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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 lower VO2Max have better learning outcome than other respondents.

Keywords: fitness; learning performance; polytechnic students

Introduction

Students learning performance is influenced by various factors. Considerable research has examined those influential factors (Cekiso, Arends, Mkabile, & Meyiwa, 2016; Honicke & Broadbent, 2016; Lin, Yen, Liang, Chiu, & Guo, 2016). It is proved that students' satisfaction and motivation as well as their teacher performance has significant influence to students learning performance (Asfani, Suswanto, & Wibawa, 2016; Suswanto, Asfani, & Wibawa, 2017). 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 (Kadlowec & Navvab, 2012). 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

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master both theoretical knowledge and fundamental work skills (Besterfield-Sacre, Atman, & Shuman, 1997; Klement & Klementová, 2016; Nguyen, 1998). 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 (So & Park, 2016). 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 (Lee & Loke, 1997). 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 <u>evaluation of cardiorespiratory fitness (CRF) and the body mass index (BMI)</u> of Brazillian schoolchildren (De Araujo, Miguel-Dos-Santos, Silva, & Cabral-De-Oliveira, 2015). They found that children with higher BMI and CRF may possess lower maximal oxygen uptake (VO2max) as indicator of aerobic fitness (Black, Vehrs, Fellingham, George, & Hager, 2016; Shadiqin, 2013; Takken, Bongers, Van Brussel, Haapala, & Hulzebos, 2017). In other words, they consume less oxygen than ones with low BMI. Another research focused on <u>examining the relationship between part time working, mental and physical health and academic performance</u> (Carney, McNeish, & McColl, 2005). 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 (Castelli, Hillman, Buck, & Erwin, 2007). 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.

Methods

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 (Castelli et al., 2007; Grissom, 2005; Tomkinson, Olds, Kang, & Kim, 2007). 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 second test is competency test (Ali & Akayuure, 2016; Ushatikova, Rakhmanova, Kireev, Chernykh, & Ivanov, 2016). 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.

RESULT AND DISCUSSION

Table 1 presents the result of fitness test. The students' weight distribution is in the range of 42-66 kgs

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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.

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 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 Table 1. Fitness Test Result

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(Davies, 1973)]. 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 (De Araujo et al., 2015), where students with higher BMI may have lower VO2Max (Östenberg & Roos, 2000). 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.

Table 3 shows the frequency of remedial against the V02Max class. Here, the VO2Max is classified into three classes to simplify the analysis: 70.1-75 (lowest); 75.1-80 (medium); 80.1-85 (highest). The frequency distribution of the class is also recorded, based on the frequency of remedial test. We assume that the student who did more remedial test is the student with the lower academic performance. As presented in Table 3, the number cleverest students, need one remedial test, is four students are in the lowest VO2Max classification. The most population have to do two remedial tests. In contrast, the student with low academic performance is also in the first class 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 (Anderson & Good, 2017; Resaland et al., 2016).

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 (Higgins, Hall, Wall, Woolner, & McCaughey, 2005; Shariff et al., 2008). Implement a health-related physical education curriculum can potentially advantage students (Basch, 2011; Cavill, Pediatric Biddle, & Sallis, 2001; Sallis et al., 1997; St Leger & Nutbeam, 2000). Furthermore, universities must make establishment for engineering subjects (Rugarcia et al., 2000), 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. 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 Pass 2 R7 Fail Pass 2 R8 Fail Fail Pass 3 R9 Fail Fail Pass 3 R10 Fail Pass Pass 3 R11 Fail Pass Pass 3 R12 Fail Fail Pass 3 R13 Fail Pass Pass 3 R14 Fail Fail Pass 3 R15 Fail Fail Pass 3 R16 Fail Fail Pass 3 R17 Fail Pass Pass 3 R18 Fail Pass Pass 3 R19 Fail Fail Pass 3 R20 Fail Fail Pass 3 R21 Fail Fail Pass 3 R22 Fail Fail Pass 3 R23 Fail Fail Pass 3 R24 Fail Fail Pass 4 R25 Fail Fail Pass 3 Table 2. The Result Of Competency Test

VO2Max

Range Frequency of Remedial Test 1 2 3 70.1-75 4 9 1 75.1-80 9 80.1-85 2 Table 3. The Frequency Remedial vs Vo2max Range

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 (Mohedas, Kaufmann, Daly, & Sienko, 2015). Various learning approaches such problem and project based learning should be considered to improve the students learning outcome (Mills & Treagust, 2014; Mohedas et al., 2015; Sienko, Sarvestani, & Grafman, 2013). The future research should involve different respondents with various gender (Lee & Loke, 1997), ages (Castelli et al., 2007), social-economic condition (Voorn & Kommers, 2013) and also their intelligence quotient (IQ) (Li, Yu, Liu, Shieh, & Yang, 2014). Similar research is also visible for lecturers and laboratory technicians as research objects. The use of SOFIT (Hannon, 2013; Mckenzie, 2012; Rowe, van der Mars, Schuldheisz, & Fox, 2004), 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. References

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