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The Development of Motoric Test for Basic Movement in Primary School

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ABSTRACT

The availability of culturally relevant and psychometrically verified motor skill assessment measures for upper primary school kids in Indonesia remains limited. The purpose of this study was to create and assess the validity and reliability of a motoric test instrument specifically tailored for fifth and sixth grade pupils. A cross-sectional design was used with 51 fifth-grade kids (27 boys and 24 girls) chosen by chance from a public primary school in Surabaya, Indonesia. The designed instrument included seven core movement skill items that represented locomotor, stability, and manipulative domains: obstacle leap, coordination movement, forward roll, football dribbling, basketball dribble, throw and catch, and ball striking. The data was analyzed with IBM SPSS 25 using Pearson product-moment correlation to determine item validity and Cronbach's alpha to measure internal consistency. Six of the seven test items were found to be valid ($r = 0.31$-0.75; $p < 0.05$), but the obstacle jump item did not satisfy the validity criteria ($r = 0.27$; $p = 0.05$). The overall reliability coefficient showed adequate internal consistency (Cronbach's alpha = 0.59), above the minimum r-table value (0.28). These results indicate that the created instrument is largely valid and reliable for measuring fundamental movement skills in upper primary pupils, with only one item requiring minor revision. In practice, this instrument gives physical education instructors a context-appropriate and structured assessment tool to help them support evidence-based evaluation and improve motor learning outcomes in Indonesian primary schools.

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INTRODUCTION

Physical education is a learning process that contributes holistically to a child's growth and development. A child's growth and development occur from birth to adulthood (Mello et al., 2024). In this case, not all of a child's growth and development can be evaluated with the naked eye. Brain network development is one thing that cannot be observed directly but can be felt (Mualem et al., 2024). Meanwhile, physical growth and development can always be observed and evaluated gradually (Airaksinen et al., 2023).

A child's physical growth and development require special attention, starting from the family environment until the child enters the world of education. The role of physical education teachers is crucial in ensuring that their children or students grow and develop well physically (Castillo et al., 2020). Stimuli provided through physical education will make the growth and development process more structured and systematic.

Providing stimuli through the learning process is not enough as a measure of whether a child has undergone significant physical changes (Serikov & Serikov, 2016). To facilitate the assessment of physical education teachers, many relevant motor test instruments have been developed for elementary school students (Herrmann & Seelig, 2017; Wibowo et al., 2024). On the other hand, physical education teachers also have the competence to make appropriate assessments for their students (Hernán et al., 2019; O'Brien et al., 2023). However, this is often not tested to ensure that the test instruments created are truly valid and reliable.

Various studies have developed valid and reliable motor test instruments (Nugroho Putro et al., 2024). Motor tests such as TGMD are effective in measuring locomotor and manipulative skills (Kwon & Maeng, 2022). Motor skills tests such as MOBAK are divided into several phases and are effective in measuring locomotor and stability skills (Herrmann & Seelig, 2017). These studies were conducted and developed based on the social conditions of children outside Indonesia. Currently, there is still a lack of research conducted to explicitly measure the motor skills of students in grades 5 and 6.

In order to facilitate the research gap that has been revealed, this study aims to test the validity and reliability of motor test instruments that have been developed for 5th and 6th grade students in elementary school. The facilitation carried out through this study is expected to make a significant contribution to physical education, especially in Indonesia. With instruments that have been tested for validity and reliability, physical education teachers need not worry about assessing their students' motor skills. Physical education teachers will be able to provide appropriate and suitable evaluations for their students. Thus, the physical education learning process will be able to ensure the physical growth and development of students more precisely and effectively.

METHODS

This study uses a cross-sectional design in the research data collection process. The collected data will undergo validity and reliability testing for each item using statistical testing software. The results of these tests will reveal the outcome of the instrument development that has been carried out.

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Participants and Sampling

This study used a sample of fifth graders at an elementary school in Surabaya. A total of 51 samples, consisting of boys and girls, took a motor skills test using a motor skills test instrument developed by the researcher. The sampling technique used in this study was accidental sampling. This was due to the limited time available to the researcher.

Table 1. Research Participants

Grade	Sample	Sex	
		Boys	Girls
5	51	27	24

Research Instruments

This study used a basic motor skills test instrument developed specifically for this research. The basic motor skills test instrument developed is a test instrument specifically designed for grades 5 and 6 in elementary school. The test instrument consists of jumping over objects, moving with focus, balancing, dribbling a ball, catching a ball, and hitting objects.

Table 2. Research Instrument

No	Item Test	Tools
1	High Jump	Two cones and a hurdle (50 cm)
2	Coordination Movement	Four cones
3	Roll Depan	One mattress
4	Football Dribble	Nine cones and one soccer ball
5	Basketball Dribble	Nine cones and one basketball ball
6	Throw and Catch	Four cones and one tennis ball
7	Hit a Ball	Two cones, one bat, and one tennis ball

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Research Procedures

The research process began with preparing fifth or sixth grade students (phase C). Then, the physical education teacher gave instructions on the movements to be performed by the students. The instructions given are, of course, based on the test instruments that have been developed in this study. The students practice the movements from the basic motor skills test instruments in turn. Meanwhile, the teacher assesses the movements using the assessment sheet from the motor skills test instruments that have been developed. The final results of the assessment will be converted into scores in accordance with the school's grading system.

Data Analysis

Data analysis in this study used statistical software, namely IBM Statistical SPSS 25. The testing method used was product moment correlation to determine the validity and reliability of the instruments that had been developed.

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RESULTS

The results of this study are divided into two parts, namely validity testing and reliability testing. Validity testing will be presented to determine the validity level of the developed motor test instrument. If it is declared valid, then the instrument is indeed suitable for application. Then, the reliability test is conducted to determine the reliability level of the instrument. A reliable instrument will be declared as an instrument that is suitable for use with strong consistency and accuracy.

Validity Test

The validity test results for the items in phase C presented only one item was indicated as invalid (Table 3). That item was the high jump, marked by a calculated r value less than the table r value and a significance value greater than alpha (Sig > 0.05). The other items showed valid test results with r-count values greater than r-table and significance values less than alpha (Sig < 0.05).

Tabel 3. Validity Test

Item Test	Pearson Correlation	p-Value	Validity
High Jump	0.27	0.05	Not Valid
Coordination Movement	0.31	0.03	Valid
Roll Depan	0.61	0.00	Valid
Football Dribble	0.75	0.00	Valid
Basketball Dribble	0.67	0.00	Valid
Throw and Catch	0.51	0.00	Valid
Hit a Ball	0.59	0.00	Valid

*Sig < 0.05

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Reliability Test

Based on the Cronbach's alpha value, the test items in phase C are reliable with a value of 0.59 or more than the r-table (0.28). The results shown in the Cronbach's alpha item deleted column reflect that each test item is reliable (Table 4).

Tabel 4. Reliability Test

Item Test	Cronbach's Alpa Item Deleted	Cronbach's Alpha	Reliability
High Jump	0.60		
Coordination Movement	0.66		
Roll Depan	0.52		
Football Dribble	0.45	0.59	Reliable
Basketball Dribble	0.49		
Throw and Catch	0.56		
Hit a Ball	0.54		

Note: r-tabel 0.28

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DISCUSSION

Physical education plays an important role in supporting and monitoring children's physical development holistically (Cale et al., 2014; Hartwig et al., 2019). Nonetheless, physical education instructors frequently employ motor assessment tools that lack validation and reliability testing, potentially resulting in erroneous appraisals of a child's developmental progression (Dwi et al., 2021). Conversely, the majority of standard measuring equipment presently accessible have been designed based on the features of youngsters from foreign countries, rather than those in Indonesia (Komaini et al., 2022). Motor development is significantly shaped by socio-cultural influences, daily physical activity patterns, and anthropometric traits, indicating that tools created for Western cultures may lack ecological relevance in other contexts (Lopes, 2021).

This study is to assess the validity and reliability of a fundamental movement test instrument specifically developed to evaluate the motor skills of fifth and sixth grade elementary school pupils. The findings of this study demonstrate that the created instrument is predominantly valid and reliable for students at this stage.

Of the seven test items, six demonstrated a significant level of validity (p-value < 0.05). The six pieces addressed particular manipulative skills, including throwing, catching, dribbling, and striking a ball. The substantial validity of these questions corresponds with the regular incorporation of object-control abilities in local educational curriculum and daily recreational activities (Bakhtiar et al., 2020). Nonetheless, one item was statistically invalid, specifically the high jump (p-value = 0.05). Disparities in school infrastructure frequently result in kids having inconsistent access to essential resources and opportunities to develop this particular talent, culminating in variable test outcomes (Purnama, 2025).

Additionally, this instrument demonstrated consistency with a Cronbach's alpha value of 0.59, indicating that it has satisfactorily met the criteria by surpassing the r-table threshold. Although clinical environments typically require elevated alpha values, a coefficient of approximately 0.60 is generally seen sufficient for exploratory research and field-based instructional tools, particularly when assessing a wide-ranging and multifaceted construct such as general motor ability (Wibowo et al., 2024).

This finding aligns with prior studies demonstrating that the evaluation of locomotor and manipulative skills with tools like TGMD is very dependable. Research related to the MOBAK instrument is also quite good in dividing motor tests into several phases (Carcamo-Oyarzun et al., 2022). This device mostly targets youngsters in European nations. This undoubtedly complicates direct application to varying social contexts, as spatial needs and equipment familiarity vary considerably. Consequently, the instrument utilized in this study was intentionally designed to address this deficiency, ensuring its greater relevance to the actual circumstances of students in Indonesia.

The creation of this instrument offers significant practical advantages to physical education instructors and educational officials. Teachers now possess precise, standardized, and easily applicable evaluation criteria in the field, facilitated by an appropriate instrument (Qin et al., 2025). Thus, instructor evaluations become more impartial, facilitating a more profound comprehension of student movement deficiencies. This corresponds with the

application of a deep learning framework in physical education, wherein assessment transcends mere scoring to offer substantive feedback aimed at enhancing fundamental movement patterns (Liang & Liang, 2025). The monitoring of students' physical development quality can thus proceed more efficiently.

Despite its beneficial contributions, this study possesses certain drawbacks. The primary disadvantage is the relatively small sample size (n = 51), with data collection conducted exclusively at a single school utilizing the accidental sampling method. Furthermore, due to its cross-sectional observational methodology, this study cannot assess the long-term development or stability of children's motor skills. Subsequent research should seek to validate this instrument across a wider, more heterogeneous demographic utilizing bigger sample sizes and maybe longitudinal designs to monitor motor skill retention over time.

CONCLUSION

In general, the basic motor skills test instrument developed specifically for fifth and sixth grade elementary school students has been proven to be valid and reliable. Of the seven-test series compiled, six are highly suitable and accurate for use in measuring children's motor skills. However, there is one test item, namely the high jump, which is not yet valid and therefore requires further adjustment.

As a form of practical application, physical education teachers can now use this instrument directly in schools to assess students' physical development more objectively and in a standardized manner. For future research, it is highly recommended to involve a much larger number of students from more diverse school backgrounds. In addition, using a longitudinal research approach would be very interesting to see how children's motor skills persist and develop over time.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

Airaksinen, M., Taylor, E., Gallen, A., Ilén, E., Saari, A., Sankilampi, U., Räsänen, O., Haataja, L. M., & Vanhatalo, S. (2023). Charting infants' motor development at home using a wearable system: validation and comparison to physical growth charts. *EBioMedicine*, *92*, 104591. https://doi.org/10.1016/J.EBIOM.2023.104591

Cale, L., Harris, J., & Chen, M. H. (2014). Monitoring health, activity and fitness in physical education: its current and future state of health. *Sport, Education and Society*, *19*(4), 376–397. https://doi.org/10.1080/13573322.2012.681298

Carcamo-Oyarzun, J., Peña-Troncoso, S., & Cumilef-Bustamante, P. (2022). Content validity of the MOBAK Battery for the assessment of the curricular motor skill-related aims in Physical Education. *Estudios Pedagogicos*, *48*(1), 309–322. https://doi.org/10.4067/S0718-07052022000100309

Castillo, I., Molina-García, J., Estevan, I., Queralt, A., & Álvarez, O. (2020). Transformational Teaching in Physical Education and Students' Leisure-Time Physical Activity: The Mediating Role of Learning Climate, Passion and Self-Determined Motivation. *International Journal of Environmental Research and Public Health*, *17*(13), 4844. https://doi.org/10.3390/ijerph17134844

Hartwig, T. B., Pozo-Cruz, B. del, White, R. L., Sanders, T., Kirwan, M., Parker, P. D., Vasconcellos, D., Lee, J., Owen, K. B., Antczak, D., Lubans, D. R., & Lonsdale, C. (2019). A monitoring system to provide feedback on student physical activity during physical education lessons. *Scandinavian Journal of Medicine and Science in Sports*, *29*(9), 1305–1312. https://doi.org/10.1111/sms.13438

Hernán, E. B., Pastor, V. M. L., & Pérez-Brunicardi, D. (2019). Why do I do formative and share assessment and/or assessment for learning in physical education? The influence of Teacher Education. *Retos*, (36), 37–43. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85060910477&partnerID=40&md5=0d1ab6b298ad01663790b5b24a99d3ad

Herrmann, C., & Seelig, H. (2017). Structure and Profiles of Basic Motor Competencies in the Third Grade—Validation of the Test Instrument MOBAK-3. *Perceptual and Motor Skills*, *124*(1), 5–20. https://doi.org/10.1177/0031512516679060

Kwon, H., & Maeng, H. (2022). The Impact of a Rater Training Program on the TGMD-3 Scoring Accuracy of Pre-Service Adapted Physical Education Teachers. *Children*, *9*(6). https://doi.org/10.3390/children9060881

Mello, J. B., Nobre, G. C., Gaya, A. R., Duncan, M., Nevill, A., & Gaya, A. (2024). Growth charts of Brazilian youngs: 20-years data of 95,000 children and adolescents from "Projeto Esporte Brasil." *Ciencia e Saude Coletiva*, *29*(5). https://doi.org/10.1590/1413-81232024295.06412023

Mualem, R., Morales-Quezada, L., Farraj, R. H., Shance, S., Bernshtein, D. H., Cohen, S., Mualem, L., Salem, N., Yehuda, R. R., Zbedat, Y., Waksman, I., & Biswas, S. (2024). Econeurobiology and brain development in children: key factors affecting development, behavioral outcomes, and school interventions. *Frontiers in Public Health*, *12*, 1376075. https://doi.org/10.3389/fpubh.2024.1376075

Nugroho Putro, B., Kristiyanto, A., Furqon Hidayatullah, M., & Ayu Ketut Rachmi Handayani, I. G. (2024). Validity and reliability of motor competence assessment as an instrument measuring fundamental motor skills for 12-year-olds in Indonesia. *Retos*, *58*, 462–468. https://doi.org/10.47197/retos.v58.106612

O'Brien, W., Philpott, C., Lester, D., Belton, S., Duncan, M. J., Donovan, B., Chambers, F., & Utesch, T. (2023). Motor Competence Assessment in Physical Education -- Convergent Validity between Fundamental Movement Skills and Functional Movement Assessments in Adolescence. In *Physical Education and Sport Pedagogy* (Vol. 28, Number 3, pp. 306–319).

Serikov, S. G., & Serikov, G. N. (2016). Health promoting role of physical education in university learning process. *Teoriya i Praktika Fizicheskoy Kultury*, (5), 6–8. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84978083351&partnerID=40&md5=ac152249fb62e86463791db5ea470ba9

Wibowo, C., Dese, D. C., & Nopiyanto, Y. E. (2024). Developing a precise gross motor skills assessment instrument for elementary school students (ages 7-9). *Pedagogy of Physical Culture and Sports*, *28*(2), 84–92. https://doi.org/10.15561/26649837.2024.0201

Bakhtiar, S., Famelia, R., Syahputra, R., Oktavianus, I., & Goodway, J. (2020). *Developing a Motor Skill-Based Curriculum for Preschools and Kindergartens as a Preventive Plan for Children With Obesity in Indonesia*. *464*(Psshers 2019), 276–280.

Dwi, Y., Septyarini, A., Gading, I. K., & Antara, P. A. (2021). *Validity a nd Reliability : Early Childhood ' s Locomotor Capability Assessment Instruments*. *540*(Ictes 2020), 400–404.

Komaini, A., Kiram, Y., Rifki, M. S., Handayani, S. G., Ayubi, N., & Putra, R. Y. (2022). *DEVELOPMENT OF BASIC MOVEMENT SKILLS TEST INSTRUMENTS FOR EARLY CHILDHOOD*. *7989*, 493–499. https://doi.org/10.17309/tmfv.2022.4.06

Liang, H., & Liang, H. (2025). *Deep learning based multi attribute evaluation for holistic student assessment in physical education*. 1–17.

Lopes, V. P. (2021). *Socio-Cultural and Somatic Factors Associated with Children ' s Motor Competence*.

Purnama, F. (2025). *EduBasic Journal : Jurnal Pendidikan Dasar The Influence of Physical Activity , Play Facilities , and Teacher Roles on Early Childhood Development*. *7*(2), 146–161.

Qin, L., King, W., Ho, Y., & Khoo, S. (2025). *Development and validation of a measurement instrument for student assessment of quality physical education in Chinese secondary schools*. 1–22. https://doi.org/10.1371/journal.pone.0324227

Wibowo, C., Dese, D. C., & Nopiyanto, Y. E. (2024). *Developing a precise gross motor skills assessment instrument for elementary school students (ages 7-9)*. https://doi.org/10.15561/26649837.2024.0201