Fitness and Learning Performance among Polytechnic Students

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Fitness and Learning Performance among Polytechnic Students

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Abstract. Learning performance could be affected by several factors, one of it is body fitness. This paper aims to describe the fitness and learning performance among polytechnic students. It is based on the findings and results of observing the second-year polytechnic students. Twenty-five girls do series of fitness test and competency test. As a result, students with lower BMI has higher VO2Max since they can run faster than their competitors. Students with higher VO2Max have better learning outcome than other respondents.

1. Introduction

Students learning performance is influenced by various factors. Considerable research has examined those influential factors [1]–[3]. It is proved that students' satisfaction and motivation as well as their teacher performance has significant influence to students learning performance [4], [5]. While students feel happy their motivation could be increased in line with their learning performance. For example, sport based engineering course is beneficial and delightful for students learning process [6]. Furthermore, when students learn from smart teacher their possibility to become smarter is also increasing. There are still others influential factors that might boost the pupils' performance, especially engineering and polytechnic students.

The characteristics of engineering or polytechnic students are different with general students. They must master both theoretical knowledge and fundamental work skills [7]–[9]. Since they expected to become skillful workers, they should improve their ability by doing practical actions. They should be able to operate several machines of woods or metal working, medical treatments, and another special-purpose machinery. That hands-on activity required absolutely splendid health conditions.

There is some global research on students' physically and mentally health and its impact to learning performance. The first research discusses on Korean teenagers' health behaviors and their academic performance [10]. They suggest teenagers conduct systematic diet, reducing smoking and alcohol drinking, and physical activity for refining their academic achievement. One study of scores the students health responsibility, nutritional habits, spiritual growth, interpersonal relations, or stress-management [11]. The result offers an understanding that the health-related issues of young universities students has implications for the health of youngsters in the wider community.

Another research focused on the evaluation of cardiorespiratory fitness (CRF) and the body mass index (BMI) of Brazillian schoolchildren [12]. They found that children with higher BMI and CRF may possess lower maximal oxygen uptake (VO2max) as indicator of aerobic fitness [13]–[15]. In other words, they consume less oxygen than ones with low BMI. Another research focused on

examining the relationship between part time working, mental and physical health and academic performance [16]. This research found that working more hours tend to decrease the student academic performance.

The physical fitness and academic achievement relationship has received much courtesy due to the increasing prevalence of unfit and overweight students [17]. However, none of researches discuss the fitness and performance among polytechnic students.

This paper discovers the fitness and learning performance among polytechnic students. The research method, result and discussion will be discussed in the following subsections.

2. Method

The research is conducted in a public polytechnic in Malang. Two academics with physical education experience carried out the tests and measurements. The number population is 25 female students, who attend the classes regularly. This study uses uniform age, gender, attendance and treatments to avoid data discrepancy.

The research is divided into following observed tests. The first test is the fitness test [17]–[19]. Before performing the test, every respondent's weight and height. Their body composition is then presented by Body Mass Index (BMI). Afterwards, they have to run three times a week with distance of 1.6 kms. The running time is recorded and used to calculate VO2Max together with other parameters such as heart rate and weight. The VO2Max is measured using the Rockport Fitness Walking Test [20], [21].

The second test is competency test [22], [23]. After one week running treatment, the students must do their written vocational competency test. Students have to reach 80 to pass the test. Otherwise, they have to do remedial test until they succeed. The frequency of each student test is also recorded.

Finally, descriptive statistics is used to describe the finding. It may provide simple summaries of the sample and the conducted measures.

3. Result and Discussion

Table 1 presents the result of fitness test. The students' weight distribution is in the range of 42-66 kgs with over 155 cm heights as required by the polytechnic. The students' heart rate is measured after they performed the physical test. Their heart rate is in range of 102-120.

Table 1. Fitness Test Result

Respondent Id	*Weight (Kg)*	*Average Time (minutes)*	*BMI*	*Heart rate*	*VO2 Max*
R1	54	6.69	21.6	110	76.1
R2	57	7.20	22.5	103	75.0
R3	54	6.82	22.5	108	76.0
R4	49	7.34	19.4	114	74.2
R5	66	7.17	26.4	110	72.5
R6	51	7.43	22.4	112	73.9
R7	50	7.11	21.1	113	75.0
R8	53	7.57	22.6	102	74.7
R9	46	7.57	18.2	115	73.8
R10	56	7.28	21.6	116	72.9
R11	49	6.29	19.6	117	77.2
R12	58	6.77	22.7	102	76.8
R13	46	8.19	18.0	107	73.4
R14	50	6.07	18.9	120	77.7
R15	40	6.08	16.4	109	81.0
R16	51	7.21	21.5	106	75.9

Respondent Id	*Weight (Kg)*	*Average Time (minutes)*	*BMI*	*Heart rate*	*VO2 Max*
R17	43	6.93	18.1	104	78.5
R18	51	6.95	19.0	120	74.6
R19	52	6.16	21.6	111	78.4
R20	51	4.96	17.2	114	82.0
R21	57	7.58	19.5	127	70.4
R22	62	6.67	25.2	121	73.5
R23	44	6.80	19.3	106	78.5
R24	63	7.05	24.0	109	74.0
R25	65	8.14	26.0	109	70.1

Since all respondents is in the same gender, it can be seen that all students have VO2Max over 51, means that they are in excellent fitness level [6[24]]. The BMI of respondents is in range of 16.4 to 26. Their average running time is from 4.96 to 8.19. Here, we can conclude that students with lower BMI will run faster than one with higher BMI. Furthermore, the students with the highest VO2Max (82) is also recognized as the fastest runner. It is match with the previous research of [12], where students with higher BMI may have lower VO2Max [25]. In other words, fat students may have a low fitness.

The result of competency test is showed by Table 2. None of the students can pass the test in one turn. Most of them (80%) need to do remedial test two times to get a minimum passing score. Four students need only 1 more test, while one student has to do the 3rd remedial test.

Figure 1 shows the percentage remedial test. Here, we assume that the student who did more remedial test is the student with the lower academic performance. As presented in Figure 1, the two cleverest students, need one remedial test. They have the highest VO2Max classification. Furthermore, the most population have to do two remedial tests. Thus, the student with low academic performance has the low level of the VO2Max.

In this far from perfect study, we face difficulties on concluding the research results. The main reason is that all students are in excellent fitness condition. The other reason is that the applied descriptive analysis is not adequate to reveal the correlation between VO2Max and the number of remedial test. This preliminary research should be more explored by using more sophisticated method. A linear regression with a Pearson's R correlation should be used to find significant correlation the learning outcome with the healthy body [26], [27].

Mens sana in corpore sano a healthy mind in a healthy body. This phrase express that physical exercise is a crucial part of mental and psychological condition. In context of engineering and polytechnic, the implemented curricula should be reviewed based on the changing global environments. The academic environment can be an effective and efficient medium on influencing the students' health [28], [29]. Implement a health-related physical education curriculum can potentially advantage students [30]–[33]. Furthermore, universities must make establishment for engineering subjects [34], teaching and learning material combined with proportional physical activities which are updated and capable of enhancing the skills and attributes of the next generation of engineers.

Table 2. The Result Of Competency Test

Respondent Id	*Competency Test*				*Number of test to pass*
	Main	*1st remedial*	*2nd remedial*	*3rd remedial*	
R1	Fail	Fail	Pass		3
R2	Fail	Pass			2
R3	Fail	Fail	Pass		3
R4	Fail	Pass			2
R5	Fail	Fail	Pass		3
R6	Fail	Fail	Pass		3

R7	Fail	Fail	Pass		3
R8	Fail	Fail	Pass		3
R9	Fail	Fail	Pass		3
R10	Fail	Pass	Pass		3
R11	Fail	Fail	Pass		3
R12	Fail	Fail	Pass		3
R13	Fail	Pass	Pass		3
R14	Fail	Fail	Pass		3
R15	Fail	Pass			2
R16	Fail	Fail	Pass		3
R17	Fail	Pass	Pass		3
R18	Fail	Pass	Pass		3
R19	Fail	Fail	Pass		3
R20	Fail	Pass			2
R21	Fail	Fail	Pass		3
R22	Fail	Fail	Pass		3
R23	Fail	Fail	Pass		3
R24	Fail	Fail	Fail	Pass	4
R25	Fail	Fail	Pass		3

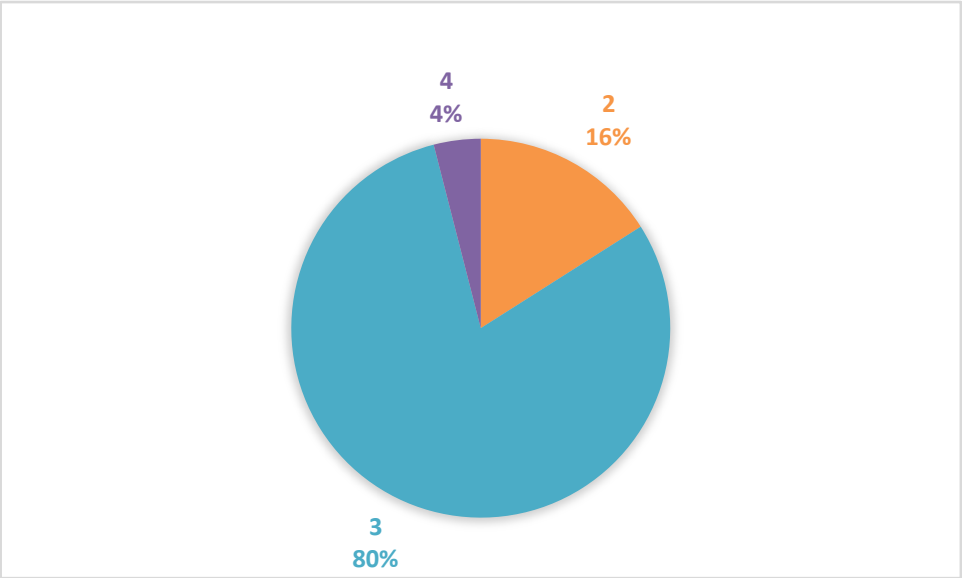

Figure 1. The Percentage of Remedial Frequency Remedial

4. Conclusion

The research finds that the lower BMI may increase the VO2Max. However, since all respondents are in their very fit condition, it is hard to describe that their competency is related to their fitness as well as the number of test that they did. Thus, further research with deeper technique should be conducted. It is necessary to do research on the correlation between fitness and students learning outcome. The research should concern on perceptions of their discipline and also career opportunities [35]. Various learning approaches such problem and project based learning should be considered to improve the students learning outcome [35]–[37]. The future research should involve different respondents with various gender [11], ages [17], social-economic condition [38] and also their intelligence quotient (IQ) [39]. Similar research is also visible for lecturers and laboratory technicians as research objects. The

use of SOFIT [40]–[42], an objective assessment of the physical education quality, is potential for the future research. The tool measures the student activity levels, lesson context, and teacher behavior during class time. Thus, the research finding might be presented more systematically.

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