Flops Laboratory Practice Facility towards Cadet's Flight Plan Navigation Course Performance

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ABSTRACT

One of the laboratories to support learning activities in the Air Transportation Management Study program at the Surabaya Aviation Polytechnic is the Flops Laboratory. The use of laboratories that are less than optimal due to the incompleteness of the available practical facilities can affect the academic abilities of cadets. This study has the objectives of (1) the current condition of the Flops Laboratory practice facilities (2) The value of the academic ability of Air Transportation Management cadets in the Aviation Navigation Planning Course to know (3) to determine the effect of flops laboratory practice facilities on the academic abilities of cadets in planning courses flight navigation reviewed from the results of the final exam assessment. This research is quantitative. The population in this study were cadets of Air Transportation Management batches VI and VII with observation data collection methods, questionnaires and documentation and interviews. The results of this study is (1) The condition of the Flops Laboratory practice facilities was still not in accordance with the Flops Laboratory standards and the actual Flops room (2) The value of academic ability for Cadets in the Flight Navigation Planning course has a sufficient category of 90% in the range 70 - 79 (3) The result of T test it has a significant value of 0.000 <0.005 which means there is an influence from the Flops Laboratory practice facility on Cadets Academic Ability Flight Navigation Planning Course. Based on the results of the simple regression test, a result of 0.622 or equal to 62.2% was obtained.

Keywords: FLOPS *Laboratory*, *Academic Ability,Air Transportasion Management*

1. INTRODUCTION

Surabaya Aviation Polytechnic is a State University which is directly under the Ministry of Transportation of the Republic of Indonesia. One of the laboratories to support learning activities in the Air Transportation Management Study program at the Surabaya Aviation Polytechnic is the Flops. The Flops labroratory is a laboratory that is used as a practicum room for several materials related to equipment and Flight Operation Officer (FOO) responsibilities. According to PM 1 tahun 2014 a Flight Operations Officer has important duties in the world of aviation, including reviewing and preparing plans for aircraft operations, releasing and monitoring aircraft until they are able to handle emergencies and include all forms of activities that have been carried out in the form of reports that are standard operating procedures. [1] The Flop Laboratory is a simulated laboratory similar to the real FOO room simulated which is used fo training, testing and developing flight operation systems. In this laboratory, tests and simulations are usually carried out to ensure the safety and efficiency of flight operations. [2]

Some of the material related to FOO's duties includes Flight Plan, Weight and Balance, Dispatch Resource Management, and so on. As a form of effort to achieve effective learning outcomes for cadets, the learning process is supported by Flops laboratory facilities, where cadets can practice making plans or other matters related to their duties and responsibilities as FOO officers.

One component of education that must exist in education is facilities and infrastructure. Educational facilities include all tools and equipment that directly support the educational process while educational infrastructure includes all tools and equipment that indirectly support the educational process [3] [4] [5] [6] [7] Therefore, the practice facilities in the Flops laboratory must continue to be considered so that they can support students' academic abilities through learning outcomes. Practical facilities are one of the factors that support the increase in interest and understanding of cadets which can be shown in student learning outcomes. Facilities, namely everything that can be used as a tool/media in achieving goals or objectives. Practical facilities are everything that is directly related to the

practical teaching and learning process such as facilities, room, furniture, practical equipment (measuring instruments and hand tools), practical materials, media to achieve learning objectives. [8] [9] [10] [11] [12] [13] aim to facilitate the delivery of practical material, in the sense of all kinds of equipment used by Lecturers and Cadets to facilitate the delivery and receiving of learning material. With adequate practice facilities, it is hoped that students can obtain optimal learning achievements. [14] [15] [16] [17] [18] Indicators according to [19] in the Journal of Education, Laboratory practice facilities in general are as follows:

1. Complete practice facilities
2. The suitability of practice facilities with the material being practiced
3. The feasibility of practice facilities to be used
4. Capacity and quantity of practice facilities adjusted to the number of students

Based on the researchers' observations, the condition of the practice facilities at the Flops laboratory was inadequate because there were several practice facilities that were incomplete with the suitability of the material being taught and there were several practice facilities that were not well maintained. This resulted in the use of laboratory flops less than optimal and rarely used. Lecturers tend to teach more material in class than in the Flops Laboratory.

One of the subject practiced in the Flops Laboratory is the Aviation Navigation Planning course. The Aviation Navigation Planning course is one of the materials for the 4th semester of air transportation management study program which consists of 2 credits, namely 1 theoretical credit and 1 practical credit. This course discusses the basic principles of navigation and flight guidance, navigation aids, flight maps, navigation systems and on-board displays, as well as flight planning. Knowledge of Flight Planning is needed by Cadets when carrying out the second On The Job Training in the Air Transportation Management study program, especially for On The Job Training activities as Flight Dispatchers, Load Control and Ramp Dispatchers.

Based on information from the subject lecturer, in learning flight navigation planning (flight plan) there is not only theoretical material but also practical material. [20] [21] [22] [23] [24] However, lecturers rarely practice in the laboratory due to the lack of available practice facilities. Laboratory use that is not optimal can affect the academic abilities of cadets. This can be proven by the lack of skills to understand any practical materials given to cadets which are shown in the cadets' learning outcomes. In various sources it is stated that the use of laboratories in the learning process has shown a significant contribution to motivation and learning outcomes [25]. It can be seen that the learning outcomes of cadets in the Aviation Navigation Planning course still get scores in the range between 70.99 - 79.99 which are included in the sufficient category.

According to previous research [26] [27] [28] . laboratory activities can build their own knowledge of facts, concepts, and theories contained in learning materials, as well as enrich experiences so that they will last longer in students' memories.

Based on the background that has been described, the authors limit the research by focusing on the formulation of the problem as follows:

1. What is the current condition of the Flops Laboratory practice facilities?
2. How is the Academic Abilities of Cadets of Air Transportation Management study program in the Aviation Navigation Planning Course?
3. How does the Flops Laboratory practice facility affect the academic abilities of cadets in flight navigation planning courses?

2. METHODS

This research uses quantitative methods. A quantitative research approach is used to examine certain populations or samples by collecting data using instruments, data analysis is statistical and aims to test the hypotheses that have been formulated previously. [29]

2.1 Reseacrh Variable

Variables are objects in any form that are found by researchers with the aim of obtaining information so that a conclusion can be drawn [30]. In this study consists of two types of variables, namely:

a. Independent variables are variables that affect or cause changes or the emergence of dependent variables. In this study the independent variable was the Flops Laboratory Practice Facility.
b. The dependent variable is a variable that is affected or becomes a result because of the independent variable. The dependent variable in this study is the Academic Ability of Cadets in the Aviation Navigation Planning Course.

2.2 Population, Sample and Research Object

The population of this study was 113 people consisting of cadets from the 6th and 7th batches of the Air Transportation Management study program. In this study the determination of the sample using the Slovin formula. The slovin formula is used to determine the sample size of a known population, namely 113 cadets.

Slovene Formula : [30]

$$n = N / (1 + Ne^2) \quad (1)$$

$$n = (113) / (1 + (113 \times (0,1)^2)$$

$$n = (113) / (1 + (113 \times (0.01))$$

$$n = 48.130$$

$n \approx 48$

For sampling, the authors used the non-probably random sampling method with a purposive sampling technique, namely selecting samples from MTU VI cadets on the grounds that MTU VI cadets had already taken the Final Practicum Examination for the Aviation Navigation Planning course, which would later be worth is used as research data for the academic ability variable of cadets (Y). In this study, the object of research was the practice facility of the Flops Laboratory.

2.3 Data Collection Techniques and Instruments

Data collection techniques in this study used observation, documentation, questionnaires and interviews. Observations are used to strengthen data regarding the conditions of the Flops Laboratory. Documentation is used to obtain data on the academic ability scores of cadets in flight navigation planning courses and questionnaires are used to measure and obtain data about the practice facilities of the Flops Laboratory at the Surabaya Aviation Polytechnic. Interviews are used as supporting data to strengthen theory about laboratory flops according to the subject's supervisor.

The instrument used in this study was a questionnaire for the practice facilities of the Surabaya Aviation Polytechnic Laboratory of Flops along with alternative answer criteria in the form of a rating scale.

2.4 Data Analysis Techniques

Data analysis techniques in this study used descriptive data analysis. The data obtained was then analyzed descriptively, by describing the answers of the respondents involved in this study regarding the academic abilities of cadets (Y) and the practical use of laboratory facilities (X). To process the data from the questionnaire results using the help of SPSS the author uses data analysis techniquesvalidity test, reliability test, normality test, and hypothesis test

3. RESULT AND DICUSSION

Research results in this study were obtained from the processing of primary data and secondary data. Primary data were obtained from direct observation of the Flops Laboratory conditions and questionnaires which were distributed to 48 respondents. Meanwhile, secondary data or data supporting sources were obtained from the results of interviews with the lecturers of the course as well as documentation of final exam scores for cadets in the Aviation Navigation Planning course.

3.1 Result

3.1.1 Observation

In this observational study, the authors made direct observations regarding the conditions of the Flops Laboratory. The things that will be observed include the place/room, furniture, equipment and educational media. However, after making direct observations, it was found that there was a discrepancy between the inventory data and the currently available facilities and infrastructure for the Flops Laboratory practice. As for the recapitulation of the results of observations that have been carried out by researchers, as follows:

Table 1 Recapitulation of Observational Data

No.	Item Name	Information
1	Briefing table	There is
2	Minimum 2 computers that are connected to the sky brief application and the BMKG website	Yes, 2 are damaged and 1 is not connected to the sky brief application and the BMKG website
3	Minimum 2 printing machines	There isn't
4	LCD monitors/TVs	There isn't
5	HT	There is
6	Communication Radio	There is, broken
7	Route Charts	There is
8	AIP document	There isn't
9	FPPM	There isn't
10	4 wall clocks	There isn't
11	Flight Simulator	There isn't

3.1.2 Documentation

The documentation method is used by the author to obtain variable data on Cadets Academic Ability (Variable Y) in terms of the Final Examination Assessment on the practicum scores for the Cadets Flight Navigation Planning Course MTU VI A and MTU VI B for the 2021/2022 academic year. Based on the results of statistical data calculations for the Final Practicum Examination for Cadets in the Flight Navigation Planning Course, as presented in the following table:

Table 2 Statistical Data on Academic Ability Scores

Statistical Data	Value
Mean	74,27
Median	75
Mode	75
Standard Deviation	2,9154
Maximum Value	80
Minimum Value	70

From a single data on the value of academic ability of cadets in the Naval Planning course, a frequency distribution table can be made as follows.

Table 3 Frequency Distribution of Academic Ability Scores

Academic Ability				
	Frequency	%	Valid Percent	Cumulative Percent
70	12	25,0	25,0	25,0
75	31	64,6	64,6	89,6
80	5	10,4	10,4	100,0
Total	48	100,0	100,0	

3.1.3 Questionnaire

The questionnaire was distributed to 48 respondents, namely Cadets MTU VI A and MTU VI B. The questionnaire contained 20 positive and negative questions related to Cadets' perceptions of Flops Laboratory Practice Facility in 4 indicators including completeness of practice facilities, suitability of practice facilities, feasibility of practice facilities and practice facility capacity . To find out the percentage of the results of the questionnaire score per item the author uses the percentage index formula calculated by: Index % formula = Total Score / X x 100% [30]

Tabel 4 Recapitulation of Questionnaire Results

Aspek	Total Responden				Total	Indeks
Variabel	SS	S	TS	STS	Score	Presentase
X.1	0	14	27	7	103	53%
X.2	17	25	6	0	155	81%
X.3	5	24	19	0	110	57%
X.4	6	25	17	0	133	69%
X.5	0	8	25	15	151	78%
X.6	0	8	17	23	159	82%
X.7	7	22	19	0	132	68%
X.8	17	25	6	0	155	80%
X.9	0	5	24	19	158	82%
X.10	20	15	13	0	151	79%
X.11	19	16	13	0	150	78%
X.12	6	27	15	0	105	54%
X.13	0	20	22	6	110	57%
X.14	0	23	17	8	111	58%
X.15	6	24	18	0	108	56%
X.16	0	19	23	6	109	57%
X.17	3	25	20	0	113	59%
X.18	20	22	5	0	156	81%
X.19	0	17	23	8	105	54%
X.20	0	6	22	20	152	79%

Based on data from the results of the research questionnaire processed with the help of IBM SPSS 29.0, the highest score for the practice facility variable was 72, the lowest was 33 so that a range value of 39 was obtained, and an average score (mean) of 57.02. From the questionnaire value data distributed to 48 respondents, it can be distributed in the frequency distribution table below.

Table 5 Frequency Distribution of Practice Facility Score Results

Frequency respondents	%	Valid %	Cumulative Percent	Frequency respondents
33-37	3	6,3	6,3	6,3
44-49	1	2,1	2,1	8,3
50-55	16	33,3	33,3	41,7
56-61	13	27,1	27,1	68,8
62-67	11	22,9	22,9	91,7
68-73	4	8,3	8,3	100,0

3.1.4 Interview

The interview was conducted openly and unstructured directly to Mr. Sulendro as the lecturer in the flight navigation planning course based on the attached interview guidelines.

From the results of the interview conducted by the author, it can be concluded that according to the lecturer who potified the course, the condition of the Flops Laboratory is still not adequate because of the lack of practical facilities that can support and facilitate cadets in understanding the material, especially in the Flight Navigation Planning course.

He also said that the incomplete practice facilities of the Flops Laboratory would have an impact on the level of understanding of cadets. The existence of complete and supportive practical facilities that are in accordance with the material will help in understanding the material taught. Cadets will also tend to have boredom if the delivery of material is only through theory. With the completeness of the available practical facilities, it can also be used as introductory material so that cadets are not surprised when cadets do on-the-job training in the field or work time. So it is necessary to manage, repair damaged equipment and procure Flops laboratory practice facilities in order to support the academic abilities of cadets such as the use of several computers connected to the Sky Brief or Sky Vector application used to make Flight Plan operations and connected to the Aviation Meteorological site from BMKG to monitor and facilitate cadets to learn wheater, flight simulators equipped with navigation system control, Communication systems, aircraft controls and other systems relevant to flight operations, the simulator can be programmed so that we can select scenarios and handle the desired flight situation, monitors that can display flight visualizations, communication tools such as handy talkies, radio communication and cell phones, complete flight documents that are appropriate to the material and add a printer machine.

3.1.3.1 Validity Test

The validity test aims to determine the validity of the questionnaire used by researchers in measuring and obtaining research data from respondents. Data is declared valid if the calculated R value is greater than R table (R calculated > R table) or the significance value is

less than 0.05 (Sig value <0.05) [31]. Based on the results of these calculations it shows that r count > r table, namely N = 48 where for the value of r table is the value of df = n-2 with a significance level (sig) of 5% is 0.2845, thus the instrument used in this study is valid and can be used in data collection .

Table 6 Validity Test

No Item	Rhitung	rtabel (5%) N=48	Keterangan
1	0,640	0,2845	Valid
2	0,675	0,2845	Valid
3	0,599	0,2845	Valid
4	0,471	0,2845	Valid
5	0,772	0,2845	Valid
6	0,719	0,2845	Valid
7	0,550	0,2845	Valid
8	0,675	0,2845	Valid
9	0,559	0,2845	Valid
10	0,355	0,2845	Valid
11	0,518	0,2845	Valid
12	0,444	0,2845	Valid
13	0,687	0,2845	Valid
14	0,719	0,2845	Valid
15	0,513	0,2845	Valid
16	0,437	0,2845	Valid
17	0,495	0,2845	Valid
18	0,687	0,2845	Valid
19	0,719	0,2845	Valid
20	0,398	0,2845	Valid

3.1.3.2 Realibility Test

The reliability test aims to determine the consistency level of the questionnaire. Data is asked to be reliable if the Cronbach's Alpha value is > 0.70. [31]

Table 7 Realibility Test

Variabel	Cronbach's Alpha	Keterangan
Sarana Praktik Laboratorium Flops (X)	0, 897	Reliabel

Based on the results it can be concluded that all statements or instruments in the variable X questionnaire are declared reliable with very high interpretations.

3.1.3.3 Normality Test

The normality test aims to find out whether the analyzed data is normally distributed or not. The normality test in this study used the Kolmogrov-Smirnov method. The results of the data normality test conducted with the help of the SPSS software program version 29.0 with a significance level of 5% or 0.05. If the data with a significance value of p > 0.05, it means that the data is normally distributed [31]. The significant value on the Kolmogorov Smirnov test obtained is 0.075 and is greater than 0.05. So it can be stated that the residual value of Distributed normal can be seen in table 5.5

Table 8 Normality Test

One-Sample Kolmogorov-Smirnov Test			
			Unstandardized Residual
N			48
Normal Parameters[a,b]	Mean		,0000000
	Std. Deviation		1,79132571
Most Extreme Differences	Absolute		,121
	Positive		,089
	Negative		-,121
Test Statistic			,121
Asymp. Sig. (2-tailed)[c]			,075
Monte Carlo Sig. (2-tailed)[d]	Sig.		,073
	99% Confidence Interval	Lower Bound	,067
		Upper Bound	,080
a. Test distribution is Normal.			
b. Calculated from data.			
c. Lilliefors Significance Correction.			
d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.			

3.1.4 Hypothesis Test

3.1.4.1 Simple Linear Regression Test and T Test

Table 9 Simple Linear Regression and T Test

Coefficients[a]					
Model	*Unstandardized Coefficients*		*Standardized Coefficients*		
	B	*Std. Error*	*Beta*	*t*	*Itself.*
(Constant)	57,987	1,888		30,713	<,001
Lab Flops Practice Facilities	,286	,033	,789	8,709	<,001

Based on the results of a simple linear regression test in the table above, the regression equation is as follows: Y = a + bX [31] (1)

$$Y = 57.987 + 0.286X \quad (2)$$

The conclusion of the simple linear regression equation above is:

1. The value of the constant (α) indicates 57.987. This means that if the variable Laboratory Practice Facility Flops (X) is 0, then the Academic ability (Y) is 57.987 units.
2. The regression coefficient value of variable X, which is 0.286, means that every increase in the Practice Facility (X) variable by one unit, it will have an effect on increasing the value of cadets' academic ability in the Flight Planning (Y) course by 28.6%. The Regression Coefficient is positive so that it can be said that the direction of the influence of the variable Flops Laboratory Practice Facility on the Academic Ability of Cadets / I Flight Navigation planning course is positive, the more the Flops Laboratory practice means, the higher the value of the Cadet academic ability.

The T test is used to test how far the influence of the independent variables used in this study individually in

explaining the partially bound variables. From table 4.9 shows the calculated T value greater than 1.67722 (table T) which is 8.709 and the signficance value is 0.001 which means less than 0.05. It shows that the value of X has a significant influence on Y.

3.1.4.2 Coefficient of Determination Test

Table 10 Test Coefficient of Determination

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,789[a]	,622	,614	1,811
a. Predictors: (Constant), Lab Flops Practice Facility				
b. Dependent Variable: Academic Ability Value				

The coefficient of determination is carried out to determine the magnitude of the influence of variable X on Y. If the R Square value is close to 1, it means that the influence is even greater. Based on the output above, it is known from table 3.7 that the value of the relationship (R) is 0.789 and the coefficient of certainty (R2) is 0.622, which can be distinguished that the influence of the free factor (means of practice) on the dependent variable (academic ability) is 62.2%, while the remaining 37.8% is influenced by different elements outside the X variable.

3.2 Discussion

3.2.1 Flops Laboratory Practice Facilities (X)

Based on data from research questionnaires processed with the help of IBM SPSS 29.0.1, the highest score of the variable value of practical facilities was 72, the lowest was 33 so that a range value of 39 was obtained, and the average score (mean) was 57.02. The following is a histogram of frequency distribution of Flops laboratory practice facility value data scores based on respondents' answers.

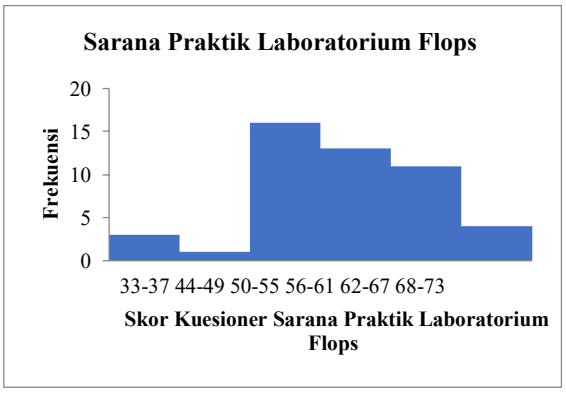

Figure 1 Histogram of Practice Facilities quiesionarre score

In line with the results of direct observations at the Flops Laboratory and interviews with the Lecturer of the Flight Navigation Planning course conducted by the author, it can be concluded that the Flops Laboratory in the Air Transportation Management study program is in accordance with the actual Flops room in the Flight Operation Officer field, but the problem found is that the condition of the Flops Laboratory is still not adequate due to the lack of practical facilities that can be support and facilitate cadets in understanding the material, especially in the Flight Navigation Planning course. The condition of the Flops Laboratory is also still not in accordance with the minimum standards of the Flops Laboratory.

3.2.2 Academic Ability of Cadets (Y)

Based on the results of the study, it shows that the academic ability scores of cadets of air transportation management batches VI A and VI B in terms of the assessment results of the Cadet Final Examination on the practicum score of the Flight Navigation Planning Course have an average cadet final exam score of 74.27, a median of 75, mode 75, a maximum score of cadets of 80, and a minimum score of cadets of 70. The highest frequency of academic ability scores is at 75 as many as 31 respondents (65%), then with a value of 70 as many as 12 respondents (25%), and a value of 80 as many as 5 respondents (10%) which can be illustrated in the histogram in the figure below.

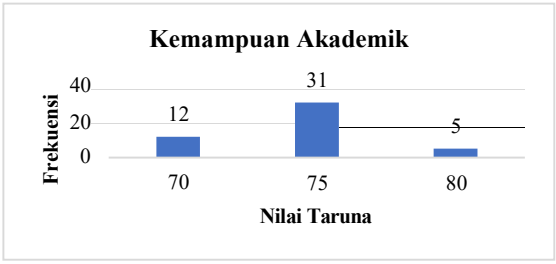

Figure 2 Academic Ability Value Diagram

From the histogram data above, it can be concluded based on the assessment criteria in table 3.3 the academic ability score of cadets in the Flight Navigation Planning course is included in the sufficient category of 90% and is included in the good category of 10%.

Figure 3 Cadet Value Presentation Diagram

In line with the results of an interview with Mr. Sulendro as a lecturer in the Flight Navigation Planning course. He said that the academic ability value of MTU cadets batch 6 is still not proven by many cadets, sometimes they still look confused in doing the practice of making flight plan operations and reading the weather.

3.1.5 The effect of Flops Laboratory practice facilities on the academic ability of cadets in the Flight Navigation Planning course

Based on the results of a questionnaire with 20 statements using the Likert scale. The results of the questionnaire were calculated using SPSS 29.0 software. In accordance with the calculations that have been done, it is known that there is a significant influence of Flops Laboratory practice facilities on the academic ability of cadets in the Flight Navigation Planning course. This can be proven by the calculated value of t > t table (8.709> 1.67722) with a significant level of 5% so that Ha is accepted and Ho is rejected.

The magnitude of the influence of Flops Laboratory practice facilities on the Academic Ability of Cadets in the Flight Navigation Planning course is evidenced by the results of the analysis of the Rsquare value or coefficient of determination of 0.622. This means that the influence of variable X (Flops Laboratory Practice Facility) simultaneously on variable Y (Academic Ability of Flight Navigation Planning Course) is 62.2%. While the rest is influenced by other factors that are not yet known. Based on the positive value of the regression coefficient, it can be said that the direction of the influence of the variable Laboratory Practice Facility Flops on the Academic Ability of Cadets in the Flight Navigation Planning course is positive, which means that the more the means of Laboratory Flops practice, the higher the value of the Cadet academic ability.

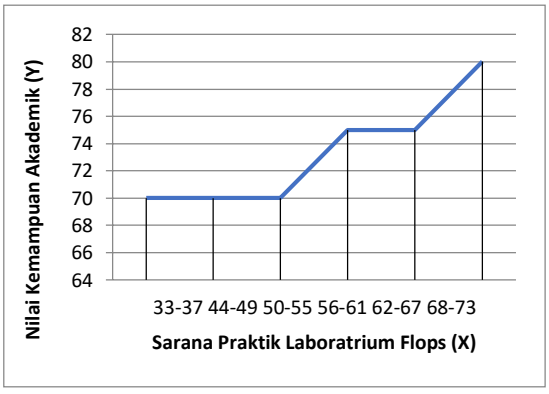

Figure 4 The Effect Curve of X and Y Variables

In line with the results of an interview with Mr. Sulendro as a lecturer in the Flight Navigation Planning course, he also said that the practice facilities of the Flops Laboratory had an impact on the level of understanding of cadets. The existence of complete and supportive practical facilities that are in accordance with the material will help in understanding the material taught. Cadets will also tend to have boredom if the delivery of material is only through theory. With the completeness of the available practical facilities, it can also be used as introductory material so that cadets are not surprised when cadets do on-the-jobtraining in the field or work time. Judging from the results of relevant research, there is a conformity in the similarities of research results conducted by Fikria (2011) that there is a positive and significant influence between learning facilities on learning outcomes which concludes that practice facilities determine the high and low learning outcomes that will be achieved by students.

CONCLUSION

Based on the results of the above research can be concluded as follows:

1. Based on the results of research, the Surabaya Aviation Polytechnic Flops Laboratory still does not have adequate practical facilities to support learning in the Flight Navigation Planning course and still does not meet the minimum facilities of the Flops Laboratory which refers to the actual Flops room in the workplace.
2. The average score of Academic Ability of Air Transportation Management Cadets VI A and VI B is 74.27, the minimum score is 70, the maximum value is 80 and has a range value of 70-75 in the sufficient category of 85%.
3. There is a significant influence between the Flops Laboratory Practice Facility on the Academic Ability score of cadets in the Flight Navigation Planning course of 62.2%. which is proven by the value of t calculated > t table (8.709 > 1.67722) with a significant level of 5% so that Ha is accepted and Ho is rejected. Based on the results of the regregesion coefficient obtained does not produce a negative score, the influence is positive, which means that the higher the value of variable X, the more it will increase variable Y.

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