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The Future is Connection:

Collaboration, Creativity and Compassion in a Digital Society

Learning in 3D: Extending Bloom's Taxonomy across cognitive, affective and operative domains for human-centred curriculum design

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Bloom's Taxonomy remains the dominant framework for writing learning outcomes in Australian higher education, and the Higher Education Standards Framework mandates their use across all Australian Qualifications Framework (AQF) levels. Far from its original conception, the taxonomy's application has collapsed to a single domain: the cognitive. This paper argues that this narrowing is not incidental but structural, rooted in the history of the taxonomy's development, the university's knowledge-transfer model, and the conventions of measurability in outcome-based assessment. A preliminary analysis of learning outcome verbs drawn from third-year courses across 10 degree programs demonstrates that cognitive-domain verbs dominate learning outcome design even at AQF levels where professional and affective capability should be foregrounded. In response, the paper presents the Extended Bloom's Framework: a three-dimensional reconceptualisation of the taxonomy that treats the cognitive, affective and operative domains as equally weighted axes within a three-dimensional design space. The framework provides a practical, theoretically grounded instrument for writing learning outcomes that reflect the full complexity of human capability and are cognitively rigorous, affectively engaged, and practically purposeful.

Keywords: Bloom's Taxonomy, learning design, affective domain, operative domain, human-centred design, curriculum design, graduate attributes, learning outcome

Bloom's Taxonomy (Bloom et al., 1956) is arguably the most widely applied framework in tertiary curriculum design globally. It has shaped the conceptualisation of learning and teaching and been adopted globally as the basis for the development of learning outcomes. In Australia, the use of learning outcomes is not merely conventional but regulatory: the Higher Education Standards Framework (HESF) Standard 1.4.1 requires that "the expected learning outcomes for each course of study are specified, consistent with the level and field of education of the qualification awarded" (Australian Government, 2021), with Australian Qualifications Framework (AQF) level descriptors providing the benchmark against which outcomes are assessed by TEQSA. The result is a sector-wide investment in learning outcome writing as a quality assurance practice, with Bloom's taxonomy, specifically its revised cognitive domain (Anderson & Krathwohl, 2001), serving as the primary instrument for constructing and evaluating those outcomes.

The cognitive taxonomy provides a well-validated, practically useful vocabulary for distinguishing levels of intellectual complexity. The problem that arises is one of reduction: in widespread practice, the taxonomy's two additional domains, the affective (Krathwohl, Bloom, & Masia, 1964) and the psychomotor (Simpson, 1972; Harrow, 1972), have been almost entirely absent from learning outcome design. The result is a curriculum design culture that systematically attends to how students think, while paying inadequate attention to how they feel, relate, act and operate physically.

This matters urgently. Industry consistently identifies affective and interpersonal capabilities like collaboration, empathy, adaptability, and ethical judgement as critical graduate attributes (Deloitte Access Economics, 2017; World Economic Forum, 2025), and the gap between employer expectations of graduate readiness and graduates' actual preparedness is well documented in the Australian context (Caballero et al., 2026). If learning outcomes are the primary mechanism through which institutions specify and assure graduate capability, and they are systematically weighted toward knowledge and cognition, then the regulatory apparatus designed to assure quality is itself reproducing the capability gap it is meant to address.

Why the cognitive domain came to dominate

The marginalisation of the affective and psychomotor domains is not a recent oversight. It is structural, and it has three identifiable sources. The first is historical incompleteness. Bloom and his colleagues produced the cognitive taxonomy in 1956 (Bloom et al., 1956) as the first of three planned handbooks. The affective domain handbook followed in 1964 (Krathwohl, Bloom, & Masia, 1964), but the psychomotor domain was never completed by the original team. Their stated reason was that they had little experience teaching manual skills at the college level. Three independent psychomotor taxonomies subsequently emerged (Simpson, 1972; Harrow, 1972), but without the institutional authority of the original Bloom team, none achieved the same uptake. The cognitive taxonomy, arriving first and bearing Bloom's name, became the default instrument — a historical accident that has shaped curriculum design for seven decades.

The second source is measurability. The affective domain, which covers values, attitudes, emotional dispositions, and interpersonal orientations, poses a fundamental challenge to outcome-based assessment. Its internal states are difficult to observe and even harder to grade reliably. A scoping review of the literature on teaching, learning and assessment of the affective domain found that while extensive research has addressed cognitive and psychomotor outcomes, considerably less attention has been given to the affective domain, and no guidelines for its assessment were found in the literature at all (Smit et al., 2025). In a quality assurance environment where outcomes must be demonstrably assessed, the unmeasurable tends to disappear.

The third source is institutional. The modern university has historically been understood, and largely understood itself, as a site of knowledge production and transfer. This epistemological framing privileges the cognitive domain almost by definition: the university's core business is the transmission of disciplinary knowledge, and its quality assurance mechanisms have evolved to assess that transmission. Constructivist and experiential learning traditions (Kolb, 1984; Vygotsky, 1978) have challenged this framing, as have more recent approaches such as design thinking and inquiry-based learning in which creation, exploration, and problem-solving precede foundational knowledge acquisition (Shelley, 2020). But these challenges have had limited structural impact on the learning-outcome writing practices underpinning institutional quality assurance. Together, these forces have produced a landscape where cognitive outcomes are over-specified and affective and operative ones are absent — not because educators do not value them, but because the instruments to design them have been missing.

A preliminary analysis of learning outcome verb use

To examine whether the structural dominance of the cognitive domain is evident in current curriculum practice, a preliminary analysis was conducted of publicly available learning outcomes from third-year courses across 10 undergraduate degree programs at an Australian university. Four courses were selected from each program, yielding a sample of 142 individual course learning outcomes (CLOs) across the disciplines of Social Work, Psychology, Nursing, Education, International Business, Industrial Design, Electrical Engineering, Veterinary Science, Music, and Law. Third-year courses were deliberately selected, as foundational knowledge should be followed by application, analysis, and professional judgment, capabilities that should, in principle, require more affective and operative outcomes alongside cognitive ones.

Each learning outcome was coded using the Extended Bloom's Framework verb lists (Klapdor, 2026). The lead verb of each outcome served as the unit of analysis. Where the lead verb appeared in the Shared verb list, applicable across all three domains, the full text was read in context, and a final domain was assigned based on the overall intent of the outcome. This distinction is important: many high-frequency verbs, such as analyse, demonstrate, apply, and reflect, sit in the Shared list precisely because their domain depends on what is being analysed, demonstrated, applied, or reflected upon. A coding rule that mechanically matched verbs against a single list would systematically misclassify learning outcomes — treating one that asks students to "demonstrate professional accountability" as equivalent to asking them to "demonstrate knowledge of organisational theory," despite these clearly representing different domains of learning. Learning outcomes whose construction made domain assignment impossible, those using non-observable language or lacking action verbs entirely, were coded as Unclear.

Of the 142 CLOs sampled, six (4.2%) were coded as Unclear and excluded from proportional calculations. Of the remaining 136, 83 (61.0%) were coded as Cognitive, 32 (23.5%) as Operative, and 21 (15.4%) as Affective. The distribution by discipline is shown in Table 1.

Table 1.
Domain distribution of CLOs by discipline (AQF Level 7)

Discipline	Total	Cognitive	Affective	Operative	Unclear
Social Work	12	8 (67%)	2 (17%)	2 (17%)	—
Psychology	12	11 (92%)	—	1 (8%)	—
Nursing	18	10 (56%)	4 (22%)	4 (22%)	—
Education	13	7 (54%)	1 (8%)	4 (31%)	1 (8%)
International Business	12	9 (75%)	2 (17%)	—	1 (8%)
Industrial Design	13	4 (31%)	—	9 (69%)	—
Electrical Engineering	15	12 (80%)	1 (7%)	2 (13%)	—
Veterinary Science	16	10 (63%)	1 (6%)	1 (6%)	4 (25%)
Music	15	5 (33%)	4 (27%)	6 (40%)	—
Law	16	7 (44%)	6 (38%)	3 (19%)	—
Total	142	83 (61%)	21 (15%)	32 (23%)	6 (4%)

The headline finding, that 61% of CLOs are coded as Cognitive, confirms the structural pattern the framework is designed to address. However, the discipline-level distribution is analytically more revealing than the aggregate. Psychology sits at 92% cognitive and Electrical Engineering at 80%, with International Business at 75%. These are disciplines in which the knowledge-transfer model of the university remains most deeply embedded in curriculum design practice. By contrast, Industrial Design operates at 31% cognitive and 69% operative, and Law, driven substantially by its professional identity and ethics courses, registers the highest affective proportion at 38%. The implication is that the affective and operative domains do not simply appear where they are academically fashionable: they appear where professional practice traditions have required disciplines to design for them explicitly. The near absence of affective learning outcomes in Psychology (0%), Industrial Design (0%), and International Business (17%) is particularly striking, given that empathy, ethical reasoning, and relational practice are foundational to each of these fields. Social Work, where one might expect the highest proportion of affective outcomes, yields only two affective learning outcomes. Its three organisational theory and practice courses treat their subject matter as objects of analysis rather than contexts of relational and values-based practice, pointing to a distinction between disciplines that know they teach affective capability and disciplines that design as if they do.

A secondary finding emerged where the operative domain is stronger than expected but heavily concentrated: Industrial Design accounts for nine of the 32 operative learning outcomes (28%), and without it the operative proportion across the remaining nine disciplines falls to approximately 17%. Operative learning outcomes appear consistently only in disciplines with a professional performance tradition explicitly embedded in their curriculum: clinical placement in Nursing, advocacy and drafting in Law, studio and design projects in Industrial Design.

These findings should be interpreted with caution: the study is a single-coder, exploratory snapshot at one institution, and verb-based proxy analysis captures outcome intent only to the extent that the verb faithfully reflects the learning outcomes design purpose, a condition that the contextual coding process attempts to honour but cannot guarantee.

The Extended Bloom's Framework

The Extended Bloom's Framework responds to this structural problem by treating the three domains not as parallel supplementary taxonomies but as equally weighted dimensions of a unified design space. Rather than a pyramid, with its implication of sequential hierarchy, the framework is better understood as a design volume: a three-dimensional space in which cognitive, affective and operative objectives can be mapped, balanced and integrated at any level of complexity. The framework makes two deliberate structural choices. First, it simplifies the taxonomy to three domains: Cognitive, Affective, and Operative. The psychomotor

domain is reframed as "Operative" to broaden its application beyond manual and physical skills to include the full range of practical, procedural, and performative capabilities required by professional, creative and social practice.

Second, it normalises the six levels of the cognitive domain (Anderson & Krathwohl, 2001) across all three domains, creating a consistent six-level structure under shared dimension names – Perceptual, Conceptual, Contextual, Practical, Professional, and Individual. These apply equally to cognitive, affective and operative learning. Each dimension maps to a domain-specific stage with its own developmental description. A Shared verb list applies across all three domains; domain-specific verb lists add precision when an outcome targets a particular kind of learning.

The framework also challenges the strict hierarchical sequencing of the original taxonomy. While the six dimensions represent a progression from foundational noticing toward original authorship, the design volume framing acknowledges that learners frequently operate across multiple levels simultaneously, and that creation, exploration and problem-solving can precede rather than follow the accumulation of foundational knowledge (Shelley, 2020; Vygotsky, 1978). Below is a sample of the framework to illustrate its structure, but a more comprehensive model has been developed (Klapdor, 2026) and was used to conduct the analysis.

Table 2.
Samples of the Extended Bloom's Framework — domains, dimensions and representativevVerbs

Dimension	Shared	Cognitive	Affective	Operative
	Applies across all domains	*Thinking · Knowing · Reasoning*	*Feeling · Valuing · Relating*	*Doing · Making · Performing*
Perceptual	identify, name, recall, recognise	**Remembering** define, list, recall, state	**Receiving** attend, notice, acknowledge, tolerate	**Perceiving** detect, orient, sense, tune
Conceptual	describe, explain, outline, summarise	**Understanding** classify, interpret, paraphrase, restate	**Responding** engage, participate, react, share	**Preparing** attempt, imitate, mimic, replicate
Contextual	apply, demonstrate, illustrate, plan, use	**Applying** calculate, establish, predict, solve	**Valuing** commit, empathise, justify, value	**Imitating** assemble, practise, rehearse, sequence
Practical	analyse, examine, investigate, reflect, test	**Analysing** deconstruct, differentiate, deduce, simplify	**Organising** facilitate, mediate, navigate, reconcile	**Practising** coordinate, customise, develop, systematise
Professional	assess, evaluate, recommend, review	**Evaluating** appraise, critique, hypothesise, validate	**Characterising** advocate, embody, model, uphold	**Performing** coach, direct, improvise, master
Individual	collaborate, create, design, innovate	**Creating** conceive, formulate, generate, theorise	**Advocating** champion, inspire, lead, transform	**Originating** curate, fabricate, pioneer, synthesise

The Extended Bloom's Framework does not replace Bloom's cognitive taxonomy. It restores what was always intended to accompany it. By returning the affective and operative domains to equal footing and providing a usable verb taxonomy that makes all three domains accessible to curriculum designers working under time and capacity constraints, the framework offers a practical response to a problem that regulatory frameworks alone cannot solve.

The verb taxonomy provides a structured instrument for designing outcomes that specify not just what students should know, but what they should feel, commit to, and be capable of doing. In practice, a curriculum designer reviewing a set of AQF Level 7 learning outcomes can use the verb taxonomy to map each outcome to its domain and dimension, identify gaps. For instance, a program with no affective outcomes above the Conceptual level can rewrite or supplement outcomes accordingly. The dimension structure supports the

design of outcomes appropriate for AQF Levels 7–10, where professional judgment, ethical practice, and original contribution should be foregrounded. Beyond learning outcome writing, the design-volume framing has implications for assessment design and program-level curriculum mapping. When graduate capabilities are distributed across three domains rather than one, the case for portfolio-based, practice-based and reflective assessment becomes structurally grounded rather than merely philosophically appealing.

Conclusion

This paper presents preliminary findings, and its results are offered as illustrative rather than definitive. A larger multi-institution study with inter-rater reliability protocols and a broader disciplinary sample would substantially strengthen the empirical case. The Extended Bloom's Framework itself is a version 1.0 instrument, designed to be refined through use and critique and the learning outcome analysis reported here suggests that refinement is warranted: even at AQF Level 7, where professional judgment should be foregrounded, the cognitive domain dominates by a margin that no single-coder study can fully explain. Feedback from curriculum design practice is actively sought.

Bloom's Taxonomy is not the problem. The problem is the habit of treating a three-domain framework as if only one domain existed. The Extended Bloom's Framework offers a way back to the full scope of what Bloom and his collaborators originally envisioned — and a practical instrument for doing the work of curriculum design with all three dimensions of human capability in view. In a higher education environment where industry, regulators and students are all asking for graduates who can not only think but also empathise, collaborate, and create, designing learning outcomes that attend to all three domains is not an extension of good practice. It is the baseline.

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