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The effect of using smartphone media and learning activities on collaborative abilities and learning outcomes

Sutarum[1], Akhmad Qomaru Zaman[2)]
Universitas PGRI Adi Buana

[1] Email: msutarum@ymail.com
[2] Email: qomaru@unipasby.ac.id

Abstract

This study aims to determine the differences in the use of smartphone media for students with disabilities on collaboration abilities and learning outcomes. Experimental research using comparative testing in two different classes with a sample of special school students in Lamongan district. The results show that collaborative activities increase collaboration and foster motivation in learning by using smartphones, but the use of smartphones has little effect on their learning outcomes. This is because students with disabilities have not been able to understand learning procedures using smartphone media.

Keywords: smartphone media, learning activities, collaboration, learning outcomes

Introduction

The smartphone is one of the latest innovations in the development of communication technology that works by using all operating system software which promises a standard and fundamental relationship for application development. (Daeng, Mawengkang, & Kalesaran, 2017). The use of smartphone media in learning is expected to help students to improve learning outcomes. Smartphone media are also used in learning in disability classes. Some schools with disabilities use electronic media a lot in learning activities in their schools. The application of the use of smartphone media certainly considers the condition of students in schools with disabilities (Ratna nurdiana, 2021; Suryanto, Degeng, Djatmika, & Kuswandi, 2021). Dozens of people with disabilities in Kediri attended training on the operation and use of Smartphones held by the Social Service of Kediri Regency. This training aims to train independence and support work and learning activities for persons with disabilities who are members of the Indonesian Blind Association (Muji Harjita, 2021). Not only happened to Kediri Regency but also felt by all persons with disabilities including in Lamongan. This proves that activities in using smartphone media can make it easier for students to meet their daily needs in learning activities, as well as information needs to support the quality of learning. Learning resources are actually widely available everywhere, not only in books or in magazines, even in the current era of advanced technology, learning support resources can be easily obtained through smartphones, on smartphones both used as learning supports and as a means for learning facilitate communication.

Smartphones are useful for humans, both for adults, teenagers, and even children, because smartphone phones can be used in a positive form such as being used to access the internet where the internet that can be accessed using a smartphone aims to dig up information, school assignments, references, journals and so on (Wang, Sigerson, & Cheng, 2019; Xu, Wang, Collins, Lee, & Warschauer, 2021) . Therefore, humans cannot be far from smartphones because today's smartphones can be interpreted as tools for daily needs. Almost all students at school carry smartphones and use them for positive things, namely looking for school assignments. The development of an increasingly sophisticated era has formed a virtual world or internet media, which is now a place for community interaction anywhere and anytime. The internet is a means to carry out various activities or activities as

we do in the real world (Hattie & Donoghue, 2016; Plummer, Witkowski, Smits, & Dale, 2021) . The use of smartphones as a learning support is also very important in the world of education, especially education in inclusive schools. The main function of the smartphone in question is to increase intelligence both independently and independently. By using this smartphone, students are directed directly by the teacher to look for topics or discourses that are directly related to the task to be carried out, in this case the role of the teacher is also very necessary so that students can achieve maximum learning (Chen, 2019; Ferreira et al., 2016) . Achieved by using smartphones at school, with the support of students currently having broad insight to explore lessons in inclusive schools. Inclusive school teachers also play an active role in supervising all students who take advantage of learning and learning, with maximum supervision it is hoped that students do not play around in smartphone operations and always use them positively. There are many ways teachers direct students and teach students to operate smartphones at school, one of which is by holding quizzes and the answers can be searched through their smartphones.

These experiences become more meaningful, so “sharing” and “collaborating” are imperative for educators (Ferreira et al., 2016; Lindsey, 1990) . By sharing and collaborating, educational actors can learn from each other, complement and complement each other so as to create synergy. Collaborative learning allows for a lot of added value, for both students and teachers. These advantages include; 1) Students get an accessible experience not only with their classmates, but with other students they have never met before, 2) In collaborative learning, interactions between students they just know become due to participating in programs that have been planned by the teacher, 3) Collaborative activities will usually encourage motivation and competitive spirit in a positive sense for students, 4) Students also get a lot of learning resources from teachers other than their own school teachers who they already know. Apart from these advantages, of course, there are many other advantages, either directly or indirectly.

Method

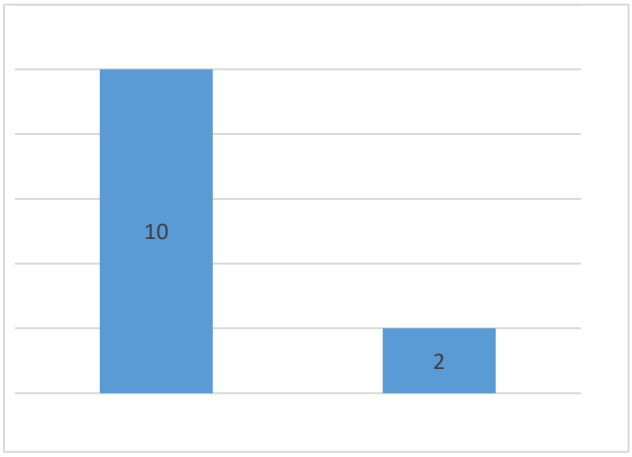
This research is an experimental research and comparative research, namely research that connects and compares between the 2 groups. According to (Sugiyono, 2017) "Comparative research is research that compares the existence of one or more variables in different samples or at different times. According to (Arikunto, 2013) Experimental research is a way to find a causal relationship (social relationship) between two factors that are deliberately caused by researchers. Researchers conducted experiments by applying learning to two study groups, namely the first group learning using *Smartphone media* and the second group learning without using *Smartphone media.* Furthermore, the researcher gave posttest questions with the same questions to see the difference between respondents who learned to use Smartphones and not using Smartphones had the same results or not. Furthermore, researchers will distribute questionnaires to respondents with a pattern of statements expressed with 20 questions and 5 answer choices. All alternative answers have a weighted score calculated using a similar scale, which is always 5 scores, often 4 scores, Sometimes 3 scores, almost never 2 scores, and very never 1 score. Calculation of the score of the questionnaire results by means of the highest score is very good with a total score of 5 x 20 = 100 (Very Good) and the minimum score with a total score of 1 x 20 = 20 (Very Poor). Then each instrument was closed with a questionnaire from the independent variables and tested for validity, reliability, and continued with the Shapiro Wilk normality test and simple linear regression. Then the posttest results were tested using the Shapiro Wilk normality test and paired t test. Furthermore, to collect supporting data, researchers used observation and documentation. Observations made were direct observations to respondents or parties related to what was being done at the research location, namely at the Lamongan State Extraordinary School. The documentation used in this study is school data which include school profiles, teacher data, student data, and other data that can strengthen the validity of the study.

Results

Based on the results of responses from 12 respondents regarding the use of smartphones on students' collaboration abilities, the researchers will describe the percentage of answers from respondents as follows:

Smartphone use

Based on the results of the measurement of the Smartphone Use variable, it is shown in the following figure:

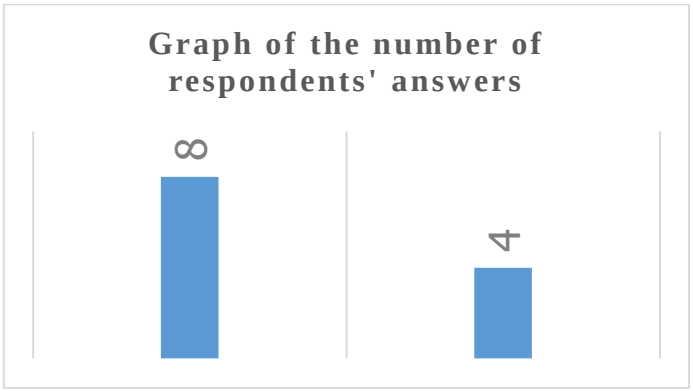


Source: Researcher, 2022

Figure 1. Graph of variable data tabulation of *smartphone media use*

The explanation of the description of the respondent's answer categories shows the number of results and questionnaires, where the most categories are 10 respondents and the good category is 2 respondents.

Collaboration Ability
The results of the measurement of the Collaboration Ability variable are listed in table 4.8 as follows:



Source: Researcher, 2022

Figure 2. Graphs of collaboration capability, variable data tabulation

From table 1, the description of respondents' answers shows the number of results and questionnaires, where the highest category is 8 respondents and the good category is 4 respondents.

Characteristics of Answers Pretest Posttest
Pretest data (Pretest), this pretest is given to all students to determine the basic abilities of students before the learning program is implemented and using the smartphone learning method, the following table of pretest results:

Table 1. Results of the pretest of students with visual impairments in SLLB Lamongan

Statistics
Pretest

N	Valid	16
	Missing	0
mean		67,00
median		68.00
Mode		68
Std. Deviation		4,000
Variance		16,000
Range		12
Minimum		60
Maximum		72

Source: Researchers 2022

The results of calculations using SPSS for data before treating (pre-test) obtained a valid sample size of 16, mean value = 67.00, mean = 68.00 standard deviation = 4,000, minimum value = 60 and maximum value = 72.

Final Test Data (Posttest)

The posttest application after the learning program was implemented by dividing 2 (two) groups because there were two learning methods, namely students who used and did not use smartphones. Final test data (posttest) Students who do not use smartphones, Here are the results of the posttest conducted on students after the learning program was implemented:

Table 2. Posttest result data

Statistics		
Posttest		
N	Valid	4
	Missing	0
mean		76.00
median		76.00
Mode		76
Std. Deviation		3,266
Variance		10,667
Range		8
Minimum		72
Maximum		80

Source: Researchers 2022

The results of calculations using SPSS on the data after treatment (posttest) obtained the number of valid samples 4, mean score = 76, mean = 76, standard deviation = 3,266, minimum value = 72 and maximum value = 80. The final test data (posttest) of students who use smartphones , the following are the results of the posttest conducted on students after the learning program is implemented:

Table 3. Posttest results

Statistics		
	Posttest	
N	Valid	12
	Missing	0
mean		79.67
median		78.00
Mode		88
Std. Deviation		6,706
Variance		44,970
Range		16

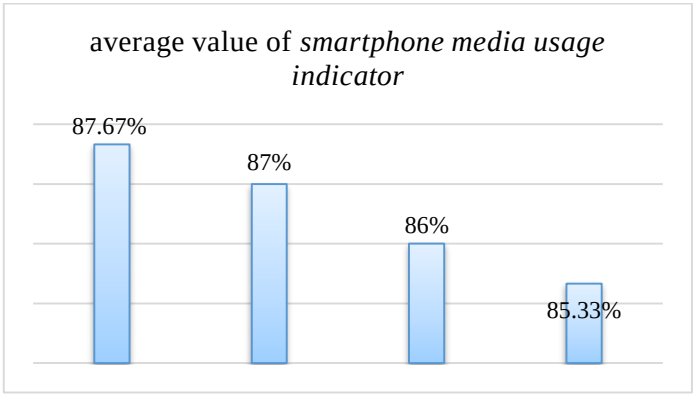
Minimum	72
Maximum	88

Source: Researchers 2022

The results of calculations using SPSS for the data before treatment (posttest) obtained a valid sample of 12, the mean = 79.67, the mean = 78, the standard deviation = 6.706, the minimum value = 72 and the maximum value = 88.

Percentage of Recapitulation of Questionnaire Answers

Percentage of Respondents' Answer Results for Each Variable Indicator of Smartphone Media Use. Of the five alternative answers given to answer each questionnaire statement. The researcher adds up the answers and then divides them into an average to find out the results of the recap of answers according to Figure 4 as follows:



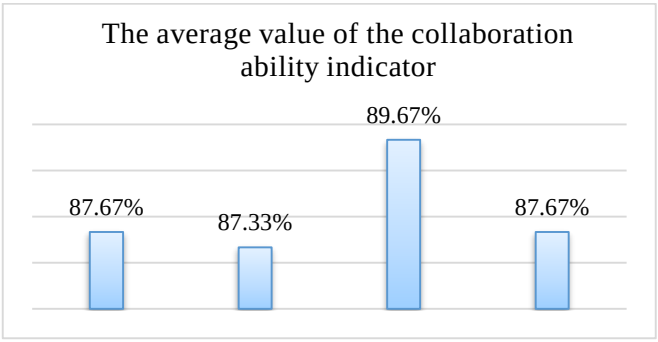
Source: Researcher, 2022

Figure 4 Graph of average value of *smartphone media usage indicators*

From the presentation of the image above, it can be seen the results of the respondents' answers through the Google Form application about the variable use of *Smartphone media* with 4 indicators, namely as follows:

a) Frequency: 87.67%
b) Contents: 87%
c) Duration: 86%
d) Activity: 85.33%

Percentage of Respondents' Answer Results Per Indicator of Collaboration Ability Variable. Of the five alternative answers given to answer each questionnaire statement. The researchers add up the results of the answers and then divide them into averages to find out the results of recap answers according to Figure 5 as follows:



Source: Researcher, 2022

Figure 5. Graph of the average score of collaboration ability indicators

From the presentation of the image above, it can be seen the results of respondents' answers through the Google Form application about the Collaboration Ability variable with 4 indicators, namely as follows:

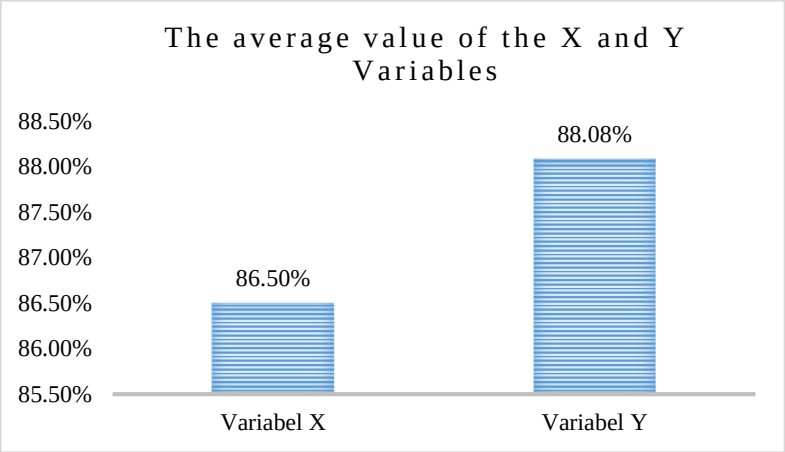
a) Communicate: 87.67%
b) Collaborate: 87.33%
c) Appreciation: 89.67%
d) Responsible: 87.67%

Percentage of Respondents' Answer Result Variables Using Smartphone Media and Collaboration Ability Variables, After the results of the recapitulation of answers for each indicator, each researcher look for the average of each x and y variable as shown in table and figure 6 below:

Table 6. The percentage of recapitulation of answers to variables X and Y

Variable Average Smartphone Media Usage	Average Collaboration Ability Variable
88.08%	86.50 %

source: Researcher, 2022



Source: Researcher, 2022

Figure 3. graph of the average value of the collaboration ability indicator

From the table and figure data above, it is stated that the use of Smartphone media is 86.50% and 88.08% of students have collaboration skills. These data are supported by the results of research observations.

Research data analysis

Shapiro Wilk normality test

The following are the results of the normality test that has been carried out using the Shapiro Wilk test. If Sig (2-tailled) > 0.05, then the data are normally distributed, while the data is not normally distributed if the value of Sig (2-tailled) < 0.05. The following are the results of the normality test using the Shapiro Wilk test.

Table 7. Tests of normality

	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.

Smartphone Media Usage	.204	12	.179	.929	12	.369
Collaboration Ability	.188	12	.200 *	.926	12	.339

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Source: Researcher, 2022

Table 7, it can be seen the significance value of the normality test of the X and Y variables. The use of Smartphone media shows a Sig value of 0.369 and the ability to collaborate Based on a significant value of 0.339. Both show a significance value of more than 0.05. Based on the test results, it can be obtained that the two data variables are normally distributed.

Simple Linear Regression Test

Simple Linear Regression Analysis is a linear relationship between one independent variable (X) and the dependent variable (Y). This analysis is to determine the direction of the relationship between variables.

Table 8 Coefficient

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.395 [a]	.156	.072	8.825

a. Predictors: (Constant), Smartphone Media Usage

Source: Researcher, 2022

The table explains the magnitude of the correlation value (R) which is 0.395 and explains the magnitude of the influence of the percentage influence of the independent variable on a variable called the coefficient of determination which is the result of the square of R. Smartphone media) of the variable (Collaboration Ability) of 15.6%, while the remaining 84, 4% are influenced by other variables.

Table 9 Regression Test (Coefficients)

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	123,143	27.055		4,552	.001
	Smartphone Media Usage	-.416	.306	-.395	-1,360	.204

a. Dependent Variable: Collaboration Ability

Source: Researcher, 2022

In the table, Constant (a) is 123,143, while the value of Smartphone media usage (b) is 0.416, so the regression equation can be written: Y = a + bX = 123,143 + 0.416X The constant 123,143 states that if there is a Smartphone usage value, the ability value is collaboration is 123,143. The X1 regression coefficient of 0.416 states that for every additional 1 value of Smartphone media usage, the value of Collaboration ability will increase by 0.416.

Test for Pretest and Posttest

Pretest Normality Test

Normality test is used to determine whether the sample taken comes from a normally distributed population. The results of the normality test can be seen in the Tests of Normality table after processing with SPSS 16.0 for windows. The normality test used is the normality test using the Shapiro-Wilk method. The results of processing the normality test data can be seen in Table 19 below:

Table 10 Pretest Normality Test Results

		Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Group	Statistics	df	Sig.	Statistics	df	Sig.
Pretest	Conventional	0.151	4	.	0.993	4	0.972
Results	Smartphone User	0.237	12	0.061	0.891	12	0.123

a. Lilliefors Significance Correction

Source: Researchers 2022

Based on Table 10, it can be seen that the pretest significance value for conventional class learning outcomes is 0.972 and smartphone user class is 0.123. Both show a significance value of more than 0.05. Based on the test results can be obtained that the two groups of data are normally distributed.

Posttest Normality Test

Normality test is used to determine whether the sample taken comes from a normally distributed population. The results of the normality test can be seen in the Tests of Normality table after processing with SPSS 16.0 for windows. The normality test used is the normality test using the Shapiro-Wilk method. The results of the normality test data processing can be seen in Table 11 below.

Table 11. posttest normality test results

		Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Group	Statistics	df	Sig.	Statistics	df	Sig.
Pretest	Conventional	0.329	4	.	0.895	4	0.406
Results	Smartphone User	0.198	12	0.200 [*]	0.894	12	0.134

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Researcher2022

Based on Table 11, it can be seen that the pretest significance value for conventional class learning outcomes is 0.406 and smartphone user class is 0.134. Both show a significance value of more than 0.05. Based on the test results can be obtained that the two groups of data are normally distributed.

Paired t test

After going through the prerequisite test with the normality test and homogeneity test, it can be used to test the hypothesis. The hypothesis test used in this study is a parametric statistical test, namely the Paired Sample T-test because it comes from two interrelated variables. This test is used to determine whether or not there is an average difference between two pairs of sample groups (related). That is, two samples, but received two different treatments. The data used usually appear at intervals or ratios. 68 The following are the results obtained from the Paired Sample T-test listed in table 12 and table 13 below:

Table 12 statistical test results t test

Paired Sample Statistics

		mean	N	Std. Deviation	Std. Error Mean
Pairs 1	Smartphone User Class	78.00	4	7,659	3,830
	Conventional Class	76.00	4	3,266	1,633

Source: Researchers 2022

Table 13 t test results

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pairs 1	Smartphone User Class - Conventional Class	2,000	10,583	5,292	-14,840	18,840	0.378	3	0.731

Source: Researchers 2022

It can be seen from table 13 above that it can be seen that:

Ho: There is no difference between *smartphone users and* the collaborative ability of students with visual impairments at the Lamongan Special School in 2021/2022.

Ha: There is a difference between smartphone users and the collaborative ability of students with visual impairments at the Lamongan Special School in 2021/2022.

The basis for decision making is based on the value of count with table: If tcount >t-table, then Ho is rejected and Ha is accepted. If tcount < t-table, then Ho is accepted and Ha is rejected. Based on the table about the t test (paired sample t test) above, it shows that there is a significant difference between the learning outcomes of conventional methods and the use of smartphones. To see the value of the t table based on the degrees of freedom (dk) whose magnitude is N-1, namely 12-1 = 11. The value of dk = 11 at a significant level of 5% obtained t table = 1.795. Based on the results of the t-test analysis (paired sample t-test), it is known that the t-count is greater than the t-table, namely 0.378 > 1.795 and Sig. (2 tailed) = 0.731 < 0.05, then Ho is accepted and Ha is rejected. Based on data analysis, it can be said that there is a significant difference in students' collaboration abilities between before and after being given the learning method using smartphones. In other words t count < t table which means Ha is rejected and Ho is accepted. So it can be concluded that there is no difference between smartphone users and the collaborative ability of blind students at SLB Lamongan in 2021/2022, this can be caused because the number of students who are respondents in the two groups tested is not balanced.

Discussion

This study was conducted to find out whether there are differences in the use of Smartphone media on the collaboration abilities of students with disabilities at SLB Negeri Lamongan in 2021/2022. The population in this study was 16 students, 11 elementary students, 1 junior high school students, and 4 high school students. Based on the results of the presentation of the data above, the researchers grouped students into 2 groups, namely the first group as a control group, namely students who did not use Smartphone media and the second group, namely the experimental group, namely students who did not use Smartphone media. *Using Smartphone media.*

The results of data analysis carried out stated that there was no difference between smartphone users on students' collaboration abilities, this can be seen from the results of hypothesis testing, analysis which showed that t count was greater than t table, namely 0.378 > 1.795 and Sig. (2 tails) = 0.731 < 0.05. However, from the results of the regression test, the coefficient of determination (R2) is 0.156, which means the effect of the independent variable on the variable is 15.6%, while the remaining 84.4% is influenced by other variables. The results of this test can be caused by the number of students as respondents in the two groups being tested which are not balanced and few. This research is supported by research conducted by Dyah Isna Nurhayati, DWI Yulianti, Budi Naini Mindyarto with the title Problem Based Learning, Teaching Materials on Straight Motion Materials to Improve Students' Communication and Collaboration Skills in 2019 (Journal). Dependent Variable Communication and Collaboration Ability Independent Variable Problem Based Learning. Which concludes that the improvement of written communication skills in this study is still in the moderate category, so further discussion of the material is needed.

The results of this study are inversely proportional to the research conducted by Miroh, S Patonah, and Kaltsum entitled The Effect of the Team Games Tournament (TGT) Learning Model on

the Collaboration Ability of Students at SMP N 5 Ungaran in 2019 (Journal). Dependent Variable Collaboration Ability Independent Variable Learning Model Team Games Tournament (TGT). This study concludes that the data obtained in this study are normally distributed and homogeneous, and the hypothesis test obtained a significance value of 0.039 <0.05 which states that there is a significant difference between the control class and the experimental class. The results showed that there was a relationship between smartphone users and collaboration skills, but there was no difference between smartphone users and conventional learning that was applied to improve students' collaboration skills. The results of this study may be influenced by the small number of respondents at SLB Negeri Lamongan plus not all students use smartphones so that the comparison between users and non-users are not balanced.

Conclusion

Results Based on the research and discussion, it can be concluded that there are differences in smartphone users with the ability to collaborate with students with disabilities at SLB Lamongan in 2021/2022. Based on the data that has been collected and tested by researchers using Pairet t test, it can be said that t count is greater than t table, namely 5.407 > 1.795 and Sig. (2 tailed) = 0.000 <0.05, then Ho is rejected and Ha is accepted, in other words t count > t table which means Ha is accepted and Ho is rejected. Therefore, there is no difference between Smartphone users and collaboration of blind students. The results of this study may be influenced by the small number of respondents at SLB Negeri Lamongan plus not all students use smartphones so that the comparison of users and non users is not balanced.

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