Online Physical Fitness Tests: Unveiling Anomalies in Paving the Way for Enhanced Testing in the Digital Era

Fajar Hidayatullah [1*], Heny Setyawati [2], Mashuri Eko Winarno [3]
[1] Universitas Negeri Semarang
[1] STKIP PGRI Bangkalan
[2] Universitas Negeri Semarang
[3] Universitas Negeri Malang
*Corresponding author: fajarhidayatullah@students.unnes.ac.id

Abstract: This paper delves into the implications of online physical fitness tests and emphasizes the significance of carefully crafting assessments and choosing appropriate evaluation techniques. The research investigates the efficacy of self-assessment and peer assessment in evaluating movement skills, while also addressing the challenges related to arm strength measurements that may necessitate sophisticated approaches or specialized equipment. Considerations of access to digital devices, internet connectivity, and information security are crucial for establishing a conducive online assessment environment. Additionally, the study highlights anomalies observed during the push- up and standing stork tests, which were attributed to screen delays. These findings emphasize the continuous need for technological advancements. In conclusion, the study stresses that a thoughtful design and adaptation of assessment methods tailored to specific physical fitness components are vital for successfully implementing virtual learning environments. Collaborative efforts between educators and technology developers are indispensable in optimizing the potential of online physical education assessments and promoting overall student health and fitness in the digital era.

Keywords: Physical fitness test, Digital, Education, Student

INTRODUCTION

Digital education significantly change traditional approaches in education and gently revolutionized the educational landscape today. The education sector is witnessing a paradigm shift with the rapid and ongoing technological advancements The education sector is witnessing a paradigm shift with the rapid and ongoing technological advancements (Sharma et al., 2022). Availability of digital technology and the internet has made e-learning a popular and also

accessible educational method. Due to its multiple benefits and advantages, e-learning is widely used in universities, making it one of the most effective teaching methods (Arkorful & Abaidoo, 2014). The main benefit of digital education is ability to overcome geographical barriers and provide adequate educational resources to students around the world easily. This inclusiveness ensures equal opportunities to the students from many different backgrounds, regardless of location or socio-economic status. Digital technology is growing in popularity in the enacted teaching and learning process (Wallace et al., 2023). In addition, digital education offers flexibility and convenience that allowing students to access course materials and lessons at their own pace and in a convenient manner when the teacher using asynchronous learning in ther educational method. In the current scenario, e-learning has become very important due to its flexibility, accessibility, global reach, technological advancement and resilience (Barman & Roy, 2023). The use of multimedia tools, interactive videos and virtual simulations increases engagement and comprehension while adapting to different educational styles. Through the combined efforts of Digital Education, its can continue to transform education, empowering students and preparing them for success in tomorow. In order to better manage alternative assessment procedures, incorporating suitable technology can help teachers facilitate an easier, more productive practice in unique and innovative ways (Ha et al., 2022). The digital era transformation has recognized the importance of physical well-being and has made physical education an integral part of the educational world on developing physical activity for students in schools. This change recognizes the importance of maintain the overall well-being of students, which includes not only academic development but also physical health (Hariyanto et al., 2023). Integrating physical education into the digital world will offers a unique opportunity to improve the overall learning experience of students. As technology continues to revolutionize education, sport is not spared its transformative impact. Many of the selected studies focused on the benefits of using digital media to achieve physical education goals, and few focused specifically on media-based learning, including themes and the impact of image viewing on students' self-esteem (Jastrow et al., 2022). While digital inclusion has many benefits, the balance between screen activity and physical interaction is critical to maintaining the essence of physical education. The authors of the study acknowledge that new technologies have many positive and negative impacts on education (Santos et al., 2022). Through the effective use of digital tools and resources, the integration of physical education into the digital landscape has the potential to revolutionise the way students engage with fitness, health and sport, and to foster an appreciation of an active and healthy lifestyle for all.

As the use of online test tools increases, lecturers benefit in terms of marking time and costs of producing grades, while for students, online quizzes provide immediate and comprehensive feedback and significantly increased

flexibility in terms of time and place of assessment (Baleni, 2015). The use of technology allows for immediate feedback, enabling learners to identify areas for improvement and adjust their learning strategies accordingly. To ensure that students' priorities are being met in online learning, instructors need to first facilitate an effective interaction between the students and the content (Abou-Khalil et al., 2021). In addition, online assessments promote flexibility by allowing learners to complete assignments and tests at their own pace and convenience. However, ensuring the integrity and security of online assessments remains a concern. With the growth of online education, educators are faced with the possibility of compromising convenience for the loss of security and integrity of students' course assessments (Ahadiat & Gomaa, 2020). In addition, accessibility issues for students with limited Internet access or technology skills should be addressed to ensure inclusivity in the assessment process. Online physical education assessment is currently encountering distinctive challenges due to the ever-evolving landscape of education. Educators must devise innovative and dependable approaches for evaluating students' motor skills, coordination, and physical fitness remotely. Furthermore, the digital divide presents an equity hurdle as not all students may possess the required technology or internet access for online assessments. Studies conducted by both Russian and foreign researchers highlight various issues, including the inadequate physical health of incoming university students, insufficient logistical support, lack of a standardized system for assessing students' physical fitness, and significant disparities in the curriculum (Osipov et al., 2016). To tackle these challenges, it is essential to adopt a strategic strategy, making use of video submissions, interactive simulations, and self-assessment tools that enable students to showcase their skills proficiently. Additionally, instilling a strong sense of responsibility and integrity in students is pivotal to curbing academic dishonesty during online physical education assessments. Teachers should lay down clear guidelines and expectations, emphasizing the significance of honesty and integrity in reporting their achievements. By using technology wisely and overcoming these barriers, online physical education assessment can become an invaluable tool for improving students' physical well-being, monitoring their progress and supporting their overall development in a virtual learning environment.

Online assessment in physical education still has full of possibilities, as technology opens up new ways and method of assessing students physical fitness. However, there is still little research on the impact of formative assessment, either in general or specifically in the context of physical education (Chng & Lund, 2018). The digital era offers many of advanced tools and platforms that can transform the way physical education is assessed that used to be. A key advantage was the ability to provide immediate, personalised feedback to students. In addition, immersive experiences using virtual simulations and interactive videos allow students to

effectively take the test online. However, existing research sheds light on online physical education curriculum, teaching methods and student assessment (Daum et al., 2022). In addition, online physical education assessment is inclusive because it offers flexible learning alternatives for students with different needs and schedules. Students can engage in physical activity at their own pace and convenience, based on their individual learning preferences. As educators continue to explore and implement cutting-edge assessment methods, the balance between technology and physical interaction is critical to maintaining the core of physical education. Digital Physics in education is a bold innovation, although the era of teaching for exams is over. Some schools still neglect physical education (Shan, 2021). By taking advantage of these opportunities, an online physical education assessment can reveal significant progress that will motivate students to stay active and encourage a lifelong commitment to an active, healthy lifestyle.

Physical fitness tests assess different components of fitness such as cardiovascular endurance, muscular strength, flexibility and body composition. This is a vital role in understanding a person's physical capabilities and identifying strengths and weakness areas for improvement. Fitness testing widely use in educational institutions, sports training programmes and healthcare organisations to monitor physical capabilities progress, set fitness goals and design personalised training programmes. By providing valuable information in a person's fitness level, these tests enable people to make informed decisions about their health and lead a more active and balanced lifestyle for them. Whether it's running, doing push-ups or testing flexibility with the sit-and-stretch test, fitness testing is an important part of promoting overall health and optimal physical performance. The push-up test widely used as method of upper body strength and endurance test. Push-up tests were used to determine test taker's physical ability (Kellner et al., 2021). This physical fitness assessment traditionally has been conducted in person and may have untapped potential for taken online. Within the increasing availability of digital platforms, there are more opportunities to explore the feasibility of delivering push-up assessments remotely. Online push-up testing could offer several advantages, such as greater flexibility and accessibility. Participants can complete the test from the comfort of their own home, eliminating the need to travel to physical testing sites. The standing stork test is a test that measures a person's balance in units of seconds (Hutagalung et al., 2023). The standing stork test, a common test to measure static balance and stability, may be adaptable for online implementation. Balance is the ability to maintain posture while performing a movement (Putri et al., 2022). Traditionally used in physical education, the standing stork test involves standing on one leg while balancing the other foot against the knee of the supporting leg. The standing stork is a balance test used to assess a person's static balance (Malarvizhi & Arvind, 2019). It is important to ensure that the testing environment is standardised, free from distractions and

that students follow the correct form throughout the test. In addition, potential issues related to the digital divide, limited access to technology, and privacy and data security concerns need to be addressed. Online administration will offer several advantages, including a greater accessibility and convenience for both students and lecturers. There is limited research on online learning that has been transitioned from physical classes and that has continued to use active learning approaches in an online environment (Ting et al., 2022). By carefully exploring the opportunities and overcoming the challenges, phycical fitness test online could become a valuable tool for distance learning in physical education, promoting students' balance and stability skills in a digital learning environment.

The main research question of this research relates to the feasibility of conducting physical education assessments online without sophisticated device or high-tech tools and gadgets. The main concern of this research is the limited digital device to only mobile phones or tablets, for both teachers and students. The researchers aim to investigate how traditional fitness assessments can be adapted to online environment, taking into account the limitations of the available technology. They will explore possible methods to ensure accurate and reliable data collection using simple digital devices such as mobile phones or tablets. To answer these research questions, the thesis will conduct a series of experiments to compare the results of online physical education assessments with traditional face-to-face assessments using a live camera. The results of this research will contribute to the understanding of the challenges and opportunities of implementing online physical education assessment with minimal digital resources, and pave the way for more inclusive and accessible approaches to physical education in the digital age.

METHOD

This article is a study that examines a specific phenomenon using a quantitative descriptive design. Descriptive studies measure things as they are without intervention from researchers to change people's behaviour and experiences (Price & Lovell, 2018). The aim is to gain a comprehensive understanding of the topic through the analysis of numerical data. These (quantitative) concepts reflect post-positivist philosophical assumptions. Determinism suggests that studying the relationships between variables is essential to answering questions and hypotheses through surveys and experiments (Creswell et al, 2018). A quantitative descriptive approach was chosen for this study because it can accurately quantify relationships between variables. This approach involves the collection of numerical data to describe and interpret the phenomenon under study. By using quantitative methods, the researchers aimed to obtain objective and accurate results that could add to existing knowledge on the subject. This approach allowed the researchers to analyse the data using

statistical techniques, which enabled them to draw meaningful conclusions and make generalisations about the study population.

The study used a purposive sampling technique, with 30 subjects completing the push test and 30 subjects completing the standing stork test. Purposive Sampling are Nonprobability Sampling Techniques that a researcher uses to choose a sample of subjects/units from a population (Etikan, 2016). Purposive sampling is the deliberate selection of people or cases that meet certain criteria related to the research question. This method ensures that the selected sample has the necessary characteristics to meet the research objectives. The reason for purposive sampling is the better matching of the sample to the aims and objectives of the research, thus improving the rigour of the study and trustworthiness of the data and results (Campbell et al., 2020). Purposive sampling allowed researchers to focus on specific subgroups or individuals who had unique insights or experiences related to the phenomenon. This sampling technique increased the power of the study and provided concentrated data for subsequent analysis.

The instruments used for this study encompassed two distinct types: a muscle strength and endurance assessment through push-up tests and a balance assessment via the standing stork test. Push-up (PU) testing is widely used to assess upper-extremity muscular strenght and endurance (Rozenek et al., 2022). However, there was a significant modification in the technical execution of these tests, as they were conducted online. Meanwhile, all other aspects of the testing process remained unchanged. Stork test used to measure body balance was timed with a stopwatch (Kamarudin et al., 2022). The standing stork test, on the other hand, is used to assess an individual's balance and stability. Participants were asked to stand on one leg for a predetermined period, and the data were also collected remotely. To establish the validity of the modified testing procedures, a thorough validation process was undertaken. This included comparing the online test results with the traditional in-person assessments for a subset of participants to ensure that the online version accurately reflected the participants' true abilities. Reliability testing was another crucial component of the research. To assess the consistency and stability of the online test results, a subset of participants completed the online tests on two separate occasions. The data from these repeated tests were then analyzed to determine the reliability of the online assessment methods.

After collecting the statistics, the researchers assessed the normality of the information using the Kolmogorov-Smirnov test. This statistical test is used to determine whether the information is typically distributed. The normality assumption is essential for many parametric statistical tests, such as the paired t-test. If the data deviates significantly from a normal distribution, other non-parametric tests may be more appropriate for statistical evaluation. The

Kolmogorov-Smirnov test provided essential information for the following evaluation steps and ensured the accuracy of the selected statistical assessments and the reliability of the research results.The researchers used a paired t-test to examine the data and draw meaningful conclusions from the look at. The paired samples t-test is used when there are related agencies or situations and researchers need to decide whether or not there may be a giant difference between their way. In this take a look at, the researchers wanted to understand how a particular intervention or treatment affected the base variable. By evaluating the means of the associated organisations, the researchers could decide whether the intervention had a statistically extensive impact. The paired t-test provided a powerful statistical analysis that gave insight into the relationships between variables and the hypotheses of the studies.

RESULTS

Table 1. Normality test 1

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
test_offline_ArmStrenght	.141	30	.130	.885	30	.004
test_online_ArmStrenght	.152	30	.076	.913	30	.018
a. Lilliefors Significance Correction						

The results of the normality test on offline arm strength test data (test_offline_ArmStrenght) indicate a significance value of 0.141, which is higher than the significance level of 0.05. Therefore, it can be concluded from these results that the offline arm strength test data is normally distributed. Similarly, the normality test results on online arm strength test data (test_online_ArmStrenght) show a significance value of 0.152, which is also higher than the significance level of 0.05. Consequently, it is concluded that the online arm strength test data is normally distributed. Since both data groups have been confirmed to follow a normal distribution, they can proceed to the next stage of testing using a paired sample t-test.

Table 2. Normality Test 2

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
test_offline_Balance_Right	.116	30	.200*	.947	30	.138
test_offline_Balance_Left	.107	30	.200*	.968	30	.479
test_online_Balance_Right	.132	30	.193	.937	30	.077
test_online_Balance_Left	.092	30	.200*	.961	30	.323
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

The results of the normality tests on offline right leg balance test data (test_offline_Balance_Right) show a significance value of 0.116, which is higher than the significance level of 0.05. Therefore, it can be concluded from these results that the offline right leg balance test data is normally distributed. Similarly, the normality test results on offline left leg balance test data (test_offline_Balance_Left) show a significance value of 0.107, which is also higher than the significance level of 0.05. Consequently, it is concluded that the offline left leg balance test data is normally distributed. Moreover, the normality tests on online right leg balance test data (test_online_Balance_Right) reveal a significance value of 0.132, which is higher than the significance level of 0.05. Thus, it is concluded that the online right leg balance test data is normally distributed. Similarly, the normality test results on online left leg balance test data (test_online_Balance_Left) show a significance value of 0.092, which is higher than the significance level of 0.05. Hence, it is concluded that the online left leg balance test data is normally distributed. Once it is confirmed that all four data groups follow a normal distribution, they can proceed to the next stage of testing using a paired sample t-test.

Table 3. Paired Sampel T Test 1

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	**test_offline_Balance_Right**	5.4503	30	1.96260	.35832
	test_online_Balance_Right	5.8997	30	2.29871	.41968
Pair 2	**test_offline_Balance_Left**	5.4210	30	2.46516	.45007
	test_online_Balance_Left	6.5750	30	2.40540	.43916

Based on the table above, it is evident that the average time for the online right leg balance test is recorded as 5.8997 seconds, which is higher than the average time for the offline right leg balance test recorded at 5.4503 seconds. Similarly, the online left leg balance test shows an average time of 6.5750 seconds, which is higher than the average time for the offline left leg balance test, which is only 5.4210 seconds. From this data, it can be concluded that there is an increase in the test scores when conducted online compared to the offline tests for both the right and left legs.

Table 4. Paired Sample T Test 2

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	**offline_Right - online_Right**	-.44933	1.10036	.20090	-.86022	-.03845	-2.237	29	.033

Pair 2	**offline_Left - online_Left**	-1.15400	2.48442	.45359	-2.08170	-.22630	-2.544	29	.017

Based on the table above, it can be observed that the difference in average scores between offline and online right leg balance tests is 0.44933 seconds, indicating that the online right leg balance test has a higher average score. Furthermore, the significance value of the test is 0.033, which is lower than the significance level of 0.05. Therefore, the null hypothesis (H0) is rejected, and it is concluded that the offline and online right leg balance tests are not identical. Similarly, for the left leg balance test, there is a difference in average scores between the online and offline tests of 1.15400 seconds, with the online test having a higher average score. The significance value of this test is 0.017, which is smaller than the significance level of 0.05, indicating that the offline and online left leg balance tests are also not identical.

Table 5. Paired Sample T Test 3

		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	**test_offline_ArmStrenght**	23.5667	30	6.16264	1.12514
	test_online_ArmStrenght	19.6667	30	3.37673	.61650

Based on the table above, it is evident that the average score for the online arm strength test is recorded as 19.6667, which is lower than the average score for the offline right leg balance test, recorded at 23.5667 seconds. From this data, it can be concluded that there is a decrease in the test scores when conducted online compared to the offline tests.

Table 6. Paired Sample T Test 4

		Paired Differences					**T**	**df**	**Sig. (2-tailed)**
					95% Confidence Interval of the Difference				
		Mean	**Std. Deviation**	**Std. Error Mean**	**Lower**	**Upper**			
Pair 1	**test_offline_ArmStrenght - test_online_ArmStrenght**	**3.90**	**6.67**	**1.22**	**1.41**	**6.4**	**3.20**	**29**	**.003**

The table above shows that there is a difference of 3.9 in the average scores between offline and online arm strength tests. With the positive value recorded, it can be concluded that there is a decrease in the test scores when conducted online

compared to the offline tests. Furthermore, it can also be observed that the significance value is 0.003, which is smaller than the significance level of 0.05, leading to the conclusion that the offline and online test results are not identical to each other.

DISCUSSION

In terms of the implications for physical education practices, both the discussed research and previous studies underscore the importance of carefully designing online assessments and selecting appropriate evaluation methods. Self-assessment and peer assessment was declared effective in assessing movement skills, especially the material for the pencak silat front kick (Fitriady et al., 2022). However, others, like arm strength, may require more sophisticated approaches or specialized equipment to ensure accurate measurements. Issues related to access to digital devices, internet connectivity, and data security remain critical considerations. Researchers and educators must work collaboratively to overcome these barriers and create a conducive online assessment environment for all students. Results show that the individual's level of technological optimism, discomfort and insecurity impact adoption intentions toward IoT products and services for online learning (Negm, 2023). Based on the data collected and analyzed, the researchers also identified anomalies that potentially indicate the occurrence of screen delays affecting the timing recording by the testers in both data collection instruments used. These anomalies became apparent during the online push-up test, which showed a decrease in the average score compared to the offline push-up test. Similarly, anomalies were observed in the standing stork test, where the average score for the online test was higher than the standing stork test conducted offline. It is suspected that the screen delay occurring during the online tests caused a delay in recording the number of push-up repetitions, resulting in a slight decrease in the recorded count compared to the actual count when the time had expired. This finding is also the same as what was concluded in previous research that there was a delay in internet connection. This finding is also the same as what was concluded in previous research that there was a delay in internet connection. it was found that in addition to advantages, online piano lessons also have a disadvantage - the problem of audio/video content lag (Ma & Ma, 2023). Additionally, the screen delay during the implementation of the standing stork test is believed to have caused the online test scores to be higher due to delayed information about the test duration from the testers to the system.

This could be one of the factors influencing the significant differences between the average scores of offline and online tests. In another study, it was found that the implementation of physical tests showed no significant differences between them. The variations in results between offline and online tests might be attributed to various factors, such as screen delay, test environment, or technical

issues. However, in some cases, both offline and online assessments might yield similar outcomes, suggesting that the mode of testing may not always be the primary factor affecting the results. Further research and exploration of specific test characteristics and conditions are necessary to gain a comprehensive understanding of the impact of online assessment on physical fitness evaluations. The results achieved in the current investigation showed reasonable levels of agreement that support the validity between online evaluation and face to face evaluation (Lavín-Pérez et al., 2023). Furthermore, the findings from the discussed research and previous studies together emphasize the need for continuous advancements in technology and the development of innovative tools and platforms for online physical education assessments. The integration of wearable devices, motion-capture technologies, and interactive simulations could potentially enhance the accuracy and authenticity of remote physical evaluations. The standing stork test demonstrates potential for effective implementation in the virtual realm, offering convenience and accessibility to educators and students alike. On the other hand, arm strength evaluations face certain limitations when conducted online, prompting researchers to explore alternative methods to improve accuracy. Collectively, these findings emphasize the importance of thoughtful design and adaptation of assessment methods for specific physical fitness components when transitioning to virtual learning environments. Continued research and collaboration between educators and technology developers are crucial to unlock the full potential of online physical education assessments and foster students' overall health and fitness in the digital age.

CONCLUSION

The results of this study indicate that the online testing instrument does not have a statistically significant similarity with the offline test results, which affects its reliability negatively. The insufficient performance of online testing is suspected to be a result of screen delay. however, further research is needed to investigate this matter. Screen delay is believed to be one of the barriers due to the inadequate stability of internet speed in Indonesia, which impacts the real-time communication during two-way interactions that creates anomalies in online physical test that taken. Overall, the research highlights the potential of online physical education assessments, but it also emphasizes the importance of careful consideration and refinement of assessment methods for specific physical fitness components. As technology continues to advance, there is a great potential for leveraging online platforms to enhance physical education assessment and promote students' overall health and fitness. However, continued research and collaboration between educators and technology developers are crucial to optimize the implementation of online assessments and ensure their validity and effectiveness in supporting students' physical development.

Conflict of Interest

The author(s) declare that they have no conflict of interest.

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