Designing Competency-Based Curriculum in Higher Education: An Evidence-Informed Framework for Outcomes, Assessment, and Program Coherence

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Abstract

Competency-based education (CBE) has gained considerable momentum across higher education systems worldwide as institutions face intensifying expectations to demonstrate that graduates possess not only disciplinary knowledge but the transferable, integrative capabilities that professional practice, civic life, and lifelong learning genuinely demand. Yet adoption frequently stalls or produces superficial results when competency statements remain abstract, when assessments fail to generate credible evidence of actual mastery, or when faculty experience CBE as an administrative relabeling exercise that demands compliance without offering pedagogical substance. This evidence-informed conceptual paper synthesizes scholarship on constructive alignment, curriculum coherence, program-level assessment design, and assessment validity principles to propose a practical, integrated framework for competency-based curriculum innovation in higher education. Drawing on research traditions in learning outcomes design, authentic assessment, formative feedback, and educational governance, the paper articulates four interdependent domains: (a) competency architecture and progression design that specifies observable performance at multiple proficiency levels; (b) assessment blueprinting and moderation routines that produce trustworthy evidence of mastery across diverse task contexts; (c) mastery-oriented learning design and feedback cycles that create the revision opportunities through which competence genuinely develops; and (d) governance and quality assurance structures that protect equity, credential portability, and public trust. Three conceptual tables operationalize the framework: a competency architecture template, an assessment blueprint connecting competencies to evidence artifacts and moderation routines, and a program coherence checklist for academic leaders and curriculum design teams. The paper concludes with implications for academic leaders, curriculum designers, and quality assurance agencies seeking to implement CBE as a substantive pedagogical and assessment reform rather than an administrative relabeling of existing practices.

Keywords: *Competency-Based Education; Curriculum Innovation; Constructive Alignment; Program Assessment; Higher Education.*

A. INTRODUCTION

Higher education systems across diverse national and regional contexts are confronting a sustained and intensifying challenge: the expectation that universities demonstrate, with specificity and credibility, that their graduates possess the capabilities that professional practice, civic participation, and adaptive lifelong learning require (Biesta, 2020). This expectation is not new in its broad contours, but its specificity and urgency have sharpened considerably in recent decades as labor markets have grown more volatile and complex, as accreditation bodies and professional licensing organizations have moved toward outcomes-based standards, and as students and families seeking returns on substantial educational investment have demanded greater transparency about what degree credentials actually signify. In response, higher education institutions around the world have embraced a proliferating vocabulary of graduate attributes, graduate profiles, program outcomes, and professional competency frameworks, each articulating ambitious accounts of the human capacities that undergraduate and postgraduate education is intended to cultivate (Arasaratnam-Smith & Northcote, 2021).

Competency-based education has emerged as one of the most prominent and consequential institutional responses to this challenge. At its theoretical core, CBE represents a principled rejection of the time-based model of educational credentialing, in which students accumulate credit hours, satisfy seat-time requirements, and receive credentials as a function of temporal persistence rather than demonstrated achievement (Biggs & Tang, 2020). In its place, CBE proposes a mastery-oriented model in which students advance through defined proficiency levels by demonstrating their capabilities on assessments designed to provide meaningful evidence of competence, and in which the curriculum is organized around the systematic development of those capabilities through carefully sequenced learning

experiences rather than around the coverage of disciplinary content for its own sake (Brown & Knight, 2020). The promise of this model is substantial: clearer alignment between educational processes and graduate capabilities, stronger signals to employers and professional bodies about what credential holders can actually do, and more equitable pathways for students whose prior knowledge and learning pace differ from the assumptions built into conventional curriculum designs (Boud et al., 2023).

The gap between this promise and the reality of CBE implementation in higher education is, nonetheless, wide and well-documented. A recurring pattern in the literature and in institutional practice is what might be termed competency washing: the adoption of competency terminology and framework structures that are layered onto existing curriculum and assessment practices without substantively transforming them, producing programs that are describable in competency language but that continue to assess primarily content recall, that provide no mechanism for students to demonstrate mastery beyond a single high-stakes examination, and that offer faculty no meaningful guidance about how the competency framework should shape their teaching. In this pattern, CBE becomes a compliance exercise that satisfies accreditation requirements and marketing expectations while delivering none of the pedagogical substance that makes CBE valuable (Priestley & Biesta, 2013).

A second recurring failure mode involves the opposite error: programs that take CBE seriously as a pedagogical commitment but implement it without adequate attention to assessment validity and reliability, producing competency judgments that are neither sufficiently consistent nor sufficiently grounded in meaningful evidence to be trusted by the students, employers, and professional bodies whose confidence in the credential the program depends upon. When competency assessments are poorly designed, inadequately moderated, and inconsistently scored, the mastery claims that CBE credentials represent lack the evidentiary foundation that distinguishes genuine competency certification from the administrative allocation of positive labels (Cevallos et al., 2020; Evans, 2024).

Both failure modes share a common root: the absence of a coherent, evidence-informed design framework that connects competency definition, assessment design, learning design, and governance into a mutually reinforcing system. Individual attention to any one of these elements, without corresponding attention to the others, predictably produces the partial implementations that characterize much of the CBE landscape in higher education. The framework advanced in this paper is designed to address that systemic gap (Guskey, 2021).

The paper is organized as follows. The subsequent section synthesizes the theoretical and empirical foundations of the framework, drawing on scholarship in constructive alignment, competency architecture, assessment validity, and educational governance. The third section presents the four-domain framework in operational detail, supported by three conceptual tables designed for use by curriculum design teams and academic leaders. The fourth section addresses implementation challenges, equity considerations, and the organizational conditions that support sustainable CBE development. The concluding section synthesizes the framework's contributions and identifies priority directions for future research and quality assurance development.

The paper's contribution is simultaneously theoretical and practical. Theoretically, it integrates streams of scholarship in curriculum design, assessment theory, and educational governance that have developed largely in parallel, articulating the interdependencies among them in ways that existing literature has not fully mapped. Practically, it provides curriculum designers, academic program directors, and quality assurance professionals with a structured, evidence-grounded decision architecture for CBE implementation that translates principled commitments into specific design choices and governance routines.

B. LITERATURE REVIEW

Constructive Alignment and the Challenge of Program-Level Coherence

Biggs's (1996) concept of constructive alignment has exerted enduring influence on curriculum design theory and practice in higher education, providing a conceptual vocabulary and a practical design principle that connect learning outcomes, teaching and learning activities, and assessment tasks into a mutually reinforcing system. The core insight of constructive alignment is at once simple and consequential: students learn by constructing meaning through their engagement with learning activities, and the quality of their learning is substantially determined by the alignment between what those activities require them to do and what the intended learning outcomes specify they should be able to do (Henri et al., 2021). When learning activities and assessment tasks are aligned with outcomes, students' cognitive efforts are directed toward the development of the intended capabilities; when they are misaligned, students optimize for the demands of assessment rather than for the development of the capabilities that assessment is supposed to measure (Hodge, 2021).

In competency-based programs, constructive alignment must be achieved not only at the level of individual courses but across the program sequence as a whole, a requirement that substantially amplifies the design challenge (Khan & Law, 2023; Koenen et al., 2022). Program-level coherence demands that competencies be introduced and practiced progressively across multiple courses and years, that assessment tasks across the program collectively sample performance across the diverse contexts in which the target competencies are ultimately required, and that feedback and revision opportunities are embedded throughout the program in ways that enable the iterative, developmental learning through which complex capabilities genuinely mature. Without this program-level architecture of coherence, CBE degenerates into a collection of course-level competency claims that bear no systematic relationship to one another and that provide no defensible basis for making judgments about integrated graduate capability (Newmann et al., 2001).

The practical difficulty of achieving program-level constructive alignment in higher education is compounded by the organizational structures of universities themselves (Lizzio & Wilson, 2019). In most higher education institutions, curriculum design and delivery responsibility is distributed across individual faculty members who hold strong professional norms of course autonomy, and whose coordination around shared program-level goals requires deliberate institutional investment in collaborative design processes, shared frameworks, and governance routines that most universities have not historically provided. CBE implementation that does not directly address these organizational conditions will find that even well-designed competency frameworks are interpreted and enacted inconsistently across courses, producing the variability in implementation quality that undermines both student learning and credential credibility (Mulder, 2019).

Competency Architecture: The Problem of Specifying What Mastery Means

The design of competency architecture represents one of the most intellectually demanding and practically consequential tasks in CBE curriculum development. At its simplest, competency architecture refers to the structured specification of what graduates should be able to do, at what levels of proficiency, in what contexts, and with what degree of independence and complexity. The challenge is that this specification task sits at the intersection of multiple competing pressures: the need for sufficient generality to allow competencies to be developed and assessed across diverse disciplinary contexts, the need for sufficient specificity to guide the design of learning activities and assessment tasks, and the need for sufficient face validity with professional and community stakeholders to ensure that the competency framework retains credibility beyond the academy (St-Onge et al., 2022).

Programs that define competencies too broadly, specifying goals such as "communication" or "critical thinking" without further elaboration, provide insufficient guidance for either instruction or assessment. A teacher who knows that their course is supposed to develop "communication" but has no further specification of what communication looks like at different proficiency levels, in what disciplinary contexts it should be practiced, or by what criteria different levels of performance should be distinguished cannot design learning activities or assessment tasks with any confidence that they are addressing the intended competency coherently. Students in such programs similarly lack the developmental map they need to understand what they are working toward and how to direct their learning efforts productively (Redmond & Slaughter, 2023).

Effective competency architecture specifies, for each core competency, observable performance statements that describe what students can demonstrably do at each proficiency level, the contexts of application within which the competency should be practiced and assessed, the sub-competencies or enabling skills that support its development, and the accessibility considerations that may create barriers for particular student populations. This level of specificity does not constrain professional judgment or curriculum diversity; on the contrary, it provides the shared framework within which professional judgment can be exercised consistently and within which curriculum diversity can be organized coherently. The distinction between constraining specificity and enabling specificity is critical: the former prescribes exactly how competencies must be taught; the latter specifies what performance at different levels looks like while leaving the design of learning pathways to professional judgment (Schuwirth, 2023).

Shavelson (2013) argues that competency assessment requires a model of competence that is sufficiently structured to generate consistent inferences from performance evidence but sufficiently flexible to accommodate the situated, contextual nature of competence in practice. This tension between structure and flexibility is a defining design problem for competency architecture, and the framework advanced in this paper addresses it through the specification of proficiency levels defined by observable performance descriptors rather than by prescribed instructional pathways.

Assessment Validity, Reliability, and the Evidentiary Foundation of Mastery Claims

The evidentiary foundation of competency-based credentials rests on the quality of the assessments through which mastery is claimed. Assessment validity, in the framework developed by Messick (1995) and elaborated by subsequent scholars, refers to the degree to which the inferences drawn from assessment evidence are appropriate, meaningful, and defensible given the construct the assessment is intended to measure and the uses to which assessment results will be put. In CBE contexts, validity requires that assessment tasks genuinely elicit the competencies they are designed to measure, that scoring criteria reflect meaningful dimensions of quality rather than surface features of performance, and that the accumulated body of assessment evidence across a program supports the integrated competency claims that program credentials represent (Tai et al., 2022).

Authentic assessment approaches, including project-based assessments, case analyses, simulations, clinical performance observations, and portfolios of practice, have been widely advocated in CBE contexts because they can provide richer and more ecologically valid evidence of competence than conventional recall or recognition tests (Zlatkin-Troitschanskaia et al., 2022). The ecological validity of authentic assessments reflects their structural resemblance to the performance contexts in which competencies are ultimately required: a student who can successfully navigate a realistic professional case scenario under assessment conditions provides more defensible evidence of professional competence than a student who can correctly answer multiple-choice questions about professional practice principles. Authentic assessments are not, however, sufficient guarantees of assessment quality: they introduce challenges of scoring reliability and construct relevance that must be actively addressed through rubric design, scorer training, and moderation routines if the validity of their mastery claims is to be sustained (Sadler, 1989).

Reliability in CBE assessment, understood as the consistency of mastery judgments across assessors, assessment contexts, and assessment occasions, is essential for equity as well as for credential credibility. When identical levels of student performance are judged differently by different assessors, or when assessment standards drift inconsistently across cohorts or courses, students whose work is assessed by more stringent raters are systematically disadvantaged relative to otherwise-equivalent students assessed by more lenient raters (Van der Vleuten, 2021). This assessor inconsistency, which research consistently identifies as a significant source of assessment unreliability in performance-based contexts, can be substantially reduced through the use of analytic rubrics with behavioral anchors, calibration sessions in which assessors jointly apply criteria to shared anchor samples before independent scoring, and sampling-based double marking for high-stakes competency decisions (Black and Wiliam, 1998).

Mastery-Oriented Learning Design and the Role of Feedback

Competency-based curriculum requires learning design that is explicitly oriented toward mastery development rather than content coverage, a distinction with significant implications for how courses are structured, how instructional time is allocated, and what kinds of student-teacher interaction are prioritized. The mastery orientation of CBE learning design is grounded in Bloom's (1968) foundational argument that the distribution of achievement in conventional instruction reflects variation in the time and support students receive rather than genuine variation in learning capacity: when students receive sufficient time, appropriately sequenced instruction, and timely corrective feedback, the vast majority can achieve mastery of complex learning goals.

The practical design implications of mastery orientation include the provision of multiple practice opportunities that progressively increase in complexity and contextual variation, the embedding of formative assessment checkpoints that provide students with specific, actionable feedback about their current level of performance relative to proficiency descriptors, and the creation of structured revision opportunities through which students can act on feedback and demonstrate improvement before summative mastery judgments are made. Hattie and Timperley's (2007) influential synthesis of the feedback literature identifies the conditions under which feedback produces learning gains: it must address the gap between current and desired performance, be specific enough to guide the actions that will reduce that gap, and be delivered in conditions that allow the student to act on it. Without revision opportunities, feedback functions as evaluation rather than as a learning tool, and competency judgments made on the basis of first-attempt performance reflect learning opportunity as much as learning capability.

Sadler's (1989) concept of the assessment gap, referring to the space between the student's current understanding and the standard of quality toward which they are working, provides a complementary theoretical foundation for the feedback and revision cycles that mastery-oriented learning design requires. Reducing the assessment gap requires not only that students receive feedback about their current performance but that they develop the capacity to evaluate their own work against

the relevant quality criteria, identify the specific aspects of their performance that fall short, and generate the revisions that will bring their work closer to the standard. This development of student evaluative judgment is a key educational goal of CBE learning design, one that is served by explicit engagement with rubrics, exemplars of performance at different proficiency levels, and structured self-assessment and peer assessment activities.

Governance, Equity, and the Portability of Competency Credentials

The governance dimension of CBE in higher education encompasses the institutional structures, decision rights, data systems, and quality assurance routines through which the integrity of competency credentials is established and maintained over time. Governance is not merely an administrative concern; it is the organizational expression of the institution's commitment to the validity and equity of its competency claims, and its quality directly determines whether those claims carry the credibility with professional bodies, employers, and other educational institutions that makes them valuable to students.

Equity in CBE governance requires attention to the ways in which competency frameworks and assessment designs may create differential barriers for students from different cultural, linguistic, and socioeconomic backgrounds (Zlatkin-Troitschanskaia et al., 2022). Assessment tasks designed within particular cultural or professional contexts may disadvantage students whose backgrounds do not align with those contexts, not because those students lack the target competencies but because the assessment design does not provide them with the opportunity to demonstrate those competencies in ways that draw on their knowledge and experience. Similarly, rubric criteria that privilege particular language varieties or rhetorical styles may produce systematically biased assessments of students who communicate with equal sophistication in different but equally legitimate registers. Equity-by-design requires proactively interrogating competency frameworks and assessment designs for these potential biases rather than monitoring for differential outcomes after the fact.

Credential portability, the degree to which CBE credentials are recognized and trusted by employers, professional bodies, and receiving educational institutions, depends on the transparency and consistency of the competency claims they represent. When competency credentials are accompanied by clear, publicly accessible documentation of the performance standards they represent, the assessment evidence on which mastery judgments are based, and the quality assurance routines through which assessor consistency is maintained, they provide a more meaningful basis for external recognition decisions than conventional grade-based credentials whose meaning is largely opaque to those outside the institution.

C. METHOD

The methodology of this paper is consistent with evidence-informed conceptual framework development, a scholarly approach appropriate for papers that seek to synthesize and integrate existing research traditions into a practically actionable model rather than to generate new empirical data. The framework presented here draws on systematic engagement with peer-reviewed scholarship across multiple research traditions: constructive alignment and curriculum design, competency architecture and learning progressions, assessment validity and reliability, formative feedback and mastery learning, and educational governance and equity.

The literature synthesis process proceeded through three stages. In the first stage, foundational theoretical works in each relevant domain were identified through systematic searches of major educational research databases, including ERIC, PsycINFO, and the Web of Science, using search terms associated with competency-based education, constructive alignment, authentic assessment, mastery learning, assessment validity, and quality assurance in higher education. Priority was given to peer-reviewed journal articles, scholarly monographs, and research reports from recognized educational research institutions. In the second stage, recent empirical literature published within the preceding fifteen years was reviewed to identify findings that extend or qualify foundational theoretical positions in light of contemporary higher education contexts, with particular attention to studies conducted in program-level or institution-wide CBE implementation contexts rather than single-course experimental settings. In the third stage, cross-domain synthesis was conducted to identify the theoretical complementarities and tensions that inform the framework's design, with the explicit aim of constructing an integrated model that addresses the interconnected complexity of CBE curriculum innovation as a whole.

The conceptual framework is operationalized through three structured tables designed for practitioner use by curriculum design teams and academic leaders. These tables were constructed by mapping identified design challenges and quality assurance requirements from the reviewed literature onto framework elements, and then refining the preliminary structures iteratively against the internal

logic of the framework and the practical constraints that higher education curriculum design typically operates within. As a conceptual paper, the framework's propositions are theoretical rather than empirically validated through original research, and the framework's credibility rests on the coherence of its theoretical integration and the quality of its evidence base. Future empirical research should examine the framework's domain relationships in specific institutional and disciplinary contexts, particularly investigating the conditions under which different governance configurations support or undermine the equity and validity commitments that the framework advances.

D. RESULT AND DISCUSSION

Competency Architecture and Progression Design

The first domain constitutes the foundational intellectual work of CBE curriculum design, establishing the conceptual architecture within which all subsequent design decisions are oriented. A competency architecture that is genuinely fit for purpose requires program teams to accomplish several distinct but related design tasks: identifying a small number of core competencies that are essential to the graduate profile the program is designed to develop; articulating each competency through observable performance statements that specify what capable performance actually looks like in practice; defining progression levels that describe how competence develops from novice to proficient across the program sequence; mapping the contexts and disciplinary applications within which each competency should be practiced and assessed; and identifying the sub-competencies and enabling skills whose development is prerequisite to higher-level competency performance.

The restraint required in identifying core competencies deserves emphasis because it runs against the institutional impulse to be comprehensive. Programs that attempt to formally develop and assess large numbers of competencies across a curriculum simultaneously create the same fragmentation and surface-level adoption that initiative overload creates at the system level: when every competency receives equal billing, none receives sufficient instructional attention to develop beyond a superficial familiarity. A coherent competency architecture limits the number of core competencies to a set small enough that each can be deliberately developed through multiple practice opportunities across the program sequence, with complexity and contextual variation increasing as students advance. The following table provides a structured template for competency architecture development that program teams can adapt to their disciplinary context and program level.

Table 1. Competency Architecture Template for Higher Education Programs

Architecture Element	Guiding Design Question	Example Output
Competency domain	What broad, transferable capability is being developed?	Professional communication
Performance statement	What can graduates demonstrably do, in what contexts?	Communicate evidence-based recommendations to diverse professional stakeholders
Proficiency levels	How does performance progress across the program sequence?	Novice: structures ideas with support; Developing: communicates independently with feedback; Proficient: adapts communication strategically to audience and purpose
Evidence contexts	Where across the program should competence be demonstrated?	Presentations, written reports, client-facing briefs, peer collaboration records
Related sub-competencies	What enabling skills and knowledge support the competency?	Argumentation structure, data visualization, audience analysis, disciplinary register
Equity and accessibility notes	What structural barriers must be identified and reduced?	Multiple submission formats; language scaffolding; culturally diverse task contexts

Source: data proceed

The elaborative logic of Table 1 requires comment. The progression levels row is the most demanding to design well and the most critical to the framework's functioning: without specific, observable performance descriptors at each proficiency level, the competency architecture provides insufficient guidance for either instruction or assessment. Performance descriptors should be written in behavioral terms that describe what students at each level can do with the relevant content and in the

relevant contexts, rather than in terms of what students know or what traits they possess. The equity and accessibility row reflects the framework's commitment to treating equity as a design principle rather than as a retrospective monitoring category: each competency's architecture should be scrutinized at the design phase for the structural barriers it may create for particular student populations, and those barriers should be addressed through design adjustments rather than post-hoc accommodations.

Assessment Blueprinting and Moderation for Trustworthy Mastery Decisions

The second domain translates the competency architecture into a structured assessment blueprint that specifies, for each core competency, the evidence artifacts through which mastery will be assessed, the rubric dimensions against which performance will be evaluated, and the moderation routines through which assessor consistency will be maintained. The assessment blueprint serves multiple interdependent functions: it ensures that each core competency is assessed through tasks that genuinely elicit the relevant performance, prevents over-assessment by making explicit which assessments serve which competency evidence purposes, supports curriculum coherence by mapping the distribution of assessment evidence across the program sequence, and provides the shared framework within which calibration and moderation activities can be organized.

Rubric design within the assessment blueprint deserves particular attention because rubric quality is one of the most significant determinants of both validity and reliability in competency assessments. Analytic rubrics that break competency performance into specific, observable dimensions and provide behavioral descriptions of performance quality at each proficiency level serve the framework's purposes more effectively than holistic rubrics or generic quality scales: they provide assessors with specific criteria against which to make consistent judgments, provide students with specific feedback about which dimensions of their performance are strong and which require development, and generate the diagnostic information about competency development that program improvement processes require.

Table 2. Assessment Blueprint for Competency Evidence and Moderation

Competency	Evidence Artifact	Rubric Focus Dimensions	Moderation Routine
Problem solving	Case analysis and recommendation memorandum	Quality of reasoning; integration of evidence; feasibility of proposed solution	Anchor samples at each proficiency level plus structured calibration session
Communication	Presentation to simulated stakeholder panel	Argument clarity; audience adaptation; quality of data visualization	Co-scoring of shared sample set plus rubric refinement debrief
Ethical reasoning	Ethics reflection paper with decision rationale	Identification of relevant ethical dimensions; quality of justification; reasoning about consequences	Peer review of criteria plus faculty moderation sample review
Collaboration	Team project with individual contribution log	Role responsibility; quality of peer feedback provided; responsiveness to group needs	Bias guardrails for peer assessment plus independent instructor check
Professional practice	Portfolio of authentic practice artifacts	Evidence of progression across proficiency levels; transfer across contexts	Sampling-based portfolio review plus external reviewer input on standards

Source: data proceed

The moderation column of Table 2 reflects a deliberate scaling strategy: moderation routines are specified at a level of intensity calibrated to the stakes of the corresponding mastery decision and to the practical constraints of workload and staffing that program teams realistically face. Lightweight moderation approaches, including calibration meetings using anchor samples and co-scoring of shared sets, can substantially improve assessor consistency without creating the unsustainable workload that more intensive moderation of every student submission would require. The principle governing moderation intensity decisions is proportionality: more intensive moderation is appropriate for high-stakes summative competency decisions that determine credential award or program progression, while lighter moderation approaches are adequate for formative assessments whose primary purpose is to guide learning rather than to certify mastery.

Mastery-Oriented Learning Design and Feedback Cycles

The third domain addresses the learning design architecture through which competencies are genuinely developed rather than merely assessed. A CBE program whose assessment blueprint is sophisticated but whose learning design provides students with only one or two opportunities to practice each competency, without formative feedback and structured revision, is assessing readiness rather than developing capability. The mastery orientation that gives CBE its distinctive educational logic requires learning designs that provide students with repeated, progressively complex practice opportunities, embed formative assessment checkpoints at which students receive specific feedback against proficiency level descriptors, create structured revision windows through which students can act on that feedback before summative competency judgments are made, and develop students' evaluative judgment through engagement with exemplars, peer assessment, and explicit self-assessment against rubric criteria.

The developmental arc of competency learning across a program sequence should be reflected in the design of practice opportunities: early-program tasks should provide significant scaffolding through worked examples, modeling, and structured guidance; mid-program tasks should progressively reduce scaffolding while maintaining access to feedback and revision; and late-program and capstone tasks should provide students with the opportunity to demonstrate integrated, independent performance across the full complexity of the target competency. This scaffolding trajectory is not a concession to student limitation but a theoretically grounded recognition that complex competencies develop through extended practice in conditions of appropriate challenge and support, and that the conditions appropriate to novice learners differ systematically from those appropriate to learners approaching proficiency.

Governance, Quality Assurance, and Equity-by-Design

The fourth domain provides the institutional infrastructure through which CBE credentials retain their meaning, consistency, and trustworthiness over time and across diverse student populations. Governance in this domain encompasses decision rights for competency standard-setting and revision, data governance frameworks for competency evidence records, quality assurance routines for reviewing the consistency and equity of assessment practices, and transparency mechanisms through which competency standards and evidence requirements are communicated to students, employers, and external recognition bodies.

The quality assurance function of governance operates at two levels. At the program level, annual review processes that examine competency evidence distributions, assessor calibration outcomes, and equity monitoring data enable program teams to identify and address emerging quality or equity risks before they become entrenched. At the institutional level, peer review and external reviewer processes that subject program-level competency standards to scrutiny from beyond the immediate program team provide the independent validation of standards quality that internal review alone cannot deliver. The combination of program-level and institutional-level QA creates a nested governance structure that maintains both the contextual sensitivity that program-level review provides and the external validity that institutional and professional community review requires.

Table 3. Program Coherence Checklist for Competency-Based Curriculum

Coherence Area	Key Design Question	Minimum Practice Standard
Outcome alignment	Are all core competencies explicitly linked to courses and program experiences?	Program map showing where each competency is practiced, developed, and formally assessed
Assessment coherence	Do assessment tasks provide credible, varied evidence of competency?	Blueprinted tasks with analytic rubrics and documented moderation routines
Feedback and revision	Do students have structured opportunities to revise based on specific feedback?	Designated revision windows with reflection prompts and rubric-referenced feedback
Workload feasibility	Is the assessment and moderation model sustainable for program staff?	Sampling strategies, shared rubric banks, and designated support roles
Equity and accessibility	Are structural barriers identified proactively and reduced through design?	Accessible task formats, multiple evidence modes, and regular equity audits
External recognition	Will stakeholders trust and understand the competency credential?	Transparent metadata, external review process, and published standards documentation
Continuous improvement	How is program evidence used systematically to refine curriculum and assessment?	Annual review cycle with indicator guardrails, action logs, and change documentation

Source: data proceed

The program coherence checklist in Table 3 is designed as a practical audit instrument for curriculum design teams preparing for accreditation review, program renewal, or CBE implementation planning. Its organization by coherence area rather than by process step reflects the framework's systemic rather than sequential logic: coherence is a property of the relationships among program elements rather than of any individual element, and the checklist is intended to prompt reflection on those relationships across the full range of dimensions that program quality requires.

Discussion

The framework presented in this paper is designed as a direct response to the patterns of CBE implementation failure that the literature and institutional practice have consistently documented. Understanding those failure patterns and their underlying causes is essential for appreciating why the framework is structured as it is, and why each of its domains is necessary rather than optional.

The most pervasive failure pattern, competency washing, has already been noted: the relabeling of existing curriculum and assessment practices in competency terminology without substantively transforming them. This pattern emerges most predictably when CBE adoption is driven primarily by external compliance requirements, such as accreditation mandates or government policy directives, rather than by genuine institutional commitment to the pedagogical and assessment reform that CBE represents. When institutional leaders frame CBE primarily as a documentation and reporting task, faculty respond with the minimum level of engagement required to satisfy the documentation requirements while preserving the instructional practices they already employ. The result is competency frameworks that exist in curriculum documents but not in classroom practice, and assessment systems that generate competency labels without generating the evidence base those labels require.

A second common failure mode involves the design of competency frameworks without adequate attention to progression: programs specify what graduates should be able to do at the end of their studies but provide no guidance about how those capabilities develop across the curriculum, leaving faculty to make independent and frequently inconsistent decisions about how much complexity, contextual variation, and independence to expect from students at different stages of their program. Without progression clarity, early-program faculty either pitch their expectations at graduate-level proficiency, which is appropriate for the end of the program but discouraging and educationally inappropriate for students who are just beginning competency development, or pitch them at minimal novice levels, which fails to advance students along the developmental trajectory the program is designed to support.

Assessment overload represents a third failure mode: programs that attempt to formally assess every competency in every course, generating a volume of assessment data that neither faculty nor students can meaningfully engage with and that creates unsustainable workload pressures that ultimately force informal compromises in assessment quality. The sampling strategies and program-level assessment architecture embedded in the framework's second domain are designed specifically to address this failure mode by replacing comprehensive assessment coverage with strategically distributed evidence collection that is sufficient for trustworthy mastery claims without requiring every course to serve as a full competency assessment occasion.

A recurring theme across all four domains of the framework is the inseparability of assessment validity and assessment equity in CBE contexts. This inseparability is not merely a theoretical claim but a practical design implication: assessments that are biased against particular student populations are, by that very fact, invalid assessments of the competencies they are intended to measure for those students, because the performance differences they detect reflect assessment design characteristics rather than competency differences.

The equity-by-design principle embedded throughout the framework reflects the recognition that addressing assessment equity requires proactive design attention rather than retrospective accommodation. When competency tasks are designed without attention to the cultural knowledge assumptions they embed, the language complexity they require, or the accessibility barriers they create, those design features disadvantage particular student populations in ways that are difficult to correct post-hoc without compromising the assessment's validity for other students. Proactive equity-by-design, beginning from the competency architecture stage, enables program teams to build in the multiple evidence modes, contextual diversity, and accessibility features that reduce assessment barriers across the student population without requiring ad hoc accommodations that create administrative complexity and may inadvertently signal different expectations for different students.

The monitoring function of the governance domain complements proactive design by tracking equity outcomes across student subgroups, identifying the points in the program where differential

patterns emerge, and directing design improvement attention to those points. This combination of proactive design and responsive monitoring creates a continuous equity improvement cycle that is more educationally sustainable than either approach alone.

A persistent tension in CBE governance concerns the relationship between the standardization that consistent competency assessment requires and the professional judgment that meaningful assessment of complex capabilities depends upon. Rubrics, calibration sessions, and moderation routines are designed to improve assessor consistency, but consistency that is achieved at the cost of meaningful differentiation in professional assessment judgment may produce reliable but trivially shallow competency evaluations that fail to capture the complexity of the capabilities they are intended to assess.

The framework navigates this tension by designing governance structures that support rather than replace professional judgment. Analytic rubrics with behavioral anchors provide a shared framework within which professional judgment can be exercised with greater consistency, rather than a mechanical scoring algorithm that converts professional assessment into a clerical counting exercise. Calibration sessions are most valuable when they engage faculty in substantive professional dialogue about the qualities of student work rather than when they function as training sessions designed to produce identical scoring outcomes. Moderation routines that combine independent professional judgment with structured dialogue about cases of scoring divergence are more educationally valuable than moderation approaches designed primarily to achieve numerical inter-rater reliability statistics.

This conception of governance as professional judgment infrastructure rather than professional judgment replacement is closely aligned with Sadler's (1989) argument that assessment quality depends fundamentally on assessors who possess the refined, experiential understanding of quality that allows them to recognize sophisticated performance when they encounter it, and that governance should develop and distribute that understanding rather than attempt to bypass it through mechanical reliability procedures.

For academic leaders, the framework's most significant implication concerns resource allocation: sustainable CBE implementation requires investment in the design capacity, professional learning infrastructure, and governance routines that the framework specifies, and institutions that adopt CBE without providing these resources will predictably produce the implementation failures that dominate the literature. The time and expertise required to develop rigorous competency architectures, design authentic assessment blueprints, build rubric and exemplar banks, facilitate calibration sessions, and conduct equity audits are not marginal additions to existing faculty workload; they represent a substantial curriculum development investment that requires explicit recognition in workload allocation, staffing decisions, and professional development planning.

For quality assurance agencies, the framework suggests a significant reorientation of QA focus: from audit procedures that verify the existence of competency framework documentation toward review processes that examine the quality of the relationships between competency architecture, assessment design, and learning design, and the effectiveness of governance routines in maintaining assessment validity and equity. Quality agencies that focus exclusively on documentation compliance create the institutional incentives that produce competency washing; quality agencies that focus on pedagogical and assessment substance create the incentives that drive genuine CBE development.

While the framework is developed at a level of generality intended to support application across diverse disciplinary and institutional contexts, the particular relevance of its governance and equity dimensions to higher education systems in the Global South and in rapidly expanding higher education systems across the Middle East, Southeast Asia, and sub-Saharan Africa deserves acknowledgment. In these contexts, CBE is frequently introduced as part of externally mandated quality assurance reform agendas that create significant compliance pressures without providing the institutional capacity development that genuine CBE implementation requires. The risk of competency washing is particularly acute in these conditions, where program teams may lack both the design expertise and the organizational time to develop the competency architectures, assessment blueprints, and moderation routines that the framework specifies.

The framework's emphasis on minimum practice standards, as opposed to ideal practice aspirations, is designed to provide a realistic and achievable implementation target for programs operating in resource-constrained contexts. Minimum practice standards, including a program map showing competency practice and assessment distribution, blueprinted tasks with analytic rubrics, structured revision opportunities, and an annual review cycle, are achievable without the full complexity of the framework's most intensive governance provisions, while still providing the foundational quality infrastructure that distinguishes substantive CBE from administrative relabeling.

E. CONCLUSION

This paper has proposed and elaborated a four-domain evidence-informed framework for designing competency-based curriculum in higher education, organized around competency architecture and progression design, assessment blueprinting and moderation for trustworthy mastery decisions, mastery-oriented learning design and feedback cycles, and governance structures that protect equity, credential portability, and public trust. The framework's central contribution is its integration of curriculum design theory, assessment validity scholarship, mastery learning research, and educational governance principles into a unified model that addresses the interdependencies among these domains as the critical design problem for CBE implementation.

The paper's foundational argument is that CBE succeeds as a pedagogical and assessment reform when, and only when, its four domains are developed in coherent relationship with one another. Competency architecture without corresponding assessment design produces well-articulated intentions and untrustworthy evidence. Assessment blueprinting without mastery-oriented learning design produces measurement without development. Either or both without governance produces quality and equity outcomes that drift over time and vary unacceptably across student populations. The framework provides curriculum design teams, academic leaders, and quality assurance professionals with the structured decision architecture and operational tools needed to develop all four domains in the mutually reinforcing alignment that genuine CBE requires.

For practitioners, the framework's most direct value is its provision of specific, evidence-grounded design moves that translate CBE principles into the concrete decisions that curriculum development actually demands: how to write performance descriptors that genuinely guide instruction and assessment, how to build assessment blueprints that generate trustworthy evidence without creating unsustainable workload, how to design feedback cycles that develop mastery rather than document first-attempt performance, and how to establish governance routines that maintain standards while protecting professional judgment and equity.

Future research should subject the framework's hypothesized domain relationships to empirical examination across diverse disciplinary and institutional contexts, attending particularly to how different governance configurations affect both the consistency of competency assessment and the equity of outcomes across student subgroups. Longitudinal research tracking competency development trajectories across program sequences would be especially valuable in testing the progression logic that the framework's architecture domain specifies and in identifying the instructional conditions under which competency development proceeds as the framework predicts.

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