Journal of Education Psychometrics and Bibliometric Studies
(JEPSY) ISSN (E): 3139-308X

Vol.01, No.02 (2026)
pp.86-94

Article Type: Research Article

Article Information:
Received: 25/05/2026
Accepted: 10/07/2026
Published: 17/07/2026



Vyom Hans Publications

Assessment of the Psychomotor Domain Learning

B. L. Gupta[1]

[1]Quality Assurance and Accreditation, IIST Group of Institutions, Rau Indore. M. P., India (Bharat).
[1]Email: *badrilalgupta72@gmail.com*(corresponding author)

Abstract

The demand for skilled professionals is increasing in the 21st century to ensure the quality of products and services in terms of safety, comfort, effectiveness, efficiency, sustainability, and productivity. The integration of skills-based courses in all higher education programmes has become mandatory irrespective of discipline. The national education policy, UGC, AICTE and NBA have incorporated skill-based courses in programme structure. The development of skills and ultimately competency and proficiency to accept the challenges of the world of work has become crucial. Development of psychomotor skills and proficiency in using the skills requires laboratories, workshops, project labs, research labs, incubation centres, internships, and apprenticeships. Once the skills are developed, they need to be certified along with proficiency through valid, reliable, transparent, and credible assessment. In this paper, the importance of developing the skills and proficiency, the psychomotor domain of learning and hierarchy of learning, the process of learning skills, portfolio-based assessment, types of assessment tools and the process of designing assessment tools are explained. The current limitations of higher education institutions in developing psychomotor skills and remedies to overcome these limita-tions are suggested.

Keywords: Psychomotor domain, learning portfolio, rubric, checklist, observation schedule, rating scale, portfolio-based assessment

INTRODUCTION

The national education policy 2020 emphases on development of vocational skills right from school education and integrates vocational education with the mainstream across the educational programme (MHRD, 2020). The development of vocational capabilities takes place simultaneously with the academic capabilities (MHRD, 2020). The skills enhancement courses, having 9 credits, are a mandatory requirement for all educational pro-grammes across disciplines (UGC, 2022). In vocational and

© 2026 Author(s). This article is published under the CC-BY license at https://edu.vyomhansjournals.com/

engineering educational programmes, the development of psychomotor skills is an integral and core component. Programme outcome number 4, conduct investigation of complex problems and outcome number 5, engineering tool usage, are directly related to the development of skills at programme level (NBA, 2024). The synchronized physical movements of various limbs of the body and thoughts to perform a task are called psychomotor skills. The psychomotor domain of learning, learning achievements with respect to learning outcomes and assessment is a less explored area.

HIERARCHY IN PSYCHOMOTOR DOMAIN OF LEARNING

The hierarchy of learning in the psychomotor domain of learning is developed by Indian educationist R. H. Dave. In outcome-based education philosophy, the third level in the hierarchy of learning, viz precision, is the minimum acceptable level of performance. The hierarchy of learning guides the process of development of psychomotor skills. The hierarchy of learning in the psychomotor domain suggested by R. H. Dave is shown in Figure 1.

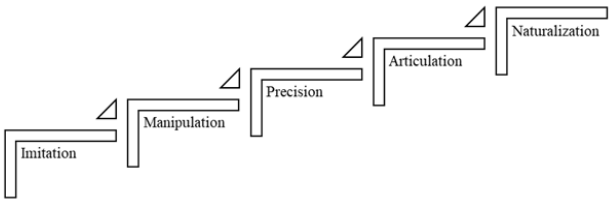


Figure 1: Hierarchy of learning in the psychomotor domain.

PROCESS OF LEARNING IN PSYCHOMOTOR DOMAIN

Learning in the psychomotor domain requires different approaches to learning than learning in the cognitive domain of learning. The prerequisite for the development of psychomotor skills is having underpinning knowledge of theory aligned with psychomotor skills. The underpinning knowledge is developed using a wide variety of approaches used in the development of learning outcomes in the cognitive domain. These approaches are self-learning, peer learning, and group learning. The methods used are presentation and demonstration, using media or without using media. There is an old saying that practice makes a man perfect. This fits the development of psychomotor skills. The sequence of development of psychomotor skills is shown in Figure 2.

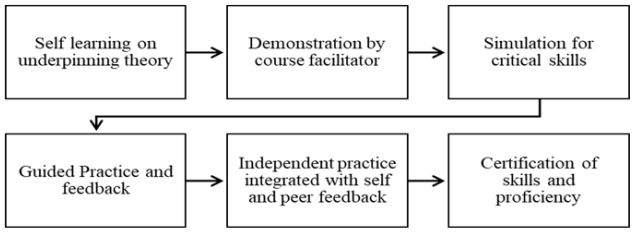


Figure 2: Development of Psychomotor Skills. **Source:** Author

Self-learning on underpinning theory

Theoretical knowledge related to the development of psychomotor skills is a prerequisite for initiating the development of psychomotor skills. The theoretical knowledge is acquired under the guidance of the course facilitator using handouts, textbooks, research papers, manuals, workbooks, operation

guidelines, online learning resources, case studies, watching videos, animations, and the like. The self-learning approach is followed by doubt clarification sessions and self-assessment, peer assessment, and assessment by the course facilitator using a paper-and-pencil test or an online quiz. The principles of learning, such as scaffolding, assessment, reflection, and the process of transferring knowledge in practice, are followed.

Demonstration of skills by course facilitator

The course facilitator demonstrates the psychomotor skills in a scaffolding manner, and after each chunk of demonstration, the learners are asked to relate it to theory. The learners imitate the steps and repeat each step till they gain confidence to perform. The course facilitator demonstrates the complete process of performance and provides an opportunity for learners to reflect and perform.

Simulation for critical skills

The course facilitator simulates the work situation, which is risk-free for the learners. The course facilitator provides instructions to perform, and learners follow the instructions and operate the equipment/machine. The course facilitator observes the performance on significant and direct criteria of performance to reinforce the right performance and provide positive, constructive, encouraging, specific, and concrete feedback for improvement in the performance and increasing the proficiency in using the skills. The course facilitator uses appropriate formative assessment tools aligned with the skills, viz check list, observation schedule, observational rubrics, and the like.

Guided practice and feedback

In some disciplines, some skills are critical skills and core skills. The quality of the product or service, upkeep of the machine, and safety of performers and others depend on these skills. These skills are finishing of a product to specification, hygienic operation of kitchens in hotels, quality assurance in water treatment for packaged water, operation of electrical machines, maintenance of machines, storage of hazardous material, and the like. Such critical core skills are developed under the guidance of the course facilitators. The course facilitator observes each step and provides feedback for accuracy, precision, safety, hygiene, housekeeping, cleanliness, and the like using an observation schedule and rubrics.

Independent practice integrated with self and peer feedback

The facilitator provides jobs, tasks, and activities to the learners to practice the skills developed in previous steps. The course facilitator selects the jobs, tasks, and activities which require the transfer of skills in different conditions. The practice of skills by learners in different situations increases proficiency in performance and boosts confidence to perform. At this stage of performance, learners become conscious of their mistakes and receive self-feedback. The development and transformation of skills take place with peers, so they receive feedback from peers to perform proficiently.

Certification of skills and proficiency

The certification of skills and proficiency in skills is carried out by the course facilitator based on the assess-ment of learning during the skills development, the portfolio maintained by them and actual performance dur-ing summative assessment.

LEARNING PORTFOLIO-BASED ASSESSMENT

The course facilitator provides a wide variety of opportunities to learners to develop psychomotor skills in the laboratory, workshop, industry (internship, apprenticeship, and research work), micro project,

incubation centre, and the like. The learning tasks are designed to produce learning outputs to develop clearly articulated psychomotor course learning outcomes. The compilation of learning outputs is used for summative assessment and certification of skills, proficiency, and competency. A wide variety of assessment tools are used to assess the portfolio created by learners. The portfolio may comprise drawings, sketches, documents, products, reports on maintenance carried out, photographs and video of calibrated equipment, static and working models, prototypes, and the like (Gupta and Gupta, 2025).

ASSESSMENT TOOLS

The assessment tools for psychomotor skills are different from the assessment of learning outcomes in the cognitive domain. The strengths, uses, and examples of different assessment tools are given below.

Check list

The checklist is used to assess the presence or absence of the skills used. It contains a dichotomous scale, viz yes or no, used or not used, wear or not wear, and the like. It does not assess the extent, magnitude, intensity or proficiency in the use of skills. It is used in formative assessment to provide feedback for improving skills. It is used for reinforcement of acquired skills. It is used in self-assessment and peer assessment by mature learners. An indicative checklist is given in Table 1 to assess the preparation for operation.

Table 1: Checklist to assess the preparation for operation.

Present	Absent	Criteria
-	-	Select the raw material in the right quantity
-	-	Select the right tools for the operation
-	-	Select the right technique for the operation
-	-	Wears all safety gadgets
-	-	Organize all support resources for the operation

Source: Author.

Rating scale

A rating scale is used to assess the extent, magnitude, intensity, proficiency or quality in the use of skills. It is used for formative assessment to take feedback on progress in the development of skills and planning further processes of development of skills and proficiency in skills. It is used for process assessment in formative assessment by self, peers, and course facilitators. The feedback from three sources of assessment guides the process of skills and proficiency development.

A rating scale is used in summative assessment for certifying the development of skills and proficiency by course facilitators and resource persons. The rating is used for assessment of a product which has produced by learners performing the task. In some skill and proficiency certifications, product and process assessment is mandatory according to the assessment policy of the institute. An indicative rating scale is given in Table 2 to assess the civil engineering drawing prepared by the assessor.

Observation schedule

An observation schedule is used for assessment and providing feedback during performance. Once the task and performance are over, these skills cannot be assessed. These skills may be core skills in some work situations and in other associated skills. The observational assessment is integrated with the

Table 2: Rating scale to assess civil engineering drawing.

Criteria	Perfect	Good	Poor	Feedback/ Remark
Layout of drawing sheet	-	-	-	-
Accuracy in dimensions	-	-	-	-
Organization of elements	-	-	-	-
Details of different elements of drawing	-	-	-	-
Labelling and dimensioning of the drawing	-	-	-	-

Source: Author.

process of performance. The observational assessment is ignored in skill development and assessment because of a shortage of trained assessors and a high learner-course facilitator ratio. In many work situations, failure takes place because of the absence of the use of these types of skills. The assessors require minute observational skills to assess these skills. An indicative observation schedule is given in Table 3 to assess the skills which cannot be assessed after performance.

Table 3: Observation schedule to assess the skills which cannot be assessed after performance.

Criteria	Perfect	Good	Poor	Feedback/ Remark
Organization of resources	-	-	-	-
Synchronization of legs, hands, and eye movements while operating the machine	-	-	-	-
Sequence and method of performance	-	-	-	-
Adherence to safety rules	-	-	-	-
Quality assurance measures	-	-	-	-

Source: Author.

Rubrics

Rubrics are commonly used to develop and assess critical of the critical and core of the core skills without which a degree is not awarded to learners. Rubrics are gold standard assessment tools. A wide spectrum of rubrics is used in higher and technical education to achieve a variety of purposes (Gupta and Gupta, 2021). Rubrics are integrated with the skill development process for motivation to learn, assessment of learning achievements and planning further course of action to develop precision and proficiency. Rubrics are used to develop dexterity in skills and assess to the perfection level. The national education policy 2020 focuses on the development of skills related to sustainable development goals, and the national board of accreditation emphasises developing skills to use modern equipment. Rubrics are useful assessment tools which integrate principles of learning, such as challenge in the learning process, learning with scaffolding, assessment, reflection, feedback, and transfer of skills in different work situations. Rubrics are used to develop work-ready graduates. An indicative rubric is given in Table 4 to assess survey skills in civil engineering.

DESIGN OF ASSESSMENT TOOLS

The assessment tools are readily available on various websites, in standard lab manuals and workbooks for assessing course learning outcomes in the psychomotor domain. The available assessment tools are

Table 4: Assess survey skills in civil engineering.

Criteria	Weightage	Excellent	Very good	Good	Average	Poor
Planning for the survey project	20	All essential equipment and resources are identified (20)	One equipment or resource is missing (15)	Two equipment or resources are missing (10)	Three equipment or resource is missing (5)	More than three equipment or resources are missing (0)
Organization of resources and equipment	10	All essential equipment and resources are organized scientifically (10)	One equipment or resource is missing (8)	Two equipment or resource is missing (6)	Three equipment or resource is missing (4)	More than three equipment or resource is missing (0)
Use of equipment	30	Effective and efficient use of equipment and resources with a purpose (30)	Use of equipment with 90% precision (25)	Use of equipment with 80% precision (15)	Use of equipment with 70% precision (5)	Use of equipment with less than 60% precision (0)
Safety	20	All safety precautions were followed (20)	90% Major safety precautions followed (15)	80% Major safety precautions followed (10)	70% Major safety precautions followed (5)	Less than 60% of major safety precautions were followed (0)
Record keeping	20	All essential data/information collected (10)	90% of essential data /information collected (15)	80% of essential data /information collected (10)	70% of essential data /information collected (5)	Less than 60% of essential data /information is collected (0)
Total	100					

Source: (Gupta, 2023).

directly used or modified by the course facilitator to match the skills and proficiency to be assessed Nur et al. (2025).

In some assessment situations, the assessment tools are designed by course facilitators. The course facilitator considers guidelines for selecting or designing assessment tools. These guidelines are: assessment tools adhere to the assessment scheme of the institute; are aligned with programme learning outcomes; are integrated with skills and proficiency development; ensure validity, reliability, and practicability; provide the tools to learners along with tasks. The assessment tool should be free from biases, ambiguity, extreme assessment, and consume a minimum of time, effort, and energy of assessors for assessment. The course facilitator educates the learners on using the assessment tools for learning,

reflection, and feedback. The assessment tools are used for self-assessment and peer assessment to develop assessment, reflection, and providing and receiving feedback for improving skills development.

Table 5: Limitations in developing skills and remedies.

Limitations of the institution	**Remedies**
Course learning outcomes are not aligned with work situations.	Design/revise curriculum as per provisions of NEP 2020, UGC guidelines (UGC, 2022) and AICTE guidelines.
Outdated practical and practices.	Incorporate skill development practices which are commonly used in work situations
Laboratories, workshops, and project laboratories are not updated.	Update the laboratories, workshops, and project laboratories in col-laboration with industry and organizations. Establish incubation, research, and a centre of excellence. Take advantage of UGC and AICTE schemes for establishing new laboratories and modernizing existing laboratories.
Low attention to the quality of students' project work, internship, and apprenticeship.	Align students' project work, internship and apprenticeship with course learning outcomes and programme learning outcomes
Absence of incubation and research work.	Encourage incubation and research work through sponsored re-search and collaboration with industry
No funds for skills development.	Generate funds through consultancy, donations, corporate social responsibility funds, and research work. Collaborate with sister institutions, research organizations, and in-dustry to develop skills and award credits.
Course facilitators are not industry-trained professionals.	Provide an opportunity to course facilitators to develop skills in industry through industrial training or industrial projects. Create scope for exchange of faculty with industry resource persons for a semester for one to three skill-oriented courses. Appoint professors of practice for developing specific skills.
No production centre.	Establish a production centre to learn, develop and use skills for production and earning.
No collaboration with innovative projects of the central and state government.	Associate the institute with innovative projects of the government. These projects are Skill India, Digital India, and Swachha Bharat.
Lack of e-learning resources on the latest practices in the industry.	Course facilitators and industry resource persons should develop a variety of e-learning resources for creating awareness and education on the latest developments in technology and techniques.

Source: Author.

SOME LIMITATIONS AND REMEDIES TO IMPROVE LEARNING AND ASSESSMENT IN THE PSYCHOMOTOR DOMAIN

There are some limitations of institutions in developing psychomotor skills in learners. These limitations need to be overcome using the right strategies. The limitations and remedies are stated in Table 5.

CONCLUSION

The development and assessment of psychomotor skills is critical. It requires trained and experienced facilitators, resources in terms of machines, tools and materials. It requires time and concentrated effort from facilitators and learners. In technical and vocational education, the development of psychomotor skills is essential before awarding the degree; otherwise, the retraining cost in employers' organisations will be high, bringing a bad name to the institute, getting under employment in the industry and frustrating experiences for the employers and employees.

Authorship contribution

The author is the only contributor to the article.

Conflict of interest

There is no conflict of interest.

Declaration

It is the work of the author

Similarity Index

I hereby confirm that there is no similarity index in the abstract and conclusion, while overall is less than 10% where individual source contribution is 2% or less than it.

REFERENCES

Gupta B. L. and Gupta P. B. (2021). Rubrics as Versatile Educational Tool for Outcome-based Education, Journal of Engineering and Technology Education, NITTTR, Chandigarh, 15(2) pp 13-24.

Gupta B. L. (2023). Last Thing First, Rubrics as Innovative Tools for Learning, University News, 16(12) pp 139-145.

Gupta B. L. and Gupta P. B. (2025). Learning Portfolio – Means for Learning and Evidence of Learning Achievements, IPEM Journal for Innovations in Teacher Education, 10, pp1-15.

MHRD (2020). National Education Policy 2020, Ministry of Human Resource Development, Government of India.

NBA, (2019). Manual for Accreditation of Undergraduate Programmes (Tier I Institutions), National Board of Accreditation, New Delhi.

NBA, (2024). Self-Assessment Report Format for Undergraduate Engineering Programmes Tier I Institutions, National Board of Accreditation, New Delhi.

UGC (2022). Curriculum and Credit Framework for Undergraduate Programme, University Grants Commission, India.

UGC (2019). Evaluation Reforms in Higher Educational Institutions, University Grants Commission of India.

UGC (2020). Learning Outcome-Based Curriculum Framework for Undergraduate Education, University Grants Commission of India.

Nur A. M N. Oh C. L, Wardah T. Mohd A. T. Che M. M. I. (2025). Assessing Alternative Assessment for Psychomotor Domain in Engineering Education: Insights from a Qualitative Case Study Analysis, Journal Intelek, 20 (1).

COPYRIGHT AND LICENSE

[© 2026 **B. L. Gupta**] This is an Open Access article published in **Journal of Education Psychometrics and Bibliometric Studies** *(JEPSY)*, an Open Access Journal by Vyom Hans Publications. It is published with a Creative Commons Attribution - CC-BY4.0 International License. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

HOW TO CITE?

B. L. Gupta (2026). Assessment of the Psychomotor Domain Learning. *Journal of Education Psychometrics and Bibliometric Studies*, 01(02), 86-94.