Development of Psychomotor Assessment Strategies and Instruments: A Comprehensive Approach to Improving Learning Quality

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Abstract

Psychomotor assessment is an important aspect of education that focuses on students' physical abilities and motor skills. This study aims to examine the development of psychomotor research strategies, techniques and instruments that are valid, reliable, and in accordance with learning needs. The research method used was a literature study with descriptive analysis techniques from various related literature sources. The results showed that psychomotor assessment requires a comprehensive approach involving various techniques, such as tests, observations, performance assessments, portfolios, and products. The development of standardized and accurate assessment instruments such as assessment rubrics is an important step to ensure the validity and reliability of the assessment. Although there are challenges in assessing the psychomotor domain such as limited instruments and difficulties in objective assessment. The limitations of this study lie in the use of the literature study method which limits the scope of the study only to the available literature without involving data in the field or direct interviews with educators. For further research, it is hoped that it can conduct trials of psychomotor assessment instruments in real conditions in various types of education and involve more diverse respondents to increase the validity and reliability of the instrument.

Keywords: *psychomotor assessment, assessment instrument, performance assessment, assessment rubric*

Introduction

Education is one of the crucial aspects that has a major influence on the quality of human resources and the development of a nation (Lestari & Nuryanti, 2022). The educational process is able to produce creative and innovative ideas that are in accordance with the dynamics of the times. Education not only aims to develop students cognitive and affective abilities, but also psychomotor aspects related to practical actions. In the world of education, the psychomotor domain emphasizes students ability to manipulate objects, demonstrate creative skills physically, and develop movement abilities (Ofem et al., 2024). This domain includes aspects related to movement, action, and physical coordination, which are crucial components in various subjects, especially those related to technical skills, sports, and arts.

Assessment is one of the key strategies used by teachers to support the learning process, assess student achievement and develop students' ability to evaluate future learning. While assessment should be a core skill in teaching, several studies reveal that classroom assessment practices often do not optimally utilize its formative potential (Pardo et al., 2024). Assessment encompasses a variety of methods, such as tests and assignments, which are used to obtain feedback on learning progress. The results of these assessments are then used in the assessment and evaluation process to determine the status or classification of learning outcomes.

Effective assessment in the psychomotor domain is key to ensuring that learners master the skills needed in real practice (Nurwati, 2019). However, developing assessment techniques and instruments for the psychomotor domain remains a challenge for many educators. Psychomotor assessments are often more complex than cognitive assessments because they require assessing physical actions that are difficult to measure with conventional methods. The quality of

psychomotor assessment is highly dependent on the validity and reliability of the instruments used, as well as the ability of educators to assess objectively and accurately.

Before learning begins, teachers are required to compile learning tools that will be used in the learning process and assessment (Jufrizal, 2021). The assessment is carried out to obtain information that will be used as a basis for providing feedback to students, as well as for program and curriculum evaluation. Competencies in the psychomotor domain include abilities that can be achieved through learning activities that involve physical movement, not just through tests. This aspect includes performance, imagination, creativity, and intellectual works (Khalishah & Iklilah, 2021). Assessment in the psychomotor domain is more effective in face-to-face meetings, in its development this field has undergone revisions due to limitations in the definition and difficulties in the assessment process. The lack of standardized and tested instruments in assessing psychomotor abilities can hinder the achievement of learning objectives. Many educators find it difficult to precisely measure aspects such as movement skills, speed of response, or coordination required in various activities (Fitriani & Bayu, 2019). On the other hand, inappropriate assessment techniques can result in biased assessments that do not reflect the true abilities of learners. Therefore, the development of effective strategies to create valid, reliable, and practical psychomotor assessment techniques and instruments is needed (Fathurrahman, 2020). These strategies should involve a comprehensive approach, taking into account the specific needs of each learning area and the expected psychomotor abilities.

Psychomotor assessment plays a very important role in education because it focuses on students' physical skills and body coordination which are very important in various subjects such as sports, arts, and technical skills. This research has great significance because it aims to develop psychomotor assessment strategies, techniques, and instruments that are valid, reliable, and practical. By developing better assessment instruments this research seeks to provide solutions to the challenges faced by educators in assessing physical skills which require a more complex assessment approach than cognitive and psychomotor assessments. In today's education where the curriculum demands more integrated assessment, this research is expected to make a positive contribution to improving the quality of feedback received by students and assisting teachers in identifying student progress in mastering psychomotor skills. The development of valid and reliable assessment instruments is expected to improve the quality of learning and have a positive impact on improving physical skills.

Research related to psychomotor skills has been conducted in several previous studies which generally highlight the challenges in measuring students' physical skills. Research by (Jubaedah et al., 2024) shows that many educators have difficulty in assessing students' basic motor skills such as response speed and coordination due to the limitations of existing instruments. Meanwhile, according to Alqadri & Arsyad (2024) who revealed that although psychomotor assessment is important, its practice is often not optimally utilized in the learning process, especially in the utilization of formative assessments that can provide useful feedback for student development.

Although there are some studies that propose the use of various assessment techniques such as tests and observations, the techniques used in these studies have not been varied and comprehensive enough. This research focuses on developing a complete range of assessment techniques such as tests, observations, performance assessments and portfolios to provide a more thorough picture of students' ability to master psychomotor skills.

Method

The research method used in this research is the literature study method, which is a type of qualitative research with descriptive analysis (Darmalaksana, 2020). Data analysis was conducted using content analysis, where researchers systematically reviewed various documents to ensure the validity and constraints of the data. Documents reviewed include regulations, policies, and previous research results (Hardani et al, 2020). In this study, the literature used comes from books, magazines, journals, documents, scientific articles, and other relevant reference

sources, which are used as a basis for developing further ideas or concepts without the need to conduct field research (Revian Viva Giovardhi, 2019).

The researcher reviewed a large number of articles that delved deeply into the topic of effective strategies for developing psychomotor assessments. Articles were obtained from academic databases such as DOAJ and Google Scholar related to the research title. The quality of the data was assessed based on the publication's credibility, relevance to the research topic, methodological variation, and fit with existing theory.

Results and Discussion
Definition of Psychomotor Assessment

Assessment is one of the most important components in the process and implementation of education. Improving the quality of education can be achieved through improving the quality of learning and the assessment system. Assessment itself is defined as the application of various methods and the use of various tools to obtain information about the extent of student learning outcomes or competency achievement. Assessment results can be in the form of descriptive narratives or numbers. Basically, the assessment of learning outcomes focuses on how the teacher can understand the learning outcomes that have been carried out (Arikunto, 2021). Teachers need to know the extent to which students understand the material that has been taught or the extent to which learning objectives or competencies have been achieved. The level of achievement of competencies or instructional objectives of the learning can be expressed in the form of grades.

The psychomotor domain is the domain related to skills and the ability to act after a person receives certain learning experiences. It involves physical activities that include reflex movements, motor skills, and complex expressive abilities. Related to psychomotor, Widodo (2021) argues that the psychomotor domain involves motor activities that are crucial for developing learners' ability to manipulate objects and generally hone their motor skills. This domain is also related to movements that are intentional and controlled by brain activity. In other words, psychomotor usually involves skills that require coordination between the brain and various muscles. In the development of the psychomotor domain, the role of the teacher is very important and is expected to be carried out properly.

Psychomotor Assessment Development Strategy

A set of approaches, methods and measures designed to measure and assess learners' motor skills. Psychomotor assessment focuses on physical abilities that involve coordination between the brain and body, such as fine and gross motor movements. This strategy aims to ensure that the assessment of these skills is carried out objectively, systematically and in accordance with the learning objectives, so that it can help the development of learners' motor abilities optimally (Samsuar et al., 2023). Here are some of the main components in the psychomotor assessment development strategy:

1. Define is the first step in the psychomotor assessment development strategy, which involves two main components: a. Needs Analysis: Determining the need for psychomotor assessment, this step involves identifying the psychomotor skills that need to be measured in the learning context (Haris Munandar & Safrina Junita, 2020). b. Learning Objectives: Developing Clear Objectives, which involves developing learning objectives that are specific, measurable, and relevant to the material being studied (Nurjanah, 2019).

2. Design in the psychomotor assessment development strategy involves several important steps to ensure that the assessment instruments developed can be effective and accurate in measuring psychomotor skills. a. Developing an Assessment Grid: Creating a Psychomotor Skills Assessment Grid and Indicators, This step involves creating a clear and specific assessment grid. b. Developing Rubrics: Creating a Rubric for Each Assessment Item, This rubric should include a clear rating scale, such as very good, good, sufficient, less, and very less (Fathurrahman, 2020).

3. Pengembangan (Development)

Tahap ini terbagi beberapa langkah yaitu:

Expert Validation

The process of testing to determine the extent to which the research instrument represents the components it is intended to measure. This involves assessment from experts who have expertise in the relevant field to ensure that the instrument actually measures what it is supposed to measure (Puspitasari & Febrinita, 2021).

Limited trial

The initial stage of testing the research instrument was carried out using a small sample. The main purpose of the limited trial is to identify problems that may arise in the use of the instrument and make improvements before it is widely used (Murniati, Sardianto M.S, 2019).

Broad trial

Broad testing is an important step in the research instrument development process to ensure that the developed product can be used effectively and efficiently in a broader context. This stage involves testing the instrument on a larger and more representative number of subjects from the intended population (Alkalah, 2019).

4. Disseminate is the process of promoting and disseminating development products that have been developed to a wider network (Okpatrioka, 2023). The main purpose of dissemination is to obtain input, corrections, suggestions, and assessments from various parties to improve the final product development.

5. Peer Assessment Technique

An assessment process that involves students or individuals assessing the performance, skills, or work of their peers (Tiadam, 2019). This is different from an assessment conducted by an instructor or teacher, as students themselves conduct the assessment and provide feedback.

Psychomotor Assessment Techniques and Instruments

Assessment is a process used to make decisions by utilizing information obtained to measure student learning achievement through the use of instruments, both tests and non-tests (Wahyudi, 2020). Assessment provides an overview of certain qualities not only looking for answers to the questions asked, but also assessing how and to what extent the process reflects the results achieved by students, as well as the extent of student skills during the learning that has been done.

The term instrument in assessment cannot be separated from assessment techniques (Murniati, Sardianto M.S, 2019). That is, assessment instruments are closely related to the techniques used. Assessment techniques are methods used by teachers or assessors to collect data about student learning outcomes. As there are nine techniques for assessing student learning outcomes, namely: observation tests, self-assessment, peer-assessment, performance assessment, portfolio assessment, project assessment, product assessment, and journal assessment (Brigham et al, 2019).

Meanwhile, assessment instruments are tools used by teachers to collect data, analyze, measure, and apply various information obtained to assess the level of achievement of learning objectives that have been carried out (Badriyah et al., 2019). This information is obtained through the assessment of knowledge, skills, and attitudes as part of the competencies that must be achieved by each student.

Assessment Technique	Assessment Instrument
Test	Test Questions
Observation	Observation guidelines (check, list, rating scale)
Assessment (self- assessment)	Inquiry
Peer Assessment	Inquiry

Perfmance Assessment	Rubric
Portofolio Assessment	Rubric
Projek Assessment	Rubric
Product Assessment	Rubric
Journal Assessment	Rubric

Table 1. Research Technniques and Instruments

Based on Government Regulations governing education, specifically in the Regulation of the Minister of Education and Culture (Permendikbud) No. 23 of 2016 concerning Educational Assessment Standards, assessment instruments are devices used to collect and process information about student learning outcomes.

According to Depdiknas, the assessment of psychomotor outcomes is different from the assessment of cognitive and affective learning outcomes. Assessment of cognitive and affective learning outcomes needs to be directed at the achievement of each level, while in psychomotor learning outcomes, it is sufficient to assess the highest level that is considered to meet the standards (SUPRIHATIEN et al., 2024). Assessment of skills or the psychomotor domain can be done through two methods, namely using test and non-test techniques.

1. **Test Technique**

The test technique here refers to a form of assessment carried out using a predetermined test. This method is usually used to measure or assess student learning outcomes, including mental abilities, achievements, skills, motor coordination, and talents, both individually and in groups (Setiawati dkk, 2016). In its application, the assessment of psychomotor learning outcomes can be carried out through action tests or skills tests (performance tests) based on the abilities that have been mastered by students (Sukiman, 2014). This skills assessment is carried out by observing students while carrying out a task or activity. In a broader scope, performance assessment can be interpreted as an assessment of the mastery and application of knowledge and skills that reflect student competence, both in the process and the results achieved.

In performance assessment, the student's ability to be evaluated not only includes cognitive aspects, but also looks at the psychomotor or skill side of the student. Thus, this is getting closer to the concept of holistic assessment, in accordance with the principles of assessment that must be comprehensive. Assessment of competency achievement that requires students to perform certain tasks, such as laboratory practice or worship practices such as prayer, sports, and playing music.

Performance assessments use rubrics or scoring guidelines instead of right or wrong answer keys (Nurhaifa et al., 2020). These rubrics help ensure that assessments are fair and consistent. The essence of performance assessment is to assess students' ability to demonstrate their performance directly, rather than just answering or choosing answers from existing options (Widoyoko, 2014). Performance assessment requires special consideration (Yuniawan, 2019) *First,* students must carry out performance measures to demonstrate real skills in one or more specific competencies. *Second,* the aspects of performance assessed must be precise and complete. *Third,* students must have the specific abilities required to complete the learning task. *Fourth,* the main focus of performance assessment is on the important indicators to be observed. *Fifth,* the assessment is carried out based on the order in which the student's abilities or skills are observed.

Monitoring student performance needs to be done in various situations to determine the level of achievement of certain abilities. For example, to assess students' language skills in terms of speaking ability, teachers can make observations in specific contexts, such as

speeches, discussions, storytelling, and interviews. From this, a comprehensive picture of the assessed speaking ability will be obtained (Yunita & Sukenti, 2024). To observe student performance, tools or instruments can be used, such as attitude assessment, behavior observation, direct questions, or personal interviews.

a. The following are the steps in effectively assessing student performance: (Erawati et al., 2023)

   1) Identify critical steps: determine the key steps required to achieve the best results, as well as the factors that influence those results.

   2) Record the specific skills required: list the specific skills that are essential to complete the task and produce optimal results.

   3) Determine the assessment criteria: Create clear criteria for assessing skills. Make sure the number of criteria is not too large so that it can be observed easily when students are doing the task or activity.

   4) Sort the criteria by process: arrange the criteria in a logically observable order throughout the process.

   5) Check and compare with other criteria: if possible, double check these criteria against existing standards or criteria that others have developed. Performance assessment is done by observing students in action, documenting classroom activities, or evaluating work created in accordance with learning objectives.

b. The display that is assessed from students is skills. Assessment of student skills is based on a comparison between student performance and a predetermined standard. Here's how to easily understand student skills performance assessment:

   1) Assessment of student skills: the skills that students demonstrate in their tasks are what is assessed. This is done by comparing the student's performance against a predetermined standard, so the student's performance is measured against that standard.

   2) Performance standards: in performance appraisal, clear standards are needed as benchmarks. These standards should be appropriate to the type of task or competency being measured as well as the expected outcome of the assessment. There are 4 important principles in making good assessment standards, namely: (Yunita & Sukenti, 2024)

      a) Validity: the standard must actually match the skills it is intended to measure.

      b) Agreement: the standard is created and agreed upon so that it can be accepted by all parties.

      c) Realism: standards should be realistic and in line with students' abilities.

      d) Objectivity: free from bias, making the assessment fair.

   3) The performance assessment format requires students to perform tasks that can be seen and observed, such as singing, sports, dancing, or other forms of practice. For example, the following is a format for elementary school students to perform a performance: (Wafiqni et al., 2022).

Table 2. Assessment Format for Primary School Children

Activities: Traditional Dance Practice
Grade: IV
Date: _____
Student Name: _____

No	Assessment Criteria	Rating Scale	Assessment Description

1	Appropriateness of Movement to Music Rhythm	1 - 2 - 3 - 4 - 5	1 = Not suitable, 5 = Very suitable
2	Precision of Movement with the Right Direction	1 - 2 - 3 - 4 - 5	1 = Not appropriate, 5 = Very appropriate
3	Expression and Confidence	1 - 2 - 3 - 4 - 5	1 = Less expressive, 5 = Very expressive
4	Cohesiveness with Friends (If in a Group)	1 - 2 - 3 - 4 - 5	1 = Not compact, 5 = Very compact
5	Concentration During the Show	1 - 2 - 3 - 4 - 5	1 = Often distracted, 5 = Very focused

Rating Scale
- 1: Very Poor
- 2: Less
- 3: Enough
- 4: Good
- 5: Excellent

Teacher Comments: _____

Follow-up:
- Development of areas that need improvement
- Support to maintain or improve good performance

Signature of Instructor: _____

2. Non-test technique

The non-test assessment method is a way to assess students' abilities without using a written test (Rusilowati, 2019). Assessing psychomotor outcomes is different from assessing cognitive and affective learning outcomes. Affective assessment focuses on students' understanding and feelings, while psychomotor assessment deals with physical skills. It consists of questions or commands to be performed by learners, as well as guidelines for scoring their performance. Before conducting an assessment, the assessor must first create an assessment grid. This grid serves as a guide for assessing and scoring learners based on predetermined criteria. In skill assessment, a numerical scale and description from 0 to 100 are used (Yus, 2014). This method is applied by using various non-test assessment instruments Based on Permendikbud No. 104 of 2014, assessment of projects, products, portfolios, and event notes can be used to assess skill competencies. The following is the explanation:

a. Project assessment is the process of assessing a task that must be completed within a certain time outside of class hours (Hanardi, 2019). This project assessment aims to assess students' ability to plan, organize, and present information in accordance with the tasks given outside of class hours. The project assessment process starts from planning, working, to completion. Teachers need to determine the things that will be assessed, such as project design, data analysis, and written reports. So, project assessment helps teachers to see the extent to which students can understand and apply the subject matter in a real context.

b. Product Assessment

Product assessment is a way to assess how students make a product and how good the quality is. In assessing student products, two things are assessed. First, the way students use tools and work procedures. Second, the technical and aesthetic quality of the student's work. So, product assessment involves both the process of making and the final product made by the students (Maruti & Kusumawati, 2020).

There are 3 aspects of product assessment, namely:

1) Preparation, where the teacher assesses the students' abilities and plans and develops ideas for the product to be made.

2) Product creation, where students assess their ability to select materials, tools and techniques used in the product creation process.

3) product assessment, where products that have been made by students are assessed according to predetermined criteria.

This process is an integrated whole, where teachers can assess students' abilities in various stages, such as choosing work techniques at the product making stage and at the final stage, which is the assessment of the resulting product. Thus, this learning process helps students to develop their skills and abilities in making products independently.

c. Portfolio Assessment

A portfolio is a collection of student work over a period of time that shows effort, development, and learning achievement. So, portfolio assessment is carried out by assessing all student work in a particular field to see students' interests, development, achievement, and creativity within a certain time (Magdalena et al., 2023). Portfolio assessment provides a more complete picture of students' abilities and potential than traditional assessments that focus only on written exams or tests. Thus, this portfolio assessment gives students the opportunity to demonstrate various aspects of their learning, not just the ability to recall information. There are three forms of portfolios distinguished by Forster & Masters (1996), namely work portfolio, documentation portfolio, and performance portfolio.

a) A working portfolio is a collection of work that shows the process of creating a work from start to finish. For example, in assessing a student's writing ability, a working portfolio could contain not only the final piece of writing, but also various draft versions of the writing, revisions, and comments on the writing process. With a working portfolio, teachers can see how students plan, produce, and write writing.

b) A documentation portfolio is a collection of student work that is used specifically for assessment. Unlike a working portfolio that describes the process of making work, a documentation portfolio contains works that are finished and ready to be assessed.

c) A performance portfolio is a collection of the best work created by students. It contains examples of work that demonstrate a student's ability and expertise in a field. These performance portfolios are usually used for various purposes, such as selection into schools or universities, or to obtain certification in a particular field. By looking at a student's performance portfolio, interested parties can more easily assess the student's ability and potential.

d) Basic principles of portfolio assessment

Portfolio assessment assesses student works based on certain principles. There are several basic principles that must be considered in assessing portfolios, namely process and outcome assessment, assessment carried out periodically and continuously, and fair assessment. Portfolio assessment is a way to assess students' works based on certain principles. There are several basic principles that must be considered in assessing portfolios, namely process and outcome assessment, periodic and continuous assessment, and fair assessment.

There are several things that need to be used as guidelines in using portfolio assessment in schools. First, the work in the portfolio must be the student's own work. Second, there must be mutual trust between teachers and students. Third, confidentiality between teachers and students must be maintained. Fourth, the work in the portfolio is the joint property of the student and the teacher. Fifth, the assessment must give satisfaction to students. Sixth, assessment must be in accordance with predetermined criteria. Seventh, assessment must include the process and results of student work. Finally, assessment must have an impact on the student learning process.

Conclusion

Assessment in education, particularly in the psychomotor domain, is an important aspect of assessing students' physical skills gained from learning experiences. This assessment not only measures cognitive and affective achievements, but also physical skills that involve coordination between the brain and body. In the psychomotor assessment process, effective strategies are needed to ensure that skills are measured objectively, systematically and in line with learning objectives. These strategies involve defining, designing, developing, deploying and using assessment techniques such as peer assessment, rubrics, and test and non-test instruments. With the proper implementation of psychomotor assessment, it is expected that students' motor skills can be optimally developed, and learning outcomes can be more comprehensive, covering physical, mental, and attitudinal aspects.

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