International Journal of Evaluation and Research in Education (IJERE)
Vol. 14, No. 3, June 2025, pp. 2419~2437
ISSN: 2252-8822, DOI: 10.11591/ijere.v14i3.33147

Enhancing educational outcomes using AlAfnan taxonomy: integrating cognitive, affective, and psychomotor domains

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Article Info

Article history:

Received Oct 6, 2024
Revised Feb 21, 2025
Accepted Feb 26, 2025

Keywords:

Affective domain
AlAfnan taxonomy
Cognitive domain
Educational objectives
Psychomotor domain

ABSTRACT

Following the introduction of AlAfnan's taxonomy of educational objectives, this study offers a framework for educational development encompassing cognitive, affective, and psychomotor domains essential for nurturing well-rounded learners. The cognitive domain emphasizes knowledge acquisition, critical thinking, ethical reasoning, practical application, creativity, and lifelong learning skills. It prepares students to analyze, synthesize, and evaluate information effectively, fostering intellectual depth and adaptability in navigating complex challenges. The affective domain focuses on emotional intelligence, creativity, resilience, collaboration, and visionary thinking. By cultivating these attributes, educators create a supportive environment that encourages self-awareness, empathy, and ethical decision-making. This domain prepares students to excel academically and contribute meaningfully to society, emphasizing holistic personal development alongside academic achievement. The psychomotor domain enhances sensory perception, cognitive-motor integration, feedback responsiveness, creative motor expression, precision, and leadership through physical action. It equips learners with practical skills and dexterity, enabling them to effectively apply theoretical knowledge in real-world contexts. This domain emphasizes hands-on learning experiences that promote mastery, innovation, and leadership in various fields. The study emphasizes that integrating AlAfnan's taxonomy into educational practices requires strategic alignment of instructional methods and assessment approaches tailored to each domain's objectives. Educators are encouraged to utilize inquiry-based learning, collaborative projects, experiential activities, and reflective practices to foster comprehensive skill development across all learning styles. This shall foster students' intellectual curiosity, emotional resilience, and practical competence. This framework promotes a balanced educational approach that prepares learners to thrive in diverse professional settings and contribute actively to global challenges.

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1. INTRODUCTION

Setting educational goals and achieving them through learning and assessment has long been challenging for educators. However, experts in curriculum design and related fields have developed various teaching and learning frameworks, taxonomies, and models that offer significant benefits. These frameworks and taxonomies, created by scholars, aim to enhance the student learning experience and improve assessment

processes [1]–[8]. These cognitive, affective, and psychomotor frameworks serve as guidelines or conceptual tools in educational institutions for developing or updating courses. They are often employed to describe various learning behaviors and traits that instructors aim for students to develop. Additionally, these frameworks help differentiate between different stages of learning progression, making them helpful in determining the suitability of learning outcomes for specific module levels within courses.

The taxonomies, the backbone of these frameworks, have evolved. They typically encompass three domains: cognitive, affective, and psychomotor. They view learning as a process that enhances learners' capabilities to meet predefined learning outcomes. For example, Bloom *et al.* [2] identified six primary levels: knowledge, comprehension, application, analysis, synthesis, and evaluation. In 2001, Anderson *et al.* [7] revised this taxonomy, reorganizing the hierarchy of educational objectives from the original framework and incorporating a new domain (psychomotor). They replaced the original nouns with action verbs to define the seven cognitive categories: remember, understand, apply, analyze, evaluate, and create. The original 'knowledge' category was expanded to include four types of cognitive knowledge: factual, conceptual, procedural, and metacognitive knowledge [2]. Each category of knowledge is further subdivided into various subcategories.

AlAfnan [1] proposed a new taxonomy to assist in meeting the needs of the information and artificial Intelligence era. This taxonomy covers many essential skills and competencies, aligning education with current demands and preparing students for personal and professional success. It emphasizes the development of knowledge, critical thinking, ethical decision-making, practical application, innovation, and continuous adaptation, all crucial for addressing modern challenges. "Knowledge and comprehension" form the educational foundation, focusing on understanding fundamental facts, theories, and concepts. This deep comprehension underpins critical thinking and higher-order cognitive skills. Next, "synthesis and evaluation" skills enable students to critically evaluate sources and make informed judgments. Following this, "ethical and moral reasoning" examines ethical dilemmas and value systems to justify decisions and critique moral arguments. The "application and strategic thinking" phase focuses on applying knowledge in real-world contexts and planning for the future. "Creativity and innovation" encourage students to "devise," "design," "invent," "imagine," and "integrate," fostering a mindset of exploration and problem-solving essential for progress. Finally, "lifelong learning and adaptability" highlights the importance of continuous learning and adapting to new circumstances. This study elaborates on the latter taxonomy by outlining the cognitive, affective, and psychomotor domains of educational activities in AlAfnan's taxonomy.

2. SYNTHESIZING EXISTING TAXONOMIES

The taxonomies have played a crucial role in shaping the education landscape. While classics like Bloom's taxonomy are familiar to many, newer taxonomies highlight the expanding knowledge about student learning and the accompanying advancements in teaching methodologies. Bloom *et al.* [2] taxonomy was intended to be the first volume in three series, with subsequent volumes focusing on the affective and psychomotor domains. The original Bloom's taxonomy (OBT) comprises six levels in a cumulative bottom-up hierarchy. Mastery of each level is assumed before progressing to the next. Each level is associated with specific verbs corresponding to the difficulty level of the questions. The taxonomy reflects the advancements in our understanding of student learning and the subsequent development of teaching strategies that align with this knowledge [9].

The extensive emphasis in the OBT (cognitive domain) may indicate the evaluation methods that were prevalent during its inception when university assessments primarily focused on cognitive aspects. However, the utilization of OBT quickly expanded beyond simply categorizing assessment questions. It began to encompass the design of courses, the specification of learning objectives, and the modification of existing courses to ensure comprehensive coverage of all six taxa. OBT has been extensively employed to create learning objectives and design courses, as evidenced by several studies [10]–[14]. Additionally, OBT has been utilized to evaluate assessment items, identify higher-order thinking skills (HOTS), and assess both higher and secondary education. Notably, the affective domain was introduced by Krathwohl *et al.* [5]. This taxonomy presents a cumulative top-down structure with sublevels and descriptions.

Although not as widely recognized as OBT, the affective taxonomy has found various significant educational applications. For instance, Muzyk *et al.* [15] employed the affective domain of OBT to influence and mitigate stigmatizing attitudes among pharmacy students. Similarly, Uğur *et al.* [16] integrated OBT-A with self-determination theory to promote personal growth and self-awareness in course design. Additionally, Dollarhide [17] utilized OBT-A as the foundation for a counseling education course that addressed spiritual, ethical, and religious counseling. Notably, one of the significant applications of OBT was its contribution to mathematical well-being (MWB) development.

In their study, Clarkson *et al.* [18] devised a taxonomy of MWB that combines Bloom's original taxonomy with the cognitive and affective domains. The affective taxonomy clearly outlines the connections

between the levels. Clarkson *et al.* [18] employed Bloom's taxonomy to develop their MWB theory. This top-down, cumulative taxonomy of well-being addresses a complex subject area, emphasizing the substantial impact of affective and emotional dimensions on student success [19], [20].

In 2001, Anderson *et al.* [7] released a revised version of the OBT, now commonly referred to as revised Bloom's taxonomy (RBT). This revision was primarily undertaken to address the criticisms raised against the original OBT. RBT is generally regarded as a hierarchical taxonomy that follows a bottom-up approach, focusing on cognitive demand. To achieve this, the level descriptors were transformed into gerunds, specific taxa were given new names, and the levels "synthesize" and "evaluate" were interchanged, with the former being renamed as "create." However, the most significant alteration was the conversion of the taxonomy into a two-dimensional array, where cognitive processes are applied to knowledge domains. Similar to OBT, each level of RBT consisted of sublevels accompanied by descriptors. It is worth noting that the primary objective of this revision was to emphasize student learning rather than student performance, as highlighted by Airasian and Miranda [11].

Similar to OBT, RBT has been utilized in various educational contexts. Several scholars [21]–[23] have employed RBT to establish learning objectives. Other researchers [24], [25] have also employed RBT to classify assessment items. RBT has also been employed in course design by several educators such as [11], [26], [27]. Furthermore, RBT has been utilized to identify HOTS by scholars [28]–[31].

The structure of observed learning outcomes (SOLO) taxonomy, developed by Biggs and Collis [6] is a non-hierarchical framework used to assess the quality of a student's response to an assessment or evaluation question. By analyzing the student's response, one can infer the student's understanding level based on the SOLO levels. At the pre-structural level, the student's response indicates a lack of understanding of the question. The response consists of a single set of relevant details at the unit-structural level. Responses at the multi-structural level contain multiple sets of unrelated details. Relational-level responses integrate relevant details into a coherent structure. Finally, at the extended abstract level, the relational-level understanding is generalized or reconceptualized to a higher level of abstraction. This taxonomy progresses from primary quantitative responses to higher-order qualitative responses, exemplifying deep learning. The SOLO taxonomy has found numerous applications in education. In their original work, Biggs and Collis [6] demonstrate how the taxonomy can be applied to teaching history, mathematics, English, and geography. Previous research [32], [33] extensively discusses the use of SOLO in assessing student learning in higher education. Additionally, SOLO has been applied in various fields such as counseling education [34], marketing [35], dentistry education [36], online learning [37], accounting [38], and science education [39], [40].

Webb [41] categorized the depth of a student's knowledge into four levels: the depth of knowledge (DOK). This taxonomy is considered a bottom-up approach that is not cumulative. However, some authors, question using the term "taxonomy" when referring to DOK. Level 1, recall and reproduction, involves recalling facts, terms, concepts, or principles. It also includes the capability to perform routine procedures and locate specific details. In level 2, the basic application of skills or concepts, students must utilize their informational and conceptual knowledge. They should be able to select appropriate procedures for a given task, solve routine problems, and tackle problems that involve multiple steps and decision points. Additionally, they should be able to organize and present data, interpret and use simple graphs, summarize information, identify main ideas, explain relationships, and make predictions. Level 3, strategic thinking, requires students to engage in reasoning, decision-making, and justification. They should be able to develop a plan or sequence of steps to solve a problem, particularly non-routine problems, complex problems, or abstract concepts. Furthermore, they should be able to support their judgments with evidence and handle problems that may have multiple possible answers. Finally, at the highest level, level 4, or extended thinking, students are expected to perform investigations or apply their knowledge to real-world problems. They should be able to solve problems requiring research, extended time, and problems involving multiple conditions or non-routine manipulations. Additionally, they should be able to synthesize information from various sources across different content areas or disciplines.

Fink [8] introduced a Fink's taxonomy of significant learning (FTSL) in response to concerns about the state of teaching in higher education and the perceived limitations of existing taxonomies like OBT and RBT. Fink [8] argued that courses in higher education should address various dimensions such as metacognition, ethics, leadership, interpersonal skills, communication skills, tolerance, character, and adaptability. Notably, Fink [8] emphasized the importance of adaptability, as he believed that change is essential for learning and teaching in higher education. FTSL is represented as a circle, with no hierarchical structure proposed for its segments. The first category in FTSL is foundational knowledge, which emphasizes acquiring and understanding information and ideas that serve as a basis for further learning. Following this is application, which involves developing and utilizing skills, including intellectual, physical, and social skills, as well as project management and critical, creative, and practical thinking. Applications demonstrate the practical value of other forms of learning. Integration, the next category, focuses on connecting ideas, learning experiences, and life experiences. The ability to establish new connections enhances students'

capacity for learning. The human dimension category involves learning about oneself and others, enabling students to develop their self-concept, self-confidence, and practical interpersonal skills. Caring, another category, encourages students to develop new emotions, interests, and values. When students care about a particular topic, it increases their motivation to learn more about it and integrate it into their lives. The final category, learning to learn, encompasses metacognition, developing self-directed learning skills, and the ability to inquire into subjects. This category aims to promote lifelong learning and empower students to become better learners. Overall, FTSL provides a comprehensive framework for designing courses in higher education that address various dimensions of learning and promote holistic development among students.

The taxonomy proposed by AlAfnan [1] is designed to seamlessly integrate new realities into the educational landscape, maintain the classroom as the formal learning environment, and empower teachers to act as facilitators who guide students in optimizing their cognitive abilities and practical skills, as shown in Figure 1. In the current educational context, striking a balance between knowledge and skills essential for the future workforce is imperative. The taxonomy comprises six hierarchical levels: i) knowledge and comprehension; ii) synthesis and evaluation; iii) ethical and moral reasoning; iv) application and strategic thinking; v) creativity and innovation; and vi) lifelong learning and adaptability. This study intends to define and provide comprehensive illustrations of AlAfnan's three domains of educational activities.

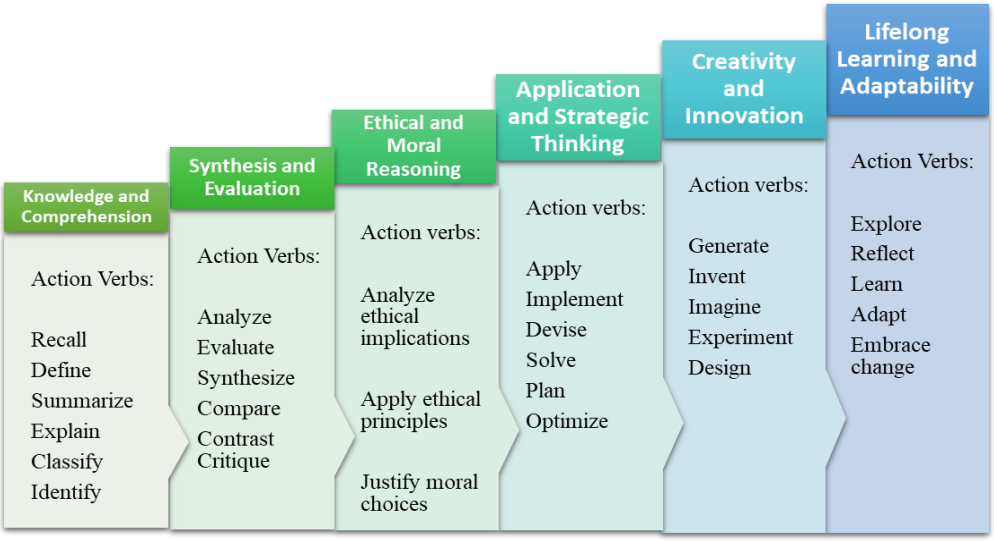

Figure 1. AlAfnan taxonomy with action verbs

3. DOMAINS OF EDUCATIONAL ACTIVITIES

Bloom's taxonomy comprises three domains: cognitive, affective, and psychomotor. The cognitive domain primarily encompasses learning skills predominantly associated with mental processes or thinking. Within this domain, the learning processes involve a hierarchical arrangement of skills that revolve around processing information, constructing understanding, applying knowledge, solving problems, and conducting research. Cognitive complexity is categorized into six levels, namely knowledge, comprehension, application, analysis, synthesis, and evaluation. Unlike process skills, Bloom's taxonomy primarily focused on describing levels of achievement and did not extensively address the progression from one level to the next. The cognitive domain comprises skill clusters that effectively organize a comprehensive and concise list of each process's most crucial learning skills. The updated version of Bloom's taxonomy of learning introduces several additional features that can significantly benefit educators in designing optimal learning experiences.

Learning is often associated with intellectual or mental processes but encompasses more than cognitive functions. In addition to acquiring knowledge, learning also involves the development of attitudes, behaviors, and physical skills. The affective domain, which pertains to our emotions, feelings, and attitudes, plays a significant role in learning. This domain encompasses how we emotionally engage with various aspects of life, including our sentiments, values, appreciation, enthusiasm, motivations, and attitudes. The affective domain is divided into five sub-domains: i) receiving, ii) responding, iii) valuing, iv) organization, and v) characterization. Each sub-domain contributes to the overall development of our affective abilities and influences how we perceive and interact with the world around us.

Psychomotor objectives are related to discrete physical functions, reflex actions, and interpretive movements. Interestingly, while the cognitive taxonomy was established in 1956 and the affective in 1964, the psychomotor domain was not fully defined until the 1970s. Typically, these objectives involve physically manipulating information, movement, and activities that engage gross and fine muscles to express or interpret information or concepts. This domain also encompasses natural, autonomic responses and reflexes. It involves the utilization and coordination of motor skills. Dave [3] proposed a classification system that categorizes skill development into five stages. The first stage is imitation, which involves the process of observing and replicating the actions of others. In the second stage, manipulation, individuals are guided through instructions to acquire and perform a specific skill. The third stage, precision, emphasizes the importance of accuracy, proportion, and exactness in skill execution, even without the source. Moving on to the fourth stage, articulation involves the combination and sequential execution of two or more skills in a consistent manner. Finally, the fifth stage, naturalization, represents the highest level of skill development, where the combined skills are performed effortlessly and automatically, with minimal physical or mental effort.

Educators must integrate learning strategies across all three domains: cognitive, affective, and psychomotor. While there has traditionally been a heavy focus on the cognitive domain, the affective and psychomotor aspects have often been overlooked. According to Bloom, knowledge is crucial, but it should not be the sole objective of instruction. It is also essential for students to demonstrate their ability to apply their knowledge to real-life situations and problem-solving. Additionally, some researchers argue that educators have not effectively addressed the cognitive domain. Freire [42] criticized that students are often required to memorize content rather than truly understand it, as the knowledge is presented as the teacher's property. Despite focusing on the cognitive domain, studies [43], [44], have shown that students struggle with applying knowledge. Daggett [43] pointed out that students struggle to effectively use their knowledge across different subjects and in unpredictable situations. Daggett [45] noted that while the U.S. excels in teaching higher levels of Bloom's taxonomy, students may be unable to apply this advanced instruction in real-world situations.

The most challenging aspect of teaching often lies within students' affective domain. Bloom *et al.* [2] suggests that objectives in this domain are unclear, and teachers may lack clarity on the appropriate learning experiences to achieve these objectives. Paul [46] argues that not all learning is rational, and the belief formation or change process may hold more significance than the belief itself. Educators can shape student behavior through positive or negative experiences, but what about altering their beliefs or preconceived attitudes toward specific subject matters? By challenging students to reevaluate their values and reassess their behavioral reactions to different situations, instructors may find an effective means to influence affective domain behavior and rationalize student progress. This approach becomes particularly relevant for the student's affective development in aviation meteorology. The emotional responses of the aviation meteorology student might not demonstrate increased alertness in icing conditions or may not exhibit any form of concern. Bloom [47] posits that an individual is more likely to be ready to reassess judgments and adjust behavior in light of evidence. In the case of the aviation meteorology student, this evidence could be a newfound belief that uncontrolled structural ice buildup could lead to a realistic possibility of death, whether through a real-life experience, simulation, or classroom discussion. This realization could lead to a behavioral change within the emotional domain [48].

Academic activities like role-playing provide students with a safer alternative to real-life situations involving death. In these exercises, learners can test different behaviors in a controlled setting. Moreover, instructors can assess student attitudes and responses to controlled stressors. For example, during a flight simulation, instructors can evaluate students' performance in meeting affective learning objectives related to aviation safety.

While Bloom *et al.* [2] acknowledged the existence of the psychomotor domain, he argued against developing a classification for these objectives. Conversely, Harrow [49] created a practical and beneficial taxonomy for the psychomotor domain to meet the needs of educators working in this field. While some psychomotor skills may appear uncomplicated, they can be pretty complex, especially when combined with other learning behaviors. According to Harrow [49], purposeful movement requires the coordination of cognitive, psychomotor, and affective domains. For instance, when operating de-ice/anti-ice equipment, a student must utilize cognitive processes to assess atmospheric and affective processes to recognize the potential risks associated with structural ice buildup for safe flight [48].

A simplified representation of a psychomotor skill related to de-icing/anti-ice equipment involves conducting a flow check through an essential simulation exercise. For instance, a student acquiring the psychomotor skill of correctly employing anti-ice procedures may initiate the process at the overhead panel, follow a diagonal path, and proceed from left to right in a Z-pattern. The flow check does not inherently necessitate knowledge utilization or the student's display of a particular behavior (attitude). Nevertheless, by physically executing the operating procedures, the students' psychomotor skills are further developed, enabling them to effectively implement timely and efficient corrective actions in response to the occurrence

of aircraft structural icing. The assertion made by Harrow [49] underscores the notion that the psychomotor domain is commonly regarded as the most conducive domain for delineating specific educational objectives, as psychomotor behaviors are typically visible and measurable. Therefore, recognizing the importance of the psychomotor domain is essential for achieving successful educational outcomes in the postsecondary aviation learning environment [48].

4. THE COGNITIVE, AFFECTIVE, AND PSYCHOMOTOR DOMAINS IN ALAFNAN'S TAXONOMY

To implement AlAfnan's taxonomy, educational activities are viewed from the cognitive, affective, and psychomotor domains. The cognitive domain primarily encompasses learning skills predominantly associated with mental processes or thinking. The affective domain pertains to learners' emotions, feelings, and attitudes. Psychomotor objectives are related to discrete physical functions, reflex actions, and interpretive movements. AlAfnan's taxonomy comprises six categories: i) knowledge and comprehension; ii) synthesis and evaluation; iii) ethical and moral reasoning; iv) application and strategic thinking; v) creativity and innovation; and vi) lifelong learning and adaptability, as shown in Figure 2.

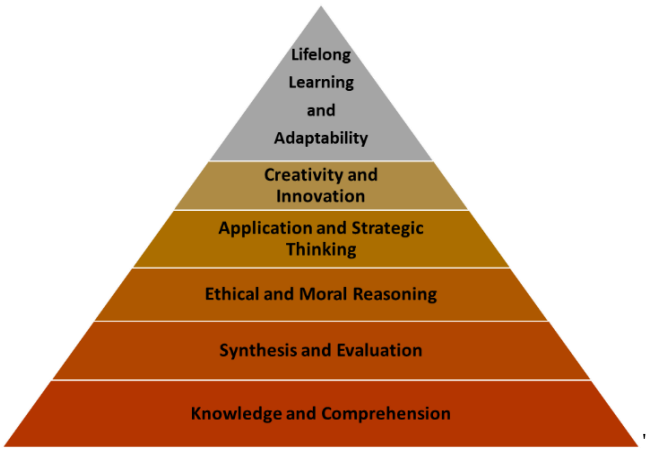

Figure 2. AlAfnan's taxonomy

4.1. The cognitive domain

The cognitive domain of AlAfnan's taxonomy directly relates to the six categories. It primarily involves mental processes, as shown in Figure 3. "Knowledge and comprehension" are the bedrock of the cognitive domain in learning activities and are essential for intellectual development and mental growth. These foundational elements enable learners to acquire a structured understanding of facts, concepts, and principles, which are critical for contextualizing new information. Knowledge entails the acquisition of information, while comprehension involves a deeper understanding and interpretation of this information, allowing learners to grasp the interconnections between various pieces of information. A robust foundation in knowledge and comprehension fosters confidence in learners. When individuals have a solid grasp of the basics of a subject, they are more inclined to explore advanced topics and engage in intellectual pursuits with enthusiasm. This confidence serves as a driving force, encouraging further learning and exploration. At this level, students shall be able to: i) define critical terms and concepts; ii) list fundamental facts within a subject area; iii) recall significant theories and principles; iv) explain the underlying principles of a theory; and v) summarize the main ideas from readings. For setting up assessments, lecturers may use action verbs that belong to the list:

- Explain: clarify or give a detailed account of a concept or process.
- Describe: provide characteristics or features of a specific topic.
- Summarize: condense information while retaining key points.
- Paraphrase: restate information in one's own words.
- Define: state the meaning of a term or concept.
- Identify: recognize and name specific elements or components.
- Locate: find specific information within a text or dataset.
- Restate: express the same idea in different words.

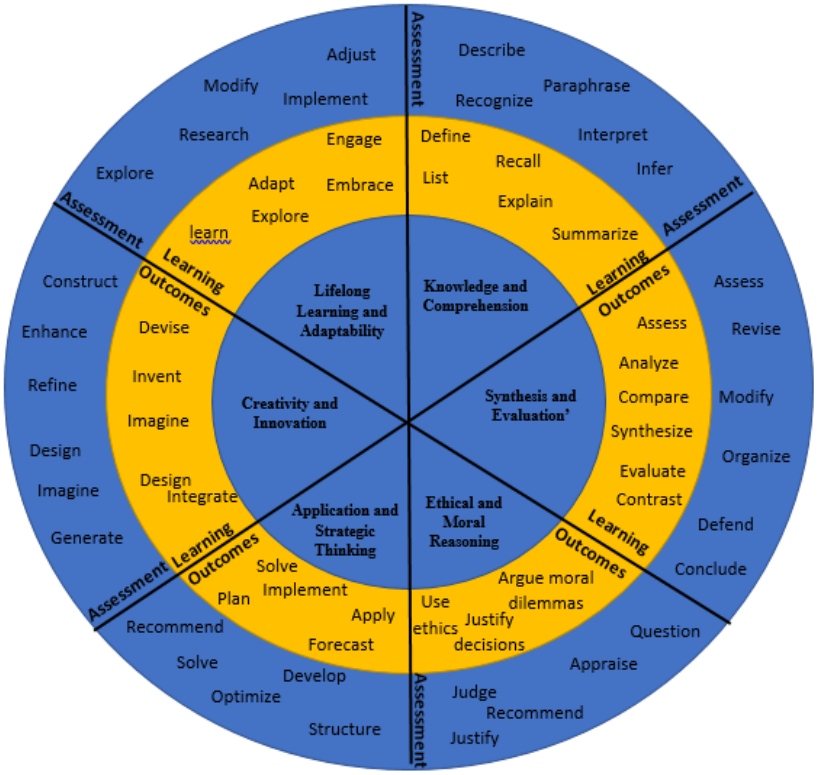

Figure 3. Cognitive domain of AlAfnan's taxonomy

'Synthesis and evaluation' are crucial for cultivating critical thinkers and problem solvers. Evaluation involves critically assessing information and analyzing the quality, credibility, and relevance of ideas, arguments, or data. This skill lets learners differentiate between reliable sources and misinformation, facilitating well-informed decision-making. Evaluation promotes analytical thinking, teaching individuals to question assumptions, identify biases, and consider multiple perspectives. It fosters intellectual responsibility to encourage learners to base their beliefs and actions on reasoned judgment rather than mere acceptance. Synthesis involves integrating various information or ideas to create a coherent and meaningful whole. It enhances problem-solving skills by enabling individuals to devise innovative solutions by combining existing knowledge. The synthesis also encourages interdisciplinary thinking, allowing learners to bridge gaps between different fields of study and explore diverse perspectives.

In the modern era of open access, generative AI, and extensive digital resources, synthesis and evaluation are more accessible and essential than ever. These skills should be encouraged to enhance students' information literacy and professional development. By integrating AI and other technological resources into the teaching process, educators can support students in the synthesis and evaluation process, helping them reach well-informed conclusions. At this level of learning, students should be able to: i) analyze case studies to identify core issues; ii) assess the validity of different sources of information; iii) compare and contrast different theories or perspectives; iv) synthesize information from multiple sources into a coherent argument; and v) evaluate the effectiveness of various solutions to a problem. For setting up assessments, lecturers may use action verbs that belong to the list:

- Compose: create a new piece of work by combining various elements.
- Construct: build or form by combining parts.
- Design: plan and create something new.
- Formulate: develop a method or system by careful thought.
- Generate: produce new ideas, products, or solutions.
- Contrast: examine differences to evaluate significance.
- Assess: determine the value or significance of something.
- Critique: provide a detailed analysis and judgment of the merits and faults.
- Judge: form an opinion or conclusion about something.
- Evaluate: appraise the strengths and weaknesses of a concept or object.
- Compare: identify similarities and differences to assess value.

‘Ethical and moral reasoning’ are essential components of the cognitive domain, guiding learners in their intellectual pursuits and decision-making processes. These aspects cultivate a deep sense of responsibility, integrity, and empathy, shaping learners into socially conscious and morally aware individuals. Ethical reasoning enables learners to grapple with complex ethical dilemmas, recognizing, and analyzing the ethical dimensions of various situations. It promotes thoughtful consideration of the consequences of one’s actions and decisions, fostering a heightened awareness of their impact on others. Moral reasoning provides a framework for evaluating actions and choices based on moral principles and values. It encourages learners to reflect on their beliefs and values and understand the ethical implications of their decisions. Ethical and moral reasoning teaches learners to approach their studies and interactions with honesty, integrity, and respect for others, preparing them to face ethical challenges in various fields. Integrating education for sustainable development (ESD) [50] and social, legal, ethical, and environmental responsibilities into the curriculum can help students develop integrity, commitment, and honesty. These elements should be core components of the educational process, ensuring that teaching and learning encompass technical knowledge and ethical considerations. At this level, students shall be able to: i) debate ethical issues in contemporary society; ii) argue different sides of moral dilemmas; iii) justify personal ethical decisions with reasoned arguments; iv) evaluate moral arguments presented in case studies; and v) apply ethical principles to real-world situations. For setting up assessments, lecturers may use action verbs that belong to the list:

- Analyze: examine the ethical implications of situations or actions.
- Evaluate: assess the moral responsibility of individuals or organizations.
- Justify: provide reasons and arguments supporting moral or ethical decisions.
- Debate: discuss opposing ethical viewpoints or dilemmas.
- Reflect: consider and ponder ethical experiences and dilemmas.
- Resolve: find a solution to an ethical problem or conflict.
- Judge: form an opinion or conclusion about the morality of actions.
- Question: challenge assumptions and explore ethical dimensions.
- Prioritize: determine the most important ethical considerations in a situation.

‘Application and strategic thinking’ are pivotal in bridging the gap between theoretical knowledge and practical implementation. They prepare learners for real-world challenges and opportunities. The application involves using knowledge and skills in practical situations, enabling learners to solve problems, make informed decisions, and innovate. Strategic thinking complements application by teaching learners how to plan, anticipate, and make decisions with a long-term perspective. It involves analyzing situations from multiple angles, considering potential outcomes, and devising effective action plans. Strategic thinkers are adept at identifying patterns, understanding cause-and-effect relationships, and anticipating consequences. These skills are vital in complex, dynamic environments where learners must navigate uncertainties and make decisions that align with overarching goals. At this level, students shall be able to: i) apply theoretical concepts to real-world scenarios; ii) implement procedures or techniques learned in class; iii) solve practical problems using acquired knowledge; iv) plan and develop a strategic project; and v) forecast potential outcomes based on current trends. For setting up assessments, lecturers may use action verbs that belong to the list:

- Implement: put plans or strategies into action.
- Execute: carry out a plan or strategy effectively.
- Devise: create a plan or strategy.
- Solve: find solutions to complex problems.
- Plan: develop a detailed approach to achieve a specific goal.
- Calculate: determine figures or amounts as part of strategic planning.
- Structure: organize components into a functional plan or strategy.
- Coordinate: align efforts and resources to execute a plan effectively.
- Investigate: examine details to inform strategic decisions.
- Design: create a plan or system that meets specific needs.
- Develop: build and improve strategies or plans.
- Formulate: create or devise a systematic plan.
- Synthesize: combine elements to create a cohesive strategy or solution.
- Construct: build a plan or strategy from various components.

‘Creativity and innovation’ are essential for developing adaptable, forward-thinking, and inventive problem solvers. Creativity encourages learners to explore uncharted territories, connect seemingly unrelated concepts, and envision possibilities. It fosters divergent thinking, enabling learners to consider multiple angles and create innovative solutions. Creative approaches to learning make education engaging and enjoyable, sparking curiosity and a thirst for knowledge. Innovation is the practical application of creative

ideas. It involves turning imaginative concepts into tangible products, services, or processes that drive positive change. Fostering innovation equips learners with the ability to solve complex problems and encourages experimentation and learning from failure. These skills prepare learners to adapt to rapidly changing environments, a vital capability in today's fast-paced, technology-driven world. Encouraging creativity and innovation transforms education into a dynamic and enriching experience fostering curiosity, engagement, and a thirst for knowledge. These skills equip learners to navigate uncertainty, drive progress, and shape the future. At this level, students shall be able to: i) devise new ways to approach a problem; ii) design original projects or experiments; iii) invent new products or processes; iv) imagine innovative solutions to current challenges; and v) integrate various ideas to form new concepts. For setting up assessments, lecturers may use action verbs that belong to the list:

- Generate: produce new ideas, concepts, or solutions.
- Brainstorm: think freely to generate various ideas or solutions.
- Imagine: conceive new possibilities or scenarios.
- Invent: create something new and original.
- Design: plan and outline the structure or form of a product, system, or process.
- Visualize: form a mental image of something not present or realized.
- Sketch: create a rough drawing or outline of an idea.
- Develop: expand on an idea to create something new or improved.
- Prototype: create an early model or sample of a product to test a concept.
- Experiment: test new ideas or approaches systematically.
- Refine: improve by making small changes to an idea or product.
- Transform: change something significantly to create something new.
- Adapt: modify something to suit a new purpose or condition.
- Integrate: combine different elements to create something innovative.

'Lifelong learning and adaptability' are crucial in a rapidly changing world where knowledge evolves swiftly, and new challenges continually emerge. Lifelong learning ensures that learners stay intellectually engaged and updated with the latest developments in their field and beyond. It fosters personal growth and career advancement, promoting the continuous acquisition of new knowledge and skills. Adaptability is critical in an era of unprecedented technological and industrial evolution. The ability to adapt enables individuals to navigate shifting job markets, embrace new technologies, and acquire new skills. This skill goes hand in hand with lifelong learning, enhancing employability, and fostering resilience in the face of change. Lifelong learning and adaptability empower learners to remain relevant, resilient, and thriving in an evolving educational landscape and dynamic workforce. These qualities ensure learners can navigate diverse environments effectively and stay agile in a changing world. At this level, students shall be able to: i) engage in continuous professional development courses; ii) adapt to new learning tools and technologies; iii) embrace changes in curriculum and update skills accordingly; iv) explore new fields of study or interest; and v) learn and apply new techniques in different contexts. For setting up assessments, lecturers may use action verbs that belong to the list:

- Engage: participate actively in learning activities.
- Update: refresh knowledge or skills to stay current.
- Pursue: follow or strive to achieve a particular area of interest.
- Absorb: take in the information and understand it thoroughly.
- Adjust: modify one's approach in response to new conditions.
- Adapt: change strategies or methods to suit different situations.
- Respond: react appropriately to new or changing circumstances.
- Innovate: create new methods or solutions in response to challenges.

The cognitive domain in this taxonomy encompasses a broad spectrum of educational objectives, addressing cognitive skills, practical abilities, ethical considerations, and future-ready competencies. By incorporating these categories into the curriculum, educators can design learning experiences that holistically develop students, preparing them for success in the current era.

4.2. The affective domain

The affective domain of learning objectives in AlAfnan's taxonomy, as shown in Figure 4, provides an innovative and creative approach that encompasses a broad spectrum of emotional, social, and intellectual development needed in the current era. It is designed to create a dynamic learning environment that fosters well-rounded individuals' growth by engaging curiosity, embracing emotions, cultivating creativity, building resilience, fostering collaboration, and inspiring vision.

Figure 4. Affective domain of AlAfnan's taxonomy

At each stage of this affective domain, educators can employ tailored educational strategies to support the development of these critical attributes. For instance, inquiry-based and social-emotional learning (SEL) practices can enhance curiosity and emotional intelligence [51], [52]. Similarly, creative projects, growth mindset training, and resilience-building activities can be integrated to foster creativity and resilience. In addition, group work, leadership opportunities, and vision-building exercises can be incorporated to promote collaboration and inspire vision.

Ultimately, this affective domain aims to develop knowledgeable and skilled learners who are emotionally intelligent, creative, resilient, collaborative, and visionary. By integrating these objectives into the curriculum, educators can effectively prepare students to thrive in a rapidly changing world and contribute positively to society. The affective domain of AlAfnan's taxonomy includes the following:

4.2.1. Engaging curiosity (cultivating wonder and inquiry)

At the heart of the affective domain lies the cultivation of curiosity and a sense of wonder. This foundational level emphasizes the importance of sparking learners' intrinsic motivation to explore, ask questions, and seek new knowledge. Educators can inspire a lifelong passion for learning by fostering a sense of curiosity. For this level of learning, learners should be able to i) notice: pay attention to details and phenomena that evoke curiosity; ii) question: formulate thoughtful questions about observed phenomena; iii) explore: investigate topics of interest with enthusiasm and an open mind; and iv) wonder: exhibit a sense of wonder and fascination with the unknown. For assessments, lecturers may use any of the action verbs:

- Debate: discuss opposing viewpoints to deepen understanding.
- Critique: evaluate and analyze to understand strengths and weaknesses.
- Challenge: question assumptions and explore alternatives.
- Interpret: explain the meaning or significance of information.
- Validate: confirm the accuracy and reliability of information.
- Theorize: develop theories based on evidence and reasoning.
- Solve: find solutions to problems through investigation and reasoning.
- Navigate: find one's way through a complex topic or situation.
- Conclude: reach a decision or judgment based on investigation and evidence.
- Predict: make an educated guess based on information and analysis.

Engaging curiosity is crucial for igniting the spark of inquiry in learners. Educators can foster this by creating a stimulating and supportive environment where questions are encouraged and exploration is celebrated. Innovative teaching methods, such as inquiry-based learning and project-based activities, can enhance curiosity and wonder.

4.2.2. Embracing emotions (recognizing and valuing emotional responses)

Embracing emotions involves recognizing and valuing the emotional responses that arise during learning. This level emphasizes the importance of emotional intelligence, encouraging learners to understand, express, and manage their emotions constructively. For this level of learning, learners should be able to i) identify: recognize and name their emotions; ii) express: communicate their feelings effectively and appropriately; iii) empathize: understand and share the feelings of others; iv) reflect: reflect on their emotional experiences and learn from them; and v) monitor: keep track of one's state and changes. For assessments, lecturers may use any of the action verbs:

- Analyze: examine the sources and effects of reactions.
- Evaluate: assess the appropriateness of responses.
- Resolve: find solutions to conflicts or issues.
- Mediate: intervene in emotional conflicts to find resolution.
- Cultivate: develop a deeper understanding and appreciation.
- Encourage: foster positive emotional expressions in oneself or others.

Embracing emotions is essential for developing emotional intelligence and creating a supportive learning environment. Educators can enhance this by incorporating SEL practices, facilitating open discussions about emotions, and modeling emotional intelligence in student interactions.

4.2.3 Cultivating creativity (encouraging imagination and original thinking)

Cultivating creativity involves encouraging learners to use their imagination and think outside the box. This level fosters original thinking, innovative problem-solving, and creative expression, enabling learners to approach challenges with a fresh perspective. For this level of learning, learners should be able to i) imagine: envision new possibilities and scenarios; ii) create: develop original ideas, products, or solutions; iii) experiment: test new ideas and approaches, embracing trial and error; and iv) express: use various forms of expression to communicate creative ideas. For assessments, lecturers may use the action verbs:

- Generate: produce a variety of ideas, concepts, or solutions.
- Brainstorm: think freely to develop a wide range of ideas.
- Imagine: visualize new possibilities and scenarios.
- Invent: create something original and new.
- Design: plan and develop the structure or form of a product, system, or process.
- Visualize: form a mental image of something not present or realized.
- Sketch: create a rough drawing or outline of an idea.
- Compose: create a piece of work, such as music, writing, or art.
- Devise: formulate a new method, plan, or solution.
- Innovate: introduce new ideas or methods.

Cultivating creativity is vital for nurturing innovative thinkers and problem solvers. Educators can support this by providing opportunities for creative projects, encouraging risk-taking and experimentation, and celebrating diverse forms of creative expression. Integrating arts, design thinking, and creative writing into the curriculum can also enhance creative development.

4.2.4. Building resilience (developing grit and perseverance)

Building resilience involves developing grit and perseverance, enabling learners to overcome challenges and setbacks. This level emphasizes the importance of persistence, adaptability, and a growth mindset in achieving long-term goals. For this level of learning, learners should be able to i) persist: continue efforts despite difficulties and setbacks; ii) adapt: adjust strategies and approaches in response to changing circumstances; iii) reflect: learn from failures and use them as opportunities for growth; and iv) encourage: support and motivate themselves and others to keep going. For assessments, lecturers may use the action verbs:

- Resource: utilize available resources to manage challenges.
- Improvise: create solutions with the resources at hand.
- Reframe: view challenges from a different, more positive perspective.
- Plan: develop strategies to handle future challenges.
- Commit: dedicate oneself to overcoming obstacles.
- Bolster: strengthen one's resolve and determination.
- Encourage: motivate oneself or others to keep going despite difficulties.
- Evaluate: assess the situation to find the best way forward.
- Support: provide or seek emotional support during tough times.
- Acknowledge: recognize and accept challenges as part of growth.
- Visualize: imagine successful outcomes to build confidence.

Building resilience is crucial for preparing learners to navigate the ups and downs of life. Educators can enhance this by promoting a growth mindset, providing constructive feedback, and creating a supportive environment that values effort and perseverance. Incorporating stories of resilience, resilience training programs, and opportunities for self-reflection can further strengthen this attribute.

4.2.5. Fostering collaboration (promoting teamwork and collective problem-solving)

Fostering collaboration involves promoting teamwork and collective problem-solving, emphasizing the importance of working effectively with others. This level focuses on developing interpersonal skills, communication, and cooperation towards common goals. For this level of learning, learners should be able to i) communicate: share ideas and listen actively to others; ii) cooperate: work together towards shared objectives; iii) negotiate: resolve conflicts and reach a consensus; and iv) support: encourage and assist team members. For assessments, lecturers may use any of the action verbs:

- Participate: take an active part in group discussions or activities.
- Support: assist and encourage team members in their efforts.
- Share: distribute information, resources, or ideas with others.
- Engage: involve oneself fully in group activities or discussions.
- Negotiate: discuss and reach agreements with others.
- Facilitate: make group activities more accessible or more efficient.
- Empathize: understand and consider the feelings and perspectives of others.
- Coordinate: align efforts and synchronize actions with team members.
- Resolve: find solutions to conflicts or disagreements within the group.
- Brainstorm: generate ideas collectively with the group.

Collaboration is essential for preparing learners to work in diverse and dynamic environments. Educators can enhance this by incorporating group projects, cooperative learning activities, and team-building exercises. Teaching conflict resolution skills and promoting a culture of mutual respect and support can also strengthen collaborative abilities.

4.2.6. Inspiring vision (encouraging forward-thinking and goal setting)

Inspiring vision involves encouraging learners to think ahead and set meaningful goals. This level emphasizes the importance of vision, purpose, and long-term planning in achieving personal and collective aspirations. For this level of learning, learners should be able to i) envision: articulate a clear and compelling vision for the future; ii) plan: develop detailed plans to achieve their goals; iii) motivate: stay motivated and focused on their objectives; and iv) lead: inspire others to share and pursue a common vision. For assessments, lecturers may use any of the action verbs:

- Envision: formulate a vivid picture of the future.
- Articulate: clearly express ideas and visions.
- Motivate: encourage others to pursue a common goal.
- Inspire: fill others with the urge or ability to do or feel something.
- Enlighten: provide insights and understanding to support a vision.
- Lead: guide and direct a group towards a goal.
- Imagine: conceive new possibilities and innovative ideas.
- Create: develop new ideas or concepts for the future.
- Strategize: plan the actions needed to achieve a vision.
- Communicate: share a vision effectively with others.

Inspiring vision is vital for cultivating future leaders and change-makers. Educators can enhance this by encouraging goal setting, providing mentorship and guidance, and creating opportunities for leadership and advocacy. Integrating vision-building activities, such as vision boards and future planning exercises, can inspire learners to pursue their dreams.

This affective domain seeks to cultivate knowledgeable and skilled learners who are emotionally intelligent, creative, resilient, collaborative, and visionary. By incorporating these objectives into the curriculum, educators can equip students to excel in a rapidly changing world and make meaningful contributions to society.

4.3. The psychomotor domain

The psychomotor domain of learning objectives encompasses a broad range of skills, from enhanced sensory perception to leadership in motion, as shown in Figure 5. Educators can support the comprehensive development of learners' motor abilities by focusing on sensory engagement, cognitive-motor integration, interactive feedback loops, creative motor expression, advanced precision, dynamic adaptation, and leadership in motion.

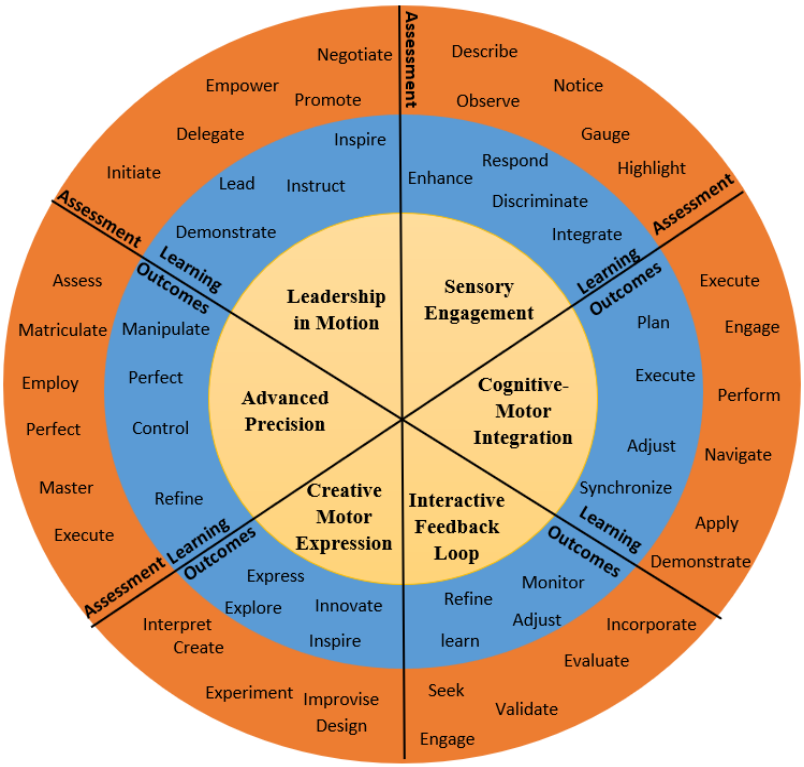

Figure 5. Psychomotor domain of AlAfnan's taxonomy

4.3.1. Sensory engagement (enhanced sensory perception and awareness)

Sensory engagement is at the foundation of this psychomotor domain, which emphasizes the development of heightened sensory perception and awareness. This stage is about training learners to use their senses more acutely and effectively to gather and interpret sensory information that is crucial for precise motor actions. For this level of learning, learners should be able to i) enhance: sharpen their sensory perception through targeted exercises; ii) discriminate: distinguish subtle differences in sensory stimuli; iii) integrate: combine sensory inputs to understand their environment comprehensively; and iv) respond: react promptly and accurately to sensory cues. For assessments, lecturers may use any of the action verbs:

- Observe: notice or perceive details through careful watching.
- Listen: pay close attention to sounds or spoken words.
- Taste: experience and identify flavors.
- Touch: feel and identify textures or shapes.
- Smell: detect and distinguish scents.
- Perceive: become aware of or understand sensory information.
- Describe: provide details about sensory experiences.
- Recognize: identify sensory information based on prior experience.
- Detect: notice or discover sensory stimuli.

Educators can enhance sensory engagement by using sensory deprivation exercises, mindfulness practices, and multi-sensory experiences. These activities help learners develop a more acute sense of perception, essential for advanced motor skills.

4.3.2. Cognitive-motor integration (mental and physical coordination)

The second level focuses on cognitive-motor integration, which involves the seamless coordination of mental processes and physical actions. This stage emphasizes synchronizing cognitive functions like planning, decision-making, and problem-solving with motor skills. For this level of learning, learners should be able to i) plan: develop mental strategies for executing motor tasks; ii) execute: perform physical actions in alignment with cognitive plans; iii) adjust: modify motor actions based on cognitive feedback; and iv) synchronize: achieve harmony between mental intent and physical execution. For assessments, lecturers may use any of the action verbs:

- Execute: perform actions or tasks based on cognitive instructions.
- Integrate: combine cognitive processes with physical actions effectively.

- Implement: put cognitive strategies into action through motor skills.
- Engage: participate actively in tasks requiring thinking and physical movement.
- Navigate: move through tasks or activities while applying cognitive understanding.
- Apply: use learned knowledge or skills in practical situations requiring physical action.
- Demonstrate: show or illustrate the integration of cognitive and motor skills.
- Coordinate: manage and synchronize cognitive processes with physical movements.
- Perform: carry out actions that require both cognitive and motor abilities.
- Operate: control or manipulate objects or tools using cognitive skills and motor actions.

Cognitive-motor integration can be enhanced through activities like strategic games requiring physical manipulation, dual-task training exercises, and complex motor planning tasks. These activities help learners develop the ability to integrate their cognitive and motor skills seamlessly.

4.3.3. Interactive feedback loop (real-time adjustments and learning)

The third level, the interactive feedback loop, involves making real-time adjustments based on continuous feedback. This stage focuses on the ability to respond dynamically to immediate feedback from the environment, improving the precision and efficiency of motor actions. For this level of learning, learners should be able to i) monitor: continuously assess the outcomes of their actions; ii) adjust: make immediate corrections to improve performance; iii) learn: integrate feedback into subsequent actions to enhance skills; and iv) refine: continuously improve motor actions based on iterative feedback. For assessments, lecturers may use any of the action verbs:

- Receive: accept and take in feedback or information.
- Analyze: examine feedback to understand its implications or content.
- Reflect: think deeply about the feedback received.
- Respond: act or make changes based on feedback.
- Adapt: adjust behavior or approach in response to feedback.
- Incorporate: integrate feedback into one's work or practice.
- Apply: use feedback to improve performance or outcomes.
- Integrate: combine feedback with existing knowledge or practices.
- Adjust: make changes or corrections based on feedback.
- Evaluate: assess the effectiveness or value of feedback received.

Interactive feedback loop skills can be developed through activities that provide instant feedback, such as using biofeedback devices, real-time video analysis, and interactive simulators. These tools help learners make quick adjustments and continuously improve their motor performance.

4.3.4. Creative motor expression (innovative and artistic movement)

Creative motor expression emphasizes using motor skills to express creativity and artistry. This stage encourages learners to explore and develop their unique movement style, pushing the boundaries of conventional motor skills through innovation and artistic expression. For this level of learning, learners should be able to i) innovate: develop new and unique movement patterns; ii) express: use motor skills to convey artistic and creative ideas; iii) explore: experiment with different forms of movement and expression; and iv) inspire: use their motor skills to inspire others through creative performance. For assessments, lecturers may use any of the action verbs.

- Create: generate new and original physical expressions.
- Design: plan and arrange movements creatively.
- Innovate: introduce novel approaches or techniques in physical expression.
- Express: convey emotions, ideas, or concepts through physical movements.
- Improvise: spontaneously create movements or actions.
- Choreograph: arrange movements into a structured sequence or dance.
- Perform: demonstrate creative expression through physical actions.
- Animate: bring movement and life to physical gestures or expressions.
- Craft: skillfully create or shape movements with artistic intent.
- Compose: organize and arrange movements artistically

Creative motor expression can be enhanced through dance, improvisational movement, performance arts, and creative sports. These activities encourage learners to explore their motor abilities and express their creativity through movement.

4.3.5. Advanced precision (mastery of fine motor skills)

Advanced precision focuses on the development and mastery of fine motor skills. This stage emphasizes the ability to perform delicate and intricate tasks with high levels of accuracy and control. For

this level of learning, learners should be able to i) refine: perform detailed and precise movements with high accuracy; ii) control: maintain steady and controlled movements in challenging situations; iii) manipulate: handle small objects and tools with dexterity; and iv) perfect: achieve near-perfect execution of complex motor tasks. For assessments, lecturers may use any of the action verbs.

- Master: achieve a high level of proficiency or expertise in a specific area.
- Refine: improve or perfect techniques to achieve greater precision.
- Perfect: achieve flawless execution or performance.
- Achieve: reach a specific level of accuracy or proficiency.
- Practice: engage in repetitive exercises to enhance precision.
- Assess: evaluate performance based on established standards of precision.
- Employ: use precise methods or approaches effectively.
- Calibrate: adjust and fine-tune actions or measurements precisely.

Advanced precision can be enhanced through activities that require fine motor control, such as playing musical instruments, detailed crafts, surgical simulations, and precision sports like archery. These activities help learners develop the high levels of control and accuracy needed for advanced motor skills.

4.3.6. Leadership in motion (leading and teaching through motor skills)

The highest level, motion leadership, involves using motor skills to lead, teach, and inspire others. This stage emphasizes the ability to guide others through demonstration, instruction, and leadership in motor activities. For this level of learning, learners should be able to i) demonstrate: show advanced motor skills as a model for others; ii) instruct: teach motor skills effectively to different learners; iii) inspire: motivate others to achieve higher levels of motor performance; and iv) lead: guide teams and groups through motor activities with confidence. For assessments, lecturers may use any of the action verbs.

- Initiate: take the lead in starting or beginning actions or projects.
- Direct: guide or oversee activities with clarity and purpose.
- Lead: take charge of a group or team to achieve goals.
- Inspire: motivate others through actions and words.
- Guide: provide direction and support to others.
- Facilitate: make actions or processes easier for others.
- Mentor: support and develop others through coaching and guidance.
- Empower: enable others to take initiative and make decisions.
- Collaborate: work with others to achieve common goals.
- Influence: effectively persuade or convince others.

Leadership in motion can be developed through roles that require leading and teaching motor skills, such as coaching, mentoring, and leading group activities. These experiences help learners develop the ability to inspire and guide others through their motor skills. This psychomotor domain aims to develop skilled and proficient learners who are adaptable, creative, and capable of leading and inspiring others through their motor abilities. By integrating these objectives into the curriculum, educators can prepare students to excel in various fields and contribute to advancements in their respective domains.

5. DISCUSSION

AlAfnan's taxonomy was presented to address the recent challenges to the educational process and maintain classrooms as the formal venues of learning. It provided six two-fold levels of learning and supported these levels with action verbs that assist teachers, lecturers, and professors in forming educational objectives and learning outcomes. However, as learning has three domains, this study provides insights into these domains (cognitive, affective, and psychomotor) to establish rigorous performance learning objectives.

AlAfnan's cognitive domain taxonomy underscores the importance of "knowledge and comprehension" as foundational to intellectual growth. Knowledge acquisition involves gathering information, while comprehension deepens understanding and connects information pieces. This fundamental grasp fosters confidence among learners, enabling them to delve into advanced topics enthusiastically. Educators use explaining, summarizing, and defining verbs to assess these levels, ensuring students master essential concepts effectively. Moving to "synthesis and evaluation," the taxonomy promotes critical thinking and problem-solving skills. Evaluation entails assessing information quality and credibility, which is crucial in navigating vast digital resources. Synthesis integrates diverse information to innovate solutions, encouraging interdisciplinary thinking and enhancing information literacy. Assessment verbs like analyzing, synthesizing, and evaluating gauge students' ability to integrate knowledge and judge solution effectiveness. "Ethical and moral reasoning" integrates ethical dilemmas into learning, fostering responsibility and empathy. It challenges students to justify ethical decisions and apply principles to real-world contexts.

It promotes integrity and ethical reflection-assessment verbs such as analyzing, debating, and justifying, supporting ethical exploration and decision-making across diverse scenarios.

"Application and strategic thinking" bridge theory with practice, preparing students for real-world challenges. The application involves using knowledge practically, while strategic thinking fosters long-term planning and decision-making skills. These competencies equip learners to solve problems and anticipate outcomes in dynamic environments. Assessment verbs like implementing, planning, and solving effectively assess the practical application and strategic foresight. "Creativity and innovation" cultivate inventive problem-solving and adaptability. Creativity encourages exploration and novel connections, while innovation transforms ideas into tangible solutions, essential for navigating technological advancements and uncertain environments. Assessment verbs include generating, inventing, and designing. They evaluate creative thinking and practical application, preparing students to drive progress and embrace change. "Lifelong learning and adaptability" emphasize continuous growth and resilience in a rapidly evolving world. Lifelong learning supports ongoing skill development, while adaptability equips learners to thrive amidst change. These qualities, assessed through verbs like engaging, updating, and innovating, prepare students for diverse challenges and opportunities, ensuring they possess the necessary skills and mindset for lifelong success.

The affective domain in AlAfnan's taxonomy offers a comprehensive framework that integrates emotional, social, and intellectual development into modern education. It aims to nurture well-rounded individuals by promoting curiosity, emotional intelligence, creativity, resilience, collaboration, and visionary thinking. Educators employ tailored strategies to cultivate these qualities at each domain stage. Inquiry-based learning and social-emotional practices enhance curiosity and emotional intelligence, while creative projects and resilience-building activities foster creativity and perseverance. Group work and vision-building exercises promote collaboration and inspire future-oriented thinking. The foundational level of "engaging curiosity" emphasizes sparking intrinsic motivation and a sense of wonder in learners. It encourages them to explore, question, and actively pursue new knowledge. Educators utilize assessment verbs like debating, critiquing, and theorizing to gauge students' ability to delve deeply into topics and think critically. "Embracing emotions" focuses on recognizing and valuing emotional responses during learning. It promotes emotional awareness, practical expression, empathy, and reflective practices. Assessment verbs such as analyzing, evaluating, and resolving help educators assess students' emotional intelligence and ability to manage emotions constructively. "Cultivating creativity" encourages original thinking and innovative problem-solving. It nurtures imagination, experimentation, and various forms of creative expression. Assessment verbs like generating, brainstorming, and inventing evaluate students' creative abilities and ability to approach challenges from new perspectives. "Building resilience" emphasizes developing grit, adaptability, and a growth mindset to overcome obstacles and setbacks. It fosters persistence, reflection, and the ability to support oneself and others during difficult times. Assessment through verbs like planning, improvising, and bolstering assesses students' resilience and their readiness to navigate challenges effectively. "Fostering collaboration" promotes teamwork, communication, negotiation, and cooperation towards common goals. It builds interpersonal skills essential for dynamic environments. Assessment verbs such as participating, supporting, and coordinating evaluate students' collaborative abilities and ability to work effectively in groups. "Inspiring vision" encourages forward-thinking, goal-setting, and leadership skills. It emphasizes articulating a clear vision, planning for the future, motivating others, and guiding collective efforts toward shared objectives. Assessment verbs like envisioning, motivating, and leading assess students' visionary thinking and ability to inspire and drive positive change.

The psychomotor domain of learning objectives in AlAfnan's taxonomy encompasses various skills essential for comprehensive development, ranging from sensory engagement to leadership through motion. At its core, the domain begins with "sensory engagement," focusing on sharpening sensory perception and awareness to enable precise motor actions. Educators employ verbs like observing, listening, and describing to assess how learners perceive and interpret sensory stimuli, which is essential for developing advanced motor skills. Sensory deprivation exercises and mindfulness practices enhance sensory acuity, laying a foundation for more sophisticated motor abilities. "Cognitive-motor integration" emphasizes the seamless coordination of mental processes with physical actions. Learners are encouraged to plan, execute, and adjust their movements based on cognitive strategies, fostering skills like planning, executing, and integrating. Assessment involves verbs such as executing, coordinating, performing, and evaluating learners' ability to synchronize cognitive functions with physical tasks. Strategic games and dual-task training exercises strengthen this integration, preparing learners for tasks requiring complex motor planning and execution. The "interactive feedback loop" stage involves making real-time adjustments based on continuous feedback from the environment. Learners monitor, adjust, and refine their motor actions to improve precision and efficiency, integrating feedback effectively into subsequent actions. Assessment verbs like analyzing, reflecting, and adjusting gauge learners' responsiveness to feedback, crucial for refining motor skills through biofeedback training and interactive simulators. "Creative motor expression" encourages learners to explore innovative

and artistic movements, pushing the boundaries of conventional motor skills. This stage fosters creativity and self-expression through activities like dance and performance arts, utilizing verbs such as creating, designing, and improvising for assessment. By experimenting with various forms of movement and expression, learners develop unique motor styles and expand their creative capacities. "Advanced precision" focuses on mastering fine motor skills, requiring learners to perform delicate tasks with high accuracy and control. Activities such as surgical simulations and precision sports facilitate the development of precise motor control, assessed through verbs like refining, mastering, and calibrating. This stage aims to achieve flawless execution and proficiency in tasks demanding meticulous motor skills. "Leadership in motion" represents the pinnacle of the psychomotor domain, where learners demonstrate leadership through motor skills, guiding and inspiring others. Skills in demonstration, instruction, and motivation are developed through coaching and mentoring roles, evaluated using verbs like leading, instructing, and empowering. This stage prepares learners to lead teams effectively in motor activities, fostering qualities essential for collaborative and leadership roles.

6. CONCLUSION

This study provided the three learning domains for AlAfnan's taxonomy. The cognitive, affective, and psychomotor domains in AlAfnan's taxonomy offer a comprehensive framework for holistic learning and development. The cognitive domain, focusing on knowledge acquisition, critical thinking, ethical reasoning, application of knowledge, creativity, and lifelong learning, equips learners with essential intellectual skills and competencies. The affective domain promotes personal growth and societal contribution by nurturing curiosity, emotional intelligence, creativity, resilience, collaboration, and visionary thinking. Simultaneously, the psychomotor domain enhances sensory perception, cognitive-motor integration, feedback responsiveness, creative motor expression, precision, and leadership through motion, preparing learners to excel in practical and physical tasks.

Integrating these domains into educational curricula fosters well-rounded individuals capable of addressing complex challenges with intellectual rigor, emotional maturity, and practical competence. Educators play a crucial role in facilitating these learning objectives through tailored instructional strategies, assessment methods, and experiential activities that cater to diverse learning styles and developmental needs. Ultimately, by embracing and implementing the principles of AlAfnan's taxonomy across educational settings, institutions can empower learners to thrive in dynamic environments, contribute positively to society, and embrace lifelong learning as a pathway to continuous personal and professional growth.

FUNDING INFORMATION

Authors state no funding involved.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Mohammad Awad AlAfnan	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Author states no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

DATA AVAILABILITY

Derived data supporting the findings of this study are available from the corresponding author [MAA] on request.

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