The impact of the Personality of Programming Algorithm and Learning Models at Stikom Ambon College

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ABSTRACT— Poor academic performance implies that algorithm program continues to face challenges and that these challenges are yet to receive lasting solutions. Some of the factors accounting for this dilemma include mental personality problems among learners and a poor choice of learning models or instructional approaches. To understand this subject or debate, it is essential for instructors to ensure that the role of mental personality in shaping the outcomes is identified and examined before selecting the most appropriate model to solve the dilemma. This study aimed at implementing a learning model in a laboratory set-up, having identified different types of personalities exhibited by the selected learners. The motivation was to understand the impact of learning models; including a conventional and direct learning model, as well as that which is aided by laboratory sessions. Also, the study strived to determine if certain types of personality (including extroverts and introverts) determine the rate at which learners acquire knowledge and skills. The research context entailed Stikom Ambon College Ambon Maluku. The period of investigation was an even semester that came during the 2016 academic year. With 60 students selected as an appropriate sample, a block design (2x2) treatment was the chosen research design. From the results, the use of laboratory sessions as teaching aids were found to yield superior learning outcomes compared to situations where there was direct and conventional instruction in classroom settings. Also, the study established that the type of personality does not pose a statistically significant impact on learning outcomes. However, there was a direct relationship between the type of learner personality and the type of learning model employed in classroom settings. Additional results demonstrated that when students exhibit an extrovert personality, superior learning outcomes are likely to be achieved; especially if laboratory sessions are embraced as teaching aids—compared to a case involving introvert learners. It was inferred further that when the direct and conventional learning model is applied to the introvert personality group, the learning outcomes tend to be better compared to their counterparts in the extrovert personality group, who exhibit superior performance in the presence of laboratory sessions as teaching aids.

Keywords— Algorithm programming, personality, learning model

I. INTRODUCTION

With computer technology advancement, the computer system language has been developed. This language entails the programming language. Indeed, the programming language can be likened to a machine language whose modification is felt in terms of syntax. This modification seeks to enhance human understanding. Also, computer systems indicate high-level programming languages and exhibit simplified commands that interpreters or computers provide to programmers [1].

A notable aspect that is worth considering during software design involves establishing a data structure that is deemed the most appropriate. Through data structures, programmers can establish the method of data storage; especially because the data structures shape the outcomes linked to overall parameters such as program efficiency, clarity, and cohesiveness. An example illustrating this correlation is a case in which structs, arrays and instructions are provided by Language C, which is contained in high-level data structures [2].

Regarding the use of algorithms, two elements are worth noting. The elements include drawing and writing. Particularly, the algorithm charged with the writing process is linked to specific pseudocodes and data structures (such as English or Indonesian). Similar to actual programming codes such as C and Pascal, pseudocodes are responsible for the description of algorithms expected to communicate or relay messages to programmers. With images presented along the algorithms (such as the use of flowcharts), the role of the pseudocodes is to ensure that there is informal expression of ideas—during the development of algorithms. A specific example of a process through which algorithms can be generated is a case involving formal language rule stretching, especially that which enables the expression of the algorithm’s final version. Indeed, the adoption of this approach applies to situations where the use of the programming language is implemented form the initial phase.

Targeting the context of Ambon, this study focused on high school computer science sessions; with the study program Strata 1 Information Systems on focus. The study excluded parties with certification at the international and national certification levels. In Ambon’s Prodi Information System STIKOM, nine lecturers have satisfied the criterion of algorithm programming in legend courses. In each year,
the institution hosts experts from Yahoo and Goggle to provide knowledge and skills on how STIKOM could collaborate with these companies.

It is also notable that through the study program, students or participants gain knowledge about references and related topics. Insights form books and notes that have proved relevant to STIKOM Ambon Information Systems Program’s programming algorithm suggest 563 exemplar, as well as 103 titles; with six open access journals also documented. Through subscription, students can access these sources easily. Apart form references, Prodi Information Systems STIKOM Ambon is seen to provide an opportunity for learners to interact with a complete information system lab, which houses several applications programs and computer units (900 and 120 respectively). The main aim of these provisions has been to ensure that IT work competence is facilitated, especially among STIKOM Ambon’s graduates; with the programming algorithm course being of particular emphasis.

Imperative to highlight i that the performance of the majority of learners who take the programming algorithm course has remained low. These insights are informed by the assessment by many lecturers – regarding the course learning outcomes. One of the factors documented to account for these wanting outcomes include the low input quality whereby most of the students pursuing the course are poor or have a poor background in mathematics, as well as poor entry behavior. Anotehr factor involves students' negative attitude towards the course [1, 2]. In particular, the course is associated with numerical problems similar to mathematics, causing a negative attitude among students; compounded by poor background and lack of interest in mathematics. Anotehr factor involves the teaching strategies that many lecturers employ. In situations, where laboratories are offered as teaching aids, it remains notable that the algorithm course can be learned easily. However, poor instructional management implies that most of the lecturers are likely to opt for direct teaching-learning processes; failing to exploit the Information Systems Laboratory as a teaching aid. An additional reason behind the majority of the students' poor performance in this course involves the majority of the lecturers’ lack of understanding of different types of personality; including the case of extrovert and introvert learners. Imperatively, personality plays an important role in shaping learning outcomes. Hence, the need to consider whether students are introvert or extrovert (both in classroom and laboratory settings) is essential. From the documentation above, it becoems important to conduct an in-depth analysis or examination of the subject involving the impact of the type of personality and learning models on learning outcomes; with particular emphasis on the programming algorithm course. The target population is a case ofStikom Ambon College’s Information System students.

II. LITERATURE REVIEW

A. Learning Outcomes

According to Gagne and Bringgs [3], desired individual changes, which represent measurable capacities, characterize learning outcomes. The outcomes are informed by innate variables or characteristics that students possess, proving specific to certain teaching processes and sessions. In another study, the OECD [4] documented that certain competencies, skills, and knowledge gained and demonstrated as the need arises represent learning outcomes. Form the affirmations by Purwanto [5], learning outcomes are marked by changes in the behaviors of individuals; including parameters such as psychomotor, affective, and cognitive functioning.

B. Logic Concept Algorithm

An algorithm entails a logic process that comes in the form of instructions or command sets. Its role involves calculating computer program mathematical problems [6]. During problem solving, the algorithm targets the expected steps [7], which can be likened to a recipe. As observed by Albert et.al. (in Bernardo, et.al.), logic programming refers to a paradigm whose programming language constitutes formal logic. Imperatively, the latter refers to different systematic steps used in problem solving [8]. From these observations, it is worth inferring that algorithmic logic supports decision making in computer programs because it relies on the given instructions or command sets.

C. Learning Model

In the process of learning, a model refers to a stepwise procedure aimed at fulfilling a certain goal [9]. As such, the role of a learning model stretches beyond the teacher’s entry in a classroom to facilitate the process of knowledge skill acquisition. Instead, it involves the acquisition of the intended goal(s); especially improving learning effectiveness. Also, learning models are seen to be systematic processes responsible for the organization of the students' experiences, ensuring that the intended learning goals are realized. Hence, the models guide the instructors regarding the planning of learning and teaching activities, classroom management, and the organization of the learning environment [11]. The eventuality is that learning models involves systematic arrangement and advance planning to ensure that changes such as active learning sessions and behavioral modifications among individual learners are realized; involving both students and the instructors. Also, a good learning mode is seen as that which paves the way for feedback provision or interaction among the concerned parties, eventually maximizing the achievement of the intended objectives.

D. Laboratory-Based Learning Model

A laboratory is seen to constitute a setting for practical activities, serving as a substitute to the traditional classroom. The aim is to promote knowledge and skill acquisition. Indeed, most of the laboratory have been affirmed to emphasize an increase in scientific method understanding, the process of skill development, and gaining knowledge about scientific concepts [12]. Hence, this setting allows learners to observe physical phenomena before formulating problems and inferences about the topic being investigated. In turn, learners gain an opportunity to prove theories that
they might have learned in classroom [13]. Based on these observations, learning models based on the laboratory seek to apply certain procedures, demonstrate certain processes or tools, and prove theories or concepts learned in classroom settings.

E. Direct Instruction Model

As observed by Arends[14], the role of learning models is to ensure that students gain basic knowledge and skills on a stepwise basis. This approach translates into a direct learning model, referred to as the direct instruction model. Indeed, the model proves active on the part of the instructor but most of the students assume a passive role. Hence, instructional provision is one-way. As such, the role of the students is expected to involve following the content presented and explained to them. Thus, the success of the direct instruction model depends on the ability of the instructor, especially regarding the management of the learning process, as well as content delivery and learner motivation [15].

F. Personality

An individual’s personality refers to how they interact and react to the opinions of others [16, 17]. Also, personality refers to behavioral patterns that an individual exhibits, as well as various ways of thinking, which are unique to each person. Indeed, personality shapes how the individuals tend to adjust to the environment in which they live or operate. Also, Jung observed that personality categorizes individuals into two forms: introverts and extroverts. Indeed, introverts have their consciousness directed towards one’s self. On the other hand, extroverts are seen to have consciousness and attitude that lead to the outside of one’s self; implying that they consider other individuals, as well as events in the natural surrounding (Officers, 2004). Also, Eysenck (in Alwisol) stated that personality entails the entire pattern of the potential or actual behavior of an individual, which is shaped by the environment in which they live or the factor of heredity. Specific attributes that are seen to determine whether an individual emerges as an introvert or extrovert include the somatic sector, the effective sector, the Katif sector (character), the cognitive sector (intelligence) [18]. From the observations above, it is notable that various characteristics and behaviors of an individual define their personality. To predict the personality, it becomes important to observe how the individual reacts to certain stimuli. Hence, behavior is arises form issues such as how individuals talk and how they appear. Imperative to highlight is that the aspect of character is unlikely to appear directly, proving more inherent.

III. RESEARCH METHOD

The research context constituted STIKOM Ambon Maluku Province’s S1 Program Information System. The period of investigated was between 2014 and 2015, conducted in six months and within an even semester. The target population constituted all students who were pursuing the program [19]. Particularly, the sampling frame entailed STIKOM Ambon students who were in session during the second semester. Indeed, a sample refers to a group selected to represent the opinions of the rest of the target population [20]. In this study, a simple random sampling technique was implemented. The choice of this approach was informed by the need to avoid researcher bias, which could have compromised the validity and reliability of the outcomes. Regarding the research approach or design, the study adopted a quasi-experimental technique, whose factorial design was set at 2 x 2. The independent variables involved personality (introvert or extrovert) and the nature of the learning model (the direct learning model or the laboratory-based learning approach). On the other hand, the dependent variable constitute the learning outcomes accruing form the implementation of a programming algorithm in the selected research context [19].

IV. RESULT AND DISCUSSION

The outcomes were obtained form the control group and the experimental group. From the outcomes, 25 individuals were extroverts while five individuals were introverts; outcomes obtained in relation to the experimental class. Relative to the control group, the study gained data from 17 individuals belonging o the extrovert personality type while introverts were 13. The insights gained were made meaningful via hypothesis testing and relevant statistical analyses.

A. Analysis Test Results

Before conducting the data analysis process, it is important to determine the requirements or raw data obtained form a given study. The aim is to discern information that is homogeneous and distributed normally; eventually making informed conclusions and inferences. To conduct the data analysis in this study, Kolmogorov-Smirnov test, which is used to discern normality, was employed. Also, the Bartlett Levene Test Test aided in testing for homogeneity.

1. Data Normality Testing

Table 3.2 (below) illustrates the normality test outcomes

<table>
<thead>
<tr>
<th>Model</th>
<th>Kolmogorov-Smirnov Statistic</th>
<th>Df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.000</td>
<td>.1270</td>
<td>300</td>
<td>.2000*</td>
</tr>
<tr>
<td>2.000</td>
<td>.1490</td>
<td>300</td>
<td>.0880</td>
</tr>
</tbody>
</table>

From the outcomes present in the table above, it is evident that the target population and participants were distributed normally. This observation is informed by a situation in which the laboratory-based model or model 1 group had its Kolmogorov-Smirnov test reveal outcomes of 0.2000. For the direct learning model or model 2 group, the value stood at 0.0880. Indeed, both values exceeded 0.050, suggesting that the normality test’s statistical hypotheses H0 was accepted.

2. Sample Homogeneity Test T

When the Bartlett Levene Test was applied, the resultant outcomes were obtained as shown below:
Table-3.3. Test of Homogeneity of Variances

<table>
<thead>
<tr>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>.7930</td>
<td>60</td>
<td>200</td>
<td>.5860</td>
</tr>
</tbody>
</table>

From the test results above, which sought to determine variance homogeneity, the p-value or significance value was 0.5860. Indeed, the value was more than 0.050, implying that $H_0$ was accepted.

B. Hypothesis Testing

Relative to the aspect of testing the hypothesis, the chief motivation or intention was to determine the impact of learning models on learning outcomes. Also, the testing of the hypothesis sought to establish the relationship between personality and learning outcomes. Similarly, the testing aimed at predicting how future interactions between the type of the learning model and the learning outcome might shape the instructors’ choice of different teaching methodologies or approaches. Hence, a x 2 factorial test was implemented, eventually establishing the average difference between the selected groups. The formulation of the hypotheses was set as follows:

1. \[ H_0: \mu_{A1} = \mu_{A1} \]
   \[ H_1: \mu_{A1} > \mu_{A1} \]
2. \[ H_0: \mu_{B1} = \mu_{B1} \]
   \[ H_0: \mu_{B1} > \mu_{B1} \]
3. Interaction Effects
   \[ H_0: \text{Interaction (A X B) = 0} \]
   \[ H_0: \text{Interaction (A X B) ≠ 0} \]

Indeed, the criteria were set in such a way that \( F_0 \leq F_{\text{table}} \), the null hypotheses would be rejected. The testing of the hypothesis was conducted using ANOVA 2 X 2 in the form of manual calculations; which are shown in table 4.1 below.

Table-4.1. Summary of ANOVA 2 X 2

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Db</th>
<th>JK</th>
<th>RJK</th>
<th>F count</th>
<th>Ftable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Pembelajaran</td>
<td>1.0</td>
<td>663,113.0</td>
<td>663,113.0</td>
<td>11,841.0*</td>
<td>4.02 7.31</td>
</tr>
<tr>
<td>Personality</td>
<td>1.0</td>
<td>536,543.0</td>
<td>536,543.0</td>
<td>9,581.0*</td>
<td>4.02 7.31</td>
</tr>
<tr>
<td>Interaction (A X B)</td>
<td>1.0</td>
<td>763,193.0</td>
<td>763,193.0</td>
<td>13,628.0*</td>
<td>4.02 7.31</td>
</tr>
<tr>
<td>Mistake</td>
<td>56.0</td>
<td>0.22.0</td>
<td>0.00393.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>59.0</td>
<td>1963,069.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where:
Db : The Degree of Freedom
JK : The sum of squares
RJK : The Average Number of Squares

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 Ftable at 0.05% significance level and degrees of freedom (df) 1/56 of 4.02, then $F_{\text{count}} > F_{\text{table}}$ (11.841 > 4.02).
2. There is a difference between personality to learning result of Programming Algorithm, that is obtained the value of Fcount equal to 9.581 whereas Ftable at the level of 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 $H_0$ is rejected.
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.

V. CONCLUSION

From the problem statement and the discussion (and presentation) of the tested hypotheses that this study examined, various conclusions and inferences were evident. They were summarized as follows:

1. Based on student who underwent direct learning and those who were exposed to a laboratory-based learning model, there was a statistically significant difference. Particularly, the laboratory-based learning model yielded superior results in relation to the students' performance (compared to the group that participated in the direct learning model).

2. However, when aspects of extrovert versus introvert personality were compared, the results did not reveal a statistically significant difference in the learning outcomes of individuals who participated in the student programming algorithm.

3. Regarding the nature or type of learning model and the type of personality that the students exhibited, there was a significant difference in the learning outcomes.

4. A comparison of introverts and extroverts who participated in student programming algorithms revealed a significant difference – when the students underwent the laboratory-based learning model. Specifically, students with introvert personality had inferior outcomes compared to their outcomes from the introvert personality group.

5. It is also worth noting that when the direct learning model was applied, there was a significant difference between the performance of introverts and that of extroverts. Specifically, superior learning outcomes were reported in the introvert personality group, with these students performing better than those with extrovert personality.

6. Additional insights suggest a significant difference between the performance of the introvert group exposed to the direct learning model – compared to that introvert group exposed to the laboratory-based learning model. Specifically, the introvert group exposed to the laboratory-based learning model is seen to pose superior results relative to the performance in the student programming algorithm (compared to the introvert group undergoing direct learning).

7. Lastly, a significant difference was noted regarding extroverts who underwent laboratory-based learning compared to those who were exposed to the direct learning model. Specifically, extrovert learners who underwent laboratory-based learning exhibited superior performance compared to those who underwent direct learning.

REFERENCES