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Video project in distance learning during the pandemic: Readiness, processes, and benefits

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Abstract: Research on video-making on project-based distance learning (VPjDL) was conducted for prospective chemistry teacher students to solve the problem in an educational system due to the Coviv-19 pandemic. In this study, a questionnaire analysis was conducted on the readiness of resources, the learning process and student motivation in distance learning based on video-making projects. In contrast, learning outcomes are measured based on aspects of creative thinking skills. This study aimed to determine the relationship between resource readiness, learning process, and motivation for distance learning based on video-making projects on creative thinking skills. The relationship between resource readiness, learning process and motivation on VPjDL is the novelty of this article. In this study, the number of samples used was 30 students. Data analysis was performed using the Pearson Bivariate correlation. The data analysis results show a relationship between resource readiness, learning process, and motivation to students' creative thinking skills. On the other hand, student creativity is shown by video products with a very high level of originality.

Keywords: Creative Thinking, Distance Learning, Project-Based Learning (PjBL), Video Project

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INTRODUCTION

More than a year of the pandemic due to the COVID-19 outbreak prompted almost all colleges and universities to change direct learning to distance learning. Many did it with minimal preparation and very quickly (Orlov et al., 2021). Distance learning has new challenges in its implementation. The syllabus, the science transfer, and the learning schedule to the changing environment make this learning mode unique. Although students, teachers, and lecturers prefer face-to-face learning as a comfortable learning mode (Selvaraj et al., 2021). However, this is emergency anticipation that students get learning experiences in this condition (Sumardi and Nugrahani, 2021).

In distance learning, teachers and students use technological devices connected to the internet network as a communication medium outside the classroom (Jethro et al., 2012). The speedy access to information and connectivity of space and time make this learning an option to remove boundaries. Much literature, such as articles, e-books, and videos, make distance learning create a multi-interaction between teachers, students, and digital references (Barrett et al., 2015). Distance learning or online learning carried out in the pandemic era has several forms. There are live classes, video recordings, assignments, google forms, quizzes, modules, PDF files, and power points. At the same time, the platforms for distance learning include zoom, google meet, google classroom, Microsoft team, Facebook, Youtube, and Cisco Webex. The live class is the most widely used form of distance learning in universities, followed by power points and assignments.

Meanwhile, Zoom, Google Meet, and Google Classroom are widely used to conduct distance learning (Saha et al., 2021). Distance learning can increase student participation in online learning compared to before the pandemic. However, several weaknesses were found in this learning mode. Many lessons did not reach the lesson have completeness of the syllabus, and the percentage of learning time was relatively low compared to normal learning. In contrast, the factors that cause high student

dissatisfaction with distance learning are distractions in the environment and easy loss of focus (Maqableh and Alia, 2021).

To overcome that challenges, easily losing focus, especially in distance learning, is important to design meaningful learning. One of them is by applying a project-based learning model. Project-based learning (PjBL) engages students in real problems to promote deep learning and enhance professional skills (Hernáiz-Pérez et al., 2021). PjBL refers to an inquiry-based instructional method that engages students in knowledge construction by asking them to complete meaningful projects and develop real-world products (Brundiers and Wiek, 2013; Guo et al., 2020). In another review, PjBL can also increase students' knowledge, skills, and motivation development (Ralph, 2015; Reis et al., 2017). This project-based learning also reported increased scientific literacy in science learning (Afriana et al., 2016).

On the other hand, distance learning has an aspect of excellence in increasing student creativity in the learning process (Aji, 2020). The lack of interaction between teachers and students provides opportunities for students to get more information from many sources and encourages multi-interaction in this learning mode. Students can access physical and digital literature sources on social media, such as video content-based literature. In the last decade, learning using video content sourced from social media has become an effort to combine theory transfer and experimentation simultaneously (Lichter, 2012). This is an interesting phenomenon to be studied further. With limited class meetings and access to learning facilities on campus, creativity is important to improve. Creativity, which refers to creative thinking skills, is one of the higher-order thinking skills that can be optimized in distance learning. One of the efforts to optimize creative thinking skills is encouraging students, especially prospective chemistry education teachers, to develop their learning products. This article used video project-based learning to improve students' creative thinking skills in distance learning during the pandemic. Resource factors, processes, and learning impacts are also variables analyzed. The novelty of this work is shown in the learning model that combines project-based distance learning carried out during the pandemic. It is different from assignment learning. Project-based distance learning that is carried out provides the discussion room for the mentoring process during the project period.

METODE

This correlational research aimed to determine the relationship between the readiness of resources, the learning process, and students' motivation for creative thinking skills in distance-learning learning using PjBL. The research samples are students of the chemistry education program, were studied redox reactions. The design in this study was a pretest and post-test one-group design using an experimental class. A questionnaire was conducted through the google form platform to get student responses related to the availability of resources, the learning process, and learning motivation.

The learning stage begins with online class meetings using the Google Meet platform. To give lectures on the electrochemical chapter, especially in the redox reaction sub-chapter. In this first meeting was given a project to create videos in groups. The group consists of three members, with the task of creating a learning video about redox reactions. To work on this project was scheduled in two weeks with mentoring and consultation thrice through online meetings. The product video is presented and assessed before the post-test. Assessment of video products from project-based distance learning was carried out on aspects of originality, theoretical accuracy of the material, the proportionality of duration with the flow of material delivery, ease of understanding, and interest to watch.

This research has 30 students as a sample representing the entire population. The sample is a first-year student in the chemical education study program, faculty of teacher training and education, Khairun University, Ternate, North Maluku. In this case, students have never had face-to-face learning during the pandemic. The learning was distance learning with frequently used methods such as live classes and assignments. In project-based distance learning, students are divided into several groups, each consisting of 3 students. It aims to encourage students to work together to produce faster video products.

Data collection techniques were conducted by giving post-tests to measure students' creative thinking skills. The instrument includes all learning outcomes students must achieve on redox reaction material. The creative thinking skill instrument is arranged as an essay consisting of 6 questions. The question instrument is derived from 4 indicators of creative thinking skills. Meanwhile, data on readiness for the power test, the learning process, and motivation were collected using a questionnaire. The test instrument of critical thinking skills and questionnaire of resources, learning process, and motivation

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was first tested for validity and reliability. Each instrument was constructively validated on 30 respondents. Analysis of Validation data used product-moment correlation by SPSS 20 software.

Table 1. Instrument of reliability

Aspect	Number of valid items	Cronbach's alpha
Creative thinking	*6*	0,82
Readiness of source	4	0,72
Learning process	4	0,70
Motivation	6	0,70

A reliability test was performed on all valid instruments using Cronbach's alpha, which refers to the reliability value (PA) of 0.70 (Nitko & Brookhart, 2007). The reliability values are presented in table 1. The results of the reliability test analysis show that all reliability values (PA) are 0.70, so all the instruments are reliable and feasible to use.

RESULTS AND DISCUSSION

The data analysis technique used to determine the relationship between variables uses Pearson bivariate correlation. Before analyzing the data using the Pearson bivariate correlation, the normality test of the variables was carried out first and then the linearity test. The results of the normality test using the Kolmogorov-Smirnov are in table 2. Table 2 shows the Asymp value. Sig. (2-tailed) 0.943 0.05, and data was normally distributed.

Table 2. Normal distribution test using Kolmogorov-Smirnov

		Unstandardized Residual
N		29
Normal Parameters	Mean	0E-7
	Std. Deviation	3.47608278
Most Extreme Differences	Absolute	.098
	Positive	.066
	Negative	-.098
Kolmogorov-Smirnov Z		.528
Asymp. Sig. (2-tailed)		.943

After data were normally distributed, the linearity test was carried out. The linearity test result is presented in Table 3.

Table 3. Linearity test

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Y1 * X3	Between Groups	(Combined)	618.786	9	68.754	1.856	.123
		Linearity	296.545	1	296.545	8.004	.011
		Deviation from Linearity	322.242	8	40.280	1.087	.413
	Within Groups		703.972	19	37.051		
	Total		1322.759	28			

Table 3 shows that the sig value is 0.413 0.05, so it can be concluded that there was a linear relationship between the availability of resources, the learning process, and motivation on students' creative thinking abilities. After the data was normally and linearly distributed, proceed with the Pearson bivariate correlation analysis. The results of the individual bivariate correlation analysis are presented in Table 4.

Table 4. Bivariate Pearson correlation analysis

Correlations

		X1	X2	X3	Y1
X1	Pearson Correlation	1	.313	.313	.702**
	Sig. (2-tailed)		.098	.098	.000
	N	29	29	29	29

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Correlations					
	Pearson Correlation	.313	1	.532**	.695**
X2	Sig. (2-tailed)	.098		.003	.000
	N	29	29	29	29
	Pearson Correlation	.313	.532**	1	.473**
X3	Sig. (2-tailed)	.098	.003		.009
	N	29	29	29	29
	Pearson Correlation	.702**	.695**	.473**	1
Y1	Sig. (2-tailed)	.000	.000	.009	
	N	29	29	29	29

X1: the availability of resources, X2: the learning process, X3: motivation, Y1: creative thinking skills

The results of the Pearson bivariate correlation analysis show that: a) the availability of resources (X1) with a significance value of 0.000, meaning that have a strong correlation with creative thinking skills, b) the learning process (X2) with a significance value of 0.000, meaning that have a strong correlation with creative thinking skills, c) motivation (X3) with a significance value of 0.009, meaning that have a significant correlation between motivation and creative thinking skills. Because the r arithmetic or Pearson Correlations in this analysis is positive, the relationship between the four variables is positive. In other words, the availability of resources, the learning process, and motivation improve creative thinking skills. The contribution of resource availability, learning process, and motivation toward creative thinking skills are 0.702 or 70.2%, 0.695 or 69.5%, and 0.473 or 47.3%, respectively.

Readiness of source

The results of data analysis using bivariate Pearson correlation on resource availability (X1) with a sig value of 0.000 ≤ 0.05 indicate a relationship between resource availability and students' creative thinking abilities. The process of obtaining information on supporting resources for distance learning using a project-based learning (PjBL) model is carried out by distributing online survey questionnaires using Google Forms. In a survey to determine the availability of four items of students' resources. The availability of supporting devices, the experience of making videos, collaboration with friends, and the ability to use software (Figure 1). The availability of hardware is a supporting resource in participating in project-based distance learning. It is important to know to ensure every student can join this learning. The survey results related to the availability of devices (Figure 1. a) were 62% of respondents used devices that support the project. At the same time, 38% of them do not have a device that supports making video projects. Supporting devices are hardware (such as; a laptop or smartphone) used to make videos with sufficient capacity to run video editing software. Hardware is sometimes a problem in itself in making videos. Some students who do not have supporting devices must collaborate with other students who have one in one groups.

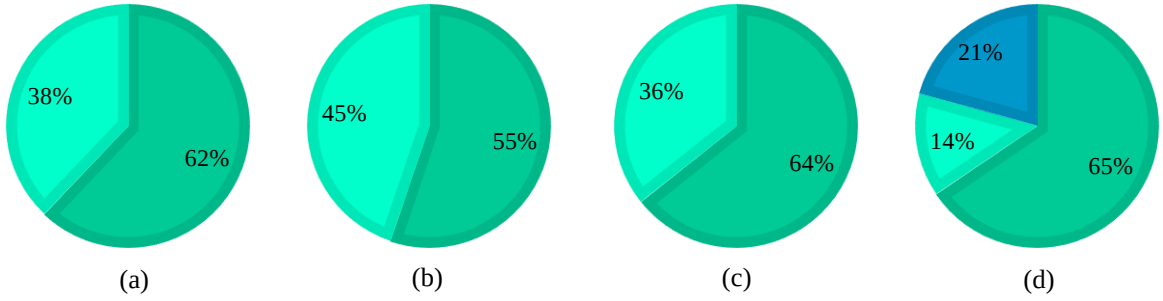

Figure 1. Readiness of source diagram, (a) Device supports, (b) experience, (c) cooperation, (d) software used.

In the experience of making videos (Figure 1. b), 55% of respondents had made videos, and another 45% never had. The experience of making videos is important to identify the time needed for making project videos in this lesson. Some students with experience making videos can complete projects faster than the allotted time. While cooperation in making learning videos (Figure 1. c), 64% stated that they cooperated with friends, and another 36% stated that they did not cooperate with friends to complete this project. Two forms of cooperation have been successfully mapped through the results

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of this survey, including cooperation in the form of division of tasks for group members and in the form of working together in completing the project of making videos. These results are identical to the study conducted (Ralph, 2015) in fourteen studies that adopted PjBL in STEM education, showing that PjBL encourages group collaboration and negotiation. However, some students reported a lack of motivation for teamwork. Another aspect that is seen in terms of availability is the amount of software used to make videos (Figure 1. d). As many as 65% of respondents use 1 software to make videos, 14% use 2 software, and 21% use 3 or more software to complete the video project. Mastery of software becomes an experience for students. More software used in this project can provide a deeper experience. The available resources that are mapped can assist the teachers in determining the role of mentoring in completing this project-based learning. Therefore, the higher the resources owned by students, the increase in students' creative thinking abilities. The availability of resources to manage information and technology is a form of instrument for solving problems or issues that develop for students in this learning (Marike & Djukri, 2016).

Process of learning and students creativity improvement

The steps to completing the project of making videos were traced using a questionnaire. There are several question points, including considerations regarding the material chosen, the first thing to do before making a video, how to get material/video content, and how to make a video to complete a project in learning. The results are presented in Figure 2. The results of data analysis using Pearson bivariate correlation in the learning process (X2) with a sig value of 0.000 ≤ 0.05 indicate a relationship between the learning process and students' creative thinking abilities.

The process of completing the video project shows that the consideration of selecting material (Figure 2. a) for the learning video is based on the ease of material can be learned of 48%. The selection of material with interesting considerations is 35%, novelty is 7%, while 10% chose challenging material. Of the things students did before making the video (Figure 2. b), 7% asked their friends, and 48% immediately compiled the content/material. Of the student who searched on search engines, 4% and 41% saw videos on social media before making the project videos. To draft the content (Figure 2. c), 21% of respondents looked for reference books, 17% looked for material through search engines, 21% looked at social media, 31% got it from the lecture, and 10% got it from the lecture process and social media. As for the response to the process of making videos (Figure 2. d), 59% of respondents made modifications to existing videos, and 41% produced videos of their creativity.

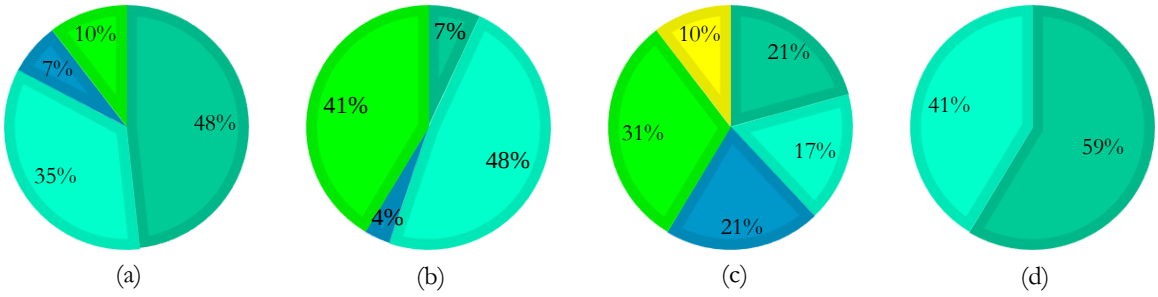

Figure 2. Student response diagram: (a) consideration of material selection, (b) things to do before making a video, (c) how to get material/video content, and (d) video-making method.

The achievement of creative thinking indicators through learning based on video projects is shown in Figure 3. In the diagram, the learning outcomes of creative thinking skills show a variety of creative thinking abilities on each indicator. Where (A) the ability of students to answer questions quickly looks more prominent than other indicators of 34.21% (%N-Gain). The ability of students to provide various interpretations (interpretations) of a Figure, story, or problem (B) shows a value of 25.51%.

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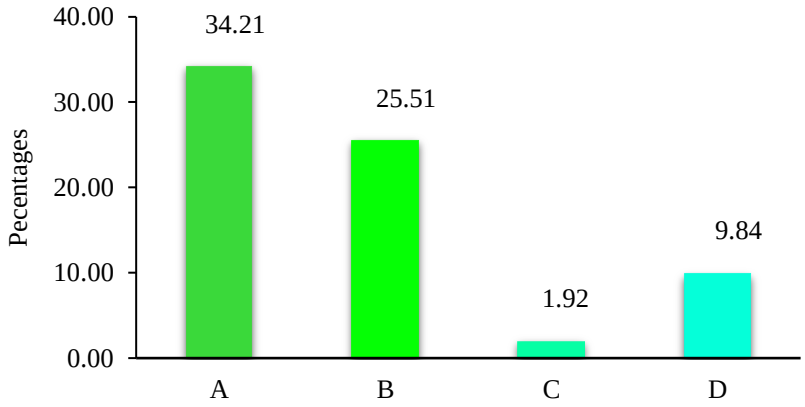

Figure 3. Diagram of project-based learning outcomes on students' creative thinking skills

The student's ability to provide original answers (C) gets 1.92%, the lowest score. In contrast, the student's ability to detail the answers (D) showed 9.84%. The %N-Gain on each indicator shows an increase in the student's creative thinking skills.

Assessment of product and motivation impact

The video product, which results from project-based learning, is assessed in five aspects (Figure 4). Originality aspect (A), theoretical accuracy (B), the proportionality of duration delivery (C), ease of understanding (D), and the video interesting to watch (E). The video's originality or novelty aspect (94.44%) has the highest assessment value. This indicates that students are aware of copyright. Originality is also an indicator of creative thinking skills. This also shows that the learning process involving creative thinking skills goes well. The theoretical accuracy presented has the next highest assessment with 86.11%. Both aspects have a very high-value criterion. The theoretical accuracy indicates a learning process using cognitive abilities, in which the process of transferring student learning independently is then produced into the video project.

The proportionality of duration delivery is the other aspect assessed in the videos produced by students through project-based distance learning. The assessment on this aspect aims to give the audience perception of learning videos that the density of video content is important for the creators. Long duration with little material can trigger the boredom of the audience. In this aspect, several videos produced through this learning show 75.00% of the assessment percentage. The ease of video for the audience to understand shows a percentage of 66.67%. Videos that use sentence explanations and dubbing support are difficult for the audience to understand. Several videos adding illustrations and dubbing for material explanations show better assessment to provide more understanding to the audience. The attractiveness of the video is another aspect of assessing this project-based learning outcome. The attractiveness of video shows the lowest assessment with a percentage of 61.11%. Most videos that present sentences make this aspect not get optimal points.

In comparison, some videos with illustrations can provide a better interest. This aspect has high criteria as two previous aspects, the proportionality of duration delivery and the ease of understanding. The video project transfers knowledge from theoretical understanding into media products to present to the community. This requires creativity and pedagogic skills to produce informative media (Davenport et al., 2018).

Several meetings in distance learning with a live class method were doing to produce video products. Assistance is provided to suggest material selection, title, presentation flow, and several other technical matters in this session. Mentoring is also can encourage students to complete projects on schedule. Some video products (Figure 5) have been successfully uploaded to the YouTube platform and become learning materials for the public. Video products on this channel have an average duration of 10 minutes, with the most video themes being daily redox applications.

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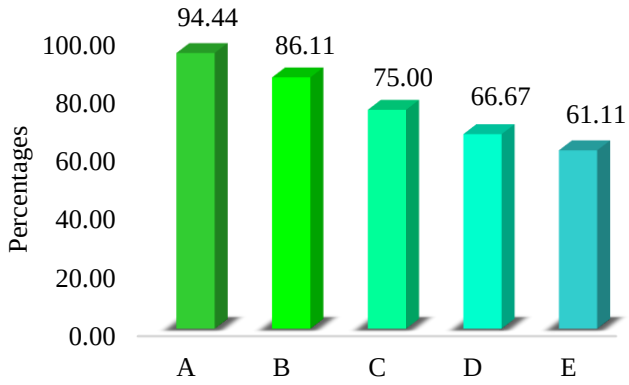

Figure 4. Bar chart of the percentage of video assessment results

Some videos successfully uploaded to YouTube have been stated to have any aspect of originality, which is one of the important requirements on this platform. The study's results (Lichter, 2012) show that YouTube video task solubility rules increase student learning about the rules and promote interest in chemistry among most students who engage in the activity.

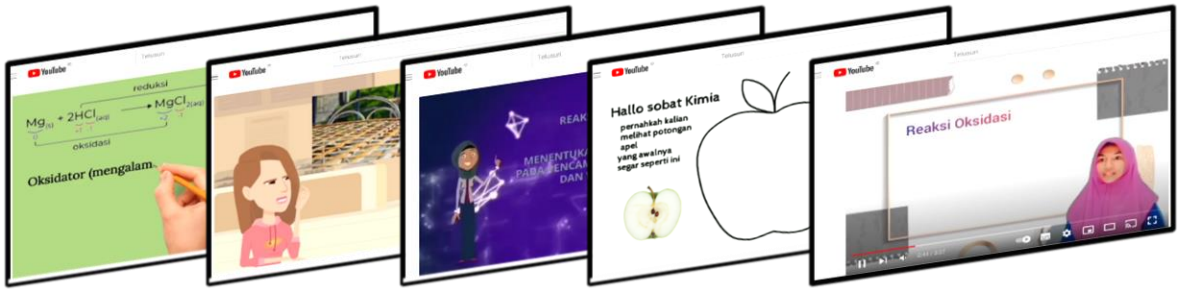

Figure 5. Project-based distance learning video products

The distance learning-based video project is also to motivate students. This is shown in the questionnaire analysis of learning motivation (Figure 6). It is seen from the six questions given to the students to determine their motivation. Among them, (A) are students who became motivated to study at home with a video project. In answer to this question, 89.66% of students agreed or were motivated to study at home, while 10.34% answered no. 72.41% of students became motivated to study chemistry independently (B), while the other 27.59% answered no. 82.76% of students stated they would spend time making video material (C), and 13.79% answered no. 89.66% of students have challenged to make a video project (D), and the other 10.34% answered no. 10.34% of students felt burdened with a video project (E), while the other 89.66%.

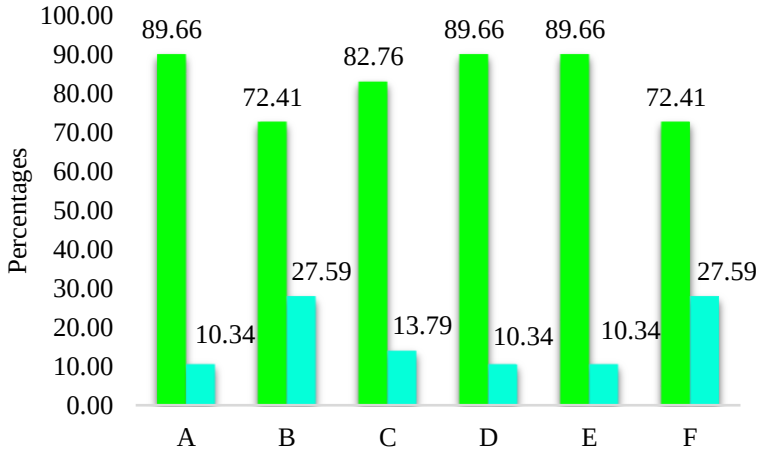

Figure 6. Diagram of student motivation in project-based distance learning

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Compared to distance learning with other models/methods (F), 72.41% of students stated that learning with video projects motivated them more. At the same time, 27.59% prefer learning with other models. Several other studies also showed that students' motivation increased after PjBL, although students also reported PjBL difficulties, such as being time-consuming (Reis et al., 2017).

In distance learning, motivation is an important thing. Not under normal conditions, project-based distance learning during the pandemic has raised several challenges in its implementation. The limited interaction between teachers and students, and the process of completing projects that require more time, are the main challenges in this learning mode. Project-based distance learning changed the stigma of the one-way learning process in its implementation. This learning offers the opportunity for deep learning and student-centered pedagogies. So that distance learning can increase student activity (Lin, 2014). One of the positive impacts of distance learning is the increase in students' motivation, which makes them willing to spend much time completing projects. However, the large impact of student motivation in distance learning was also influenced by parent roles and the environment (Demir and Demir, 2021).

On the other hand, video as the target product of this learning has several benefits in improving student learning outcomes. In a different study, video is a medium that can stimulate learning motivation, increase imagination power and be able to provide an experimental visual experience (Winkelmann et al., 2017). In addition, students who make videos (YouTube) find it much more enjoyable than those who write articles or get other pedagogical development benefits such as public presentations and even become empowered as global educators (Smith, 2014). Besides generating motivation, videos can also simultaneously present messages and information, overcome space and time limitations, and control the speed of learning (Rakhman et al., 2017). Finishing the video project requires good creativity. The creativity of this learning can be measured by tracing the creative process. The creative process is a sequence of thoughts and actions that lead to product novelty and adaptation (Boldt, 2019).

Completing the video project in this lesson demonstrates its effect on students' creative thinking skills. Creative thinking is a high-level skill that can produce new, original, unexpected, appropriate, useful, and adaptive objects or ideas related to the given task (Perry and Karpova, 2017). Creativity can foster imaginative characters, be verbally expressive, passionate, motivated to elaborate ideas, and details, synthesize diverse information and capture the essence of problems, intellectually curious, and open to new experiences (Kim, 2011).

CONCLUSION

Distance learning based on the project of making chemistry learning videos shows that there is a relationship between the availability of resources, the learning process, and motivation on student's creative thinking skills from the r-count or Pearson Correlations in this analysis which is positive. The effect of resource readiness, learning process, and motivation on creative thinking skills are 70.2%, 69.5%, and 47.3%, respectively. It was shown by the increase in student learning outcomes in four aspects of creative thinking skills indicators. Meanwhile, The originality of the product of the video project shows a very high percentage of 94.44%. And the impact students feel from participating in project-based distance learning is an increase in learning motivation.

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