

IMPROVING THE MATHEMATICAL CREATIVE THINKING ABILITY AND SOFT SKILLS STUDENTS THROUGH VIDEOSCRIBE MULTIMEDIA TEACHING MATERIALS

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Abstract

This research is motivated by the increasing need for creative thinking and soft skills in all fields of work today. To be successful at work requires the creative thinking ability and soft skills. This study aims to determine the increase in Mathematical Creative Thinking Ability and Soft skills of Bogor chemical analysis vocational high school students (SMAKBO) through Multimedia Sparkol Videoscribe Teaching Materials. This study used a quasi-experimental method. The population in this study were all grade XI students at SMAKBO. The number of research samples is 60 students. The research was conducted from September to December 2019. The design used in this study was a pretest-posttest control group design. The instruments used in this study were teaching materials using the Sparkol videoscribe application, lesson plans, pretest and posttest, and soft skills questionnaire with a Likert scale. The test uses the essay type because it is used to measure high-level abilities. This study uses two different classes. The first class is the experimental group using Sparkol videoscribe learning media, while the second class is the control group using PPT. The statistical analysis used to test the hypothesis of this study were the t-test and Mann-Whitney test. The results show the students who obtained the Sparkol videoscribe learning media have significantly better mathematical creative thinking ability and soft skills compared to students who obtained PPT media. It can be concluded that the Sparkol videoscribe media are well used in learning to improve students' creative thinking ability and soft skills.

Keywords: Mathematical creative thinking ability; soft skills ; multimedia sparkol videoscribe.

Abstrak

Penelitian ini dilatarbelakangi oleh meningkatnya kebutuhan berpikir kreatif dan soft skill di segala bidang pekerjaan saat ini. Untuk sukses dalam bekerja diperlukan kemampuan berpikir kreatif dan soft skill. Penelitian ini bertujuan untuk mengetahui peningkatan Kemampuan Berpikir Kreatif Matematis dan Soft skill Siswa Sekolah Menengah Kejuruan Analisis Kimia (SMAKBO) Bogor melalui Bahan Ajar Multimedia Sparkol Videoscribe. Penelitian ini menggunakan metode quasi eksperimen. Populasi dalam penelitian ini adalah seluruh siswa kelas XI SMAKBO. Jumlah sampel penelitian adalah 60 siswa. Penelitian dilaksanakan pada bulan September hingga Desember 2019. Desain yang digunakan dalam penelitian ini adalah desain kelompok kontrol pretest-posttest. Instrumen yang digunakan dalam penelitian ini adalah bahan ajar menggunakan aplikasi videoscribe Sparkol, RPP, pretest dan posttest, dan angket soft skill dengan skala Likert. Tes tersebut menggunakan jenis esai karena digunakan untuk mengukur kemampuan tingkat tinggi. Penelitian ini menggunakan dua kelas yang berbeda. Kelas pertama adalah kelompok eksperimen yang menggunakan media pembelajaran videoscribe Sparkol, sedangkan kelas kedua adalah kelompok kontrol yang menggunakan media PPT. Analisis statistik yang digunakan untuk menguji hipotesis penelitian ini adalah uji-t dan uji Mann-Whitney. Hasil penelitian menunjukkan siswa yang memperoleh media pembelajaran videoscribe Sparkol memiliki kemampuan berpikir kreatif matematis dan softskill yang lebih baik secara signifikan dibandingkan dengan siswa yang memperoleh media PPT. Dapat disimpulkan bahwa media videoscribe Sparkol baik digunakan dalam pembelajaran untuk meningkatkan kemampuan berpikir kreatif dan soft skill siswa.

Kata Kunci: Kemampuan Berpikir Kreatif Matematis; Soft skill; Bahan Ajar Multimedia Sparkol videoscribe.



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INTRODUCTION

Every field of work at this time requires people who have good creativity and good soft skills. One of the fields that can fulfill this challenge is education field, especially the learning process. One of the school's main subjects is mathematics. It's subject can be a good way to increase student's creative thinking ability and soft skills. This is in line with Nugroho, Wardono, Waluyo, & Cahyono (2019), who said that the mathematics learning process can make students practice thinking logically, analysis, abstraction, critical, and also creative thinking.

As candidates for chemical analysis, students of the vocational high school of chemical analysis in Bogor (SMAKBO) also need to have creative thinking abilities and soft skills. One way to reach both, the mathematics teacher can be used Sparkol Videoscribe media in the learning process.

Based on an analysis of the results of research on Sparkol videoscribe, it was found that research on sparkol videoscribe learning media was carried out using experimental research, development research (R&D) and action research. This type of research development (R&D) was done by Adha & Refianti (2022), Alifah & Utami (2022), Rahmatika & Ratnasari (2018), Fadillah & Bilda (2019), Nurhikmayati & Kania (2022), Pamungkas, Ihsanudin, Novaliyosi, & Yandari (2018), and Wahyudi & Mz (2022). The R&D research type is the most often done than experimental research and action research is the type of research that is most often done compared to the type of experimental research.

The results of R&D research about Sparkol Videoscribe, all of them state that the media developed is suitable for use in learning. Beside that

the results of the experimental research about Sparkol Videoscribe show that there is a significant difference between students who use Videoscribe and students who do not use Videoscribe ((Alifah & Utami, 2022); (Fadillah & Bilda, 2019); and (Purba, Mariani, & Sinaga, 2021).

The research about soft skills showed that although soft skills are very necessary at work, many teachers do not understand about soft skills and how to assess students' soft skills ((Busaka, Kitta, & Umugiraneza, 2022a); (Nopriana, Firmasari, & Martadiputra, 2021); (Sultanova, Hordienko, Romanova, & Tsytisura, 2021)). Research on soft skills used experimental research (Caligaris, Rodriguez, & Laugero, 2022), descriptive research (Busaka, Umugiraneza, & Kitta, 2022), and pre-experimental research (Wong, Monfero, Escala, & Banayo, 2022). The results of the research on soft skills conclude that it is important for teachers to integrate soft skills into classroom learning ((Busaka, Kitta, & Umugiraneza, 2022b); (Wong et al., 2022); and (Caligaris et al., 2022)).

The novelty of this study is there has been no previous research on the use of videoscribe media to improve students' creative thinking skills and soft skills. The hypothesis in this study is Sparkol videoscribe media can improve students' mathematical creative thinking ability and soft skills.

The expected results in this study are that the use of Sparkol videoscribe media can improve students' mathematical creative thinking abilities and soft skills. Videoscribe media can be used more broadly to increase students' positive attitudes towards mathematics so that they can improve their learning achievement.

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RESEARCH METHOD

The research method use in this study is a quasi-experimental study. The research design used was a pretest posttest control group design. The initial test is given before the experiment, while the final test is given after the experiment.

The population in this study are high school is all class XI SMAKBO students. Whereas the samples taken are two classes (60 students). One class is given learning using contextual learning with scribe video learning media called the experimental class. One other class is students who get conventional learning using power point media. The subjects used in this study is mathematics which subjects is statistics.

The research instruments used in this study are Videoscribe media, tests and questionnaires. Videoscribe is a computer application that contains videos used by the teacher when opening a lesson and used by students when working on assignments given by the teacher. Tests are instruments used to measure creative thinking ability. The type of test used is an essay test. While the questionnaire is an instrument used to measure students' soft skills. The questionnaire used was in the form of a Likert scale containing a soft skills scale.

Before being used in research, the instrument is first tested to determine the validity and reliability of the instrument. The validity and reliability of video subscription learning media is known through consultation with multimedia experts and mathematicians. The validity of the contents of the test and the questionnaire is consulted to the supervisor who mastered the field of mathematics. While the external validity of the test is done by comparing with other tests whose validity is known

such as the National Examination Based Computer scores. The correlation coefficient is calculated using the Pearson product moment correlation.

Test reliability and questionnaire are calculated with the principle of internal determination, which is done by correlating the answers to an item number with the rest of the answers in another number of the questions. The test is only done once. The formula used is Cronbach Alpha.

The steps of data analysis carried out in this study are:

- 1) Normality Test of the results of the initial pretest / questionnaire;
- 2) Homogeneity Test of test;
- 3) If the groups are homogeneous then use t test, if the two groups are not homogeneous use t' test;
- 4) If the two data do not differences in initial values, compare the postes, if there are differences initial values / initial questionnaire, then use the gain value (acquisition value) to compare the abilities of the two groups;
- 5) Normality test of gain
- 6) Homogeneity test of gain value. If the experimental group and the control group were homogeneous then use t test to compare the mean value, whereas if not homogeneous the t' test is used;
- 7) If the pretest not normally, to compare the final test/final questionnaire score, the Mann Whitney U test is performed.

RESULT AND DISCUSSION

Result

The results of data analysis consist of the results of data analysis on mathematical creative thinking abilities and the results of data analysis on soft skills.

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Mathematical Creative Thinking Ability

The instrument used to obtain the score creative thinking ability is essay tests totaling 10 items. Each item has a minimum score of 0 and a maximum score of 10. Descriptive statistics for the pretest data of creative thinking ability are shown in Table 1.

Table 1. Descriptive statistics of the pretest scores

Statistics	Experiment	Control
N	30	30
Mean	53,53	55,20
Median	56,00	56,00
Mode	56	56
Std. Deviation	20,509	19,000
Variance	420,602	360,993
Minimum	22	22
Maximum	80	80

Based on the Table 1, the mean score of each class are 53,53 (experimental class) and 55,20 (control class). So do the median, mode, standard deviation, variance, minimum and maximum score. The data distribution is presented in the form of two histograms that show similar shapes and widths. The both histograms are shown in Figure 1 and Figure 2.

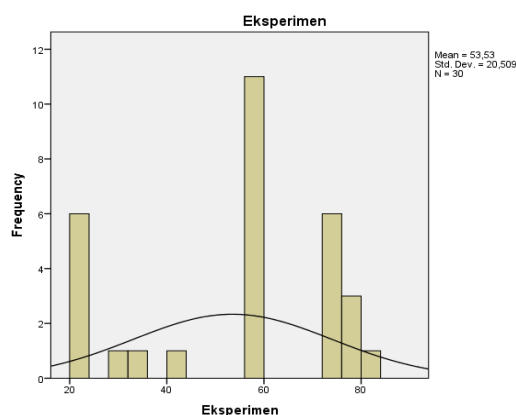


Figure 1. Histogram of pretest score of the creative thinking ability for experimental class.

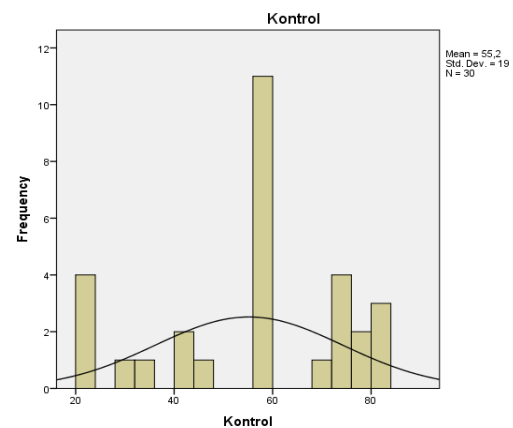


Figure 2. Histogram of pretest score of the creative thinking ability for control class

The Figure 1 and Figure 2 show that the both of distribution is same. That mean that the Creative thinking ability of experiment class is homogeneous with control class. Before conducting data processing, a normality test is first performed to determine the type of statistics that will be used in subsequent data processing.

Table 2. Result of normality test for pretest creative thinking ability for experiments group

Examination component	Experiment class
N	31
Kolmogorov-Smirnov Z	1.259
Asymp. Sig. (2-tailed)	.084

The Table 2 shows that the significance value (p value) of the test is $0,084 > 0,05$. According to the testing criteria, then H_0 is not rejected. It Means can be concluded that the eksperimen class comes from populations that are normally distributed. For the next is the result of normality test for pretest creative thinking ability for experiments group can be seen in Table 3.

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Table 3. Kolmogorov Smirnov test for the pretest creative thinking ability for the control group

Examination component	Control class
N	31
Kolmogorov-Smirnov Z	2.946
Asymp. Sig. (2-tailed)	.000

Table 3 shows significance value in the control group is 0,000 < 0.05.

Based on testing criteria, H_0 is rejected. It means that the data is not come from normally distributed populations. Based on this result, the control group is not come from normally distribution, so to determine the difference of mean values between experimental and control groups using the U-Mann Whitney test. To use the U-Mann Whitney test it is necessary to check the homogeneity of the data.

Table 4. Homogeneity test of pretest of creative thinking ability between experiments and control groups

		Levene Statistic	df2	Sig.
Groups	Based on Mean	3.887	60	.053
	Based on Median	.989	60	.324
	Based on Median and with adjusted df	.989	30.011	.328
	Based on trimmed mean	.982	60	.326

Table 4 shows that the p-value of Levene test is $0,053 > 0,05$. The value of 0.053 is not smaller than 0.05 so that H_0 is accepted. This conclusion is supported by the shape of the histogram from Figure 1 which is almost same as Figure 2 which shows that the two data are homogeneous. Thus it can be concluded that the both data is homogeneous.

Analysis of the data on the pretest shows that the experimental group came from a normally distributed population, whereas the control group is not come from a normally distributed population. To compare the mean value between the control group and the experimental group nonparametric statistics are used the Mann Whitney U test.

Table 5. The mean difference test of the pretest of creative thinking ability between experimental and control groups

Null Hypothesis	Test	Sig.
The pretest group is the same across categories	Independent Samples Mann Whitney U Test	.577

Table 5 shows the p-value of Mann Whitney U test is $0.577 > 0.05$. Based on testing criteria, H_0 is accepted. Thus it can be concluded that the mean value of pretest of the two groups are same.

The posttest instrument is the same instrument as the pretest instrument. Posttest instruments are given after students have learned mathematics on the topic of statistics. Descriptive statistics of the creative thinking ability of posttest can be seen in Table 6.

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Table 6 Descriptive statistics of posttest value of creative thinking ability for experiments and control groups

	N	Min	Max	Mean	SD	Var
Experiment Class	30	68.00	98.00	87.800	8.181	66.924
Control Class	30	48.00	80.00	68.000	8.709	75.862
Valid N	30					

Table 6 shows that the mean value of post test experiment group is 87,80 and the mean value of control group is 68. For use Difference mean value test for experiment group and control group, will be checked the normality. Before testing the normality of the post test creative thinking ability data, an analysis of the histogram obtained is first performed.

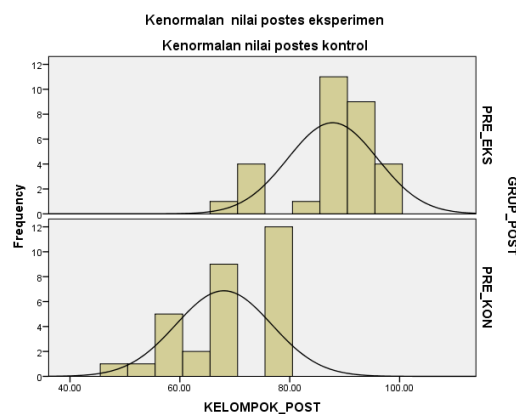


Figure 3. Histograms for post-test value of creative thinking ability in experimental class

Figure 3 shows that the shape of two distribution is look same. That means that the distribution is homogeneous. For the next is the result of normality test for post-test in both class can be seen in Figure 4 and Figure 5. Based on Figure 4, the normality of the post test value of experiment class. The curve is straight line, it can be concluded that the data is normally distributed. Beside that, Figure 5 shows that the control group have normal distribution because the curve is straight line, it can be concluded that the data is normally distributed.

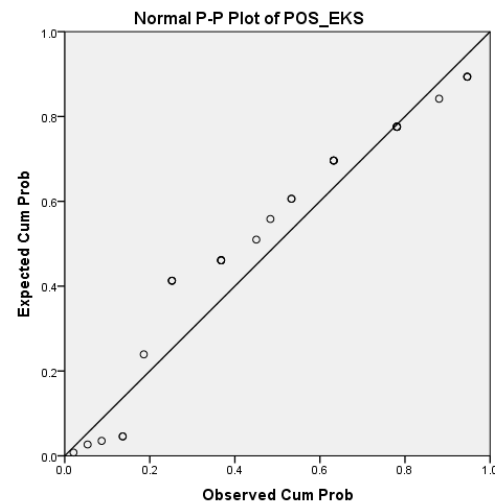


Figure 4. Normality test for post-test value of creative thinking ability in experimental class

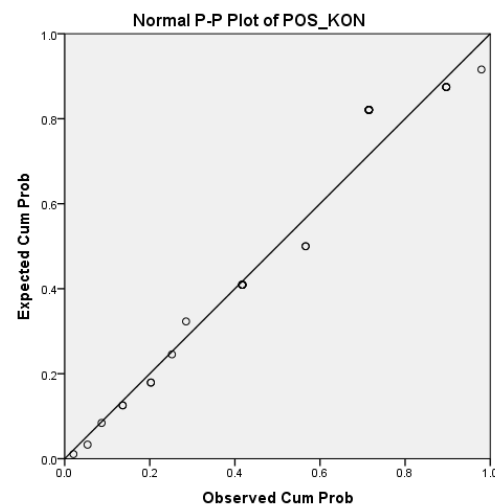


Figure 5. Normality test for post-test value of the creative thinking ability of the control class

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Table 7. Kolmogorov Smirnov-Test of Post-test Creative Thinking Ability for Experiments and Control Groups

		Experiment	Control
N		30	30
Normal Parameters ^{a,b}	Mean	87.8000	68.000
	Std. Deviation	8.18072	8.709
	Absolute	.213	.221
Most Extreme Differences	Positive	.121	.124
	Negative	-.213	-.221
Kolmogorov-Smirnov Z		1.166	1.209
Asymp. Sig. (2-tailed)		.132	.107

Table 7 shows p value of Kolmogorov Smirnov is 0.132 in the experimental group and 0.107 in the control group. Both of these values are greater than the specified significance level of 0.05. Based on testing criteria, H_0 is accepted. Thus it can conclude that both samples come from populations that are normally distributed.

Both of the data come from two normally distributed populations, next will be determined homogeneity of the experimental group's posttest score and the control group. To determine the homogeneity of the two groups, the F test will be used.

Table 8. Homogeneity Test for Post-test Creative Thinking Ability Experiments and Control Groups

		Levene's Test		t-test for Equality of Means		
		F	Sig.	t	df	Sig.
Post-test	Equal variances assumed	.650	.423	9.076	58	.00
	Equal var not assumed			9.076	57.7	.00

Table 8 shows that results of F test on SPSS software. The significance value is $0.650 > 0.05$. Based on the test criteria, H_0 is not rejected. It can be concluded that the posttest value of the experimental group and the control group comes from a homogeneous population. Thus, to test the difference of posttest value test will be used with the t test.

The hypothesis for the mean difference test are $H_0 : \mu_1 = \mu_2$ and $H_1 : \mu_1 \neq \mu_2$ with $\alpha = 0,05$. Tabel 8 shows that the difference value test have significance value is $0,000 < 0,005$. H_0 is rejected. That means the mean value of experiment group and the control group are different. That means the mean value of the student who obtained

Sparkol Videoscribe learning media are different with the student who obtained PPT.

Based on Table 6 was known that the mean score of the experiment class is 87.800 and the mean score of the control class is 68.000. That mean is the mathematical creative thinking ability of the contextual Learning with videoscribe better than for control class in significant level 0,05.

Soft Skill

The instrument used to obtained the soft skill data is used questionnaire with a Likert scale. The questionnaire consists of 39 statement items.

The soft skills for chemical analysis discussed in this study have 4

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indicators and sub-indicators for every indicator:

- 1) personal attributes (honest, confident, caring for the environment, responsible, polite, ethical and empathetic);
- 2) Communication skills (expressing ideas clearly and coherently, using standard language according to context, actively listening to information and providing appropriate responses);
- 3) Accuracy (carrying out work according to the provisions; taking measurements; weighing correctly; calculating carefully; using tools according to their function);
- 4) Creativity: (Generates many ideas; Provides many ways or suggestions for solving problems; Can see a problem from different points of view; Presents concepts in different ways; Makes unusual combinations of parts or elements).

Table 9. Descriptive statistics of soft skills experiment and control groups

	Group	N	Mean Rank	Sum of Ranks
Soft skills	Experiment	30	36.82	1104.50
	Control	30	24.18	725.50
	Total	60		

Table 9 shows that the soft skill score of experiment class is 36,82 and the of soft skill score of control 24.18. The difference of soft skill score will be checked with U Man Whitney Test.

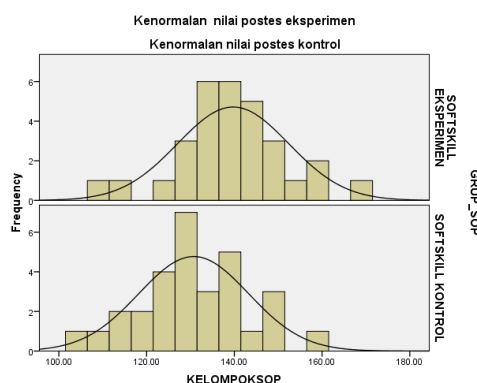


Figure 6. The histogram of soft skills for experiment and control group

Figure 6 shows that the histogram of soft skills score for experiment and control group are almost similar. It means that Experiment group and the Control Group is homogeneous. Based on data processing using SPSS software it is known that both histograms have the same shape and width as showed in Figure 6. So that to check the homogeneity using the Mann Whitney test because soft skills use an ordinal scale. Furthermore, the homogeneity of both soft skills data will be tested using the Levene test. The Homogeneity Test for Experimental and Control Soft skills Scores are shown in the Table 10.

Table 10. The homogeneity test for experimental and control soft skills scores

		Levene Statistic	df1	df2	Sig.
Soft skills Experiment Control	Based on Mean	.042	1	58	.839
	Based on Median	.035	1	58	.852
	Based on Median and with adjusted df	.035	1	57.648	.852
	Based on trimmed mean	.043	1	58	.837

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Table 10 shows that significance value of Lavene test is $0.839 > 0.05$. The experiment group have same variance with control group in soft skill. Based on the testing criteria, H_0 is not rejected. It can be conclude that the both of goup is homogeneous.

The soft skills is include ordinal data, so to check the difference of softskill score is used by U Mann Whitney Test. To compare the two soft skills scores is used by the U Mann Whitney U test because data include ordinal data types. The hypothesis of this test are $H_0 : \mu_1 = \mu_2$ and $H_1 : \mu_1 \neq \mu_2$ with $\alpha = 0,05$. The result of the test can be seen in Table 11.

Table 11. The soft skills difference test experiment class and control class

	Result
Mann-Whitney U	260.500
Wilcoxon W	725.500
Z	-2.803
Asymp. Sig. (2-tailed)	.005

Table 11 shows the significant value obtained is $0.005 < 0.05$. Based on testing criteria, H_0 is rejected. It Means can be concluded that there are differences in soft skills between the experimental group and the control group. Based on Table 9 is shown that mean rank of experiment class is 36.82, whereas the mean rank of control class is 24.18. It is mean that the students soft skills who use videoscribe are better than students soft skills who use power points.

Discussion

Based on the results of data processing, it is known that the results of the difference mean test between the experimental group and the control group show that no dif. This shows that theferent mean of pretest creative

thinking ability between students who received Sparkol Videoscribe media and students who received PPT in learning were the same. The factor that causes no difference in the ability to think creatively before receiving research is because the teachers who teach in the two classes are the same and use the same learning materials and media, namely PPT media.

After being given different treatments, namely the experimental group obtained learning using videoscribe learning media via smartphones and the control group continued to use PPT as a learning medium, there were differences in the increase in creative thinking skills. The creative thinking ability of students who receive learning with videoscribe media is higher than students who use PPT media. This is in line with previous studies that concluden that Sparkol Videoscribe media can improve student learning outcomes higher than students who use PPT media in learning ((Alifah & Utami, 2022); (Rahmatika & Ratnasari, 2018); and (Purba et al., 2021)). Some of the reasons that cause students' creative thinking abilities to receive videoscribe media in learning are described below.

Sparkol Videoscribe learning media has sound and images, so students don't get bored quickly and it's easier to understand learning material. Sparkol Videoscribe media can be used for students who have an auditory learning style and students who have a visual learning style. In Sparkol Videoscribe media, material can be repeated so that students can see learning material again anywhere and at any time. By looking at the subject matter repeatedly, students' understanding of the material will be better.

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Based on data processing on students' soft skills, it was found that students who used Sparkol Videoscribe media had higher soft skills compared to students who used PPT media, although the difference was little. The results of this study are in line with previous research that Communication skill as one of the elements in soft skills can be improve by the *didactic sequences* that were designed to contribute to the training of students in terms of communicative competence and to present the rubrics that were developed, based on the evaluation criteria that were established. Assessment instruments were also designed to analyst the degree of development of skills in students. The didactic sequences presented can be done from different subjects (Caligaris et al., 2022). Besides being able to increase high order thinking skills, Sparkol Videoscribe media can also increase learning motivation and interest (Nurhikmayati & Kania, 2022).

The difference in the soft skill scores is little as shown in Table 9 occurs because some of the soft skill components are included in the attitude group, so it takes a long time to change attitudes. The soft skills for chemical analysis discussed in this study have indicators: personal attributes (honest, confident, caring for the environment, responsible, polite, ethical and empathetic); communication skills (expressing ideas clearly and coherently, using standard language according to context, actively listening to information and providing appropriate responses); Accuracy (carrying out work according to the provisions; taking measurements; weighing correctly; calculating carefully; using tools according to their function); Creativity: (Generates many ideas; Provides many

ways or suggestions for solving problems; Can see a problem from different points of view; Presents concepts in different ways; Makes unusual combinations of parts or elements)

CONCLUSION & RECOMENDATION

Based on the data analysis conducted, there are conclusions obtained from this study below. The Enhancement of creative thinking ability who use learning using videoscribe is better than students who use power point media. The Improved of soft skills of students who use videocribe better than students who use power point media.

The creative thinking ability of students using Sparkol Videoscribe media is at a fairly high level of ability (87.8) compared to the creative thinking ability of students using PowerPoint (68.00) which is at a sufficient level of ability. Multimedia videoscribe to be used as learning media in schools to improve students' creative thinking ability, motivation and enthusiasm in learning, and also improve students' soft skills.

The research is not complete. There is need research on the effect of using Sparkol videoscribe media on students' attitudes towards mathematics. Will students have a more positive attitude towards mathematics with videoscribe media?

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