THE EFFECT OF LEARNING ALGORITHMS & PROGRAMMING COURSE ON THE SELECTION OF SPECIALIZATION AREA IN SOFTWARE ENGINEERING

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Abstract: Specialization in courses is a process of choosing part of the major or specification of the major. Specialization helps students select programs or activities according to enormous wishes based on talents, interests, and abilities. This department has three fields of interest: Software Engineering, Network Computer Engineering, and Multimedia. The condition in selecting areas of interest is that you must pass from the conditional subjects. In the RPL field request, the requirement is to give a score for the Algorithm and programming course. This study aims to determine whether Algorithms and programming Courses influence the Selection of RPL (Software Engineering) Areas of Interest in PTI. This research uses descriptive quantitative methods. This study's sample was students taking the Algorithm and Programming course, with as many as 20 respondents. This study's data collection technique is distributing questionnaires before and after students take Algorithms and Programming. The data analysis technique used is a validation test using SPSS. The result of this study is that there is an influence between Algorithm Learning and Programming on the selection of Software Engineering interests. It is marked by some students who initially did not choose the RPL field of interest to choose the RPL field of interest and vice versa. It is also reinforced by the results of the hypothesis test where the results show a significant value of < ttabel or 2,438 > 1,725 of these results can be seen in the formula If the calculation of the > ttabel at a significance level of 0.05 with df = 20, then ha is accepted, and ha is the Influence of Courses on the Selection of Areas of Interest RPL Information Technology Education Uin Ar-Raniry.

Keywords: areas of interest, algorithms, programmers, software engineering

Abstrak: Peminatan pada mata kuliah adalah suatu proses untuk memilih bagian dari jurusan atau spesifikasi dari jurusan. Peminatan membantu mahasiswa untuk memilih program atau kegiatan sesuai dengan keinginan yang sangat besar berdasarkan bakat, minat, dan kemampuan. Pada Prodi PTI terdapat 3 pilihan bidang minat yaitu Rekayasa Perangkat Lunak(RPL), Teknik Komputer Jaringan (TKJ), Multimedia (MM). Syarat dalam pemilihan bidang minat adalah harus lulus dari MK bersyarat. Pada bidang pemintan RPL syarat nya adalah harus lulus MK Algoritma dan pemograman. Penelitian ini bertujuan untuk mengetahui adakah Pengaruh Mata Kuliah Algoritma & Pemograman Terhadap Pemilihan Bidang Minat RPL (Rekayasa Perangkat Lunak) di PTI. Penelitian ini menggunakan metode kuantitatif deskrptif. Sampel dalam penelitian ini adalah mahasiswa yang sedang mengambil mata kuliah Algoritma dan Pemograman sebanyak 20 responden. Teknik pengumpulan data dalam penelitian ini adalah dengan cara membagikan angket sebelum dan sesudah mahasiswa mengambil MK Algoritma dan Pemograman. Teknik analisis data yang digunakan adalah uji validasi menggunkan SPSS. Hasil dari penelitian ini adalah terdapat pengaruh antara Pembelajaran

Algoritma dan Pemograman terhadap pemilihan minat Rekayasa Perangkat Lunak (RPL). Hal ini ditandai dari beberapa mahasiswa yang awal nya tidak memilih bidang minat RPL menjadi untuk memilih bidang minat RPL dan sebaliknya. Hal ini juga diperkuat dengan hasil Uji hipotesis dimana hasil tersebut menunjukkan nilai signifikan < ttabel atau 2.438 > 1.725 dari hasil ini dapat dilihat pada rumus Jika thitung > ttabel pada taraf signifikansi 0.05 dengan df= 20, maka ha diterima, dan ha ialah Pengaruh Mata Kuliah Terhadap Pemilihan Bidang Minat RPL Pendidikan Teknologi Informasi Uin Ar-Raniry.

Kata kunci: bidang minat, algoritma dan pemrogroman, rekayasa perangkat lunak

1. Introduction

Technology significantly impacts human life; even in the 4.0 era, technology itself has become a necessity for humans. It cannot be separated from human life (Wahyudi & Sukmasari, 2018). Every field has utilized technology to make various jobs easier (Lestari, 2018). One technology that makes things easier for humans is information technology. Information technology is a set of computers used to process, compile, store, and manipulate data to obtain various quality information and connect one computer to another using a network system (Cholik, 2021).

The results of information technology itself cannot be separated from algorithms and programming, both of which are very influential and even become the basis of this information technology itself. In information technology, there is software programming, which is an instruction expressed in a language understood by a computer, where the computer can carry out commands from that language to produce a software or application program.

In the current era of digitalization, many state and private universities have made information technology a major in their respective faculties. One is UIN Ar-Raniry Banda Aceh, who is majoring in information technology education. Information Technology Education is a teaching department in the technical field, which is under Tarbiyah and teacher training. Students in this department will be required to become experts in the field of computing or technical skills and experts in the field of education.

In choosing a field of interest in the Information Technology Education department at UIN Ar-raniry, the choice of interest must be by the student's interests and choices; in this case, it means that it is not determined or forced by the study program, the choice of this field of interest itself aims to develop talents and interests in more depth, according to the student's talents. However, according to researchers' observations, student awareness in selecting specializations still needs to improve; some only realized after the specialization had been chosen and carried out that the chosen area of interest was not in line with their talents.

Relevant research (Defiyanti, 2015) states that students experience difficulties and encounter obstacles in determining their area of concentration to

compose their final assignment. So, the final assignment takes a long time, and students even use other people's services to complete it.

The Department of Information Technology Education, especially UIN-Ar-Raniry, has three areas of specialization or selection divided into fields: Software Engineering (RPL), Computer Networks (TKJ), and Multimedia. There are several obstacles in selecting fields. Usually, students choose their field of interest by following their friends, feeling a need for more confidence in their abilities. The field of specialization can be chosen, provided that you have chosen courses related to the specialization.

There are several obstacles in choosing a field of interest. Usually, when students choose a field of interest, they only follow their friends, feeling less confident in their abilities. Other related research (Ramdani, 2016) is related to implementing the AHP method in deciding students' fields of interest. So, a decision will be produced by displaying the ranking obtained by each alternative. Students make decisions in terms of predicting which specialization they will take.

The field of specialization can be selected only with one condition: the student must have chosen a course related to the specialization. Many students choose RPL specialization. However, they are constrained by their grades and need help capturing algorithms and programming courses because they are more complex than others. The course is conditional on choosing the RPL specialization field.

Based on what has been described, it is the basis for researchers to research whether learning outcomes cause the main factor underlying the field selection. Is there a factor in Algorithm and Programming courses in selecting the RPL specialization field? Algorithms and Programming also include expertise courses that aim to give students the ability to recognize concepts, identify, apply fundamental theories, and develop an algorithm into programming.

2. Literature Review

The algorithm is a stage arranged sequentially and logically to solve problems. Algorithms are needed before creating software (Isroqmi, 2018). Algorithms are an essential part of computer science and the basis of programming. The algorithm must be studied and mastered before designing the software (Ni Nyoman Emang Smrti et al., 2023; Udayana, 2018). In general, algorithms are divided into three primary structures: sequential, selection and looping. Sequential structure is the process of processing the stages in the algorithm systematically. The first stage will be done, and the next stage will continue. Selection structure is a step that will be done when choosing one or more options as the next step. At the same time, the looping structure is a step that is done repeatedly as long as the conditions are still met and will stop doing the step if the conditions are no longer met (Maulana, 2017; Nuraini, 2015).

Algorithms that are made can be represented using symbols called flowcharts. The symbols or charts used in the flowchart can indicate the program's logic flow and flow direction or the stages made. The representation of algorithms using flowcharts is more straightforward than with pseudocode. Representation with pseudocode is almost similar to the coding or syntax of programming (Rangkuti et al., 2023; Yulianeu & Oktamala, 2022). However, computers cannot understand the pseudocode and cannot be run in programming applications (Retta et al., 2020).

3. Research Methods

This research was conducted at UIN Ar-Raniry, Faculty of Tarbiyah, especially the Department of Educational Information Technology. In this research, the author uses a quantitative descriptive approach. It is a method used to answer a research problem closely related to data poured in the form of numbers and statistical programs. This method contains subchapters including approaches and types of research, population/sample, instruments, data collection techniques, and finally, data analysis. It is very suitable for research where this method can be used to formulate problems where the main objective is to determine whether the learning outcomes of the algorithms and programming courses affect the selection of interests of information technology education students at UIN Ar-raniry.

4. Data Collection Method

The population in this study were second-semester students or students taking Algorithms and Programming courses at the Department of Educational Information Technology, Ar-Raniry State University Banda Aceh. In this study, the sampling technique that the authors used was the Probability Random Sampling technique, in which the main target of this study was Information Technology Education students in semester two or were taking Algorithms and Programming courses, which numbered 25 people. The sample was drawn in this study using the Slovin formula.

5. Analysis and Results

The following are the results of distributing questionnaires that random or random respondents have filled in. The classification of respondents included 13 male respondents with a percentage of 65% and as many as seven women with a percentage of 35%.

Meanwhile, it consists of 3 (three) forces, namely, 2017, 2019, and 2020, based on enrollment year, as we can see in Figure 4.2:

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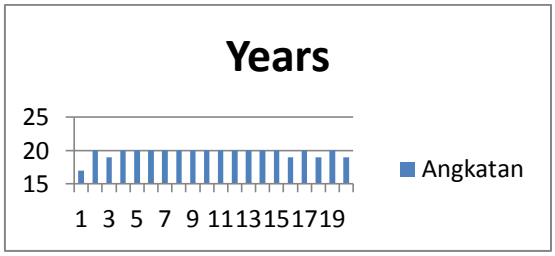

Gambar 4.2 Grafik Agkatan Responden

In Figure 4.2, it can be described that there are 15 students from the class of 2020, 4 students from the class of 2019, and one student from the class of 2017. Based on the results of the graph in the figure, it can be seen that most of the students who filled out the questionnaire were 2020 batch students because they were taking the course. The rest were students who repeated the Algorithm and programming course.

Validity Test

Validity shows the extent to which a measuring device is used in measuring what is measured. In this case, a method correlates the score obtained in each question item with the total individual score. Validity testing here is done with the help of the SPSS computer program for installing Version 18.0 and using the Correlate formula in the Microsoft Excel program. In this study, validity testing was only carried out on 20 respondents. Decision-making is based on the value of rcount (Corrected Item-Total Correlation)> rtabel of 0.444, for df = 20; a = 0.05 so that the item is valid or vice versa.

a. Questionnaire Validity Test Before Learning Algorithms and Programming begins, based on the results of test calculations with 3 Item Items are as follows;

Table 4.2. Validity Test Before Learning

Butir	Nilai Corrected Item Total Correlation / rhitung	Sig.	rtabel	Criteria
1	0	0,000	0.444	INVALID
2	0.772	0,000	0.444	VALID
3	0.758	0,000	0.444	VALID

a. Questionnaire Validity Test After Algorithm and Programming Learning Begins

Table 4.2.1 Validity Test After Learning

Items	Nilai Corrected Item Total Correlation / rhitung	Sig.	rtabel	Criteria
1	-	0,000	0.444	INVALID
2	0.844	0,001	0.444	VALID
3	0.813	0,002	0.444	VALID

Based on the results of the two tables above, namely table 4. Moreover, it can show that there are two valid items, namely the second and third items, where the results are rcount> rtable, and while the invalid item is the first item where the result is 0, which means rcount < rtable, so that it is declared invalid due to all the answers to the first item the answer is yes or has a value of 1, causing the first item to be invalid.

Reability Test

After obtaining the results of the next validity test, the researchers conducted a reliability test, which was carried out on each question item that had been declared valid. A variable can be reliable if the question's answer is always consistent.

The instrument reliability coefficient is intended to see the consistency of the respondents' answers to the question items. In this reliability calculation, the researcher uses the "Alpha Cronbach" formula, which is carried out with the help of the SPSS computer program. The reliability results for each variable are shown in the table below:

Reliability Statistics

Cronbach's Alpha	N of Items
.446	2

Based on the table above, the reliability test carried out on each question is declared valid; a variable is said to be reliable if the answer is always consistent. The variable is also reliable if the rcount> table value, known to be the rtable value for 20 samples, is 0.444. The two question items above found that the variable is reliable or rcount> table where the r count is 0.542 or 0.542> 0.444, so it can be concluded that the variable is reliable.

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Normality Test

The normality test is carried out to determine whether each variable is normally distributed. One way to identify normality is with the Kolmogorov-Smirnov formula, which is assisted by using the SPSS 18 application. The basis for making a decision is if the significance value of asymp. Sig (2-tailed) is more significant than 0.05((sig)>0.05), so the data is usually distributed, and the opposite is ((sig)<0.05), so the data is not normally distributed.

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		20
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.70929818
Most Extreme Differences	Absolute	.210
	Positive	.113
	Negative	-.210
Kolmogorov-Smirnov Z		.941
Asymp. Sig. (2-tailed)		.339

From the table of normality test results, it is identified if the significance value between the learning relationship of algorithm and programming courses before students take part in learning and after showing results> 0.05 so that the data before and data after are normally distributed, where the Residual value found is 0.339 or 0.339> 0.05, it can be ascertained that the data is usually distributed.

Hypothesis Test

The data that has been collected is then analyzed using the T-test formula. This T-test formula aims to identify whether or not there is a relationship or difference between learning before and after taking the Programming Algorithm Course. The testing technique tests the average of the acquisition results of both values. The results of the t-test that researchers have done by using the help of the SPSS computer program are as follows:

Paired Samples Test	t	df	Nilai Sig (2-tailed)
	2.438	19	0.025

The results of Table 4. Hypothesis testing shows that the results of the respondents' answer scores using the t-test found the Sig (2-tailed) value to be 0.025, a significance value of less than 0.05. From the results, the two tests have a significant difference because the considerable value is <0.05 or 0.025 <0.05.

If tcount> ttable at a significance level of 0.05 with df = 19, so that ha is accepted, and vice versa if it is smaller than ttable so that ha is rejected and ho is accepted. So it can be concluded that Ha, which reads "The Effect of Subjects on the Selection of the Field of Interest of RPL Information Technology Education Uin Ar-Raniry", is declared accepted..

Correlation Test

This correlation test aims to see if there is a relationship between two variables. In this case, the researcher tests the score results from the data before learning the Programming Algorithm and the total score results after attending the lesson and the following results are obtained;

Correlations			
		Before	After
Before	Pearson Correlation	1	.383*
	Sig. (2-tailed)		.096
	N	20	20
After	Pearson Correlation	.383	1
	Sig. (2-tailed)	.096	
	N	20	20

The above results show a relationship between learning algorithms and programming courses in selecting the field of interest of Software Engineering from the test results before and after taking the lesson.
From the two results of the data analysis above, the researchers distributed questionnaires twice. The researchers initially gave questionnaires online to

students where the questionnaire was given at the beginning of the learning of Algorithms and Programming courses; at that time, students did not know much about Algorithms and Programming / had never studied and knew what Algorithms and Programming were.

While the researchers' second questionnaire was given after taking the Algorithm and Programming Course learning or after the Midterm or midterm exam results came out, this is the goal of identifying how influential the Algorithm and Programming Course is on the selection of Software Engineering (RPL) interests where we all know that Algorithms and Programming are one of the primary and most essential parts in Software Engineering.

Research conducted by Ramdani (2016) also states that many factors cause students to choose specializations, including factors of student interest and interest in a specialization. Specialization is usually taken based on the field of specialization of a student in the department.

The results from the two questionnaires above show that Algorithm and Programming Learning affect the selection of Software Engineering interests. It is indicated by some students who initially did not choose the RPL field of interest to select the RPL field of interest and vice versa. It is also reinforced by hypothesis testing results, which show a significant value <0.05 or 0.025 <0.05. The considerable value is smaller than the t table with df = 19, then ha is accepted, and ha is the Effect of Courses on the Selection of the RPL Field of Interest in Information Technology Education UIN Ar-Raniry.

6. Conclusion and Suggestion

From the results obtained from the two questionnaires above, there is an influence between Algorithm and Programming Learning on the selection of Software Engineering (RPL) interests. It is indicated by some students who initially did not choose the RPL field of interest to select the RPL field of interest and vice versa.

It is also reinforced by the results of hypothesis testing, which show a significant value < t table or 2.438> 1.725 from these results can be seen in the formula if tcount> t table at a significance level of 0.05 with df = 20, so that ha is accepted, and ha is the Effect of Subjects on the Selection of the RPL Field of Interest Information Technology Education Uin Ar-Raniry.

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