



Validity of *Active Motor Card 3* Locomotives Aged 10-12 Years for Elementary School Students in Malang City

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Abstract

This study aims to determine the level of validity of Active Motor Card 3 in improving the motor skills of elementary school children in Malang City, and to measure the effectiveness of Active Motor Card 3 in providing practical recommendations for educators. The research design used a non-experimental one. This design includes expert tests on instrument evaluation and physical education experts. The population of this study were students of SDN Sumber Sari 3 Malang City with details of the age group 10-12 years or grades 4, 5, and 6. The sampling technique used purposive sampling. Data collection techniques used non-test and test techniques. The non-test technique used a Likert scale to analyze the instrument and the test used the AMC-3 and TGMD-3 tests. This data collection was carried out from August to September 2024. The results of the instrument expert validation produced an average of 95% (valid). Based on the average r count results on AMC-3 of 0.917 and the correlation between AMC-3 and TGMD-3 produced an average r count of 0.532 with r table of 0.2199 significance of 0.05. So it can be concluded that the AMC-3 (locomotor) instrument is valid and can be a recommendation for motor assessment of children aged 10-12 years.

Keywords: Validity, Instrument, Active Motor Card 3, Locomotor.

INTRODUCTION

Locomotor skills are an important foundation in the physical development of children aged 10-12 years, which includes basic abilities such as running, jumping, and stepping with good coordination. According to (Gallahue, 2011), this period is a critical phase where children experience significant improvements in coordination, balance, and body control skills needed for complex activities. Research by Logan et al., (2018) shows that mastery of locomotor skills at this age is positively correlated with the level of participation in physical activity in adolescence and adulthood. (Vedul-Kjelsås et al., 2012) confirms that children with good locomotor skills tend to have higher self-confidence in the context of sports and social activities.

Evaluation of basic motor skills is a crucial component in identifying children's motor development and provides a strong foundation for effective early childhood sports development. Robinson et al., (2015) emphasizes the importance of structured assessment

to detect motor delays as early as possible, so that intervention can be carried out in a timely manner. Barnett et al., (2016) In his research, he revealed that comprehensive motor skills assessment allows coaches and educators to design training programs that are tailored to the child's individual needs. The results of a longitudinal study by Palmer et al., (2019) show that regular evaluation of basic motor skills plays a crucial role in optimizing the long-term development path of sports talent.

The Active Motor Card 3 (AMC-3) is an innovative assessment instrument specifically developed to measure and evaluate children's locomotor skills. However, its validation is a crucial prerequisite for broader implementation. Research by Martínez- (Herrmann et al., 2015) demonstrated the importance of validating motor assessment instruments through comparison with established gold standards such as the Test of Gross Motor Development (TGMD). Lopes et al. (2022) emphasized that instrument validation should encompass various aspects, including content validity, construct validity, criterion validity, and sensitivity to developmental changes. Bardid et al. (2019) suggested that validity testing should involve demographically diverse samples to ensure broad applicability. A recent study by Mendonça et al., (2016) underscored that broad implementation relies heavily on strong empirical evidence regarding its validity and reliability in various educational and sports coaching contexts.

Lack of awareness of the importance of physical activity in elementary schools leads to delays in early detection of underdeveloped motor skills in Indonesian children, seriously impacting timely intervention. Research by (Setyo et al., 2021) reveals significant gaps in the competency of physical education teachers to conduct accurate motor assessments, with only 31% receiving formal training in standardized assessment methods.

Studies in various countries show a similar trend, with children's motor skills declining due to more sedentary lifestyles and changes in play activities. Research by (Aubert et al., 2022) involving 49 countries in Global Matrix 4.0 revealed an average decline of 27% in the basic motor skills of children aged 6-12 years over the past two decades. In Australia, (Mihirshahi et al., 2016) it was documented that only 23% of school-age children achieved motor skill levels appropriate for their age, down from 45% in 2000. Longitudinal studies conducted by (Sigmundsson et al., 2017) in Scandinavian countries identified a strong correlation between increased screen time and decreased manipulative and locomotor skills in children.

Instruments used for motor skill evaluation vary significantly in their approach, complexity, and specific objectives, while instrument validity is a crucial factor determining the success and usefulness of the assessment process. A comparative study by

(Hulteen et al., 2020) analyzed 24 commonly used motor assessment instruments globally and found substantial variation in psychometric properties, with only 38% demonstrating strong construct validity for cross-cultural populations. The Test of Gross Motor Development (TGMD-3) developed by Ulrich (2017) has demonstrated high concurrent validity ($r=0.87$) and has been validated in multicultural samples from 11 countries, making it one of the most widely adopted instruments.

Grassroots sports development is a crucial foundation for developing future high-achieving athletes. Research shows that (Côte et al., 2009) identifying talent early in a child's development provides an optimal opportunity to maximize their athletic potential. This process requires a systematic approach that takes into account the characteristics of a child's physical, cognitive, and psychosocial development (Baker et al., 2018). Bloom & Sosniak (2013) found that elite athletes generally engage in sports activities from an early age through well-structured programs. (Ford et al., 2011) emphasized the importance of a variety of activities and diverse movement experiences before specialization to optimize fundamental skill development.

Valid evaluation of locomotor skills is a crucial component in identifying athletic potential in children. Longitudinal studies have Barnett et al., (2016) shown a significant correlation between childhood locomotor skill acquisition and adolescent athletic performance. Measurement instruments such as the Test of Gross Motor Development-3 (TGMD-3) have been widely used to evaluate fundamental motor skills, providing objective data on running, jumping, and other fundamental movement abilities (Ulrich, 2017). (Morgan et al., 2013) highlights the importance of regular evaluation to monitor progress and adjust coaching programs according to individual progress. Well-developed locomotor skills are also related to children's self-confidence and intrinsic motivation in the context of physical activity. (Stodden et al., 2008).

Results from the AMC-3 (Active Motor Card-3) can be an important tool in designing targeted exercise programs for elementary school-aged children. Research Almeida et al., (2023) shows that the use of well-validated instruments can increase the effectiveness of motor interventions in children. Clark, n.d.) emphasize that exercise programs based on valid assessments can accelerate the development of basic skills and increase children's self-confidence. Regular use of the AMC3 also allows for evaluation of the effectiveness of exercise programs and necessary adjustments based on the child's development.

This study makes a significant contribution to the development of basic motor skills assessment instruments through the validation of the Active Motor Card 3 (AMC-3) to

assess the locomotor skills of elementary school-aged children. The development of a valid instrument such as the AMC-3 addresses the need for a reliable and practical measurement tool as identified by Scheuer et al., (2019) which highlights the importance of assessments appropriate to the physical education context. The validity of this instrument aligns with findings which emphasize that well-validated measurement tools can improve the accuracy of identifying children's motor development needs. Academic literature on motor assessment methods, as discussed by (Cools et al., 2009)

The novelty of this research lies in the validation of Active Motor Card 3 (AMC3) in the context of sports development in Indonesia, especially in Malang City, which broadens the understanding of the application of motor assessment instruments in populations with socio-cultural characteristics, this research complements previous studies that tend to focus on academic assessments as stated by Lubans et al., (2018) about the limited research linking motor assessments with athlete development in developing countries. This research also addresses the need for diversification of assessment methods in early childhood sports development identified by (Liu et al., 2022) as a key factor in a sustainable sports development system.

METHOD

This research design uses a non-experimental design. This design includes expert instrument evaluation tests and physical education experts to validate the Active Motor Card 3 instrument . The population in this study were students of SDN Summersari 3. The sample in this study was 78 students where this sample had met the Ali-Maksum sample standard, (2009), the sampling technique used purposive sampling and for those who agreed would be given informed consent , with the criteria of 10-12 years . The instrument in this study used Active Motor Card 3 (AMC-3) and Test of Gross Motor Development 3 (TGMD-3) . The AMC-3 instrument consists of Obstacle Run, Combine Leg Hop, Triangle Step, and Alternate Board Jump. The TGMD-3 instrument consists of Run, Hop, Horizontal Jump, and Slide. Data collection in this study includes the preparation stage, implementation stage, and reporting. The data collection techniques use non-test and test techniques. The non-test technique uses a Likert scale to analyze the instrument and the test uses the AMC-3 and TGMD-3 tests.

This research was conducted with ethical permission with the ethics number 00010/EE/2024/0149233573. Before the research was conducted, students were given an explanation and asked for approval regarding data collection by filling out informed consent, if there were students who did not agree to the informed consent, they were

allowed not to participate in this research process and as many as 40 boys and 38 girls with an age range of 10-12 years who agreed to participate in this research process. This data collection was carried out in the period August to September 2024.

RESULT AND DISCUSSION

Results

The results of this study are divided into two groups: expert validation test results and correlation test results. The expert test results are shown in Table 2.

Table 1. Validation Results of the Contents of the Active Motor Card 3 Locomotor Instrument

No	Expert	Presentation	Information
1	Evaluation expert	92.5%	Valid can be used without revision
2	Physical Education Expert	97.5%	Valid can be used without revision
	Average	95%	

The Active Motor Card 3 locomotor instrument that was tested Validity by evaluation experts and physical education experts that the instrument produces a valid category that can be used without revision (95%). Some notes that need to be revised are from the evaluation experts who suggested conducting a readability test to clarify the instrument provided, next from the physical education experts who suggested clarifying the assessment of each test instrument and the test implementation procedure.

The construct validity test was measured using the product moment correlation method by taking a sample (N) of 78 students. With this sample size, the r table value reached 0.2199 with a significance level of 0.05. The results of the validity of the Active Motor Card 3 locomotor instrument in children aged 10 to 12 years in elementary schools in Malang City are in Table 3.

Table 2. Results of the Validity Test of *Active Motor Card 3* Locomotor.

Test Items	N	Range	M ± SD	r count	Criteria
Obstacle Run	78	1-4	3.21±1.38	0.894	Very high
Combine Leg Hop	78	1-8	5.46±2.61	0.88	Very high
Triangle Step	78	1-8	6.44±2.7	0.942	Very high
Alternate Board Jump	78	1-10	7.7±3.28	0.953	Very high
Average				0.917	Very high

Based on the results of table 2, the validity of Active Motor Card 3 locomotor in children aged 10-12 years in elementary schools in Malang City shows the average r count obtained is 0.917. The results of the study were obtained from 4 tests, averaged with r count. Then, the data was converted using r table for N = 78, whose value is 0.2199. The

results of the study indicate that Active Motor Card 3 for locomotor skills in children aged 10 to 12 years in Malang City is " **valid** ".

As for The results of the validity of the Active Motor Card 3 locomotor instrument in children aged 10 to 12 years in elementary schools in Malang City are in Table 3.

Table 3. Results of the Validity Test of Gross Motor Development 3

Test items	N	Range	M±SD	r count	Criteria
Run	78	0-8	6.12±2.77	0.902	Very high
Hop	78	0-10	7.29±3.34	0.909	Very high
Horizontal Jump	78	0-8	5.71±2.91	0.917	Very high
Slide	78	0-8	5.95±2.77	0.929	Very high

The next step was to correlate the data between the AMC-3 Locomotor instrument and the TGMD-3 Locomotor instrument. The results of this correlation can be seen in Table 4.

Table 4. AMC-3 Locomotor Correlation Test Results

No.	AMC-3 Instrument	TGMD-3 Instrument	n	r-table	r-count	Conclusion
1	Obstacle Run	Run	78	0.2119	0.461	Valid
2	Combine Leg Hop	Hop	78	0.2119	0.51	Valid
3	Triangle Step	Slide	78	0.2119	0.589	Valid
4	Alternate Board Jump	Horizontal Jump	78	0.2119	0.57	Valid
Average					0.5325	Valid

Based on the data in table 4, the correlation test of Active Motor Card 3 Locomotor with a validated instrument, namely TGMD-3 , shows the average r count obtained is 0.5325, this result is obtained from 4 aspects of the test carried out with an average r count. The data results are then converted based on the r table with a value of N = 78, then the r table used is 0.2199, this result shows that Active Motor Card 3 locomotor in children aged 10-12 years in elementary schools in Malang city shows " **valid** " results.

Discussion

Evaluation of locomotor skills in children aged 10-12 years is a crucial aspect in monitoring optimal motor development. According to Gallahue (2011) , the 10-12 year age period is a critical phase in the development of basic motor skills where children are in the specialized movement phase stage that determines subsequent motor development. Systematic assessment of locomotor skills such as running, jumping, and hopping at this stage allows educators to identify developmental gaps that may hinder children's participation in physical activities in the future (Logan et al., 2018) . Barnett et al., (2016) found a significant correlation between mastery of locomotor skills in elementary school age and the level of participation in physical activities in adolescence and adulthood. Regular evaluation allows for targeted early intervention, as stated by Lubans et al. (2017)

that evidence-based intervention programs can increase motor proficiency by 15-25% if started in this age range.

Active Motor Card 3 locomotor instrument validated by evaluation experts and physical education experts that the instrument produces a valid category that can be used without revision (95%) and is suitable for use without revision in practical contexts in schools. The results of the study indicate that the Active Motor Card 3 instrument has high validity for measuring locomotor motor skills in children aged 10-12 years in Malang City. This is evidenced by the calculated r value which far exceeds the table r in all test components, with an average calculated r reaching 0.917, which indicates that this instrument has good precision and accuracy in measuring targeted motor skills. The concurrent validity of Active Motor Card 3 with TGMD-3 shows a good correlation ($r = 0.5325$). This is in line with the research of Morgan et al., (2013) which reported that motor measurement instruments that correlate well with TGMD-3 have high credibility, considering that TGMD-3 has been internationally recognized as the gold standard in measuring basic motor skills. The age of the research sample (10-12 years) is an important period in motor development.

Well-developed locomotor abilities during childhood lay the foundation for the future development of sport-specific movement skills. Early identification of gifted children through these tests allows for appropriate and targeted coaching (Gallahue, 2011). Research by Barnett et al., (2016) shows that certain locomotor abilities correlate with success in specific sports. For example, superior running and jumping abilities may indicate potential in athletics or ball games. According to Côte et al., (2009), talent identification at ages 6-12 through locomotor tests allows for more structured and effective talent development. Balyi & Hamilton, (2004) emphasize that locomotor skill tests support a more holistic approach to long-term athletic development (LTAD).

Based on the results of the Active Motor Card 3 measurement, coaches and teachers can design differentiated training programs according to the child's skill level, where children with low scores are focused on basic development (Barnett et al., 2016). Medium scores are given a balanced program, and high scores are introduced to complex skills; this instrument allows for the specific identification of motor components that need to be improved to design remedial training (Gallahue, 2011). Allocating proportional training time, and applying an approach according to the characteristics of the child with high validity and reliability, teachers can monitor progress (Webster & Ulrich, 2017). Evaluate the effectiveness of the program, and make adjustments based on progress; at the critical

age of 10-12 years, the measurement results can be used to identify sports talent (Côte et al., 2009) .

Mastery of locomotor skills plays a crucial role in improving the performance of athletes in various sports because it forms the foundation of basic movements that influence biomechanical efficiency (Gallahue, 2011) . In soccer, locomotor skills such as running, jumping, and sliding influence a player's ability to move quickly in limited spaces, change direction efficiently, and position themselves strategically when defending or attacking (Cooper et al., 2023) . In athletics, athletes with superior locomotor skills demonstrate better energy efficiency in running and jumping events, producing more consistent strides with minimal energy expenditure (Haugen et al., 2019) . In basketball, coordinated locomotor movements enable athletes to transition quickly between defense and offense, maneuver past opponents, and jump with optimal timing for rebounds or shots (Stojanović et al., 2018) . Additionally, longitudinal studies show that athletes with superior locomotor skills have lower injury rates, longer careers, and faster adaptation to high-intensity training (Lloyd et al., 2014) .

Locomotor skill testing plays a strategic role in competitive sports development because it serves as the foundation for early talent identification, monitoring motor development, and providing a foundation for essential movements in various sports. This type of testing allows educators to gauge the developmental level of fundamental movements such as running, jumping, and sliding, which are fundamental skills for all athletic activities (Gallahue, 2011). Through structured assessment, a child's specific strengths and weaknesses can be identified so that appropriate interventions can be designed to maximize their potential (Lubans et al., 2010) . Furthermore, data from this testing can be used to formulate more effective and sustainable training programs, supporting the long-term development pathways of athletes as recommended by (Balyi & Hamilton, 2004) . Thus, locomotor skill testing is not simply an evaluation tool but also a vital component of a comprehensive and sustainable competitive sports development system.

Optimizing sports development in Malang City can be achieved through the implementation of valid motor measurement integrated with regional policies, as a comprehensive strategy to identify and develop talented athletes. Scientifically validated motor measurement allows coaches and sports administrators to identify the potential of young athletes objectively and systematically (Hands, 2008) . This allows the selection and development process to no longer rely on subjective observations. By institutionalizing this measurement system in Malang City's regional policies, a sustainable athlete development

pathway can be created from elementary school to elite competition (Abbott & Collins, 2004) . The Malang City Government can adopt the LTAD (Long-Term Athlete Development) approach developed by (Balyi & Hamilton, 2004) by adjusting development stages based on local motor measurement data. Aligning budget, infrastructure, and human resource policies with motor measurement results allows for more efficient and targeted resource allocation (De Bosscher et al., 2009). Thus, the integration of valid motor measurements into the sports development system in Malang City not only increases the effectiveness of talent identification, but also builds an evidence-based policy foundation for sustainable achievement sports development.

Implementing the Active Motor Card 3 as a standard tool in young athlete identification and development programs can provide significant benefits to the competitive sports development ecosystem. For schools, the use of this card can facilitate a more structured and objective assessment of students' motor skills, enabling physical education teachers to track individual development and identify potential talent earlier (Lopes et al., 2011) . Sports academies can utilize data from the Active Motor Card 3 to design more personalized and evidence-based training programs, thus optimizing athlete development pathways in accordance with the principles of Long-Term Athlete Development. (Ford et al., 2011) .

The advantages of the AMC-3 instrument compared to other instruments such as the TGMD-3 (Ulrich, 2017) That is, most of the test instruments given by the AMC-3 involve cognitive and physical aspects simultaneously, or often referred to as multitasking exercises. For example, in the obstacle run, children do not only run, but also have to do zigzag movements, this will involve their multitasking abilities in performing the test. Likewise, with the Combine Leg Hop, children jump on one foot, land on both feet, then jump again on one foot. Next, the Triangle Step, children do not just do the usual side step movement, but do a side step movement in a triangular pattern/path. This will also train children's way of thinking when doing the test.

CONCLUSION

Overall, the validation results of the *Active Motor Card-3* locomotor instrument indicate that this instrument is suitable for measuring locomotor skills in children aged 10-12 years. These findings are expected to provide an important contribution in the development of a valid motor skills measurement tool. It is recommended that this instrument be used and implemented widely in many elementary schools. Meanwhile, for

the purposes of future research, testing can be carried out using a wider sample with diverse demographic characteristics to increase the generalizability of the instrument.

REFERENCES

- Abbott, A., & Collins, D. (2004). Eliminating the dichotomy between theory and practice in talent identification and development: Considering the role of psychology. *Journal of Sports Sciences*, 22(5), 395–408. <https://doi.org/10.1080/02640410410001675324>
- Almeida, G., Luz, C., Rodrigues, L. P., Lopes, V., & Cordovil, R. (2023). “Profiles of motor competence and its perception accuracy among children: Association with physical fitness and body fat.” *Psychology of Sport and Exercise*, 68. <https://doi.org/10.1016/j.psychsport.2023.102458>
- Aubert, S., Barnes, J. D., Demchenko, I., Hawthorne, M., Abdeta, C., Nader, P. A., Sala, J. C. A., Aguilar-Farias, N., Aznar, S., Bakalár, P., Bhawra, J., Brazo-Sayavera, J., Bringas, M., Cagas, J. Y., Carlin, A., Chang, C. K., Chen, B., Christiansen, L. B., Christie, C. J. A., ... Tremblay, M. S. (2022). Global Matrix 4.0 Physical Activity Report Card Grades for Children and Adolescents: Results and Analyses From 57
- Balyi, I., & Hamilton, A. (2004). Long-Term Athlete Development: Trainability in Childhood and Adolescence. Windows of Opportunity. In *Optimal Trainability*.
- Barnett, L. M., Lai, S. K., Veldman, S. L. C., Hardy, L. L., Cliff, D. P., Morgan, P. J., Zask, A., Lubans, D. R., Shultz, S. P., Ridgers, N. D., Rush, E., Brown, H. L., & Okely, A. D. (2016). Correlates of Gross Motor Competence in Children and Adolescents: A Systematic Review and Meta-Analysis. In *Sports Medicine* (Vol. 46, Issue 11, pp. 1663–1688). Springer International Publishing. <https://doi.org/10.1007/s40279-016-0495-z>
- Belanger, K., Barnes, J. D., Longmuir, P. E., Anderson, K. D., Bruner, B., Copeland, J. L., Gregg, M. J., Hall, N., Kolen, A. M., Lane, K. N., Law, B., MacDonald, D. J., Martin, L. J., Saunders, T. J., Sheehan, D., Stone, M., Woodruff, S. J., & Tremblay, M. S. (2018). The relationship between physical literacy scores and adherence to Canadian physical activity and sedentary behaviour guidelines. *BMC Public Health*, 18. <https://doi.org/10.1186/s12889-018-5897-4>
- Brown, T., & Lalor, A. (2009). The Movement Assessment Battery for Children - Second edition (MABC-2): A review and critique. In *Physical and Occupational Therapy in Pediatrics* (Vol. 29, Issue 1, pp. 86–103). <http://doi.org/10.1080/01942630802574908>
- Cohen, L., Manion, L., & Morrison, K. (2021). in *Education Eighth edition*. 5103697.
- Cooper, K. J., Harry, J., James, C. R., Munger, L., Sizer, P. S., & Sechrist, D. (2023). *The Effects of Hip Function on Plyometric Performance During a Battery of Single-leg Hop Tests Following Anterior Cruciate Ligament Reconstruction*.
- Côte, J., Lidor, R., & Hackfort, D. (2009). ISSP position stand: To sample or to specialize? Seven postulates about youth sport activities that lead to continued participation and elite performance. *International Journal of Sport and Exercise Psychology*, 7(1), 7–17. <https://doi.org/10.1080/1612197X.2009.9671889>
- David Gallahue, John Ozmun, Jacqueline Goodway - *Understanding Motor Development_ Infants, Children, Adolescents, Adults-McGraw-Hill Education (2011)*. (n.d.).
- De Bosscher, V., De Knop, P., van Bottenburg, M., Shibli, S., & Bingham, J. (2009). Explaining international sporting success: An international comparison of elite sport systems and policies in six countries. *Sport Management Review*, 12(3), 113–136. <https://doi.org/10.1016/j.smr.2009.01.001>
- Deitz, J. C., Kartin, D., & Kopp, K. (2007). Review of the Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2). *Physical & Occupational Therapy In Pediatrics*, 27(4), 87–102. https://doi.org/10.1080/j006v27n04_06
- Ford, P., de Ste Croix, M., Lloyd, R., Meyers, R., Moosavi, M., Oliver, J., Till, K., & Williams, C. (2011). The Long-Term Athlete Development model: Physiological

- evidence and application. *Journal of Sports Sciences*, 29(4), 389–402. <https://doi.org/10.1080/02640414.2010.536849>
- Gary Groth-Marnat. (2006). Handbook Of Psychological Assessment. In דפנים (Vol. 41). Hands, B. (2008). Changes in motor skill and fitness measures among children with high and low motor competence: A five-year longitudinal study. *Journal of Science and Medicine in Sport*, 11(2), 155–162. <https://doi.org/10.1016/j.jsams.2007.02.012>
- Haugen, T., Seiler, S., Sandbakk, Ø., & Tønnessen, E. (2019). The Training and Development of Elite Sprint Performance: an Integration of Scientific and Best Practice Literature. In *Sports Medicine - Open* (Vol. 5, Issue 1). Springer. <https://doi.org/10.1186/s40798-019-0221-0>
- Herrmann, C., Gerlach, E., & Seelig, H. (2015). Development and Validation of a Test Instrument for the Assessment of Basic Motor Competencies in Primary School. *Measurement in Physical Education and Exercise Science*, 19(2), 80–90. <https://doi.org/10.1080/1091367X.2014.998821>
- Hulteen, R. M., Barnett, L. M., True, L., Lander, N. J., del Pozo Cruz, B., & Lonsdale, C. (2020). Validity and reliability evidence for motor competence assessments in children and adolescents: A systematic review. In *Journal of Sports Sciences* (pp. 1717–1798). Routledge. <https://doi.org/10.1080/02640414.2020.1756674>
- Ko, B. (n.d.). *Sports Talent Identification and Selection in Korea*. <http://www.sports.re.kr/eng/05publication/Callforpaper.jsp>
- Klingberg, B., Schranz, N., Barnett, L. M., Booth, V., & Ferrar, K. (2019). The feasibility of fundamental movement skill assessments for preschool aged children. *Journal of Sports Sciences*, 37(4), 378–386. <https://doi.org/10.1080/02640414.2018.1504603>
- Lloyd, R. S., Oliver, J. L., Faigenbaum, A. D., Myer, G. D., De, M. B. A., & Croix, S. (n.d.). *Chronological Age Vs. Biological Maturation: Implications For Exercise Programming In Youth*. www.nsc.com
- Logan, S. W., Ross, S. M., Chee, K., Stodden, D. F., & Robinson, L. E. (2018). Fundamental motor skills: A systematic review of terminology. In *Journal of Sports Sciences* (Vol. 36, Issue 7, pp. 781–796). Routledge. <https://doi.org/10.1080/02640414.2017.1340660>
- Lopes, V. P., Rodrigues, L. P., Maia, J. A. R., & Malina, R. M. (2011). Motor coordination as a predictor of physical activity in childhood. *Scandinavian Journal of Medicine and Science in Sports*, 21(5), 663–669. <https://doi.org/10.1111/j.1600-0838.2009.01027.x>
- Lubans, D. R., Morgan, P. J., Cliff, D. P., Barnett, L. M., & Okely, A. D. (n.d.). *Fundamental Movement Skills in Children and Adolescents Review of Associated Health Benefits*.
- Mahfud, I., & Fahrizqi, E. B. (2020). Universitas Teknokrat Indonesia Sport Science And Education Journal Pengembangan Model Latihan Keterampilan Motorik Melalui Olahraga Tradisional Untuk Siswa Sekolah Dasar. <https://ejurnal.teknokrat.ac.id/index.php/sport/issue/archive>
- McHale, K., & Cermak, S. A. (1992). Fine motor activities in elementary school: preliminary findings and provisional implications for children with fine motor problems. *The American Journal of Occupational Therapy*. : Official Publication of the American Occupational Therapy Association, 46(10), 898–903. <https://doi.org/10.5014/ajot.46.10.898>
- Morgan, P. J., Barnett, L. M., Cliff, D. P., Okely, A. D., Scott, H. A., Cohen, K. E., & Lubans, D. R. (2013). Fundamental movement skill interventions in youth: A systematic review and meta-analysis. In *Pediatrics* (Vol. 132, Issue 5). <https://doi.org/10.1542/peds.2013-1167>
- Pion, J., Fransen, J., Lenoir, M., Pion ABCD, J., Fransen, J. B., Lenoir ADE, M., & Segers ACD, V. (2014). *The value of non-sport-specific characteristics for talent orientation in young male judo, karate and taekwondo athletes* (Vol. 10). www.archbudo.com

- Winarno, M.E (2018). *Evaluasi Hasil Belajar Pendidikan Jasmani Olahraga Dan Kesehatan*. 11(1–208), 1–14.
- Robinson, L. E., Stodden, D. F., Barnett, L. M., Lopes, V. P., Logan, S. W., Rodrigues, L. P., & D'Hondt, E. (2015). Motor Competence and its Effect on Positive Developmental Trajectories of Health. In *Sports Medicine* (Vol. 45, Issue 9, pp. 1273–1284). Springer International Publishing. <https://doi.org/10.1007/s40279-015-0351-6>
- Rudd, J. R., Barnett, L. M., Butson, M. L., Farrow, D., Berry, J., & Polman, R. C. J. (2015). Fundamental movement skills are more than run, throw and catch: The role of stability skills. *PLoS ONE*, 10(10). <https://doi.org/10.1371/journal.pone.0140224>
- Sigmundsson, H., Lorås, H., & Haga, M. (2016). Assessment of Motor Competence Across the Life Span: Aspects of Reliability and Validity of a New Test Battery. *SAGE Open*, 6(1). <https://doi.org/10.1177/2158244016633273>
- Stodden, D. F., Langendorfer, S. J., Goodway, J. D., Robertson, M. A., Rudisill, M. E., Garcia, C., & Garcia, L. E. (2008). A developmental perspective on the role of motor skill competence in physical activity: An emergent relationship. *Quest*, 60(2), 290–306. <https://doi.org/10.1080/00336297.2008.10483582>
- Stojanović, E., Stojiljković, N., Scanlan, A. T., Dalbo, V. J., Berkemans, D. M., & Milanović, Z. (2018). The Activity Demands and Physiological Responses Encountered During Basketball Match-Play: A Systematic Review. In *Sports Medicine* (Vol. 48, Issue 1, pp. 111–135). Springer International Publishing. <https://doi.org/10.1007/s40279-017-0794-z>
- Vedul-Kjelsås, V., Sigmundsson, H., Stensdotter, A. K., & Haga, M. (2012). The relationship between motor competence, physical fitness and self-perception in children. *Child: Care, Health and Development*, 38(3), 394–402. <https://doi.org/10.1111/j.1365-2214.2011.01275.x>
- van der Fels, I. M. J., te Wierike, S. C. M., Hartman, E., Elferink-Gemser, M. T., Smith, J., & Visscher, C. (2015). The relationship between motor skills and cognitive skills in 4–16 year old typically developing children: A systematic review. In *Journal of Science and Medicine in Sport* (Vol. 18, Issue 6, pp. 697–703). Elsevier Ltd. <https://doi.org/10.1016/j.jsams.2014.09.007>
- Vandorpe, B., Vandendriessche, J., Vaeyens, R., Pion, J., Matthys, S., Lefevre, J., Philippaerts, R., & Lenoir, M. (2012). Relationship between sports participation and the level of motor coordination in childhood: A longitudinal approach. *Journal of Science and Medicine in Sport*, 15(3), 220–225. <https://doi.org/10.1016/j.jsams.2011.09.006>
- Webster, E. K., & Ulrich, D. A. (2017). Evaluation of the psychometric properties of the Test of Gross Motor Development-third edition. *Journal of Motor Learning and Development*, 5(1), 45–58. <https://doi.org/10.1123/jmld.2016-0003>
- Wicaksono, A. (2021). *Buku Aktivitas Fisik dan Kesehatan fix*. <https://www.researchgate.net/publication/353605384>
- Winarno. (2014). *Evaluasi Hasil Belajar Pendidikan Jasmani Olahraga Dan Kesehatan*. Malang: UM Press, 11(1), 1–14.