untuk Meningkatkan Kemandirian Belajar Mahasiswa Prodi Pendidikan Matematika FKIP Universitas Muhammadiyah. *Jurnal Dimensi Pendidikan Dan Pembelajaran*, *7*(1).

Miskovic, M., Efron, E. S., & Ravid, R. (2012). Action Research in Action: From University to School Classrooms. *Education Research International*, *2012*. https://doi.org/10.1155/2012/389736

Muslim, M., Riadi, S., & Basuki, N. (2019). Development of interactive tutorial video based on curriculum based on Indonesian national qualification framework in machinery material Basic completion of completion. *Proceedings of the Proceedings of the 2nd Annual Conference of Engineering and Implementation on Vocational Education (ACEIVE 2018), 3rd November 2018, North Sumatra, Indonesia*. https://doi.org/10.4108/eai.3-11-2018.2285677

Nasrollahi, M. A., Krish, P., & Noor, N. M. (2012). Action Research in Language Learning. *Procedia - Social and Behavioral Sciences*, *47*, 1874–1879. https://doi.org/10.1016/j.sbspro.2012.06.916

Nouri, J. (2016). The flipped classroom: For active, effective and increased learning – especially for low achievers. *International Journal of Educational Technology in Higher Education*, *13*(1), 33. https://doi.org/10.1186/s41239-016-0032-z

Nurtanto, M. (2016). Pengembangan Multimedia Pembelajaran Servis Sepeda Motor Ditinjau Dari Kriteria Pendidikan, Tampilan Program dan Kualitas Teknis. *VANOS Journal of Mechanical Engineering Education*, *1*(1). https://doi.org/10.30870/vanos.v1i1.831

Nurtanto, M. (2018). Education media development for clutch (EMC) in vocational education: The concept of clutch work. *Jurnal Pendidikan Vokasi*, *8*(2), 173. https://doi.org/10.21831/jpv.v8i2.19520

Nurtanto, M. (2020). Development Model for Competency Improvement and National Vocational Qualification Support Frames In Automotive Technology. *International Journal of Evaluation and Research in Education (IJERE)*, *9*(1). https://doi.org/10.11591/ijere.v9i1.20447

Oketch, M. O. (2009). *To Vocationalize or Not to Vocationalize? Perspectives on Current Trends and Issues on TVET in Africa.), In Hansen, Rupert Maclean, David Wilson (Eds.), International Handbook of Education for the Changing World of Work (pp. 531-545)*. Springer Netherlands. https://doi.org/10.1007/978-1-4020-5281-1

Oppong, C. A. (2014). Cognitive and Affective Characteristics of History Students of the University of Cape Coast. *International Journal of Scientific and Research Publication*, *4*(10), 1–7.

Pavlova, M. (2009). Technology and vocational education for sustainable development. In M. Pavlova (Ed.), *Unesco Unevoc, Springer* (First, Vol. 10). Springer Netherlands. https://doi.org/10.1007/978-1-4020-5279-8

Pereira, J., Araújo, R., Farias, C., Bessa, C., & Mesquita, I. (2016). Sport Education and Direct Instruction Units: Comparison of Student Knowledge Development in Athletics. *Journal of Sports Science & Medicine*, *15*(4), 569–577.

Rabiman, R., Nurtanto, M., & Kholifah, N. (2020). *Design And Development E-Learning System By Learning Management System (LMS) In Vocational Education*. *9*(01), 5.

Rahayu, E., Rohmadi, M., & Andayani. (2018). Improving Students' Ability to Write Poems Through Scientific Discovery-Based Learning with Nature Pictures from Media. *KnE Social Sciences*, *3*(9), 632. https://doi.org/10.18502/kss.v3i9.2727

S.A., S., Andriani, D., Antoro, S. D., Prayekti, & Warsito. (2011). Teaching and Learning Classroom Action Research at a Distance in an Indonesian Urban Community. *Excellence in Higher Education*, *2*(2), 114–120. https://doi.org/10.5195/EHE.2011.47

Sakat. (2012). Educational Technology Media Method in Teaching and Learning Progress. *American Journal of Applied Sciences*, *9*(6), 874–878. https://doi.org/10.3844/ajassp.2012.874.878

Serdyukov, P. (2017a). Innovation in education: What works, what doesn't, and what to do about it? *Journal of Research in Innovative Teaching & Learning*, *10*(1), 4–33. https://doi.org/10.1108/JRIT-10-2016-0007

Serdyukov, P. (2017b). Innovation in education: What works, what doesn't, and what to do about it? *Journal of Research in Innovative Teaching & Learning*, *10*(1), 4–33. https://doi.org/10.1108/JRIT-10-2016-0007

Sindu, I. G. P., & Paramartha, A. A. G. Y. (2018). The effect of problem-based e-learning content on the learning achievement in basic computer system course (DSK) of the student of informatics engineering education department. *Jurnal Pendidikan Vokasi*, *8*(1), 24. https://doi.org/10.21831/jpv.v8i1.18098

Sofyan, H., Us, T., Wakid, M., & Sulistyo, B. (2019). Developing Micro-Teaching Video As Learning Media In Automotive Teacher Education. *Journal of Physics: Conference Series*, *1273*, 012059. https://doi.org/10.1088/1742-6596/1273/1/012059

Stieff, M., Werner, S. M., Fink, B., & Meador, D. (2018). Online Prelaboratory Videos Improve Student Performance in the General Chemistry Laboratory. *Journal of Chemical Education*, *95*(8), 1260–1266. https://doi.org/10.1021/acs.jchemed.8b00109

Sudarmin, S., Mursiti, S., & Asih, A. G. (2018). The use of scientific direct instruction model with video learning of ethnoscience to improve students' critical thinking skills. *Journal of Physics: Conference Series*, *1006*, 012011. https://doi.org/10.1088/1742-6596/1006/1/012011

Sung, Y.-T., Chang, K.-E., & Liu, T.-C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education*, *94*, 252–275. https://doi.org/10.1016/j.compedu.2015.11.008

Suprihatien, Marmi, Azizah, S., Barid Nizarudin Wajdi, M., Farida, U., Junus, D., Harianti, I., Nuke L Chusna, S., Roslina, & Trisno Zuono, T. (2019). Blog Implications as Learning Media in Improving Learning Achievement of Students. *Journal of Physics: Conference Series*, *1175*, 012260. https://doi.org/10.1088/1742-6596/1175/1/012260

Susiana, R., & Wening, S. (2015). Pengaruh Model Direct Instruction Berbantuan Multimedia Terhadap Motivasi Belajar dan Pencapaian Kompetensi Pembuatan Desain Busana. *Jurnal Pendidikan Vokasi*, *3*(1), 377–393.

Uztosun, M. S., Skinner, N., & Cadorath, J. (2014). An action research study designed to implement student negotiation to improve speaking classroom practice in Turkey.

Educational Action Research, *22*(4), 488–504. https://doi.org/10.1080/09650792.2014.904238

Wenno, H. (2014). Direct instruction model to increase physical science competence of students as one form of classroom assesment. *International Journal of Evaluation and Research in Education (IJERE)*, *3*(3), 169–174. https://doi.org/10.11591/ijere.v3i3.6492

Wulandari, D., Shandy Narmaditya, B., Hadi Utomo, S., & Hilmi Prayi, P. (2019). Teachers' Perception on Classroom Action Research. *KnE Social Sciences*, *3*(11), 313. https://doi.org/10.18502/kss.v3i11.4015

Yuliana Dharmayani, N. K., Natajaya, I. N., & Hendra Divayana, D. G. (2019). Pengaruh Model Pembelajaran Direct Instruction Berbantuan Video dan Kompetensi Pedagogik Guru Terhadap Hasil Belajar Rias Kreatif Siswa Kelas XI Tata Kecantikan Kulit SMK Negeri 2 Singaraja. *Jurnal Administrasi Pendidikan Indonesia*, *10*(1), 45–55. https://doi.org/10.23887/japi.v10i1.2789

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