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## ONLINE LEARNING SATISFACTION IN THE TIME OF COVID 19 AND THE EFFECT ON LEARNING OUTCOMES REVIEW FROM STUDENT'S COGNITIVE STYLE

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### Article Info

**Keywords :** Online Learning; Cognitive Style; Learning Satisfaction; Learning Outcomes.

### Abstract

*The purpose of the study was to describe the state of student satisfaction in online learning during covid 19 in terms of tangible, reliability, responsiveness, assurance, and empathy dimensions and to examine the effect of satisfaction and cognitive style on student learning outcomes in participating in online learning during covid 19. The form of the research used mixed methods with commensurate status, namely using a qualitative descriptive approach and quantitative analysis. The research was conducted at FKIP Untan Pontianak, Mathematics Education Study Program. As the main independent variable is cognitive style and the second independent variable is learning satisfaction. The dependent variable is learning outcomes. The research sample is students who take the mathematics learning process assessment course for the 2021/2022 academic year. This study uses 3 instruments, namely the cognitive style scale, learning satisfaction questionnaire and learning outcomes test. Hypothesis testing is a two-way ANOVA test. The results showed (a) students who had a free cognitive style were as much as 43.47% and students who had a dependent cognitive style were 56.52%. (b) Satisfaction aspects, Tangibles, Reliability, Responsiveness, Assurance and Empathy are classified as high. Research conclusions: (1) The average percentage of very satisfactory and satisfactory satisfaction levels is greater than the average percentage of unsatisfactory and unsatisfactory levels of satisfaction for all dimensions of tangible, reliability, responsiveness,*

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*assurance, and empathy. (2) a. The learning outcomes of students who have a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style, (b) Cognitive style factors and satisfaction factors do not affect jointly on student learning outcomes, (c) Students who have a level of learning satisfaction high, learning outcomes with independent cognitive styles are higher than student learning outcomes with dependent cognitive styles, (d) students with low levels of learning satisfaction, learning outcomes with independent cognitive styles are higher than student learning outcomes with dependent cognitive styles.*

**Kata Kunci:** *Pembelajaran Online; Gaya Kognitif; Kepuasan Belajar; Hasil Belajar.*

Tujuan penelitian untuk mendeskripsikan keadaan kepuasan siswa dalam pembelajaran online pada masa covid 19 ditinjau dari dimensi tangible, reliability, responsiveness, assurance, dan empati serta untuk menguji pengaruh kepuasan dan gaya kognitif terhadap hasil belajar siswa dalam mengikuti pembelajaran. pembelajaran online selama covid 19. Bentuk penelitian menggunakan metode campuran dengan status sepadan, yaitu menggunakan pendekatan deskriptif kualitatif dan analisis kuantitatif. Penelitian ini dilaksanakan di FKIP Untan Pontianak, Program Studi Pendidikan Matematika. Sebagai variabel bebas utama adalah gaya kognitif dan variabel bebas kedua adalah kepuasan belajar. Variabel terikatnya adalah hasil belajar. Sampel penelitian ini adalah mahasiswa yang mengikuti mata kuliah penilaian proses pembelajaran matematika tahun ajaran 2021/2022. Penelitian ini menggunakan 3 instrumen yaitu skala gaya kognitif, angket kepuasan belajar dan tes hasil belajar. Pengujian hipotesis adalah uji ANOVA dua arah. Hasil penelitian menunjukkan (a) siswa yang memiliki gaya kognitif bebas sebanyak 43,47% dan siswa yang memiliki gaya kognitif dependen sebanyak 56,52%. (b) Aspek Satisfaction, Tangibles, Reliability, Responsiveness, Assurance dan Empathy tergolong tinggi. Kesimpulan penelitian: (1) Rata-rata persentase tingkat kepuasan sangat memuaskan dan memuaskan lebih besar daripada persentase rata-rata tingkat kepuasan tidak memuaskan dan tidak memuaskan untuk semua dimensi berwujud, keandalan, daya tanggap, jaminan, dan empati. (2) a. Hasil belajar siswa yang memiliki gaya kognitif bebas lebih tinggi daripada hasil belajar siswa yang memiliki gaya kognitif dependen, (b) Faktor gaya kognitif dan faktor kepuasan tidak berpengaruh secara bersama-sama terhadap hasil belajar siswa, (c) Siswa yang memiliki tingkat kepuasan belajar tinggi, hasil belajar dengan gaya kognitif mandiri lebih tinggi daripada hasil belajar siswa dengan gaya kognitif dependen, (d) siswa dengan tingkat kepuasan belajar rendah, hasil belajar dengan gaya kognitif independen lebih tinggi daripada hasil belajar siswa dengan kognitif dependen gaya.

## INTRODUCTION

The impact of Covid 19 has affected the learning process, which was previously carried out face-to-face, to learning using online or online media for all levels of education, including higher education. Online learning, like it or not, ready or not, must be an option to prevent the spread of Covid 19. Online learning is a form of rapidly spreading computer technology and internet infrastructure. Online learning is also one of the main streams of changes that occur in the learning process (Allen et al., 2002).

Online learning is a form of e-learning that can facilitate students to take control of content, manage learning sequences, determine learning speed, improve timing and select media to meet their learning goals and to manage access to e-learning methods and materials. (Kumalasari & Akmal, 2020), stated a number of challenges in implementing online learning in developing countries, both in terms of limited facilities and the readiness of human resources, both teachers and students, so that it has the potential to make online learning not ideal. Inadequate internet access either by teachers or students can affect the implementation of learning. The challenges of distance learning during the Covid 19 pandemic faced by students include limited communication and socialization between students, lack of skill in using technology, and high bills. Challenges faced by teachers, limited

selection of teaching methods, lack of curriculum content coverage, lack of technological skills that hinder the potential of online learning (Handarini & Wulandari, 2020).

Negative assessments and positive assessments of students towards online learning will have an impact on their satisfaction in participating in online learning. Therefore, satisfaction is indicated to be one of the most important factors that determine the quality of online teaching. The success of courses, programs, and learning processes can be judged by student satisfaction (Summers et al., 2005). Apart from the barriers that online learning poses, there are also advantages. Research conducted (Paramita Sari & Arifin, 2016), concluded that satisfaction with the use of the system is influenced by the behavior patterns of the users themselves, namely the acceptance of users in using the system. Learning satisfaction occupies an important position in measuring the quality of a program, including learning programs. (Dhaqane & Afrah, 2016), in his research states that the main thing that determines student success in learning is not only reflected in academic value alone, but also from feeling satisfied with the experience gained from learning.

Online learning satisfaction is a reflection of how students experience and understand learning and is an important measure in program evaluation. Satisfaction

is a very significant problem in the implementation of the online learning process which is a measure of the quality and effectiveness of teaching and learning (Bolliger & Halupa, 2012). Student satisfaction is an important concept because it can ultimately lead to a level of motivation and success in learning. Satisfaction with online learning is influenced by students' internal characteristics, namely learning styles (Ghufron, 2020). One of the internal characteristics of a person that affects satisfaction and learning outcomes is cognitive style.

Cognitive style is one of the students' characters that is very important and especially influences their learning achievement. Cognitive style is related to how they learn through their own ways that are inherent and unique to each individual. Cognitive style refers to the way people obtain information and use strategies to respond to environmental stimuli. According to (li & Teori, 2013) that cognitive styles are different ways that students think are the most effective and efficient in processing, storing and recalling what they have learned. The research objectives are (a) to describe the state of student satisfaction in online learning during covid 19 in terms of tangible, reliability, responsiveness, assurance, and empathy dimensions (b) to examine the effect of satisfaction and cognitive style on

student learning outcomes in participating in online learning during covid 19.

This research is considered important in the implementation of online-based learning in FKIP, especially the Mathematics Education Study Program. The results of the study provide an overview of the effectiveness of online learning in relation to the level of satisfaction and learning outcomes achieved by students towards the implementation of online learning during covid 19 in addition to a description of the cognitive style of students, especially in the Mathematics Education Study Program. The procedure for developing satisfaction instruments can be used as a reference for lecturers, educators and students in constructing items relevant to aspects and indicators to measure student satisfaction. The instruments produced in this study can be used to measure student satisfaction by mathematics educators in schools or used for broader research. By knowing the level of satisfaction, learning outcomes and cognitive styles of students as well as the relationship between these variables can be used as a basis for developing more innovative and varied online-based learning programs or lectures for the future with which it is hoped that the quality of the process and student learning outcomes will increase (Fitriawan et al., 2021).

## METHOD

This form of research uses mixed methods with commensurate status, namely using a qualitative descriptive approach and quantitative analysis. The research was conducted at FKIP Untan Pontianak, Mathematics Education Study Program, from September to October 2021. The main independent variable is cognitive style and the second independent variable is student satisfaction. While the dependent variable is student learning outcomes.

The research population is all students who take online lectures for at least 3 semesters. Meanwhile, the research sample is students who take the 2021/2022 mathematics learning process assessment course. Sampling using cluster random sampling technique. Data collection techniques using indirect communication techniques and measurement techniques. The data collection tool used to obtain satisfaction data and cognitive style data is a questionnaire scale. Meanwhile, student learning outcomes data were collected through learning outcomes tests.

To test the hypothesis, namely to determine the effect of satisfaction and cognitive style on learning outcomes, the two-way Anova test was used. The cognitive style instrument used adopted the Group Embedded Figure Test (GEFT) cognitive style questionnaire. Group Embedded Figure Test (GEFT) developed by (Herlina & Dahlia, 2018). The learning satisfaction instrument

refers to the Tangible, Reliability, Responsiveness, Assurance, Empathy dimensions. Content validation carried out in this study is the validity of the suitability of the panelists and the reliability of the suitability of the panelists. The formula used to determine the validity of the suitability of the panelists is the Aiken formula (Dali, 2012).

$$V = \frac{\sum ni |i-r|}{N(t-1)}$$

The results of the assessment of the validity of the instrument by the panelists obtained 16 items were decided valid. In this study, the items used to collect satisfaction data were items that had an index of content validity accuracy greater than 0.761. Meanwhile, to determine the reliability of the suitability of the panelists, the Hoyt formula was used in (Djaali & Muljono, 2008) that is:

$$r_{kk} = \frac{RJK_p - RJK_e}{RJK_p}$$

Based on the results of calculations using the Hoyt formula, the panelists' suitability reliability coefficient was obtained by  $r_{kk} = 0.815$ . Based on the analysis of the test results obtained 14 items meet the valid criteria after being analyzed with the Moment Product test (after the data is converted) it is concluded that 14 items meet the validity of items namely numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16. Calculating the reliability coefficient of the item (14 items) using the Alpha-Cronbach test, namely:

$$r_{ii} = \frac{k}{k-1} \left[ 1 - \frac{\sum s_i^2}{S_t^2} \right]$$

The results of the analysis of the Alpha test obtained a satisfaction instrument reliability coefficient of 0.818. This result is quite high. To determine the effect of cognitive style and learning satisfaction during online learning during a pandemic on learning outcomes, research hypotheses were tested using the two-way Anova test. The research method is a two factorial design 2 x 2. With the main factor is cognitive style (A) with factor size A1 is free cognitive style and A2 is dependent cognitive style and learning satisfaction factor (B) with factor size B1 is a high level of satisfaction, while B2 is a low level of satisfaction. The response variable in this study was student learning outcomes (Y) after attending a mathematics learning process assessment course for 1 semester. The complete research design is presented in the form of the following Table 1.

**Table 1.** Two Factorial Design (2x2) Between Cognitive Style Variation (A) and Satisfaction (B)

Satisfaction (B)	Cognitive Style (A)		$\Sigma Y_j$
	Free (A1)	Depends (A2)	
Tall (B1)	$[Y]_{11K}$ K = 1, 2, 3, ....., n	$[Y]_{12K}$ K = 1, 2, 3, ....., n	Y*1

Law (B2)	$[Y]_{21K}$ K = 1, 2, 3, ....., n	$[Y]_{22K}$ K = 1, 2, 3, ....., n	Y*2
$\Sigma Y_1$	Y1*	Y2*	Y**

To test the null hypothesis (Ho), the statistical hypothesis is formulated as follows.

1. Ho :  $\mu_{A1} \leq \mu_{A2}$   
Ha :  $\mu_{A1} > \mu_{A2}$
2. Ho : INT. A x B = 0  
Ha : INT. A x B  $\neq$  0
3. Ho :  $\mu_{A1B1} \geq \mu_{A2B1}$   
Ha :  $\mu_{A1B1} < \mu_{A2B1}$
4. Ho :  $\mu_{A1B2} \leq \mu_{A2B2}$   
Ha :  $\mu_{A1B2} > \mu_{A2B2}$

## RESULT AND DISCUSSION

### Results

#### Research Results in Descriptive Data

Student cognitive style data was collected through a cognitive style questionnaire distributed to 3rd semester students who took part in the mathematics learning process assessment course involving 69 students. Based on the results of data collection, the following results were obtained by Table 2.

**Table 2.** Student Cognitive Style Data Summary

Cognitive Style	Percentase (%)
Depend (FD)	56,52 %
Free (FI)	43,47%
Total	100 %

### Testing Data Analysis Requirements

This section will describe the data on student learning outcomes in the mathematics learning assessment course. The distribution of data consists of: (1) a group of students who have a dependent cognitive style (A1), (2) a group of students who have a free cognitive style (A2), (3) a group of students who have a dependent cognitive style with a high level of satisfaction (A1B1), (4) a group of students who have a free cognitive style, with a high level of satisfaction (A2B1), (5) a group of students who have a dependent cognitive style, with a low level of satisfaction (A1B2), (6) a group of students who have a free cognitive style, with a low level of satisfaction (A2B2).

### Normality Test

To test the normality of the data, in this study the Kolmogorof-Swironov test was used. If the test results show that  $D_{count} < D_{table}$  at a significant level = 0.05, then the data being tested comes from a normally distributed population. The normality test of the data was carried out in each treatment group, namely:

A1 : The learning outcomes of students who have a free cognitive style

A2 : The learning outcomes of students who have a cognitive style depend on

A1B1 : Student learning outcomes who have a free cognitive style for students with high levels of learning satisfaction

A1B2 : The learning outcomes of students who have a free cognitive style with a low level of learning satisfaction

A2B1 : The learning outcomes of students who have a cognitive style depend on students with a high level of learning satisfaction

A2B2 : The learning outcomes of students who have a cognitive style depend on a low level of learning satisfaction

From the calculation results obtained information that for all treatment groups the value of  $D_{count}$  is lower than  $D_{table}$ . Thus it can be concluded that for all groups the data comes from a normally distributed population. More clearly can be seen in the following Table 3.

**Table 3.** Data Normality Recapitulation

Group	N	Mean	DS	$D_{count}$	$D_{table}$	Decision	Description
A1	34	64.529	13.94	0.106	0.23	$D_h < D_t$	Normally
A2	34	76.8235	13.96	0.0693	0.23	$D_h < D_t$	Normally
A1B1	17	73.12	11.25	0.0709	0.318	$D_h < D_t$	Normally
A1B2	17	55.94	10.83	0.123	0.318	$D_h < D_t$	Normally
A2B1	17	81.47	11.64	0.0695	0.318	$D_h < D_t$	Normally
A2B2	17	72.18	14.85	0.0973	0.318	$D_h < D_t$	Normally

### Homogeneity Test

To test the homogeneity of the data in the treatment groups A1 and A2, the F test was used. Meanwhile, to test the homogeneity of the data in the four groups of cells A1B1, A1B2, A2B1 and A2B2, the Barlett test was used.

Testing the homogeneity of variance of the two groups A1A2 used the F (Fisher) test

with the formula  $F = \frac{s_1^2}{s_2^2}$ , with  $\alpha = 0.05$  and dk

the numerator  $(n_1-1)$  and dk the denominator  $(n_2-1)$ . The test criteria are accept the hypothesis  $H_0$  if  $F_{(1-\alpha)(n_2-1, n_1-1)} < F < F_{1/2 \alpha (n_1-1, n_2-1)}$ . To determine the price  $F_{(1-\alpha)(n_2-1, n_1-1)}$

used formula  $F_{(1-p)(v_2, v_1)} = \frac{1}{F_{p(v_1, v_2)}}$ .

The hypothesis to be tested is:

$$H_0 : \sigma_1^2 = \sigma_2^2$$

$$H_a : \sigma_1^2 \neq \sigma_2^2$$

The results of the F test analysis are obtained  $F_{hitung} = 0,74$ . From the distribution list F we get  $F_{(0,05)(59,59)} = 1,56$  dan  $F_{(0,95)(59,59)} = 0,641$ . Because  $0,641 < 0,74 < 1,56$ , then the decision to accept  $H_0$ .

It means that it can be concluded that the data variance of the two groups A1 and A2 is homogeneous, see Table 4 below.

**Table 4.** Recapitulation of Homogeneity Analysis of Groups A1 and A2

Grp	Var	F <sub>co</sub>	F <sub>tab</sub>	Decision	Con.
1	194 .26	1.003	1.788	$F_{count} < F_{table}$	A1&A2 Homogen
2	194 .88				

Homogeneity of variance test on four groups of designed cells (A<sub>1</sub>B<sub>1</sub>, A<sub>1</sub>B<sub>2</sub>, A<sub>2</sub>B<sub>1</sub> dan A<sub>2</sub>B<sub>2</sub>) Bartlett test is used with the approach  $X^2 = (\ln 10)\{(B - (\sum dk) (\log S^2_i))\}$  dan  $B = \{(\log S^2) (\sum dk)\}$ , (Budiyono, 2009) with  $dk = k-1$  dan  $\alpha = 0,05$ . The test criteria are accept  $H_0$  if  $X^2_{hitung} < X^2_{tabel}$ .

The hypotheses to be tested are:

$$H_0 : \sigma_1^2 = \sigma_2^2 = \sigma_3^2 = \sigma_4^2$$

$H_a$  : Not  $H_0$  (there are unequal variances)

The results of the analysis of the homogeneity of variance of the four groups A1B1, A1B2, A2B1 and A2B2 were obtained  $X^2_{hitung} = 2,1$  dan  $X^2_{tabel} = 7,815$  because  $X^2_{hitung} < X^2_{tabel}$ , then the conclusion is the variance of the four groups of homogeneous data are in Table 5.

**Table 5.** Recapitulation of the results of the analysis of the four groups

Group	N	dk	S <sup>2</sup>	log. S <sup>2</sup>	dk log S <sup>2</sup>	dk .S <sup>2</sup>	X <sup>2</sup> <sub>hitung</sub>	X <sup>2</sup> <sub>(0,05)</sub>
A1B1	17	16	126.6	2.1025	33.6395	2025.76	2.1	7.815
A1B2	17	16	117.3	2.0693	33.1094	1876.96		
A2B1	17	16	135.5	2.1320	34.1115	2168.16		
A2B2	17	16	220.5	2.3435	37.4955	3528.48		
		64		8.6472	138.3559	9599.36		



## Research Hypothesis Testing Results

Hypothesis testing in this study was to

use two-way Anova which was carried out manually with the results of the Tabel 6.

**Table 6.** Two Way Anova Analysis Recapitulation

Source of Variation	Dk	JK	RJK	Fh	Ftable
Between Columns (A)	1	2569.47	2569.471	17.131	3.99
Between Lines (B)	1	2977.96	2977.96	19.854	
Interaction	1	764.041	264.041	1.7604	
In	64	9599.41	149.991		
Total	67	15410.88			

### Main Effect Hypothesis Testing A (Main Effect)

The main factor hypothesis to be tested is that the learning outcomes of group students who have a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style. The statistical hypothesis is formulated as follows.

$$H_0 : \mu_{A1} \leq \mu_{A2}$$

$$H_a : \mu_{A1} > \mu_{A2}$$

The results of testing hypothesis 1, show  $F_{\text{count}} = 17,131$ . dan  $F_{(0,05)(1,64)} = 3,99$ . Because  $F_{\text{count}} > F_{\text{table}}$ , then the decision to reject  $H_0$  means that there are differences in student learning outcomes between students who have a free cognitive style and a dependent cognitive style. The learning outcomes of students who have a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style.

### Testing the Main Factor B (Main Effect) Hypothesis

The second main factor hypothesis that will be tested is the learning outcomes of group students who have a high level of satisfaction higher than the learning outcomes of students who have a low level of satisfaction. The statistical hypothesis is formulated as follows.

$$H_0 : \mu_{B1} \leq \mu_{B2}$$

$$H_a : \mu_{B1} > \mu_{B2}$$

The results of testing hypothesis 2, show  $F_{\text{count}} = 19.85$ . dan  $F_{(0,05)(1,64)} = 3,99$ . Because  $F_{\text{count}} > F_{\text{table}}$ , then the decision to reject  $H_0$  or accept  $H_a$ , means that there are differences in student learning outcomes between groups of students who have a high level of satisfaction and learning outcomes of groups of students who have a low level of satisfaction. Mathematics learning outcomes that have a high level of satisfaction are higher than the learning outcomes of groups of students who have a low level of satisfaction.

### Interaction Hypothesis Testing (Interaction Effect)

The interaction hypothesis to be tested is that there is an interaction effect between cognitive style and learning satisfaction on learning outcomes. Statistical Hypothesis is formulated as follows.

Ho : AB = 0

Ha : AB ≠ 0

The results of testing hypothesis 3, F test factor AB obtained  $F_{\text{count}} = 1.76$  and  $F_{(0,05)(1,64)} = 3,99$ . Because  $F_{\text{count}} < F_{\text{table}}$ , means that there is no interaction effect between cognitive style and satisfaction on learning outcomes.

### Simple Hypothesis Testing (Simple Effect)

The simple hypothesis to be tested is: The learning outcomes of students who have a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style, especially for students who have high learning satisfaction. Statistical Hypothesis to be tested:

Ho :  $\mu_{A1B1} \leq \mu_{A2B1}$

Ha :  $\mu_{A1B1} > \mu_{A2B1}$

Testing hypothesis 4, the average learning outcomes of students who have a free cognitive style is 81.47 and the average learning outcomes of students who have dependent cognitive styles are 73.12, especially for students who have a high level of learning satisfaction.

The results of the analysis of the different tests show that  $t_{\text{count}} = 5,62$  dan  $t$

$(0,05) = 1,697$ . Because  $t_{\text{count}} > t_{\text{table}}$ , then it was decided to reject Ho. It means that there is a difference between the mathematics learning outcomes of students who have a free cognitive style and a dependent cognitive style, especially for students who have high satisfaction.

The learning outcomes of students who have a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style, especially for students who have low satisfaction. Statistical Hypothesis is formulated as follows:

Ho :  $\mu_{A1B2} \leq \mu_{A2B2}$

Ha :  $\mu_{A1B2} > \mu_{A2B2}$

The results of testing hypothesis 5, with the average learning outcomes of students who have a dependent cognitive style 55.44 and the average learning outcomes of students who have a free cognitive style of 73.17 specifically for students who have a low level of satisfaction, then the results of the analysis of the different tests show that  $t_{\text{count}} = 3,28$  dan  $t_{(0,05)} = 4,02$ . Because  $t_{\text{count}} < t_{\text{table}}$ , then it was decided to accept Ho. It means that the learning outcomes of students who have a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style, especially for students who have a low level of learning satisfaction.

## Discussion

One of the psychological factors that affect learning outcomes is the cognitive style of students in learning. Cognitive style is a habit or way that individuals prefer consistently in receiving, processing and describing information in solving a problem (Fuady et al., 2020). One type or type of interpersonal cognitive style, social skills and receiving information is a free cognitive style and dependent cognitive style (Sengkey et al., 2021).

The results of testing hypothesis 1, the learning outcomes of students who have a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style. This finding is in accordance with the individual characteristics of independent cognitive style and dependent cognitive style. Characteristics of individuals who have a free cognitive style include impersonal orientation, prioritizing internal motivation in creativity, being selective in emotional relationships, students preferring to work alone and preferring to try new things without the help of the teacher. While the characteristics of individuals who have a dependent cognitive style, among others, tend to be socially or environmentally oriented, need guidance on how to solve problems, prioritize external motivation in creativity, are easy to make emotional connections with other parties and tend to accept opinions from outside. Based on the

characteristics of free and dependent cognitive styles and in terms of the characteristics of the implementation of online learning, namely learning that is centered on the teacher or designed for independent learning so that it demands more students to learn independently (Safarati, 2021), then individuals who have the characteristics of a free cognitive style are more successful in learning achievement than students who have a dependent cognitive style character.

Research result (Purnomo et al., 2017), concluded that the field-independent cognitive style has a level of creativity in solving mathematical problems in the geometric aspect, which is very creative and creative. While the field dependent cognitive style has a creative level of creativity, quite creative, and less creative. The difference in the characteristics of the two cognitive styles certainly causes differences in the reception of information in the learning process. This encourages teachers to always carry out different learning strategies for groups of students who have different cognitive styles. Thus, due to differences in cognitive styles and differences in learning strategies also affect learning outcomes. As with research (Suyanto & Supramono, 2012) which states that learning styles affect learning outcomes. The results of testing hypothesis 2, indicate that the learning outcomes of students who have a high level of satisfaction are higher than the learning outcomes of groups of

students who have a low level of satisfaction. This finding is in line with several studies that examine the relationship between learning satisfaction and learning outcomes that have been proven through studies such as (Basith et al., 2020). As well (Yasir et al., 2017), in his research concluded that the higher the level of student satisfaction, the higher the learning outcomes.

The results of testing hypothesis 3, it was found that there was no interaction effect between cognitive style and satisfaction on student learning outcomes. This shows that the independent variables do not simultaneously affect student learning outcomes. This situation is very relevant to the results of testing the simple hypothesis that groups of individuals who have a free cognitive style have superior learning

outcomes than individuals who have a dependent cognitive style for both high and low satisfaction students. Although researchers have not found research results that examine the influence of cognitive style and satisfaction on learning outcomes, studies on the effect of free learning styles and learning styles depend on online learning satisfaction (Ghufron, 2020), proves that free learning style has a positive influence on online learning satisfaction. The satisfaction factor is an important element to reflect students' views on the learning experience and as an evaluation material for online learning (Nurdiyanti et al., 2021). The following table 7 below explains about student satisfaction level in tangibles dimension.

**Table 7.** Student Satisfaction Level in Tangibles Dimension

Dimension	Question	SP	P	KP	TP
<i>Tangibles</i>	Availability of lecture materials (teaching materials/ handouts/ power points, modules) by lecturers in online lectures	24,7%	55%	13%	7,2%
	The appearance of the lecturer in dressing meets the standard of politenes	34,8%	50,7%	14,5%	0%
	Average Tangibles	29,75%	52,85%	13,75%	3,6%

The level of student satisfaction in the Tangibles dimension is measured through 2 statements, namely satisfaction with the availability of lecture materials provided by lecturers in the form of teaching

materials/handouts, modules, powerpoints and lecturer performances that meet the standards in online lectures. Statement 1, the level of student satisfaction in the category of very satisfied and satisfied

students is 79.7. While the level of satisfaction is classified as less satisfied and dissatisfied as much as 20.2%. The average level of very satisfactory is 29.75% satisfactory 52.85%. While the average unsatisfactory is 13.75% and unsatisfactory 3.6%.

Based on this information, it can be concluded that in general the level of student satisfaction related to the Tangibles dimension is satisfactory. This shows that the lecturer's ability to provide adequate

physical facilities and lecture equipment including the appearance of the lecturer is quite satisfactory. Research findings (Gumilar et al., 2021), related to learning facilities are well prepared, prepare is quite satisfactory. The lecturer's appearance item meets the standard, quite satisfactory. While the items for determining the time for the implementation of online lectures are quite satisfactory. The following table 8 below explains about student satisfaction level in reliability dimension.

**Table 8.** Student Satisfaction Level in Reliability Dimension

Dimension	Question	SP	P	KP	TP
<i>Reliability</i>	Delivery of lecture material is clear and easy to understand	17,4%	50,4%	23,2%	9%
	Lecturer's punctuality starts and ends lectures	18,8%	65,1%	10,1%	5,9%
	Minimum number of lecture meetings 12 times	53,6%	39,1%	7,2%	0%
	Average <i>Reliability</i>	29,9%	51,5%	13,5%	4,97%

The level of student satisfaction in the Reliability dimension is measured through 3 statements, namely (1) The delivery of lecture material in a clear and easy to understand category is categorized as satisfied and very satisfied at 67.8%, while the category is less satisfactory and dissatisfied by 32.2% (2) Timeliness lecturers starting and ending lectures were classified as satisfied and very satisfied by 73.9%, while included in the less and not satisfied category by 16.1% and (3) The number of lecture meetings at least 12 times which was classified as very satisfied and

satisfied was 83.7%, while classified as less and not satisfied by 7.2%. This explanation shows that in general the level of student satisfaction on the reliability dimension is satisfactory.

The average percentage level of very satisfactory and satisfactory satisfaction is greater than the average level of less and unsatisfactory satisfaction. In line with research findings (Redaputri et al., 2021), most (73%) students understand the lecture material and are satisfied with the online learning that has been carried out at the University of Bandar Lampung. The findings

of this study indicate that the size of the lecturer's reliability in providing services to students in online lectures is very high. The

following table 9 below explains about student satisfaction level in responsiveness dimension.

**Table 9.** Student Satisfaction Level in Responsiveness Dimension

Dimension	Question	SP	P	KP	TP
<i>Responsiveness</i>	Sufficient time provided by the lecturer for discussion and question and answer	50,4%	37,7%	2,9%	9%
	Lecturer's response or response to student questions	47,8%	40,5%	8,7%	3%
	Lecturer assistance to students who have difficulty with lecture materials	13%	60,8%	10,1%	6%
	Average Responsiveness	37,1%	49,2%	7,2%	6%

There are three statements that describe the Responsiveness dimension, namely the question of the adequacy of the time provided by the lecturer for discussion and questions and answers classified as very satisfied and satisfied as much as 90.1%, only 9% are not and are not satisfied. The lecturer's responses to student questions are classified as very satisfied and satisfied as much as 87%, only 13% of students feel less and dissatisfied. Questions about lecturer assistance to students who have difficulty with lecture materials who are classified as very satisfied and satisfied are 81.1%. While those who

are classified as not and are not satisfied are 18.9%.

Based on the description of the data, in general, student satisfaction related to Responsiveness is at a high level of satisfaction. This finding shows that the responsiveness and willingness of lecturers to help and serve students is in accordance with their needs. This finding is in line with the research results (Chilton et al., 2010), that student satisfaction with the role of lecturers in helping students during online lectures is high (63.6%). The following Table 10 below explains about the level of student satisfaction in the assurance dimension.

**Table 10.** The Level of Student Satisfaction In The Assurance Dimension

Dimension	Question	SP	P	KP	TP
	Lecturers deliver lectures using a student-centered approach	30,9%	40,2%	22,8%	6%

Dimension	Question	SP	P	KP	TP
Assurance	Feedback is given by the lecturer on every lecture assignment done by students	5,8%	38%	45,6%	10,3%
	The ability of lecturers to use online media	15,9%	60,9%	20,3%	4,3%
	Average Assurance	17,5%	46,4%	29,57%	6,87%

Questions to obtain information on the level of student satisfaction on the Assurance dimension were measured through 3 questions, namely questions related to the approach used by lecturers when delivering lectures, namely a student-centered approach as much as 70.9% felt very satisfied and satisfied. 33.4% of students feel less and dissatisfied. Feedback questions made by lecturers on each student's assignment 42.1% felt satisfied and very satisfied, 57.9% felt less and dissatisfied. The ability of lecturers in using online media is 80.4% of students are satisfied and very satisfied, 24.6% feel less and dissatisfied. Of the three questions, the lowest level of student satisfaction is on item 2. This shows that the lecturer does not

always provide feedback to student assignments given to students so that the level of student satisfaction on this dimension is relatively low.

Lecturers should provide intense feedback on the completion of student assignments so that they know the strengths, weaknesses or mistakes of their work. according to (R et al., 2021), Feedback is a central concept in learning and includes providing learners with information about their responses. The Assurance dimension is a guarantee of lecturer behavior on obligations and responsibilities in instilling trust and confidence as well as politeness to students. The following Table 11 below explains about the level of student satisfaction in the empathy dimension.

**Table 11.** The level of student satisfaction in the Empathy dimension

Dimension	Question	SP	P	KP	TP
Empathy	Lecturers are easy to contact either via whatsapp, telephone, e-mail, or others	20%	61,4%	10,6%	9%
	Lecturers try to help understand the interests and needs of students	43,5%	50%	4,3%	2,2%
	Lecturers are open and cooperative with students	27,5%	50,9%	14,5%	7,1%
	Average Empathy	33,3%	54,1%	12,1%	6,3%

The empathy dimension relates to the actions of the lecturer towards the interests of students as well as giving personal attention and being open so as to create a sense of comfort in establishing communication for students. To measure student satisfaction on the Empathy dimension, 3 questions were asked, namely the ease of contacting the lecturer either via whatsapp, telephone, email, or others. As many as 81.4% of students feel satisfied and very satisfied, 19.6% of students feel less and dissatisfied. Questions about the lecturer's efforts to understand the interests and needs of 93.5% students were satisfied and very satisfied, 6.5% students felt less and dissatisfied. Meanwhile, questions regarding the attitude of openness and cooperative attitude of lecturers towards students were 78.4% of students were satisfied and very satisfied, 22.6% of students felt less and dissatisfied. In general, student satisfaction on the Empathy dimension is high. Increasing service quality results in increased student satisfaction with service quality (Subandi & Hamid, 2021). In addition, increasing satisfaction through good service quality will have an impact on student loyalty (Mulyono, 2016).

## **CLOSING**

### **Conclusion**

From the results of research and discussion it can be concluded that: 1)

Learning satisfaction on the dimensions of tangible, reliability, responsiveness, assurance, and empathy is quite satisfactory. The average percentage level of satisfaction is very satisfactory and satisfactory is greater than the average percentage level of satisfaction is unsatisfactory and unsatisfactory for all dimensions of tangible, reliability, responsiveness, assurance, and empathy; 2) Conclusion of the test results: a) The learning outcomes of students who have a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style; b) Mathematics learning outcomes of students who have a high level of satisfaction are higher than the learning outcomes of groups of students who have a low level of satisfaction; c) Cognitive style factors and satisfaction factors do not affect jointly on student learning outcomes; d) Students who have a high level of learning satisfaction, learning outcomes with a free cognitive style are higher than student learning outcomes with dependent cognitive styles; e) Students who have a low level of learning satisfaction, learning outcomes with a free cognitive style are higher than the learning outcomes of students who have a dependent cognitive style. So both students who have a high level of satisfaction and a low level of satisfaction, the learning outcomes of students who have a free cognitive style are higher than the learning



outcomes of students with a dependent cognitive style.

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