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Analysis of Psychomotor Domain Objectives from the Perspective of Educational Theorists

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Abstract

Achieving a number of skills is the goal of education in the 21st century. To achieve these skills, an understanding of the psychomotor aspects is required. Understanding the psychomotor aspects can help teachers or instructors to measure the extent to which individuals have achieved the desired skills. This research aims to explore the concept of psychomotor taxonomy from various educational figures. The method used in this research is the literature study method. Primary data was obtained from various scopus-indexed journal literature. While secondary data sources are obtained from other relevant journals, the data is then analyzed according to the content analysis stage. The conclusion of this research found that psychomotor taxonomy has an important role in learning, especially in developing and measuring aspects of skills. Each educational figure offers different views and stages, ranging from imitation to creation (Dave), specific response to rule use (Buttler), and reflex movement to non-discursive communication (Mardapi). Overall, this study provides insights into the contributions of each figure in formulating the psychomotor taxonomy, which is important for understanding how motor skills can be measured and evaluated objectively in the current educational context. Teachers as educators and other experts can use the views of the figures in this article as guidelines in conducting learning evaluations in the psychomotor field to measure students' skills.

Keywords: *Psychomotor, Learning, Evaluation.*

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INTRODUCTION

Psychomotor skills play an important role in the field of education. These skills involve the coordination between cognitive functions and physical movements. Psychomotor skills refer to the ability to perform coordinated bodily movements, which typically involve deliberate physical actions such as touching, holding, moving, or manipulating objects. Therefore, these skills require precision and control (Amorim et al., 2024; Razali et al., 2021). Psychomotor skills are a crucial component that must be trained seriously, as their implementation demands accuracy, appropriateness, and responsibility (Alonso-Vargas et al., 2022; Amorim et al., 2024; Terrazzo-Luna et al., 2024).

Psychomotor aspects need to be implemented in the learning process. However, several challenges must be addressed. One of the main challenges is the absence of clear guidelines regarding best practices for psychomotor assessment (Reaves et al., 2024). The lack of discussion on the most appropriate methods for assessing psychomotor skills remains a common issue in the field of education (Bourassa et al., 2024). This ambiguity makes it difficult for teachers to demonstrate and assess these skills effectively and responsibly, as expected. Psychomotor skills actually have specific pedagogical approaches designed for complex tasks, but these approaches have not been fully or systematically applied in current classroom practices (Nicholls et al., 2016). Moreover, teachers are often not provided with adequate training to design instructional and assessment strategies that are appropriate for the psychomotor domain. Based on these issues, it can be concluded that

research on psychomotor assessment guidelines is urgently needed to enable teachers to measure students' psychomotor skills in a more standardized manner.

Several previous studies have examined psychomotor skills from the perspective of educational theorists. For example, a study by Wisesa (2021) employed a qualitative approach to explore Bloom's concept of psychomotor skills and found that motor skills can be gradually developed through practice-based learning. Meanwhile, Ashcroft (2020) discussed Simpson's view of the psychomotor hierarchy, concluding that motor skills progress from imitation to complex and automatic movements through repeated practice. Another study by Al-Qodri (2025) reviewed Harrow's model and concluded that motor movements are not merely mechanical but are also closely linked to affective and perceptual factors.

These three previous studies indicate that the psychomotor domain has been academically examined, but each focused solely on a single figure or specific approach. The novelty of the present study lies in its integration of multiple psychomotor taxonomies from various theorists, including Bloom and his colleagues, Singer, Mardapi, Butler, and Dave. As such, this research provides a more detailed and holistic picture of psychomotor skills, encompassing various dimensions to yield a more comprehensive understanding. The uniqueness of this study is reflected in its simultaneous analysis of the psychomotor concepts of five educational figures, offering a broader and deeper insight into diverse approaches to understanding and applying the psychomotor domain in education.

Examining the perspectives of these theorists may lead to a comprehensive theoretical foundation for the future development of psychomotor science and practice (Doni et al., 2022; Mustaqim, 2016). Additionally, such research allows for the exploration of the relevance and contextualization of these theories in addressing current educational challenges and needs, ensuring their continued applicability and benefit to the wider community (Desman et al., 2023). This highlights the significance of the present study. Thus, the aim of this study is to explore, integrate, and analyze various psychomotor taxonomies from several educational theorists in order to construct a comprehensive framework that can serve as a foundation for designing psychomotor-based learning models.

METHOD

This research uses a literature study research method. This research process involved reviewing various books, literature, journals, notes, and other relevant information related to the psychomotor taxonomy. The stages of the literature study in this research include several steps, namely reviewing references, collecting references, analyzing these references, and displaying research data (Nasrudin et al., 2024). The types of references in this study consisted of primary references and secondary references. Primary references in this study used various Scopus indexed articles to understand the psychomotor taxonomy of various educational figures. Secondary references in this study were obtained from various relevant journals. The data obtained is then analyzed using content analysis techniques and document studies. This research procedure involves identifying objects, describing the collected data, and discussing the results. The data analysis method was carried out using descriptive and interpretive techniques throughout the stages of data reduction, data presentation, and conclusion drawing (Nasrudin et al., 2025). The flow of this research is illustrated in Figure 1.

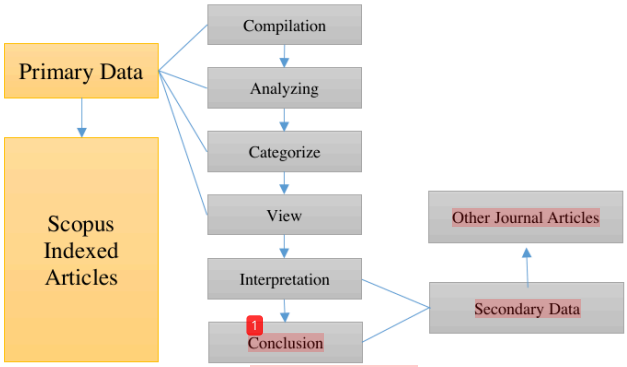

Figure 1. Research Flow

Figure 1 illustrates the research flow. This study follows a series of systematic steps, beginning with the use of primary data, namely articles indexed in the Scopus database. These articles are first compiled and then analyzed in depth to understand the perspectives of various educational theorists regarding psychomotor taxonomy. After the analysis process, the data are categorized based on themes or specific aspects relevant to the focus of the research. The categorized data are then critically examined to assess the theoretical perspectives of each figure. The results of this examination are interpreted to extract deeper meaning and to identify connections between the different theories. From this interpretation process, the researcher draws conclusions that synthesize an understanding of the psychomotor taxonomy from multiple theorists. In addition to utilizing primary data, this study is also supported by secondary data obtained from other relevant journal articles. These secondary sources are used as a basis for comparison and as supporting materials during the interpretation process.

RESULTS AND DISCUSSION

Psychomotor in Bloom's View

Bloom and his colleagues developed a taxonomy that includes three domains of learning: cognitive, affective, and psychomotor. However, in the original taxonomy developed by Bloom, the main focus was on the cognitive domain. Other researchers further developed the psychomotor domain. Although Bloom did not explicitly specify sub-categories for the psychomotor domain in his original work, this domain generally includes skills that involve physical and motor coordination (Efendi et al., 2023). This inclusion is because several learning processes as part of educational activities focus on developing physical and motor skills. The study and knowledge of the psychomotor domain in this case will be able to provide guidelines for educators in designing and evaluating learning activities related to physical activity (Nafiati, 2021). In addition, understanding this domain will enable curriculum development and evaluation processes that are not only on affective and cognitive aspects, but also the development of learning objectives and evaluations that focus on measuring students' skills (Santika et al., 2019). Based on this, it can be seen that we as prospective educators need to know and understand the concept of Bloom's psychomotor taxonomy.

Bloom's taxonomy for the psychomotor domain consists of several levels as in the cognitive and affective domains. In this case, the researcher took the psychomotor levels of Bloom's revised taxonomy based on a number of studies published in various Scopus journals (Chweu, 2025; Hussain et al., 2016; Lochotinant & Yanchinda, 2019; Nirwana et al., 2025). Based on the explanations I found, Bloom's taxonomy levels in the psychomotor domain consist of seven levels. The seven levels include perceiving, regulation, guided response, mechanization, complex open response, adapting, and creating. An explanation of each of Bloom's taxonomy for the psychomotor domain is as Table 1.

Table 1. Psychomotor According to Bloom's Taxonomy Revised

Not.	Aspect	Description	Example
1.	Understanding	Uses sensory needs to direct motor activity	Learners observe instructions from the teacher and carry them out well
2.	Organizing	Interact with the physical environment and prepare for physical activity.	Learners prepare learning tools and are ready to learn
3.	Guided response	Perform skills under the guidance of the teacher or instructor	Learners imitate the movement of ruku' as a prayer movement modeled by the teacher.
4.	Mechanization	Perform the skill more confidently without close supervision	Learners perform ruku' as a prayer movement independently without direct supervision.
5.	Complex Open-ended Responses	Able to perform complex tasks with high efficiency and accuracy	Learners can perform all the prayer movements independently with precision.
6.	Adaptability	Able to adapt skills in new or different situations.	Learners can adapt sports techniques even in different situations and conditions.
7.	Derived from	Create new skills or methods based on learned knowledge and skills.	Learners can design new physical training programs based on their knowledge.

Table 1 explains about psychomotor in Bloom's view. The first level in Bloom's psychomotor taxonomy is perception or understanding. Perception in this case is identified with the keywords selecting, identifying, relating, and selecting (Hussain et al., 2016; Lochotinant & Yanchinda, 2019). This first level relates to the ability to use sensory cues to guide motor activity (Chweu, 2025). At this level, learners begin to develop sensory awareness of the environment and the ability to respond appropriately to the physical stimulus at hand. For example, a nurse may use observation in simulated practice to read a patient's situation and respond with appropriate actions. This stage of development lays the foundation for the development of higher skills in the psychomotor domain. This is because sensory awareness of the environment or existing conditions can open up other physical activities (Nascimento et al., 2021). This awareness can be developed in learners by providing them with opportunities to practice in an environment that actively engages them and offers feedback on their progress (Ünal, 2023). Thus, it can be seen that the ability to perceive is an initial ability in the psychomotor domain that needs to be mastered by learners.

The second level in Bloom's psychomotor taxonomy is setting. Setting in the psychomotor domain can be seen in verbs such as starting, moving, and showing (Hussain et al., 2016; Lochotinant & Yanchinda, 2019). At this stage, learners interact with the physical environment and begin to understand the importance of movement and coordination in performing task activities. Learners at this stage have physical, mental, and emotional readiness to act (Chweu, 2025). For example, learners are ready and able to perform certain tasks (Ünal, 2023). A concrete example is that learners who will do practicum in the laboratory must be in a state of readiness both mentally and physically and have the necessary tools Thus, setting relates to the readiness to carry out physical activities under guidance.

The third level in Bloom's psychomotor taxonomy is guided response. This level can be measured by the verbs copy, trace, reproduce, and react (Hussain et al., 2016; Lochotinant & Yanchinda, 2019). At this level, learners begin to perform skills under the guidance of an instructor (Obuekwe et al., 2020). Learners at this stage perform learning by imitation (Chweu, 2025). For example, from what I understand, learners in Islamic religious education follow instructions to read the Qur'an modeled by the teacher. Based on the description above, it can be seen that in this case learners are not only ready but have begun to carry out activities accompanied by supervision and guidance from the teacher.

The fourth level in Bloom's psychomotor taxonomy is mechanization. This level in the psychomotor domain can be measured by the verbs assemble, calibrate, tighten, and measure (Hussain et al., 2016; Lochotinant & Yanchinda, 2019). Learners at this stage begin to be able to perform certain skills more independently and better. Learners at this stage can perform an activity or movement confidently and proficiently because they already have complex skills (Chweu, 2025). For example, a learner can use laboratory equipment without close supervision (Stupans, 2017). Based on this description, it can be seen that the level of mechanization in this case relates to the skills in carrying out an activity without too close supervision.

The fifth level in Bloom's psychomotor taxonomy is complex overt response. This level in the psychomotor domain can be measured by a number of verbs such as grind, sketch, manipulate and assemble (Hussain et al., 2016; Lochotinant & Yanchinda, 2019). At this stage, learners are able to perform complex

tasks efficiently. In addition, at this stage, guidance from educators or instructors is often minimal or even absent. For example, learners can create complex artwork independently (Panthalookaran, 2025). Thus, at this stage learners should be able to perform tasks well.

The sixth level in Bloom's psychomotor taxonomy is adapting. This level in the psychomotor domain can be measured by several verbs such as change, rearrange, vary and revise (Hussain et al., 2016; Lochotinant & Yanchinda, 2019). Learners at this level can adapt their skills to new or different situations according to their needs (Chweu, 2025). For example, a learner who has mastered a spesific technique in sports can apply the technique even if the competition situation is different. Another example is a chef who has learned one type of cuisine may be able to adapt his ability to adjust the recipe according to the ingredients available (Hussain et al., 2016). Thus, it can be seen that at this stage students are able to apply their behavioral activities properly without being influenced by other factors.

The seventh level in Bloom's psychomotor taxonomy is creating. The highest level in Bloom's taxonomy for this cognitive domain can be measured by verbs such as organize, build, construct, and create (Hussain et al., 2016; Lochotinant & Yanchinda, 2019). This level involves the ability of learners to create new skills or methods based on the knowledge and skills they have learned. Of course it is not just about doing but also about creating and innovating. For example, a learner who designs a new training program based on their knowledge of physical fitness demonstrates this level in the psychomotor domain (Stavisky et al., 2021). That example is similar to the writer's process of developing the steps required for writing a scientific paper. Thus, the level at this stage not only focuses on doing well, but also relates to the process of creating and innovating.

Psychomotor in Singer's View

Singer (Seidel et al., 2007) holds the view that psychomotor is a domain that involves the acquisition and performance of behaviors generally reflected in movement. The movement in question can be recognized as, for example, the act of touching, manipulating, or moving an object and controlling body parts. However, Singer emphasizes the importance of cognitive aspects in psychomotor skills in this case. The cognitive aspect in question is the ability of each learner to process information effectively, enabling them to perform physical activities efficiently. The key components of psychomotor according to Singer (Seidel et al., 2007) consist of two aspects, namely motor skills and perceptual-motor skills. Motor skills in this case relate to fine motor and gross motor. Fine motor skills in this case include the execution of precise physical movements. One example is correctly attaching beads. Gross motor skills involve larger movements such as jumping or running. Meanwhile, perceptual motor skills are concerned with integrating sensory input with motor action. Singer in this case views that good physical activity requires coordination and control of cognitive aspects. Based on this, the key components of Singer's view of psychomotor include motor skills and perceptual motor skills.

Table 2 Psychomotor According to Singer

Aspect	Description
Definition	Psychomotor involves the acquisition and performance of behaviors reflected in movement, such as manipulating or moving objects and controlling body parts with an emphasis on cognitive aspects.
Key Components	Motor skills (in the form of fine motor and gross motor skills) and motor perception skills
Learning Strategies	Psychomotor learning requires appropriate learning strategies to achieve success. The process of appropriate learning strategies in psychomotor learning includes: Preparing (mental and physical preparation), envisioning (imagining the action to be performed and thinking positively), focusing (concentrating on relevant features), executing (performing without thinking about the outcome), and evaluating (using feedback and assessing performance).

Table 2 shows the main psychomotor concepts in Singer's view. Physical activity according to Singer cannot be separated from the need for appropriate strategies to achieve goals. Singer views psychomotor as an important learning domain, which requires appropriate learning strategies to achieve success in psychomotor tasks. He emphasizes the importance of cognitive processes and appropriate learning strategies to achieve success in these tasks. Singer also proposed that psychomotor skills can be categorized based on information processing demands, environmental pacing conditions, and availability of feedback. In addition, Singer and Gerson developed a task classification model that sought to organize the cognitive and affective aspects of psychomotor behavior (Singer & Cauraugh, 1985).

In this regard, Singer (1985) proposed the idea of strategies or procedures that should be followed in the process of effective learning strategies. First, preparation. At this stage, learners pay attention to: (1) learning by being physically comfortable; (2) trying to achieve the optimal mental-emotional state for the task and situation; (3) trying to do things as preparation related to previous personal best performance; and (4) trying to be consistent in achieving the state of preparation for action. Second, imaging. At this stage learners should be able to pay attention to the following: (1) mentally imagining oneself performing the action briefly how the action should be performed from the result of the action to the initiation of the movement; (2) thinking positively and feeling confident; (3) feeling the movement. Third, focusing. Some of the things that learners need to pay attention to at this stage are: (1) concentrating intensely on one relevant feature of the situation; (2) blocking out all other unrelated thoughts. Fourth, implementing. At this stage learners should pay attention to two things, namely: (1) do it, and (2) do not think about the process that is happening or the possible result that will be obtained. Fifth, evaluate. At this stage learners need to pay attention to three things, namely: (1) if time allows, use the available feedback information to learn from mistakes; (2) assess the performance results and effectiveness of each step in the routine; and (3) adjust the procedure next time. The five steps are Singer's ideas so that the psychomotor activities carried out can run to achieve the expected goals.

Psychomotor Skills in Mardapi's View

According to Mardapi, psychomotor skills are divided into six levels that describe the development of human motor movements from the most basic to the more complex. The six levels consist of: reflex movements, basic movements, perceptual abilities, physical movements, skilled movements, and non-discursive communication (Sitepu et al., 2022). A more detailed explanation is as Table 3.

Table 3. Psychomotor According to Mardapi

No	Levels of Mardapi's Taxonomy	Description	Example
1.	Reflex Movement	Automatic and innate motor responses to specific stimuli that occur without practice.	Grasping or blinking reflex
2.	Basic Movements	Coordinated and purposeful gross motor movements (early control and awareness)	Walking, running, jumping, throwing, catching
3.	Perceptual Abilities	Processing sensory information to produce purposeful movements	Catching the ball by calculating the speed and direction of the throw.
4.	Physical Movement	Development of skillful movements with increased strength, endurance, flexibility and speed.	Development of perceptual abilities through advanced exercises such as running, push-ups, and so on.
5.	Skilled Movement	Mastery of specialized techniques through repeated practice and understanding of theory	Playing a musical instrument with proper notation.
6.	Non-Discursive Communication	Expressing meaning through gestures, facial expressions or sign language	Expressive gestures (nodding) or interpretive gestures (meaningful dance)

Table 3 provides information about the levels of the mardapi psychomotor taxonomy. The first taxonomy in this taxonomy is reflex movement. This level is the initial stage where individuals show automatic motor responses in reaction to certain stimuli. Real examples of reflex movements can be observed in newborn babies, such as the grasping reflex when the palm of the hand is touched, the sucking reflex when the lips come into contact with the nipple, or the reflex when the baby feels startled and automatically stretches his arms and legs. All of these responses occur spontaneously and do not require special instruction or practice. This is because the baby's nervous system is biologically programmed to respond to certain stimuli to survive and adapt to the environment. Reflex movements play a very important role in a child's development. For example, the grasping reflex helps babies learn to recognize objects through touch. Another example is the sucking reflex which is essential for feeding and survival in the early days of life. In addition, these reflexes also serve as protective mechanisms. For example, the blink reflex protects the eyes from foreign objects or light that is too bright. As we age and the central nervous system develops, most of these reflexes will undergo integration and gradually be replaced by more controlled, purposeful and deliberate movements. The process of reflex integration is very important because if the basic reflexes are not well integrated, there will be obstacles to the child's motor development and learning process in the future, such as difficulties in coordinating body movements, writing, or doing other physical activities. In the context of education, an understanding of reflex movements is also

very important for teachers and parents, as it can help them design learning activities that are appropriate to the child's developmental stage. For example, in early childhood, activities that involve touch, visual or sound stimulation can help stimulate and strengthen the integration of basic reflex movements. This can make children better prepared to learn more complex motor skills, such as walking, running or writing. Additionally, an understanding of reflex movements can aid in the early detection of developmental disorders, allowing for immediate interventions to prevent more severe issues in the future (Sitepu et al., 2022; Nurwati, 2014). Thus, reflex movements are not only the most basic unconscious psychomotor abilities but also an important foundation for students' overall skill development.

The second level of Mardapi's psychomotor skills is basic movement. According to Mardapi, basic movement in psychomotor development is the second stage after reflex movement (Nurwati, 2014). This stage includes the ability of individuals to perform coordinated and directed gross motor movements. Some examples of basic movements are walking, running, jumping, throwing and catching. At this stage, movements are no longer automatic but are controlled by muscles, body coordination, and awareness in performing physical activities. Basic movement is one of the important stages related to psychomotor development because at this stage individuals can develop more controlled activity skills (Ullah et al., 2024). In the context of education, mastering basic movements is crucial for supporting learning activities and helping children in the process of social adaptation and self-confidence development (Shariffudin, 2011). Assessment of basic movements is typically conducted through direct observation of students' physical activities, focusing on aspects such as coordination, flexibility, strength, and accuracy of movement. Teachers need to provide gradual and repeated practice so that students are able to master the correct movement patterns before moving on to higher skills (Perry et al., 2021). Thus, according to Mardapi, basic movement is not merely a physical activity, but also a continuous learning process that is integrated with students' cognitive and affective development, so that it becomes an important foundation for forming optimal psychomotor abilities in the future.

The third level in Mardapi's psychomotor skills is perceptual ability. According to Mardapi, the basic movement at the next level is perceptual ability. At this stage, each student not only performs physical movements but also processes sensory information such as visual, auditory, and kinesthetic information to produce a directed movement response. For example, Ega was able to catch the ball while calculating the speed and direction of the throw correctly. This shows that Ega has been able to combine perception with motor coordination. This ability is certainly important because at this stage, individuals must be able to identify, interpret, and respond effectively to designs in various situations (Nurwati, 2014). Perceptual ability assessment can be done through direct observation of the accuracy, speed, and adaptability of student movements in completing practical tasks. In this case, teachers can assess how students respond to commands, use equipment, or adjust their movements to changing situations (Jannah, 2022). Therefore, mastery of this stage is very important for students because it is the basis for the development of higher psychomotor skills.

The fourth level in psychomotor skills according to Mardapi is physical movement. According to Mardapi, physical movement is the fourth level in the psychomotor domain. This level emphasizes students' ability to develop skilled movements through physical activities related to their ability to develop skilled movements. The skilled movements referred to here are different from the basic movements in the previous stage. Skilled movement at this level means that each individual is already able to perform higher motor tasks, which are indicated by increased strength, endurance, flexibility, and speed (Nurwati, 2014). An example of this level is students who are able to perform activities such as running, push-ups, sit-ups, or other activities. This level is also important because it connects perceptual abilities with more skillful motor abilities, thus becoming the basis for mastering the next level (Sitepu et al., 2022). Thus, it can be seen that students who want to reach higher levels must first master good physical movements.

The fifth level in Mardapi's psychomotor skills is skillful movement. Skillful movement is the fifth level in Mardapi's psychomotor stages. This stage emphasizes mastery of certain techniques, characterized by repeated learning and practice to adapt movements better. In addition, what distinguishes this stage from the next stage is the level of coordination, where the level of body coordination at this stage is higher than the previous stage. High-level motor activities at this stage include playing musical instruments with accurate notation. Of course, in this case, students must first understand the notes of the musical instrument before playing it. Thus, it can be seen that this stage is characterized by a higher level of coordination, the need for repeated practice, and the need for understanding relevant theoretical principles.

The sixth level in Mardapi's psychomotor skills is non-discursive communication. Non-discursive communication is the highest level in psychomotor skills according to Mardapi. This level emphasizes the individual's ability to communicate or express meaning through gestures, facial expressions, or sign language

without using words (Nurwati, 2014). This is also what distinguishes non-discursive communication from the previous level. In this case, Mardapi explains that non-discursive communication involves two types of movements, namely expressive movements (such as nodding to agree with something) and interpretive movements (such as dance movements that convey certain meanings). Expressive movements are a form of nonverbal communication that often occurs in everyday social interactions where individuals express agreement, disagreement, or other emotions without using words (Habib et al., 2022). Thus, it can be seen that this stage is the highest level, which contains expressive and interpretive movements.

Psychomotor in Buttler's Perspective

This section will explain Butler's view on psychomotor. The explanation of psychomotor according to Butler (1972) in this discussion is taken from an international journal (Yatimah, 2020) , as well as relevant national journals. Butler (1972) views psychomotor aspects as learning outcomes that are divided into three main levels, namely: specific responding, motor chaining, and rule using (Nurwati, 2014; Oktaviyanti et al., 2022; Yatimah, 2020). The explanation for each level is as Table 4.

Table 4. Psychomotor According to Buttler

No.	Buttler's Taxonomy Levels	Description	Example
1.	Specialized Response	The basic level where individuals respond to physical stimuli or perform a single skill.	Hold the racket, listen, watch
2.	Motor Chain	Individuals combine two or more basic skills into more complex and coordinated movements.	Hitting the ball
3.	Using Rules	The highest level where the individual uses experience and knowledge for more complex motor skills	Kicking the ball towards a specific target

The first level in Buttler's psychomotor development is specific response. At this level, individuals can respond to physical things or perform single skills. Examples include holding a racket, hearing, seeing, or touching an object. These responses are basic and become the foundation for more complex psychomotor skills (Nurwati, 2014; Oktaviyanti et al., 2022; Yatimah, 2020). Each individual at this stage has basic skills with key characteristics including movements that do not require combination with other movements, do not require special training, and responses given based on direct stimuli from the environment (Ishak, 2022). These external stimuli automatically activate simple responses, known as this level. Thus, it can be seen that this stage is the simplest stage, does not require special training and is reactive and automatic.

The second level in Buttler's psychomotor development is motor chaining. This level indicates a person's ability to combine two or more basic skills into a more complex sequence of movements. Examples include hitting a ball, kicking a ball, or using a tool such as a yardstick. At this stage, coordination and integration of several basic skills into one activity begins to develop (Nurwati, 2014; Oktaviyanti et al., 2022; Yatimah, 2020). At this stage, movements are no longer singular as in specific responses. Movements at this stage involve a combination of skills to complete a task (Sitepu et al., 2022). The main characteristics of this stage include a combination of simple skills (such as holding and swinging), synchronization between sensory perception and motor response to achieve movement, and the need for repeated practice (Nurwati, 2014). Thus, it can be seen that the second level of Butler's taxonomy relates to movements that combine a number of simple movements that need to be trained to perform.

The third level in Buttler's psychomotor skills is the use of rules. At the highest level, individuals are able to use prior experience and knowledge to perform complex and purposeful skills. Here, psychomotor skills are not simply a combination of movements, but also involve an understanding of the rules and strategies involved in their execution (Nurwati, 2014; Oktaviyanti et al., 2022; Yatimah, 2020). At this stage, individuals are able to apply the experience, rules or principles they have learned to perform more motor skills that require adjustment. In addition, movements at this stage not only involve basic skills but also require strategy, situation analysis, and application of knowledge to achieve optimal results (Nurwati, 2014). Examples of activities at this level are when someone kicks a ball towards a specific target or hits the ball with the right strength to achieve the best results. Thus, rule using is the highest level with the most complex physical and analytical skills in the process of performing physical activities.

Psychomotor in Dave's View

Dave's perspective (Armstrong, 1970) The psychomotor aspect is described in the psychomotor taxonomy, which divides psychomotor learning outcomes into five stages of motor skill development. The five stages are as Table 5.

Table 5. Psychomotor According to Dave

No.	Dave's Taxonomy Level	Description	Example
1.	Imitation	The basic level where individuals imitate observed behaviors or movements.	Copying calligraphy based on the example given by the teacher
2.	Manipulation	Individuals can perform skills by following instructions or guidance.	Kicking the ball according to the teacher's instructions
3.	Precision	The individual can perform the skill with high precision and accuracy without assistance.	Kicks the ball with the right force and direction so that the ball consistently reaches the target.
4.	Articulation	The individual can coordinate multiple skills harmoniously to produce complex and efficient movements.	Adjust the use of the saw according to the condition of the wood.
5.	Naturalization	Skills are performed automatically, smoothly, effectively and efficiently without the need for control.	Paint calligraphy fluently without thinking about the steps involved.

Table 5 provides information on Dave's view of psychomotor skills. First, imitation. The psychomotor level at this stage is the most basic level in Dave's psychomotor taxonomy. This level involves the ability to imitate previously observed behaviors or movements. At this stage, learners observe a skill and attempt to imitate it exactly as it is demonstrated (Armstrong, 1970; Gulzar, 2014; Shannon & Leong, 2023). At this stage, students can demonstrate the ability to imitate or copy behaviours, movements, or skills that they have observed from others (Gulzar, 2014). In other words, individuals at this stage only imitate what others have done, although the results are not exactly the same. In PAI, for example, individuals imitate calligraphy based on examples given by the teacher. Verbs that are often used to describe this stage include imitating, copying, repeating, duplicating, and producing (Gulzar, 2014). Verbs at this level include trying, copying, imitating, following, repeating, duplicating, replicating, and producing. Thus, it can be seen that this stage is the most basic stage as individuals at this stage are simply copying the example exactly, although the results may differ.

The second level in Dave's psychomotor skills is manipulation. At this stage, individuals can perform a skill based on instructions or guidelines, even if they have never seen the skill before. Learners can perform tasks by following instructions or directions given (Armstrong, 1970; Gulzar, 2014). Individuals can follow instructions or directions and start performing selected movements through practice. That is, their movements are no longer identical to the example, but show independence and adaptation based on their own understanding. For example, after imitating the movement of kicking a ball from the teacher, students can kick the ball by following the instructions based on their memory. Some action verbs at this level include act, build, execute, do, finish, achieve, follow, play, produce (Armstrong, 1970; Gulzar, 2014; Shannon & Leong, 2023). Thus, it can be seen that students at this stage are different from students at the previous stage, where students at this stage no longer imitate but are able to perform movements with instructions or guidance.

The third level in Dave's psychomotor skills is precision. This stage demonstrates the ability to perform skills with a high degree of precision and accuracy without assistance or intervention. Students are able to produce accurate and consistent work products (Armstrong, 1970; Gulzar, 2014; Shannon & Leong, 2023). Individuals at this stage not only perform movements independently but can also refine and control these activities so that the results are very accurate and in accordance with the desired target. For example, students can kick a ball with the right direction and strength so that the ball consistently reaches the target. The difference between this level and the previous level is in the quality of the skill outcome. Learners at this stage have mastered the skill of an activity and can perform it purposefully, accurately and repeatedly with minimal error. Some verbs that can be used at this level include Achieve automatically, Excel expertly, Perform masterfully, Demonstrate skillfully, Calibrate perfectly (Armstrong, 1970; Gulzar, 2014; Shannon & Leong 2023). Thus, it can be seen that this level has the characteristics of mastery of skills by an individual who is more maximal than the previous level.

The fourth level in Dave's psychomotor skills is articulation. Articulation is the fourth level in Dave's psychomotor levels. At the articulation stage, individuals can coordinate and integrate several skills in harmony to produce more complex and efficient movements. Skills that have been mastered can be combined to complete more complicated tasks (Armstrong, 1970; Gulzar, 2014; Shannon & Leong, 2023). The main characteristics of articulation are inseparable from the integration of several basic skills, consistency in performing movements, and the ability to adjust movements according to the conditions or tools used. An example is an individual who is able to adjust the conditions and tools used when sawing wood based on the hardness of the material (Armstrong, 1970; Gulzar, 2014; Shannon & Leong, 2023).Thus, it can be seen that this level not only emphasizes high coordination but also emphasizes efficiency.

The fifth level in Dave's psychomotor skills is naturalization. This level is the highest level in Dave's psychomotor skills. Psychomotor skills at this level are characterized by fluid, effective, and efficient physical activities without the need for further conditioning. In other words, the individual performs the activity in question automatically and very well. For example, a student who is accustomed and skilled at making calligraphy will automatically take the tools and paint without the need to think and remember each step. The main difference between the naturalization level and the previous level lies in the aspects of automation and reflexivity of movement. At the articulated level, individuals are able to combine and coordinate several skills in a harmonious and complex manner to produce a complete work product, but still require full awareness and control in its execution. While at the naturalization level, the entire set of skills has been internalized and become a habit, so that it can be done easily, quickly, and without error even in changing conditions or under pressure (Armstrong, 1970; Gulzar, 2014; Shannon & Leong, 2023). Thus, it can be seen that psychomotor skills at this stage are no longer just one or two movements, but have become ingrained or characteristic movements.

This study has several limitations that must be acknowledged to maintain the transparency and credibility of the results obtained. One of the main limitations is the potential limitations of the data source. The data used in this study was sourced from reputable international journals, but not from the original manuscripts of the educational figures concerned. For future improvement, it is suggested that similar research be conducted using data sourced directly from the original writings of the relevant educational figures as primary sources. In addition, future research can consider alternative methodological approaches or a combination of methods to achieve more comprehensive and in-depth results.

CONCLUSION

The psychomotor domain is an important aspect of learning that focuses on developing students' physical and motor skills, ranging from the most basic movements to the ability to create and adapt complex physical activities. Psychomotor skills emphasize not only the mastery of body movements, but also the integration between theoretical knowledge and practical application, thus enabling students to apply their knowledge in real life and develop creativity. Through this domain, educators can measure and evaluate students' skills objectively, ensuring that learning is not only focused on cognitive and affective aspects, but also on practical skills relevant to real-world needs. Various educational figures such as Bloom, Singer, Mardapi, Buttler, and Dave have made significant contributions in formulating taxonomies and stages of psychomotor development. Each offers different perspectives and levels, ranging from imitation, manipulation, to naturalization (Dave); from specific response to rule use (Buttler); and from reflexive movement to non-discursive communication (Mardapi). Bloom, although initially focusing more on the cognitive domain, also developed psychomotor stages that include perception, readiness, guided response, mechanization, complex response, adaptation, and creation. Singer emphasizes the importance of cognitive aspects in psychomotor development and the need for appropriate learning strategies to achieve success in physical tasks. Teachers as educators need to understand and apply the various perspectives and stages of psychomotor development from these experts. Education is expected to apply the psychomotor views that have been described in order to produce individuals who are not only theoretically competent, but also skilled, adaptive and innovative in responding to the challenges and needs of the times.

AUTHOR CONTRIBUTIONS

Ega Nasrudin: Conceptualization, Methodology, Investigation, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualization, and Project Administration; **Saepul Anwar**: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – Original Draft, Writing – Review & Editing, Visualization, and Project Administration; and **Roslan Ab Rahman**: Conceptualization, Methodology,

Investigation, Formal Analysis, Writing – Original Draft, Writing – Review & Editing, Visualization, and Project Administration. All authors have read and approved the final version of this manuscript.

DECLARATION OF COMPETING INTEREST

The authors declare no known financial conflicts of interest or personal relationships that could have influenced the work reported in this manuscript.

DECLARATION OF ETHICS

The authors declare that the research and writing of this manuscript adhere to ethical standards of research and publication, in accordance with scientific principles, and are free from plagiarism.

DECLARATION OF ASSISTIVE TECHNOLOGIES IN THE WRITING PROCESS

The authors declare that generative artificial intelligence (Gen AI) and other AI-assisted tools were used prudently, not excessively, during the research and preparation of this manuscript. The authors accept full responsibility for the final content of the manuscript.

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