International Journal of Educational Technology and Learning
ISSN: 2523-0581
Vol. 4, No. 1, pp. 13-24, 2018
DOI: 10.20448/2003.41.13.24

The Influence of Learning Models and Personality on Learning Outcomes of Programming Algorithm Course in the Students' Majoring in Information System at Stikom Ambon College

Nurdin Ibrahim[1]
Zulfiati Syahrial [2]
Lukman Saleh[3]

[1,2,3]Universitas Negeri Jakarta, Jl. Rawamangun Muka, Indonesia.
[3]*Email: lukmansaleh.unj@gmail.com*

Abstract

The lack of achievement in learning result of algorithm programming course is still a problem which has not been solved yet. This is because of various factors like the chosen of learning models and the mental personality of the students. To be better understand this phenomenon, first, the instructors have to be able to identify mental factor behind and consider to use the right model to tackle this problem. This research is about the implementation of learning model using laboratory after first identified students' personality types. The aim of this research is to know the influence of the learning model using the aid of laboratory compared with direct learning model conventional way. Furthermore, we would like to learn if there is a specific personality type such as introvert and extrovert that will absorb the learning process much faster than the other. This research was conducted in the even semester at Stikom Ambon College Ambon Maluku in the academic year 2016. The research design is treatment by block design (2x2), and the sample is 60 students. The data was gain from the result of learning which had been tried out for validity and reliability. The result of the data analysis indicates: (1)The learning model that use laboratory as a teaching aid gives better learning outcomes than direct learning in class only; (2) The finding suggests that there is no significant difference in the learning result for those with different personality types; (3) There is interaction between the learning model and personality types; (4) The finding suggests for those who have an extrovert personality had better learning result when taught with laboratory aid learning model instead of those with introvert personality; (5) The finding also suggests for those who have introvert personality had better learning result when taught with direct conventional learning model instead of those with extrovert personality; (6) the result of those with introvert personality is better if taught using direct conventional the learning model instead of using laboratory aid model; (7) finally the result of those with the extrovert personality is better if taught using an laboratory aid model instead of using direct conventional model.

Keywords:
Learning models
Personality
Algorithm programming.

Publisher:
Scientific Publishing Institute

1. Introduction

Advances in the field of computer technology trigger the development of language used in computer systems that are often called programming languages. A current programming language is a simple form of machine language that is modified in syntax, so it can be more easily understood by humans. While high-level

programming language is shown on computer systems that have simplified commands provided programmers through the compiler or interpreter (Primary, 2014).

A key element that is one of the most important things in designing a software is the determination of the most appropriate data structure. The determination of how information is stored is defined by data structures that have a significant effect on the overall cohesiveness, clarity, and efficiency of the program. For example, Language C provides instructions, arrays, and structs as a very powerful basic facility on high-level data structures that can be created. (However, this data structure is not specific to C, and can be implemented similarly in other programming languages) (Bailey, 2005).

Including those who wrestle with the programming, the world must know the algorithm so that the process of programming more effective and efficient. Because in the algorithm there is the concept of programming logic. Through the algorithm, can be created an accumulation of clear instructions to show the problem-solving steps. Proverbial, Algorithm more or less the same procedure that is done every day, such as cell phone battery procedure, indomie cooking procedures, cooking procedures and others. The resulting products are mastery of programming algorithms eg EDP (Electronic Data Processing) or IMS (Information Management System), which is used to solve service problems to stakeholders or for decision-making processes within the organization.

The presentation of the algorithm is broadly divided into 2 forms of writing and drawing. The algorithm presented in writing is with a particular language structure (eg Indonesian or English) and pseudocode. Pseudocode is a code similar to the actual programming code such as Pascal, or C, so it is more appropriately used to describe the algorithm that will be communicated to the programmer. While the algorithm is presented with images, for example with a flowchart. In general, pseudocode expresses ideas informally in the process of developing algorithms. One way to generate pseudocode is by stretching the rules of the formal language by which the final version of the algorithm will be expressed. This approach is generally used when the programming language to be used has been known from the beginning.

With the understanding that programming algorithm is one of the content that must be mastered by IT workers or students who will become workers in the IT sector, it is important for institutions of higher education such as computer program Information Systems Studies special attention to the programming algorithm course. In some colleges this course is taught by lecturers who have a reputation of experience in program design, some require that their caregiver lecturer must have a professional certification such as CISSP (Certified Information Systems Security Professional). This certification is one of the top-earning certifications in the field of security. Because CISSP validates competencies in areas such as architecture security, cryptography, telecommunications security, application development security and more. In addition, there are CCSA (Check Point Certified Security Administrator), VMware Certified Professional, CompTIA A + (Gustafson & Branch, 2015). At the Indonesia level, certification of expertise for IT includes LSP-Telematics and LSP-ICT. The terms as described above are nothing but to ensure that the learning process of the Programming Algorithm should really produce the expected competencies as an IT worker.

In the Study Program Strata 1 Information Systems High School Computer Science in Ambon, the requirements for lecturers sycophants courses Programming Algorithm, among others, a minimum of experience as a programmer for 2 years, as evidenced by the design of the program results of its work. This requirement does not apply to those who have national and international expertise certification. Until now in Prodi Information System STIKOM Ambon has 9 lecturers certified nationally and internationally to 9 lecturers have obliged legend course Algorithm Programming. Every once a year, Prodi Information Systems STIKOM Ambon bring experts and experts from Google and Yahoo provide guest lectures as the implementation of cooperation between STIKOM Ambon with Google and Yahoo.

In addition, the Study Program provides a representative means of learning such as related references. Based on the notes, the books relevant to the programming algorithm in STIKOM Ambon Information Systems Program there are 103 Titles and 563 Exemplar, there are 6 open access journals that are subscribed by the library for Students to access this reference quickly. In addition to reference, Prodi Information Systems STIKOM Ambon also provides a complete Information Systems laboratory with the number of computer units of 120 units and there is 900 applications program. All requirements and facilities as described above are expected to facilitate the achievement of IT worker competence for the graduates of STIKOM Ambon, and more specifically the micron indicators appear on the mastery of the programming algorithm course.

In fact, the results of student learning in the programming Algorithm course is still low. This can be seen from the results of the lecturer's assessment of the learning outcomes of this course. Based on the results of a deep study of the phenomenon it can be identified the causes of low student learning outcomes in the course of Programming Algorithm. First, less learning result is caused by the low quality of input. In this case, prospective Students are recruited into many students who have low knowledge of Mathematics. Because the absolute requirement to understand this course is mastering Mathematics, so at the time of receiving the course, Algorithm becomes less have entry behavior. Second, Attitudes towards the programming algorithm course that tends to be negative. Because this subject presents a lot of numeric similar to mathematics, the tendency of students to respond to it becomes negative. Especially this happens to the Students who since the

period of study at the level of previous education less interested in mathematical logic. Third, the lesson learned strategy applied by lecturers. With the actual laboratory provided Lecturers can utilize this facility for learning Algorithm course, but because of lack of understanding in instructional management then Lecturer tend to choose a class as a place of presentation of the lecture. In more concise language that Lecturers tend to choose direct learning in the classroom rather than indirect learning conducted in the Information Systems Laboratory. Fourth. Lecturers lack an understanding of personality types of students such as Introvert and extrovert. Personality is also very influential on the achievement of maximum learning results. Therefore, the introduction of an Students belonging to the Introvert and Extrovert groups is more appropriately treated in the classroom or in the laboratory. Based on the background of the above thinking, it can be argued that research with the topic "The Influence of Learning Models and Personality on Learning Outcomes of Programming Algorithm Course in the Student Majoring in Information System at Stikom Ambon College" is very important to do.

The background exposure can be formulated research problems as follows: (1) Is there any difference in learning outcomes of Student Programming Algorithm learned through the learning model based on laboratory compared with Direct learning model?. (2) Is there any difference in learning outcomes of Student Programming Algorithm that have Introvert personality type compared to extrovert personality type?. (3) Is there any influence of interaction between the learning model compared with personality type of Student toward programming learning algorithm?. (4) Is there a difference in learning outcomes of Student Programming Algorithm that are taught by Laboratory-based learning model that has an Introvert personality type and who has an extrovert personality type?. (5) Is there a difference in the results of Student Algorithm Student Algorithm learning which is taught by Direct learning between who have an Introvert personality type compared with extrovert personality type?. (6) Is there a difference in learning outcomes of Student Programming Algorithm that have an Introvert personality type between the learning by using the laboratory-based learning model and which is taught using Direct learning model?. (7) Is there a difference in the learning outcomes of Student Programming Algorithm that have extroverted personality type between the learning by using laboratory-based learning model and that is learned using Direct learning model?.

2. Literature Review

2.1. Learning Outcomes

Gagne and Briggs (1988) suggest that learning outcomes are a measurable capacity of the desired individual changes based on their innate characteristics or variables through specific teaching treatment. Meanwhile, according to OECD (2010) learning outcomes are "knowledge, skills, and competencies that a person has gained as a result of learning, and can be demonstrated where appropriate". Purwanto (2013) said that learning outcomes that reflect behavior change include cognitive, affective, and psychomotor learning outcomes.

2.2. Logic Concept Algorithm

The algorithm is a calculation procedure given in the form of a command set (instruction) to calculate mathematical problems in the design of a computer program (Bacon & David, 2013). In other words, it can simply be defined that the algorithm is a list of steps (similar to a recipe) for a solving problem (Whiszkids, 2002) a list containing steps (such as a recipe) for problem-solving.

Meanwhile, according to Albert et.al. in Bernardo, et.al., ". Logic Programming is a programming paradigm based on the use of formal logic as a programming language "; programming logic is a programming paradigm based on the use of formal logic as a programming language. The programming language is a sequence of systematic steps to solve a problem (Nienhuys-Cheng & De Wolf, 1997). Based on the definitions described above, it can be synthesized, that algorithmic logic is a calculation procedure given in the form of a command set (instruction) in a logical sequence for decision making in calculating mathematical problems in the design of a computer program.

2.3. Learning Model

In learning, the model is defined as "a step by step process designed to achieve a particular outcome" (Timothy, Charles, & Alexander, 1997). This definition provides an explanation that a learning model does not come just when the teacher enters the classroom to implement the lesson, more than that a learning model is something that is deliberately designed and planned to achieve certain learning goals as well as to improve the effectiveness of learning. A learning model leads to a learning approach that describes systematic procedures in organizing learning experiences to achieve specific learning goals and serves as a guide for instructional designers and teachers in planning teaching and learning activities (Lukman, 2015). The learning model refers to the learning approaches to be used, including the teaching objectives, the stages in the learning activities, the learning environment and the management of the class (Darmadi, 2017).

Based on some opinions of experts on the above learning model can be concluded that the learning model is a process of learning systematically arranged so as to create a change of good individual behavior and create

active learning in the classroom between Lecturers and Students are characterized by the occurrence of good interaction/feedback so that learning objectives will be achieved with the maximum.

2.4. Laboratory-Based Learning Model

The laboratory is a practical activity that can be implemented in the classroom and can be used to train thinking skills and can make students build student knowledge. The laboratory has a goal for the learning process. One of the aims is cognitive meaning to learn about scientific concepts, skill development process, and increase understanding of scientific method (Mastika, Adnyana, & Setiawan, 2014).

The laboratory-based learning process will help learners in observing a physical phenomenon that occurs, then students will make a problem formulation about the phenomenon. In addition, the learning process conducted in the laboratory will provide an opportunity for learners to test the theories that have been studied with empirical reality (Adi & Alimufi, 2015).

Thus, the Laboratory Based Learning Model is an interaction between Lecturers and Students in a learning process in a laboratory that involves activities (1) Proof of concept or theory through experiment (experiment); (2) Demonstrate a particular tool or process; (3) Finding and finding through specific ways and working procedures.

2.5. Direct Instruction Model

Arends (2012) suggests that the learning model to help Students learn basic skills and knowledge that can be taught step-by-step, this model is called Direct Instruction Model (direct learning model). The direct teaching model on the learning process is only active on the informer only (Lecturer), while the students play a passive role by receiving only one-way information and following what is presented by the lecturer. Lecturers play a dominant role and Students perpetrate vice versa with only accept explanations and duties of Lecturers. So in practice very much depends on the ability of Lecturers in managing learning (Suardani, Private, Widiyanti, & Si, 2014).

2.6. Personality

Personality is the whole way an individual reacts and interacts with other individuals (Hutagalung, 2007). While Atkinson in Paradise (2017) provides the definition that personality as a pattern of behavior and different ways of thinking in each individual (typical), which can determine the adjustment of a person to the environment

According to Jung personality to differentiate into two, namely an Introvert and extrovert. It is said Introvert if the attitude of one's consciousness leads to one's own self. While an extrovert means an attitude of consciousness that leads to the outside of itself, that is to the natural surroundings and other human beings. According to Eysenck in Alwisol, personality is the whole pattern of actual or potential behavior of an organism, as determined by heredity and environment. The behavioral patterns are derived and developed through the functionalities of the four main sectors that organize behavior; cognitive sector (intelligence), Katif (character) sector, effective sector (temperament), somatic sector (constitution) (Alwisol, 2004)

Based on this understanding, it can be concluded that the personality encompasses all patterns of behavior and characteristic and can be predicted in a person or more can be seen from the outside, which is used to react and adjust to the stimulus, so that the behavior is a typical functional unity for the individual, like how we talk, physical appearance, and so on. While the characters are more inherent and do not appear directly. Like how we deal with other people, our nature, and so forth.

3. Research Method

The research was conducted in S1 Program Information System STIKOM Ambon Maluku Province academic year 2014/2015. Study Schedule in the Semester is even or less than 6 months. The population is the whole subject of the study (Arikunto, 2010). The population of this study is the students of STIKOM Ambon semester Semester (Semester 2). While Sample is part of the number and characteristics possessed by the population. Sugiyonos (2009). Sampling method or sampling technique is done by simple random sampling. This sampling technique is used because the collection of sample members from the population is randomly assigned without regard to the strata present in the population.

The research method used is experimental research (quasi-experiment) with factorial design 2 x 2 which involves the variable learning outcomes of the programming algorithm as the dependent variable (Y); learning model (A) as treatment variable consisting of laboratory-based learning model (A1) and direct learning model (A2). While the variable attribute in this study is a personality (B) which consists of Introvert personality (B1) and extroverted personality (B1). (Arikunto, 2010).

Based on the grouping of the above variables, the factorial design of 2 x 2 can be illustrated in the table below:

Table-3.1. 2 x 2 factorial design.

Personality (B)	**Learning model (A)**	
	PBL (A_1)	DL (A_2)
Introvert	A_1B_1	A_2B_1
Extrovert	A_1B_2	A_2B_2

Information:
A1B1= The Student Group is taught by a laboratory-based learning model and has an Introvert personality type.
A2B1= Student Group which is taught by direct learning model and has an Introvert personality type.
A1B2= The Student Group is taught by a laboratory-based learning model and has an extroverted personality type.
A2B2= Student Group that is taught by direct learning model and has an extroverted personality type.

Referring to the research variables, there are two sources of data that will be collected for the purposes of this study, the two data are (1) data learning Algorithm Student Programming Algorithm, and (2) data about the personality type of Students. Instruments used for data collection in this study consisted of 2 (two) types of instruments, namely (1) multiple choice test to measure learning outcomes in the course of Student Programming Algorithm, and (2) test to measure personality type of Student by using standard test MBTI (Myers-Briggs Type Indicator). To obtain a good instrument and correctly first created a grid of writing the instrument based on the operational definition of the two variables.

Data analysis techniques used are descriptive and inferential analysis. Descriptive analysis techniques used to obtain a description of the characteristics of the spread of the value of each score of variables studied. The data descriptions of the results scores are based on mean (mean), median (Me) and mode (Mo) of group data. It also calculated the data variance. Distribution of data based on frequency distribution tables of data groups visualized in the form of a histogram. Hypothesis testing by using Anava Dua Lane with a condition: (1) normal distributed data, and (2) variance between homogeneous sample. For that, before doing hypothesis testing first done the test requirements in the form of normality test and homogeneity test. Normality test using Kolmogorov-Smirnov test because the research data is not too big (Sugiyono, 2015).

4. Result and Discussion

The results obtained from the two classes are experimental class and control class. Where the results show that there are 5 students who have an introverted personality and 25 people who have extroverted personality in the experimental class. Furthermore in the control class found that 13 students have an introvert personality and 17 people who have an extroverted personality. Furthermore, the results of student tests carried out analysis and hypothesis testing.

4.1. Analysis Test Results

Prior to the data analysis, it is necessary to test the requirements of the data analysis. The requirements of data needed to test the hypothesis are data that is normally distributed and homogeneous so that the results of research can be accounted for by research if the sample is taken at random. Test requirements data analysis performed by the Kolmogorov-Smirnov test for normality test, while for the homogeneity test using the Bartlet Levene Test Test.

1. Data Normality Test

Normality test results in this study can be sawed in Table 3.2 as followed:

Table-3.2. Data Normality Test.

Model	**Kolmogorov-Smirnov**		
	Statistic	**Df**	**Sig.**
1.00	.127	30	.200*
2.00	.149	30	.088

Source: Results of Data.

Based on normality test data, it is known that this research data comes from the normally distributed population because the significance value of Kolmogorov-Smirnov test for model 1 (laboratory-based model) is 0.200 and model 2 (direct learning model) is 0,088, where both values are greater than 0.05. Thus, the statistical hypothesis proposed for the normality test, ie H0 is accepted.

2. Sample Homogeneity Test T

The results of the Bartlett Levene Test This study is the follows:

Table-3.3. Test of Homogeneity of Variances.

Levene Statistic	df1	df2	Sig.
,793	6	20	,586

Source: Results of Data.

Based on Bartlett Levene test results, it is known that the significant value (p-value) is 0.586, where this value is greater than the critical limit specified that is 0.05. Thus the decision taken is to accept Ho which means that the variance of the value of homogeneous variables between levels.

4.2. Hypothesis Testing

Hypothesis testing in this research is related to the main effect which is the influence of learning model on learning outcomes, and the influence of personality on learning outcomes, while the interaction effect is the influence of learning model and personality toward the learning result. The researcher conducted a 2 X 2 factorial test that was used to test the hypothesis that the average difference between the sample groups. Hypothesis formulation to be tested are:

a. $H_0 : \mu_{A1} = \mu_{A1}$

   $H_1 : \mu_{A1} > \mu_{A1}$

b. $H_0 : \mu_{B1} = \mu_{B1}$

   $H_0 : \mu_{B1} > \mu_{B1}$

c. Interaction Effects

   Ho : Interaction (A X B) = 0

Ho : Interaction (A X B) ≠ 0

Criteria testing of this hypothesis test is the null hypothesis (H0) failed to rejected if F0 ≤ Ftabel and vice versa null (H0) rejected if F0> Ftabel, H0 rejected at significance level a = 0,05, Overall the results of hypothesis testing with ANAVA 2 X 2 in the form of manual calculations can be seen in Table 4.1.

Table-4.1. Summary of ANOVA 2 X 2.

Source of Variance	Db	JK	RJK	F count	Ftable	
					0,05	0,01
Model Pembelajaran	1	663,113	663,113	11,841*	4,02	7,31
Personality	1	536,543	536,543	9,581*	4,02	7,31
Interaction (A X B)	1	763,193	763,193	13,628*	4,02	7,31
Mistake	56	0,22	0,00393			
Total	59	1963,069				

Information:
Df : Degree of Freedom
JK : The sum of squares
RJK : Average Number of Squares

Table-4.2. Two Way ANOVA Test Results Hypothesis First, Second and Third.

Dependent Variable: Learning outcomes					
Source	**Type III Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Corrected Model	347.377[a]	3	115.792	28.489	.000
Intercept	23309.196	1	23309.196	5734.963	.000
Model	18.745	1	18.745	4.612	.036
Personality	14.380	1	14.380	3.538	.065
Personality * Model	184.026	1	184.026	45.277	.000
Dependent Variable: Learning outcomes					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Error	227.607	56	4.064		
Total	35665.000	60			
Corrected Total	574.983	59			
a. R Squared = .604 (Adjusted R Squared = .583)					

Source: Results of Data

Based on Table 4.1 can be seen that the results of manual calculations ANOVA 2 X 2 can be interpreted as follows:

1. There is a difference between the learning model of learning outcomes Algorithm Programming, which is obtained the Fcount value of 11.841 while Ftabel at 0.05% significance level and degrees of freedom (df) 1/56 of 4.02, then Fcount> Ftable (11,841> 4, 02).

2. There is a difference between personality to learning result of Programming Algorithm, that is got the value of Fcount equal to 9,581 whereas Ftabel at the level of significance 0,05% and degree of freedom (df) 1/56 equal to 4,02, then Fcount> Ftable (9,581> 4, 02).
3. There is an interaction or AXB ≠ 0, which is obtained Fcount value of 13.628 while Ftable at 0.05% significance level and degrees of freedom (df) 1/56 of 4.02, then Fcount> Ftable (13.628> 4.02) so Ho is rejected, so it can be stated there is a significant influence between the model of learning and personality in the learning outcomes Algorithm Programming.

The following results of the overall hypothesis testing based on the results of further tests with the help of SPSS program 20. Where to answer the first, second and third hypothesis can refer to the following Table 4.

H1. Differences Learning outcomes of programming algorithm with learning model based on laboratory with which learned through Direct learning model.

The above test results show that there is a significant difference between the learning outcomes of Student programming algorithm that is taught by the laboratory-based learning model compared to the one learned using the direct learning model, which is seen from the model variable significance value of 0.036, where the value is smaller than the significance limit of 0, 05. Based on this, the first hypothesis proposed in this study is evident. These results explain that the laboratory-based learning model is a more effective learning model to be applied in programming algorithm learning material than direct learning model.

The results of this study are in line with the findings of several previous studies, among others, research byRiswanto (2013); Adi and Alimufi (2015); Fonna and Adlim (2013). Riswanto's research produces findings that explain that laboratory-based learning is an effective learning model, capable of encouraging the improvement of science process skills and shaping the active character of the Student. Adi Santoso and Alimufi Arief's study found that laboratory-based learning model is an effective learning model to improve students' learning outcomes, as evidenced by improvements in student learning outcomes after the use of laboratory-based learning models. The research findings by Teuku Musreza Fonna, Adlim and Ali stated that the use of virtual lab-based learning media proved able to improve students' critical thinking ability when compared with conventional teaching application.

Based on the previous research, it can be concluded that the orientation of learning affects the learning outcomes obtained, where the model of laboratory-based learning is more oriented to the Student as the party who must be active in learning, while the direct learning model is more oriented to the role of Lecturer or teacher who manages the whole learning process. As well as the advantages of the laboratory-based learning model compared to the direct learning model is the critical thinking ability of the Students.

Students who follow laboratory-based learning will have the opportunity to be able to understand a lesson material through a live demonstration of the object that is related to the material. Thus, students will build knowledge through a gradual process of understanding, which also encourages students to actively think and strive to find new solutions and ideas that underlie the emergence of critical thinking skills (Saragih, 2007).

H2. Differences Results of learning programming logic Students who have Introvert personality type with Students who have personality type Extrovert

Based on Table 4.2 it appears that there is no significant difference between the learning algorithm learning programming between students who have Introvert personality and extrovert, which seen from the value of personality variable significance that is equal to 0.065, where this value is greater than the 0.05 significance limit. The absence of such differences. Based on this, the second hypothesis proposed in this study is not proven. These results indicate that in this study, differences in personality types, namely Introvert and extrovert have no effect on the learning outcomes of programming algorithm.

These results are in line with previous research findings conducted by Ulya (2016) and Mularsih (2010). Ulya's findings suggest that students who have Introvert and extroverted personalities do not have significant differences in learning outcomes. This difference in personality affects only how the students interact with the surrounding environment and do not affect their cognitive abilities. So that each personality has advantages and disadvantages of each.

The superiority in terms of the perspective does not necessarily lead to extroverted students capable of having higher learning outcomes than Introvert students because as with an Introvert students, extroverted students also sometimes have negative effects from their open and pro-social personalities, for example, students extroverts tend to have activities that require the role of the other party that creates a sense of dependence on others, so that ultimately not able to carry out various things themselves (Eysenck, 1967). So it can be said that each person has a positive and negative value in influencing the student's learning outcomes on algorithm programming materials.

H3. The influence of the interaction between the learning model and the personality type of the Student on the learning outcomes of the programming algorithm

Based on the test results shown in Table 4.2, it is known that the significance value of the interaction effect between the learning model and the student's personality is 0,000, so it can be stated that the interaction of the learning model and personality has a significant influence on the student's learning outcomes. Thus, the third hypothesis proposed in this study is evident. This shows that the applied learning model is able to encourage the improvement of students' learning outcomes in the programming algorithmic material by considering the personality type in the Student self.

The results of this study are in line with the results of previous research conducted by Samosir and Sibuea (2014) found that there is an interaction between the learning model applied with the student's personality type towards the learning outcomes. This finding explains that the application of the learning model needs to be adjusted to the student's personality type to be able to encourage the improvement of student learning outcomes. Overall, the interaction of the learning model and the appropriate personality type to the student's learning outcomes will be able to encourage improved the learning outcomes over the programming algorithmic material.

H4. Differences Results of learning programming logic Students who taught with Laboratory-based learning model on Students who have Introvert personality type with students of extrovert personality type.

The test results using the Independent Sample t-Test for the fourth hypothesis are as follows:

Table-4.3. Results Independent Sample T-Test Hypothesis Fourth.

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Result	Equal variances assumed	2.677	.113	-5.424	28	.000	-5.32000	.98085	-7.32917	-3.31083
	Equal variances not assumed			-9.101	15.018	.000	-5.32000	.58458	-6.56587	-4.07413

Source: Results of Data.

Table-4.4. Average Comparison of Learning Outcomes.

	Personality	N	Mean	Std. Deviation	Std. Error Mean
Result	1.00	5	21.4000	.89443	.40000
	2.00	25	26.7200	2.13151	.42630

Source: Results of Data.

Based on these data, the fourth hypothesis proposed in this study is evident. The data saw from the significance value of equal variances assumed by 0.000, where this value is smaller than the 0.05 significance limit. The difference is also reinforced by the mean value of learning outcomes between an Introvert Personality Students, that is equal to 21,400 which is lower than the learning result of the extrovert personality student which is 26,720.

These findings suggest that the laboratory-based learning model is a more suitable learning model to apply to students with an extroverted personality. As far as previous research studies conducted by researchers, no previous research has been found that has studied differences in learning outcomes between Students Introvert personality and extroverted taught using laboratory-based learning model. Therefore, the findings of this study can be used as an extension of insight in the field of education related to the analysis of the model of learning, personality type, and learning outcomes.

Students with extroverted personality are open, easy to work with, and are always outward-oriented. So as to utilize the advantages of his personality to maximize the learning process and ultimately be able to achieve higher learning outcomes than the Students with Introvert personality (Eysenck, 1967).

H5. Differences Results of learning algorithm Students are taught by direct model learning on Students who have Introvert personality type with extrovert personality type.

The test results using the Independent Sample t-Test for the fifth hypothesis are as follows:

Table-4.5. Results Independent Sample T-Test Hypothesis Fifth.

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Result	Equal variances assumed	5.520	.026	5.632	28	.000	3.84163	.68215	2.44431	5.23895
	Equal variances not assumed			5.959	27.372	.000	3.84163	.64463	2.51981	5.16345

Source: Results of Data.

Table-4.6. Average Comparison of Learning Outcomes.

	Personality	N	Mean	Std. Deviation	Std. Error Mean
Result	1.00	13	25.0769	1.38212	.38333
	2.00	17	21.2353	2.13686	.51827

Source: Results of Data.

Based on this, the fifth hypothesis proposed in this study is evident. The data saw from the significance value of equal variances assumed by 0.000, where this value is smaller than the 0.05 significance limit. The difference is also reinforced by the mean value of learning outcomes between Student Introvert personality, which is 25.076, where this value is higher than the learning outcomes of extrovert personality students which amounted to 21.235. This result explains that the direct learning model is more suitable for teaching programming algorithm material in Students who have Introvert personality.

The direct learning method is a learning model that is applied primarily to help students in understanding basic knowledge (Arends, 2012) which is identical with the learning model that is implemented by way of lectures. In this model, students are not given much opportunity to interact with other study partners and perform various active activities in learning. Therefore, students who have an extrovert personality will feel less comfortable with this learning model. Conversely, students who have an Introvert personality will actually feel the atmosphere of learning that has conformity with the characteristics of his personality, which will then be able to influence the achievement of learning outcomes.

H6. Differences learning outcomes of algorithms of programming logic algorithms Students with Introvert personality types are studied using laboratory-based learning models compared to those taught using direct learning models.

The test results using the Independent Sample t-Test for the sixth hypothesis are as follows:

Table-4.7. Results of the Independent Sample T-Test The Sixth Hypothesis.

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Result	Equal variances assumed	.144	.710	-3.816	16	.002	-2.82500	.74033	-4.39443	-1.25557
	Equal variances not assumed			-3.644	11.679	.004	-2.82500	.77515	-4.51908	-1.13092

Source: Results of Data.

Table-4.8. Average Comparison of Learning Outcomes.

	Model	N	Mean	Std. Deviation	Std. Error Mean
Result	1.00	8	21.8750	1.88509	.66648
	2.00	10	24.7000	1.25167	.39581

Source: Results of Data.

Based on this, the sixth hypothesis proposed in this study is evident. The data saw from the significance value of equal variances assumed by 0.002, where this value is smaller than the 0.05 significance limit. The difference is also reinforced by the mean value of the learning outcomes, where Introverted personality students who are taught using a laboratory-based learning model has an average learning outcome of 21.875, where this value is lower than the learning outcomes Introverted personality students are taught using direct learning models, amounting to 24,700. This result explains that the most appropriate learning model to apply to Introverted Personality Students is direct learning model.

The results of this study have not been found in previous studies studied by researchers. Therefore, the findings of the sixth hypothesis of this study may serve as additional insights that may enrich the literature of the field of education, in particular in relation to the laboratory-based model of learning and the direct learning model with the Introvert personality type. The results of this sixth hypothesis reinforce the results of

the fourth and fifth hypotheses, that the Introvert personality type is compatible with the direct learning model rather than the laboratory-based model of learning.

Direct learning model has the characteristic of one of the lecturers in this case the lecturer becomes an active party and the student becomes a more passive party to receive the material presented by the lecturer. So this type of learning is perfect for students who have an introverted personality.

H7. Differences learning outcomes of programming algorithm algorithms Students who have extrovert personality types are studied using laboratory-based learning models compared to those learned using direct learning models.

The test results using the Independent Sample t-Test for the seventh hypothesis are as follows:

Table-4.9. Results Independent Sample T-Test Hypothesis Seventh.

		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
Result	Equal variances assumed	.208	.651	8.177	40	.000	5.48471	.67074	4.12909	6.84032
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
	Equal variances not assumed			8.173	34.459	.000	5.48471	.67107	4.12160	6.84781

Source: Results of Data.

Table-4.10. Average Comparison of Learning Outcomes.

	Model	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Result	1.00	25	26.7200	2.13151	.42630
	2.00	17	21.2353	2.13686	.51827

Source: Results of Data.

Based on this, the seventh hypothesis proposed in this study proved Data seen from the significance value of equal variances assumed by 0.000, where this value is smaller than the 0.05 significance limit. The difference is also reinforced by the mean value of learning outcomes, where the extroverted personality students who are taught using a laboratory-based learning model has an average learning outcome of 27,720, where this value is higher than the learning outcomes. Students with extroverted personality are taught using direct learning model, that is equal to 21,235. These results indicate that students with extroverted personality are more suitable if taught using laboratory-based learning model.

The results of this seventh hypothesis show that there have been no similar results to previous studies studied by researchers. Therefore, the research findings from this seventh hypothesis can be additional insights that enrich the educational literature, particularly related to the relationship between laboratory-based models of learning, direct learning models, extrovert personality types, and learning outcomes. Through a laboratory-based learning model, the students of extrovert personality will be able to feel a conducive learning atmosphere as it is full of elements and learning process according to their personality characteristics. Conversely, students with an extrovert personality will actually feel the discomfort when involved in a direct learning model because they do not have the opportunity to actively learn and interact with other parties.

Based on the overall presentation of the above research results, it can be presented a summary that represents the overall result of a hypothesis test of this research as follows:

1). Learning algorithm learning result Students who taught with model-based learning higher laboratory compared that taught.
2). There is no significant difference in terms of learning outcomes of programming between Students who have Introvert personality types and Students who have extrovert personality types.
3). There is an interaction effect between the learning model and the personality type of the Student on the learning outcomes of the programming algorithm.
4). Learning outcomes of programming logic Students who are taught by Laboratory-based learning model on Students who have Introvert personality type is lower than the student with extrovert personality type.
5). Learning algorithm learning result Students are taught by direct model learning on Students who have Introvert personality type higher than with extrovert personality type.
6). Learning algorithm result of programming algorithm of Student with Introvert personality type which taught by using laboratory-based learning model is lower compared to that learned by using direct learning model.

7). Learning algorithm learning outcomes Students who have extrovert personality types are taught by using a model of laboratory-based learning is higher than those learned using direct learning model.

5. Conclusions

Based on the formulation of the problem and discussion of the hypothesis proposed in this study, the conclusions that can be drawn researchers include:

1. There are significant differences on the learning outcomes of Student Programming Algorithm learned through the laboratory-based learning model compared with the Direct learning model. Learning outcomes obtained Students taught using laboratory-based learning model is higher than the result of learning Students are taught using direct learning model.
2. There is no significant difference in learning outcomes of Student Programming Algorithm that have Introvert personality types compared with extrovert personality types.
3. There is a significant influence of the interaction between the learning model compared with the personality type of Student to the learning outcomes algorithm Programming
4. There is a significant difference in the learning outcomes of Student Programming Algorithms that are taught by Laboratory-based learning models that have an Introvert personality types and those with extroverted personality types. Students who have an Introvert personality have lower learning outcomes than the extrovert personality students.
5. There is a significant difference in the results of Student Algorithm Student Learning learning which is taught by Direct learning between who have Introvert personality type compared with extrovert personality type. Introverted personality students have higher learning outcomes than the extrovert personality students.
6. There are significant differences on the learning outcomes of Student Programming Algorithm that have Introvert personality type between the learning by using the laboratory-based learning model and the learning using direct learning model. Student learning outcomes Introvert taught using laboratory-based learning model is higher than the learning outcomes Students Introverted personality is taught using direct learning model.

7. There is a significant difference on the learning outcomes of Student Programming Algorithm which has an extroverted personality type between the learning by using the laboratory-based learning model and the learning using Direct Learning model. Student learning outcomes extrovert taught using laboratory-based learning model is higher than the learning outcomes Students an extrovert personality is taught using direct learning model.

References

Adi, S., & Alimufi, A. (2015). Application of laboratory-based learning methods to increase the result of student learning material in class X optical instruments at SMA Plaosan I, Magetan. *Journal of Physics Education Innovation, 4*(3).

Alwisol. (2004). *Personality psychology.* Malang: UMM Press.

Arends, R. L. (2012). *Learning to teach.* New York: McGraw-Hill.

Arikunto, S. (2010). *Research procedure a practical approach.* Jakarta: Rineka Cipta.

Bacon, M. D., & David, C. M. (2013). *Logic from A to Z: The Routledge encyclopedia of philosophy glossary.* New York: Taylor and Francis.

Bailey, T. (2005). An introduction to the C programming language and software design. hlm.

Darmadi. (2017). *Development of learning models and methods in student learning dynamics.* Yogyakarta: Deepublish.

Eysenck, H. J. (1967). *The scientific study of personality.* London: Transaction Publishers.

Fonna, T. M., & Adlim, A. (2013). The difference of students' critical thinking skills through the application of virtual laboratory learning media on the concept of human respiratory systems in the sigli superior state high school. *BIOTICS: Scientific Journal of Technology and Educational Biology, 1*(2), 124-128.

Gagne, R. M., & Briggs, L. J. (1988). *Principles of instructional design* (2nd ed.). New York: Holt: Rinehart and Winston.

Gustafson, K. L., & Branch, R. M. (2015). *Survey of instructional development models* (4th ed.). Syracus. New York: Eric Clearinghouse of Information and Technology, Syracus University.

Hutagalung. (2007). *Personality development.* Jakarta: PT Index.

Lukman, H. (2015). Implementation of problem based learning in Madrasah Islamic education institutions. *Journal of Islamic-Islamic Religious Education, 13*(1), 37-56.

Mastika, I., Adnyana, I., & Setiawan, I. A. (2014). Biological Laboratory standardization analysis in the learning process in Denpasar city public high school. *e-Journal University of Ganesha Education Postgraduate Program, 4*(1), 1-10.

Mulasih, H. (2010). Learning strategies, types of personality and result of Indonesian language learning in junior high school students. *Makara, Social Humanities, 14*(1), 65-74.

Nienhuys-Cheng, S. H., & De Wolf, R. (1997). Foundations of inductive logic programming. *Springer Science & Business Media*, 1228.

OECD. (2010). *Recognising non-formal and informal learning outcomes, policies and practices.* Paris: OECD Publishing.

Primary, M. T. (2014). Evolution of programming languages. *Journal of Computech & Business, 8*(1), 35-42.

Purwanto, M. N. (2013). *Educational psychology* (26th ed.). Bandung: Teenagers Rosdakarya.

Riswanto. (2013). Laboratory based learning to improve science process skills in building student character. *JRKF UAD, 4*(2), 60-65.

Samosir, P., & Sibuea, A. M. (2014). The influence of cooperative learning models and students' personality types on integrated social studies learning outcomes. *Journal of Educational Technology, 7*(1), 1-15.

Saragih, S. (2007). *Application of problem based learning with contextual approach to mathematics learning*. Palembang: Sriwijaya University.

Suardani, N. N., Private, I. B. J., Si, M., Widiyanti, N. L. P. M., & Si, S. (2014). Effect of problem based learning models on students' problem solving and process skills abilities. *Indonesian Science and Education Journal, 4*(1), 1-18.

Sugiyono. (2015). *Statistics for research*. Bandung: Alfabeta Publisher.

Sugiyonos, D. R. (2009). *Research methods*. Bandung: CV Alvabeta.

Timothy, P. A., Charles, R. D., & Alexander, J. R. (1997). *Instructional development paradigm*. New Jersey: Educational Technology Publications, Inc.

Ulya, N. M. (2016). The influence of learning methods and type of personality on the result of learning Arabic (Experimental Study on MAN 1 Semarang). *Journal of Islamic Education, 10*(1), 1-25.

Whiszkids. (2002). *Computer literacy program, understandding programming concept*. Manila: Rex Book Store.