



Needs Analysis of Development of Digital-Based Vertical Jump Tests

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Abstract

This study aims to determine the need for the development of digital-based vertical jump test equipment. This research is a survey research using a non-structural questionnaire which has been prepared to be filled in by the research subjects. Six statements were compiled in this research questionnaire to find out how much is needed for the development of digital-based vertical jump test kits. 146 participants consisting of students, teachers, and physical education lecturers in South Sumatra filled out questionnaires through the google form media. The survey results showed that the majority of participants experienced difficulties during the vertical jump test and most of them thought that the vertical jump measurement instruments used were inaccurate. All participants agreed with the development of the vertical jump measurement instrument from manual to digital. The results of this study will be used as a consideration to develop a vertical jump test instrument that has a good level of validity and is relatively affordable.

How to Cite

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INTRODUCTION

Physical fitness is a person's ability to carry out a physical activity without causing excessive fatigue (Sinuraya & Barus, 2020). Physical fitness can be improved by paying attention to several factors needed in carrying out an activity which include endurance, strength, speed, and flexibility (Yane et al., 2017). To determine the level of physical fitness, we need an instrument that can be used to measure some of the factors mentioned above. One indicator of physical fitness is leg muscle power or explosive power, which is a combination of speed and strength, which can be tested by measuring vertical jumps (Pramudani et al., 2018).

Vertical jump measurements for physical fitness in several previous studies conducted in several regions in Indonesia did not include the test instruments used (Hafidz et al., 2020; Herwin et al., 2020; Utamayasa, 2020; Wijayanti et al., 2012). However, from observations made by researchers in several physical fitness tests, the measurement of limb muscle explosive power is usually done by measuring vertical jumps using a meter board mounted on a wall. According to (Haryono et al., 2013), one of the weaknesses of the vertical jump test using a meter board is that the testee has a little doubt, is afraid of his feet or other body parts hitting the wall. This can cause t-esteem to make a jump that is not optimal in carrying out tests so that it can have an impact on the results of the tests carried out.

Vertical jump measurements can actually be done using several other instruments such as Jump DF and Force Plate which have a very good level of accuracy which can increase the validity of the test results. However, each of these vertical jump test instruments is quite difficult to be owned by various groups who need it because the price is quite high. The Jump DF TKK-5414 series produced by a Japanese company has a price of Rp. 107,000,000.00, while the American Force Plate AMTI-Accu Power has a price of Rp. 635,300,000.00 per one set. This high price will certainly be difficult to reach, especially for independent testers or agencies with limited funds. These problems raise questions regarding the need to develop a vertical jump test instrument with a good level of validity at an affordable price.

This study aims to determine the need for the development of digital-based vertical jump

test equipment. The test kits that will be developed will certainly have a good level of validity and at a relatively affordable price. Thus, the analysis of development needs in this study is for vertical jump test tools that can be owned by various groups and make the implementation of tests more practical and accurate so that the results of the measurements are more valid and reliable.

METHODS

This research is a survey research using a non-structural questionnaire which has been prepared to be filled in by the research subjects. Six statements were compiled in this research questionnaire to find out how much is needed for the development of digital-based vertical jump test kit

Tabel 1. Questionnaire

Questions
What is your job?
Do you know a tool to measure the vertical jump height (vertical jump)?
How much have you used a vertical jump height meter in the last 1 year?
Are you having trouble doing the vertical jump test?
How accurate, in your opinion, is manual vertical jump measurement, which is often done?
Do you agree if the vertical jump height meter is developed and modernized from manual to digital?

Purposive accidental sampling was applied to obtain research data with a research subject of 146 participants, who were users of the vertical jump test instrument, consisting of students, teachers, and physical education lecturers in South Sumatra. The questionnaire used was in the form of a google form which was sent to participants via the link <https://forms.gle/StX-25uof2CndyWZj6> in August 2021. Participants in this study received information at the beginning of the questionnaire about the purpose of the survey and informed consent. Participants gave an assessment according to the actual situation, and they agreed to participate in this study. The average time needed to answer the questionnaire is 5 minutes. Statistical analysis used is descriptive statistics from the results of participants' answers to the questionnaires that have been sent.

Table 2. Description of Participant Characteristics

Characteristics	Amount	N (%)
Respondent Cluster		
Physical Education Student	64	44%
Physical Education Teacher	77	53%
Physical Education Lecturer	5	3%
Number of Respondents	146	100%

RESULTS AND DISCUSSION

The answers from participants who filled out the questionnaire through the google form on August 24 – 31, 2021 resulted in product needs analysis data. These results will later be used as consideration for further research in the process of developing digital-based vertical jump test kits. **Table 3** is the result of answers from research participants.

Table 3. Percentage of Research Questionnaire Answer Results

Instrument	Amount	%
Type of work		
Lecturer	5	3%
Teacher	77	53%
Physical Education Student	64	44%
	146	100%
Do you know a tool to measure the vertical jump height (vertical jump)?		
Yes	136	93%
No	10	7%
	146	100%
How much have you used a vertical jump height meter in the last 1 year?		
Sometimes	34	23%
Very often	3	2%
Tidak Pernah	109	75%
	146	100%
Are you having trouble doing the vertical jump test?		
Sometimes	28	19%
No	23	16%
Yes	95	65%
	146	100%

How accurate, in your opinion, is manual vertical jump measurement, which is often done?	Amount	%
Quite Accurate	51	35%
Very Accurate	7	5%
Not accurate	88	60%
	146	100%
Do you agree, if the vertical jump meter is developed and modernized from manual to digital?		
Yes	146	100%
No	0	0%
	146	100%

Table 3 describes the percentage of answers to the questionnaire by research participants. Question 2 shows that the majority of participants (93%) know the instrument for measuring the height of a vertical jump or vertical jump, but in question 3, in the past year participants who often use this instrument only reach 2% and sometimes use only 23%, while the rest (75%) did not use this measurement instrument. In question 4, most of the participants answered that they had difficulties during the vertical jump test (84%) and only 16% of the participants did not experience difficulties in administering the test. Question 5 shows that 60% of participants think that the vertical jump measurement instrument commonly used is inaccurate, while 35% of participants think it is quite accurate, and only 5% of participants think it is accurate. All participants in question 6 agree with the development of the vertical jump measurement instrument from manual to digital.

Several previous studies have developed physical fitness test instruments, such as (Praepty et al., 2017) which developed a physical fitness test instrument for children aged 4-6 years and (Irfan & Komaini, 2019) which developed a physical fitness test instrument based on android. Then there are also studies that develop physical fitness test instruments in more specific units such as (Komaini et al., 2018) which develops a sensor technology-based flexibility test instrument and (Purba, 2020) which develops a microcontroller-based bleep test instrument. The development carried out by several researchers aims to produce physical fitness test instruments that are easy, cheap, effective, and efficient, so that the physical fitness tests carried out will get valid and reliable results.

The results of participants' answers in this study indicate that the development of a digital-based vertical jump test is needed, although the majority of participants have not used a vertical jump test in the past year. This condition occurs due to the Covid-19 pandemic which requires various activities to be carried out from home or online so that the implementation of tests, which are usually carried out at least once a year, is abolished. One example is the physical fitness test activity as one of the entrance tests in the Physical Education, Health and Recreation study program, Sriwijaya University which is usually held every year, in the 2020 and 2021 academic years. A similar condition is suspected to have occurred in other agencies that usually carry out physical fitness tests and stopped measuring activities due to the Covid-19 pandemic. Several previous studies conducted a survey to look at the description of physical activity and body mass index (Bayu et al., 2021; Solahuddin et al., 2021) as an alternative to measuring physical fitness due to conditions that did not allow for the test, although several other studies have started to conduct the test. physical fitness test with a limited number of participants (Firmansyah & Muhammad, 2021; Syafruddin et al., 2021; Zubaidah et al., 2021).

Participants' answers to questions 4 and 5 indicate that the vertical jump test instrument they usually use is less effective and efficient, and tends to be inaccurate. This is consistent with (Haryono et al., 2013) which shows that the traditional vertical jump test instrument has weaknesses in its implementation, so the tests carried out are difficult and inaccurate. The development of the vertical jump test tool that is planned after this research is expected to produce a vertical jump test instrument that is easy to use and accurate so that it can answer the problems that occur in the results of the survey questions 4 and 5.

This research is limited to the analysis of the need for the development of digital-based vertical jump test equipment and the results of this study will be used as a consideration to develop a vertical jump test instrument that has a good level of validity and is relatively affordable.

CONCLUSION

One indicator of physical fitness is leg muscle explosive power, which can be tested by measuring the vertical jump. However, the traditional vertical jump test instrument has weaknesses in its implementation, so the tests carried out are difficult and inaccurate. Surveys conducted on users of vertical jump test instruments show

that the vertical jump test instruments commonly used are less effective and efficient, and tend to be inaccurate. All participants in this study agree with the development of a digital-based vertical jump test instrument, and the results of this study will be used as a consideration to develop a vertical jump test instrument that has a good level of validity and is relatively affordable.

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