

Patterns, Challenges, and Enablers in ESD Competency Assessment: A Thematic Analysis of Subject Matter Experts' Perspectives

Syamsul Nor Azlan Mohamad^{1*}, Norfashiha Hashim², Siti Nur Amalina Aznam³

¹Faculty of Education, Universiti Teknologi MARA

²Faculty of Built Environment, Universiti Teknologi MARA

³Faculty of Mechanical Engineering, Universiti Teknologi MARA

*Corresponding Author

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ABSTRACT

Higher education assessment unevenly implements the embedding of Education for Sustainable Development (ESD) competencies across academic disciplines. Faculty perceptions of how ESD competencies are assessed, what barriers impede integration, and what practices constitute enabling conditions remain underexplored in the Malaysian context. This study presents a qualitative thematic analysis—following Braun and Clarke's (2006) six-phase inductive, semantic, and realist framework—of six faculty group synthesis documents produced during an ESD competency mapping workshop at Universiti Teknologi MARA (UiTM). Forty course leaders across Management and Business, Social Sciences, and Science and Technology clusters participated. Fourteen initial codes were generated and organised into four themes: (1) The Rubric Gap — a systematic deficiency in rubric descriptors as the principal structural impediment; (2) Assessment Beyond the Classroom — genuine, transformative assessment innovations encompassing community engagement, work-based, and reflective designs; (3) The Student Readiness Deficit — ongoing faculty apprehension regarding students' higher-order thinking and integrative learning abilities; Navigating the Ecosystem – faculty discretion in overseeing external partner relationships, institutional alignment, and dissemination of best practices. The overarching finding is that faculty are actively innovating ESD assessment practice despite systemic constraints, yet sustainable integration depends on foundational rubric reform and institution-wide calibration. The study contributes a replicable thematic analysis protocol for ESD competency auditing and identifies concrete institutional priorities for Malaysian higher education institutions implementing MQF 2024 VBE mandates.

Keywords: ESD competencies; thematic analysis; assessment practices; rubric design; higher education; faculty perceptions; transformative learning

INTRODUCTION

The global imperative for Education for Sustainable Development (ESD) has increasingly been translated into institutional mandates for higher education institutions to embed sustainability competencies within program learning outcomes and assessment frameworks (UNESCO, 2017; Wiek et al., 2011). In Malaysia, the Malaysian Qualifications Framework (MQF 2024) and the Values-Based Education (VBE) agenda have formalised this expectation, requiring that ESD competencies—spanning system thinking (SC1), anticipatory thinking (SC2), strategic thinking (SC3), critical thinking (SC4), integrated problem solving (SC5), collaborative competency (SC6), normative competency (SC7), and self-awareness (SC8)—be demonstrably embedded in course learning outcomes and assessment designs.

Despite policy directives, empirical evidence of how faculty conceptualize, implement, and evaluate these competencies in assessment practice remains limited. Most existing research focuses on the theoretical or policy dimensions of ESD (Barth et al., 2007; Lozano et al., 2017; Rieckmann, 2012), with relatively few studies

examining the on-the-ground perspectives of frontline academics responsible for translating ESD frameworks into assessment rubrics, course assignments, and pedagogical practices. This gap is especially pronounced in Malaysia Higher Education contexts, where ESD mandates are recent and faculty development infrastructure is still maturing.

Esd Competencies Frameworks and Assessment Design

Wiek et al. (2011) established one of the most influential ESD competency frameworks, later expanded by UNESCO (2017) and Rieckmann (2012) to include eight discrete competencies – from systems thinking and anticipatory thinking through to normative competency and self-awareness. These competencies are conceptualized as discipline-transcendent, applicable across technical and humanistic disciplines, and developmental rather than binary— students acquire them through sustained, scaffolded engagement over time (Brundiers & Wiek, 2013).

The assessment of ESD competencies presents particular challenges. Unlike disciplinary knowledge assessed through recall and comprehension, ESD competencies require observable behavioural indicators, higher-order cognitive engagement, and context-sensitive performance descriptors (Barth et al., 2007). Biggs and Tang (2011) argue that constructive alignment between learning outcomes, teaching activities, and assessment tasks is the foundational requirement for competency-based assessment, yet studies consistently demonstrate that rubric design often lags behind curriculum ambition. Stokes (2009) identified vague performance descriptors, inconsistent assessor calibration, and misalignment between course learning outcomes and assessment criteria as pervasive barriers to valid competency measurement — barriers that are directly reflected in the present study.

Authentic Assessment and Transformative Pedagogy In Esd

Authentic assessment—an assessment that requires students to apply knowledge and skills to real-world problems rather than decontextualized exercises— is widely regarded as particularly suited to ESD competency development (Kolb, 1984; Brundiers & Wiek, 2013). Community-based learning, work-integrated assessments, reflective portfolios, and project-based assignments have each been identified as effective vehicles for operationalising ESD competencies in ways that conventional examinations cannot (Lozano et al., 2017). Kolb's (1984) experiential learning framework provides the theoretical underpinning: authentic assessment closes the loop between concrete experience and abstract conceptualisation, enabling the reflective observation and active experimentation that competency development requires.

Thematic Analysis As A Method Of Faculty Perspectives Study

Thematic analysis, as articulated by Braun and Clarke (2006), is a flexible qualitative method suited to identifying, analysing, and reporting patterns of meaning in textual data. Unlike grounded theory or interpretative phenomenological analysis, TA does not prescribe an epistemological position, making it well-suited to institutional document analysis where the data represent collective – rather than individual – meaning-making (Braun & Clarke, 2006). The method has been used productively in higher education research to analyse faculty perceptions of curriculum reform (Binkley et al., 2012), student feedback on teaching quality (Biggs & Tang, 2011), and institutional policy documents (Wasserman & Faust, 1994). Its application to ESD competency mapping documents is novel and constitutes a methodological contribution of the present study.

METHODOLOGY

Data Corpus and Participants

The data corpus comprised six group synthesis documents produced during an ESD competency mapping workshop at UiTM (Sessions 1B and 1C). Forty academic staff participated, organised into six groups across three field clusters: Management and Business (Group 1, n=6), Social Sciences (Groups 2 and 3, n=6 each), and Science and Technology (Groups 4, 5, and 6, n=8, 7, and 7, respectively). Each synthesis document captured group-level reflections on ESD competency selection and frequency, assessment methods and evidence,

identified gaps and risks, and highlighted beneficial practices. Documents ranged from approximately 600 to 900 words each.

Analytic Approach

The analysis followed Braun and Clarke's (2006) six-phase thematic analysis framework. Four upfront analytic decisions were made prior to coding: (1) the analysis aimed for a rich description of the whole data set rather than a focused account of one aspect; (2) the coding was inductive (bottom-up), allowing patterns to surface from the data rather than imposing a predetermined framework; (3) the analysis operated at the semantic level, capturing surface meanings as expressed by faculty rather than latent ideological assumptions; and (4) the epistemological position was essentialist-realist, treating the documents as reflective of faculty members' actual experiences and perceptions of ESD assessment practice.

Phase 1 (familiarisation) involved a repeated close reading of all six documents, generating initial analytic notes and provisional ideas. Phase 2 (generating initial codes) produced 14 codes applied systematically across all data items. Phase 3 (searching for themes) sorted codes into candidate themes, while Phase 4 (reviewing themes) applied Patton's dual criterion of internal homogeneity and external heterogeneity to refine the candidate set. Phase 5 (defining and naming themes) produced final theme definitions and sub-theme structures. Phase 6 (producing the report) resulted in the present manuscript. All analytic decisions were recorded in phased documentation files to support auditability.

To maintain rigour, the research questions were consulted at each coding phase to guide inclusion decisions. Data extracts included in this report were selected to be vivid and illustrative rather than merely representative, following Braun and Clarke's (2006, p. 24) guidance that extracts should capture the essence of the theme rather than simply occurring most frequently.

Theme	Sub-themes	Key Codes	Groups
T1: The Rubric Gap	1a: Vague descriptors; 1b: Inter-assessor inconsistency; 1c: CLO–ESD misalignment	A, B, D	All 6 groups
T2: Assessment Beyond the Classroom	2a: Community-engaged/SULAM; 2b: Work-based/clinical; 2c: Reflective/identity-forming	E, F, G, K, M	G1, G4, G5, G6
T3: The Student Readiness Deficit	3a: Higher-order thinking limitations; 3b: Integrative learning deficits	H, I	G2, G5, G6
T4: Navigating the Ecosystem	4a: External partner management; 4b: Institutional standardisation; 4c: Good practice ID	C, J, L, N	All 6 groups

Table 1. Summary of Themes, Sub-themes, Codes, and Group Representation

FINDINGS

The thematic analysis of the six group synthesis documents generated four themes, encompassing 11 subthemes derived from 14 initial codes. Table 1 presents an overview of the theme structure. Table 2 presents the final thematic map, which depicts the overarching finding that faculty innovation and agency operate in productive tension with systemic rubric inadequacy and structural constraints. Themes 1 and 3 represent barrier dimensions; Themes 2 and 4 represent enabler dimensions. Together, they provide a coherent account of the conditions under which UiTM practices, stalls, and advances ESD competency assessment.

Theme	Sub-theme	Codes	Representative Extract	Groups	Role
OVERARCHING FINDING: Faculty innovate ESD assessment despite systemic rubric and structural barriers; practitioner agency drives emergent good practice					
T1 The Rubric Gap	1a: Vague and generic rubric descriptors	A, B	Rubric too general and unclear. [Develop] detail rubric (rubric criteria) align with the attributes measurement. (G4)	All 6	Barrier
	1b: Inter-assessor inconsistency	B	Scoring consistency is impacted by individual lecturer discretion and subjective interpretation of rubric descriptors. (G1)	G1, G2, G5	Barrier
	1c: CLO–ESD competency misalignment	D	CLO may not clearly measure systems-thinking elements. (G3)	G2, G3, G5	Barrier
T2 Assessment Beyond the Classroom	2a: Community-engaged and Service learning assessment	E, K	The course serves as a model for SC5 by transitioning students from passive knowledge acquisition to transformative action. (G1)	G1, G6	Enabler
	2b: Work-based and clinical assessment	F	The student documents and writes up their daily activity during the internship and obtains feedback from SV Industry. (G6)	G4, G6	Enabler
	2c: Reflective and identity-forming assessment	G, M	Strong integration of ethics, professional behaviour, and self-awareness through reflective learning and assessment. (G5)	G3, G5	Enabler
T3 The Student Readiness Deficit	3a: Higher-order thinking limitations	H	Turning a critical thinking question into a simple reading comprehension test. (G2)	G2, G5, G6	Barrier
	3b: Integrative and cross-disciplinary deficits	I	Students failed to relate the practice between one course and other courses. (G2)	G2, G6	Barrier
T4 Navigating the Ecosystem	4a: External partner management	J	Vetting panels and industry partners often misunderstand the new rubrics and ESD standards. (G6)	G1, G6	Enabler
	4b: Institutional standardization	C	RP conducts standardization briefings for all lecturers across eight campuses at the start of the semester. (G1)	G1, G5	Enabler
	4c: Good practice identification	L	The course serves as a model for SC5... [MAF671]. (G1)	All 6	Enabler

Table 2. Final thematic map depicting four themes, 11 sub-themes, and their structural relationships.

Theme 1: The Rubric Gap — Inadequate Assessment Frameworks as a Systemic Barrier

This theme captures the most pervasive finding across the entire data set: faculty from all six groups identified rubric inadequacy as the primary structural barrier to credible ESD competency assessment. The theme encompasses three related sub-themes—vague rubric descriptors, inter-assessor inconsistency, and CLO-to-ESD competency misalignment—which collectively constitute what this study terms "the rubric gap": the structural distance between the conceptual demands of ESD competencies and the operational capacity of existing assessment instruments to measure them.

1a: Vague and Generic Rubric Descriptors

Faculty in all three clusters expressed concern that existing rubrics were not sufficiently specific to operationalise the higher-order attributes inherent in ESD competencies. The concern was expressed most directly in S&T contexts, where Group 4 noted that rubrics were 'too general and unclear', and in Social Sciences, where Group 3 observed that 'ESD competency [is] not explicitly mapped in [the] rubric'. This is not merely a technical complaint about instrument design; it reflects a deeper conceptual gap between the complexity of ESD constructs — such as systems thinking and integrated problem-solving — and the binary or three-point performance scales typically used in course assessments.

"The rubric is too general and unclear. The Content level related to strategic thinking. [Develop] a detailed rubric (rubric criteria) that aligns with the attributes measurement. (G4)"

The significance of this extract lies in what it implies about the epistemic demands of ESD: 'strategic thinking', as a competency, requires rubric descriptors that distinguish between surface-level task completion and evidence of genuine planning, foresight, and stakeholder analysis. Generic rubrics that award marks for 'completing the assignment' obscure whether the competency has actually been developed. This situation represents a form of construct irrelevance — valid performance is masked by imprecise measurement (Biggs & Tang, 2011).

1b: Inter-assessor Inconsistency and Scorer Subjectivity

Inconsistent interpretation across assessors compounded the problem of rubric vagueness. Operating across eight campuses, Group 1 identified that individual lecturer discretion and subjective interpretation of rubric descriptors impact scoring consistency. Group 2 raised a parallel concern from a different angle — not multi-campus inconsistency but intra-institutional variability: 'marks given vary between one lecturer and another'. Group 5 extended the discussion to the supervision context: 'variations in mentor guidance and interpretation of reflective video presentations' directly produced 'inconsistent student performance', suggesting that assessor inconsistency compounds rather than merely reflects rubric inadequacy.

"A clear and consistent understanding of the targeted competency and assessment requirements among all supervisors... all supervisors should operate with a unified understanding and aligned direction in evaluating and nurturing the intended competency outcomes. (G1)"

This extract reveals that faculty understood the problem structurally: the issue was not individual incompetence but systemic under-specification. The call for "unified understanding" signals an awareness that ESD competency assessment requires communities of practice—not just revised rubrics— in which shared interpretive norms are collectively maintained.

1c: CLO-to-ESD Competency Misalignment

A third sub-theme concerns the structural disconnect between Course Learning Outcomes (CLOs) and ESD competency constructs. Group 3 identified that 'CLO may not clearly measure systems-thinking elements'; Group 2 noted that 'assessment criteria may not explicitly capture strategic thinking and sustainability-oriented planning'. These observations highlight that ESD competency integration is not simply a matter of adding assessment tasks — it requires a retroactive audit of CLO language and a redesign of the alignment chain from competency construct to learning outcome to assessment task to rubric descriptor (Biggs & Tang, 2011).

Theme 2: Assessment Beyond the Classroom — Authentic and Transformative Assessment Designs

Despite the systemic rubric inadequacies identified in Theme 1, the data reveal substantial faculty innovation in assessment design. This theme captures the diversity of authentic assessment formats that faculty have developed or identified as emerging good practice — formats that extend assessment beyond the conventional examination hall into communities, clinical settings, and reflective journals. This innovation is significant precisely because it was identified against—rather than because of favourable institutional conditions.

2a: Community-Engaged and SULAM-linked Assessment

The SULAM (Service-learning and community engagement) model, referenced by Groups 1 and 6, emerged as the most ambitious authentic assessment format in the data set. Group 1's description of MAF671 as a model for SC5 (Integrated Problem-Solving) illustrates the transformative potential of community-engaged assessment: students engage with real-world 'wicked problems', synthesising cross-disciplinary knowledge to navigate tensions between environmental, social, and economic imperatives.

"The course serves as a model for SC5 by transitioning students from passive knowledge acquisition to transformative action.

By synthesizing cross-disciplinary insights to tackle complex, real-world 'wicked problems', students learn to navigate the tensions between environmental, social, and economic imperatives. (G1)"

The language here—"transformative action," "wicked problems," and "tensions"—reflects a sophisticated understanding of ESD pedagogy that aligns closely with Wiek et al.'s (2011) competency framework. The course does not merely teach problem-solving; it creates the conditions for students to experience the ethical and practical dimensions of sustainability decision-making.

2b: Work-based and Clinical Assessment

In S&T clusters, work-based assessment formats — particularly logbooks assessed by industry supervisors — provided authentic measurement contexts for competencies that classroom settings cannot easily replicate. Group 6's AGB300 Agriculture Apprenticeship (SC8) exemplifies this approach: 'the student documents and writes up their daily activity during the internship and obtains feedback from SV Industry'. The logbook here functions simultaneously as a learning tool and an assessment instrument, making the student's professional development legible to both the institution and the industry supervisor.

2c: Reflective and Identity-Forming Assessment

Group 5's MED111 Ethics and Medical Jurisprudence (SC8) was identified as the most fully evidenced good practice in the data set, combining ethics, professional behaviour, and self-awareness within a comprehensive assessment portfolio: 'CLO mapping, MQF2024 VBE/ESD worksheet, assignment brief, assessment rubric, and teaching activity records are available'. The inclusion of the MQF2024 VBE/ESD worksheet as assessment evidence is particularly significant—it demonstrates that this course has successfully operationalised the policy mandate at the instrument level, a feat not yet achieved by most participants.

Theme 3: The Student Readiness Deficit — Capability Gaps That Constrain ESD Achievement

A third theme concerns faculty perceptions of students as insufficiently prepared for the demands of ESD competency development. This theme is analytically important because it complicates a purely structural explanation of ESD implementation barriers: even where rubrics are improved and authentic assessments are designed, student capability gaps may limit the realisation of competency outcomes.

3a: Higher-order Thinking Limitations

Multiple groups identified that students struggled with the higher-order cognitive demands implied by ESD competencies. Group 6 noted that "students struggle to analyse information and identify reliable sources"—a

foundational skill for evidence-based sustainability reasoning. Group 2 observed that students were 'falling short of the high cognitive level' and tended to treat complex knowledge systems in silos: 'students treat phonetics and phonological features in silos', unable to perceive systemic interconnections.

"Turning a critical thinking question into a simple reading comprehension test. (G2)"

This extract is analytically striking: it suggests that the problem is not only that students lack higher-order thinking skills, but that assessment design — under pressure from rubric vagueness and workload constraints — is inadvertently scaffolding students away from the very cognitive demands that ESD competencies require. The risk, in Biggs and Tang's (2011) terms, is a 'backwash effect': surface-level assessment drives surface-level learning.

3b: Integrative and Cross-Disciplinary Learning Deficits

Group 2 identified a related structural problem: 'students failed to relate the practice between one course and other courses'. This integrative deficit—the inability to synthesise knowledge across disciplinary boundaries—directly undermines the systemic and anticipatory thinking competencies that are most valued in ESD frameworks. The lack of accessible reference materials further compounds this: 'lack of sources, such as textbooks for students' reference' constrains the depth of engagement possible even for motivated learners.

Theme 4: Navigating the Ecosystem — Faculty Agency Against Structural and Relational Constraints

The fourth theme complicates a purely deficit-oriented reading of the data by foregrounding faculty as active agents who are navigating — rather than merely subject to — the structural constraints of ESD implementation. This theme captures three distinct forms of agency: managing relationships with external partners unfamiliar with ESD standards, driving institutional standardisation mechanisms, and identifying and disseminating best practices.

4a: Managing External Partner and Industry Relationships

Groups working with industry and community partners identified that these stakeholders frequently lacked the contextual knowledge to apply ESD rubrics consistently. Group 6 noted that 'vetting panels and industry partners often misunderstand the new rubrics and ESD (Education for Sustainable Development) standards'. Rather than treating this as an insurmountable barrier, faculty proposed concrete solutions: 'Provide industry panel members with a guideline for evaluating student logbooks, thereby standardising the assessment,' and community engagement protocols such as 'engaging community leaders (e.g., Tok Penghulu) before approaching communities directly.'

4b: Institutional Standardization Mechanisms

Some groups had already developed institutional responses to the inconsistency problem identified in Theme 1. Group 1's multi-campus standardisation strategy — briefings at the start of each semester and panel-based mean scoring — represents an institutionally embedded calibration mechanism. While not eliminating subjectivity, these mechanisms demonstrate that faculty are not waiting for top-down solutions but are constructing bottom-up infrastructure for assessment quality.

"RP conducts standardisation briefings for all lecturers across eight campuses at the start of the semester to align on rubric application and clarify specific attribute criteria. Student presentations are assessed by a panel of all teaching lecturers, with the final grade derived from the mean score. (G1)"

4c: Good practice identification and dissemination

Perhaps most significantly, each group in the study identified at least one emerging good practice — a course or assessment format that the group considered a model for ESD competency integration. This reflexive self-assessment function — faculty analysing their own practice against ESD standards and nominating exemplars

for peer sharing — represents a form of institutional learning that the workshop format has enabled. The identification of MAF671, MED111, CHM258, and AGB300 as good practices constitutes a living inventory of ESD assessment innovation within the institution, ready for wider dissemination.

DISCUSSION AND CONCLUSION

The four themes collectively produce an overarching narrative: ESD competency assessment at UiTM is characterised by productive tension between systemic inadequacy and practitioner innovation. This narrative has theoretical and practical implications that extend beyond the Malaysian context.

Theoretically, the findings confirm Barth et al.'s (2007) observation that assessment rubric design is the critical bottleneck in ESD implementation — not faculty motivation or course design philosophy, but the technical inadequacy of measurement instruments. The Rubric Gap (Theme 1) is systemic precisely because it operates at the infrastructure level: even enthusiastic and pedagogically sophisticated faculty cannot demonstrate ESD competency development if their rubric cannot distinguish performance levels. This has implications for how institutions approach ESD reform: redesigning teaching activities or adding new assessment tasks without addressing rubric design is likely to produce surface compliance rather than genuine competency development.

The authentic assessment innovations documented in Theme 2 align with Kolb's (1984) experiential learning framework and Brundiers and Wiek's (2013) evidence on problem-based ESD pedagogy. Community-engaged assessment through SULAM, work-based logbooks, and ethics-integrated reflective portfolios each close the experiential learning cycle in ways that conventional examinations cannot. That these practices have emerged in the absence of comprehensive rubric support suggests that some faculty have developed tacit assessment expertise that has not yet been formalised or institutionally validated.

The Student Readiness Deficit (Theme 3) introduces a complicating dimension: structural reform may be necessary but not sufficient if students themselves are not prepared for higher-order ESD engagement. This finding is consistent with Biggs and Tang's (2011) analysis of the backwash effect — surface assessment drives surface learning, creating a self-reinforcing cycle. Breaking this cycle requires both rubric reform (Theme 1) and active pedagogical scaffolding to develop students' integrative and systems-thinking capabilities.

Faculty agency (Theme 4) is the study's most theoretically generative finding. It suggests that ESD implementation in Malaysian higher education is not simply a top-down policy compliance exercise but a site of active professional sense-making. Faculty are constructing local solutions — calibration briefings, industry partner guidelines, good practice inventories — that function as informal institutional infrastructure. Formalising and scaling these solutions represent the most immediate institutional opportunity.

This study applied Braun and Clarke's (2006) thematic analysis framework to six faculty synthesis documents from an ESD competency mapping workshop at UiTM, generating four themes that account for the patterns, challenges, and enabling conditions of ESD competency assessment practice. The Rubric Gap, Assessment Beyond the Classroom, the Student Readiness Deficit, and Navigating the Ecosystem constitute a coherent and generative account of the current state of ESD assessment integration in Malaysian higher education.

Three practical recommendations follow from the findings. First, institutions should prioritize rubric reform as the highest-leverage intervention — specifically, developing competency-specific descriptor banks with observable performance anchors aligned to each ESD competency. Second, the good practices identified in this study — MAF671, MED111, CHM258, and AGB300 — should be formally documented and shared as institutional ESD assessment exemplars through a peer-learning repository. Third, student academic literacy development — particularly source evaluation, systems thinking scaffolding, and cross-disciplinary synthesis skills — should be embedded as explicit learning activities in ESD-mapped courses rather than assumed as prior competencies.

This study has limitations. The data corpus is restricted to a single institutional workshop, limiting transferability. Documents represent collective rather than individual faculty voices, and group dynamics may have suppressed

minority perspectives. Future research should triangulate these findings with individual faculty interviews and student performance data to validate the structural patterns identified here.

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