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Preliminary Needs Analysis for an Inclusive Vocational Curriculum Based on Women's Roles and Industrial Partnerships

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ABSTRACT

An inclusive vocational curriculum requires connecting technical competence with gender responsiveness, disability access, sustainability, and authentic workplace learning, yet women's social roles and industrial partnerships have rarely been converted into measurable curriculum elements. This study positions women's roles not as a demographic variable but as a curriculum-generating source, and it reports a preliminary needs analysis as the first stage of a design-based research (DBR) agenda at a public polytechnic in Indonesia. A small-scale mixed-methods survey was administered to 20 stakeholders: five curriculum managers, four lecturers, six students, three education support staff, and two external partners. Likert-scale responses were analyzed descriptively and grouped into seven constructs, and open-ended responses were analyzed thematically. The strongest enabling conditions were external partners' overall readiness (M = 4.38), the availability of project-based learning spaces reported by lecturers (M = 4.75), and perceived classroom safety (M = 4.75). The largest perceived gaps concerned disability and Universal Design for Learning (UDL) integration (managers' construct M = 2.30), gender analysis in curriculum review (M = 2.60), representation of women's contributions (M = 2.60), and partner involvement in instruction (lecturers' M = 2.50). Because the data are perceptual, descriptive, and drawn from a single site, the findings provide preliminary evidence that gender analysis, UDL, SDG-oriented project-based learning, and living-lab partnerships could be embedded in learning outcomes, lesson plans, rubrics, and monitoring indicators, a design hypothesis to be tested in the co-design phase.

Keywords: design-based research, inclusive vocational curriculum, industrial partnership, Gender Analysis Pathway, Universal Design for Learning, women's roles.

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Introduction

Inclusive education has been framed globally as a commitment to ensure that all learners can access, participate in, and benefit from learning without discrimination. The 2020 Global Education Monitoring Report emphasized that inclusion cannot be reduced to enrolment or physical access alone, because education systems are also expected to remove barriers related to ability, gender, poverty, language, ethnicity, location, and other social positions (UNESCO, 2020). Yet inclusion has often been treated as a set of accommodations for students already identified as needing support, rather than as a systemic curriculum-design principle through which learning outcomes, materials, activities, assessments, and partnerships are planned from the outset. This distinction is especially important for vocational higher education, which is expected to be practice-oriented, industry-relevant, and responsive to local development needs (Korthals Altes et al., 2024; Moriña, 2017; Stentiford & Koutsouris, 2021).

Vocational education occupies a strategic position because graduates participate directly in workplaces, entrepreneurship, public services, and community-based innovation. The skills agenda now requires vocational institutions to respond not only to technological change and labor-market demand but also to the ethical and social dimensions of work, as reflected in the Sustainable Development Goals. However, SDG integration in higher education has often been uneven and reliant on thematic activities rather than translated into course-level outcomes and assessment (Molina et al., 2023). In vocational education, gender-responsive reform faces a similar challenge: women's access to training may increase, yet training can still reproduce gendered task allocation and limited recognition of women's contributions (Ray & Zarestky, 2022; Wignall et al., 2023).

The present study was situated within this problem as a preliminary needs analysis for a design-based research agenda at Politeknik Negeri Cilacap, a public polytechnic in Central Java, Indonesia. The institutional context is relevant because the polytechnic is practice-based, expanded from eleven study programs in 2023 to thirteen in 2025, and has developed active partnerships across industry, government, higher education, and community sectors (Politeknik Negeri Cilacap, 2025). The term living laboratory is used operationally rather than as a narrative metaphor. It denotes a campus environment meeting three conditions: (a) a

documented portfolio of partnership agreements (MoU, MoA and implementation arrangements) is in force at the time of study; (b) partners take part in curriculum review, project supervision or student assessment, not only in internship placement; and (c) student projects address problems supplied by those partners and return usable outputs to them. At the time of data collection, the institution held 116 active MoUs and 64 MoAs, of which around 30 involved partner participation in teaching, supervision or assessment. These indicators, rather than the descriptive label alone, are what justify treating the campus as a living laboratory for inclusive curriculum development; they nevertheless require careful needs analysis before a model is designed (Alinea & Reyes, 2023).

Several research gaps were identified from recent literature and the institutional problem statement. The first gap concerns the limited conversion of inclusive curriculum discourse into operational vocational components. Stentiford and Koutsouris (2022) argued that the concept of an inclusive curriculum in higher education remains contested and is frequently interpreted narrowly. For vocational institutions, curriculum elements must also be linked to practical competencies, industry standards, work-based learning, project assessment, and employability. The second gap concerns the weak integration of gender, disability, and sustainability into a single design framework. Gender-responsive TVET studies have argued that gender transformation should challenge patriarchal structures rather than merely add women to existing training pathways, while disability inclusion studies have emphasized proactive design and disability-led governance (Harpur et al., 2025; Wignall et al., 2023). The third gap concerns the limited empirical evidence from preliminary needs analysis in Indonesian vocational higher education. Policy briefs and institutional plans may call for inclusion, but the voices of curriculum managers, lecturers, students, support staff, and external partners are not routinely analyzed together before developing prototypes. This gap is important because inclusive pedagogy reviews show that course content, classroom interaction, assessment, and student identity must be considered together when translating inclusion into curriculum practice (Stentiford & Koutsouris, 2021, 2022).

Against these gaps, the novelty of this research lies in positioning women's roles not merely as a theme, beneficiary category, or demographic variable, but as a curriculum-generating source for vocational learning: women's contributions to communities, industries,

public services, and sociocultural systems become evidence for designing learning cases, project topics, partnership activities, and assessment indicators. A second novelty is the integration of three design lenses—Gender Analysis Pathway (GAP) for reading access, participation, control, and benefits; Universal Design for Learning (UDL) for translating diverse learner needs into flexible strategies; and Design-Based Research (DBR) for moving from needs analysis to co-design, prototyping, and revision. A third novelty is the use of industrial, governmental, and community partners as living-lab actors rather than peripheral internship providers.

The theoretical framework integrates three mutually reinforcing perspectives: Design-Based Research as the overarching developmental logic, Gender Analysis Pathway as the gender-responsive diagnostic lens, and Universal Design for Learning as the accessibility and pedagogical design framework. These perspectives were selected because the intended outcome of the wider research was not only an explanation of needs but also a curriculum prototype that can be designed, tested, and revised in authentic vocational settings.

Design-Based Research (DBR) has been used in education to bridge the gap between theory and practice through iterative development in real settings (Bakker, 2018; McKenney & Reeves, 2018). In DBR, a problem is identified collaboratively with practitioners, a solution is designed from theory and empirical evidence, the solution is implemented in context, and design principles are refined through evaluation. The logic of DBR is well suited to curriculum reform because curriculum products must be tested in classrooms, laboratories, projects, and partnerships. In the present study, preliminary needs analysis was treated as the first phase of DBR, not to produce final generalizations, but to generate a grounded design problem, identify stakeholder priorities, and define the initial principles that should be taken into a co-design workshop and later into prototype development (Schmalenbach & Ashouri, 2025).

Gender Analysis Pathway (GAP) was positioned as the second framework because the proposed curriculum is expected to be based on women's roles and gender responsiveness. GAP examines who has access to resources, who participates in decision-making, who controls processes and outcomes, and who receives benefits. When translated into curriculum analysis, these categories can be used to examine who is represented in learning materials, who is given technical roles in projects, whose community problems are selected, whose

voices are included in assessment, and which groups benefit from student projects. This framework is necessary because women's roles can be marginalized even when female students are enrolled. A gender-responsive curriculum must therefore address the social meanings attached to technical expertise, leadership, care work, entrepreneurship, community resilience, and innovation (Alinea & Reyes, 2023; Wignall et al., 2023).

Universal Design for Learning (UDL) was positioned as the third framework because inclusive curriculum development requires proactive pedagogical design. UDL supports flexible learning environments through multiple means of engagement, representation, and action or expression, and systematic reviews show it reduces barriers for diverse learners when embedded in planning rather than treated as a late accommodation (Almeqdad et al., 2023; Cumming & Rose, 2022; Wahyuni et al., 2025). In vocational education, UDL is especially relevant because practical learning may create barriers through laboratory layouts, tool access, safety procedures, communication modes, project timelines, assessment formats, and group-work dynamics. An inclusive vocational curriculum should therefore provide accessible materials, flexible participation pathways, clear rubrics, multiple ways to demonstrate competence, and reasonable accommodation procedures. Meta-analytic and STEM-focused reviews further indicate that UDL can improve access when lecturers are supported to redesign representation, engagement, action/expression, and assessment rather than relying only on individual accommodations (Capp, 2017; Schreffler et al., 2019; Xie & Rice, 2021).

Industrial and community partnerships were positioned as the contextual bridge between curriculum design and authentic social problems. Partners are not only sources of workplace skills standards; they also contribute to inclusive problem definition, co-assessment, ethical safeguards, and social impact. A curriculum can therefore be considered inclusive when technical competence is developed through projects that make women's contributions visible, include students with different needs, engage external partners, and produce benefits for communities or workplaces (Ebrahimi et al., 2022).

The frameworks above are conceptual, and the claim that empirical needs-analysis evidence is scarce in Indonesian vocational higher education requires comparison with actual studies rather than with theory alone. Seven empirical studies published in the last five years were therefore reviewed because each addresses at least one of the four target domains,

gender, disability or UDL, sustainability, and industry or community partnership, in a vocational, technical or higher-education setting. They were located through database searches combining the terms needs analysis, inclusive curriculum, vocational, TVET, gender and Universal Design for Learning, and were retained if they reported primary data or a systematic synthesis. Table 1 summarizes their context, method, inclusion focus, principal finding, and the gap each leaves open.

Table 1

Empirical Needs-Analysis and Inclusion Studies in Vocational and Higher Education, 2021–2025

Study	Context	Method	Inclusion focus	Principal finding	Gap remaining
Ebrahimi et al. (2022)	Rural Iran; VET for women	Quantitative survey	Gender; economic empowerment	VET participation was associated with higher empowerment among rural women.	Treats women as beneficiaries of training; findings are not converted into curriculum documents or assessment.
Rahayu & Aryanti (2022)	Indonesia; vocational education	Conceptual and document analysis	Gender	Gendered patterns persist in program choice and in the allocation of technical tasks.	No disability, UDL or partnership dimension, and no procedure for moving from diagnosis to design.
Alinea & Reyes (2023)	Philippines; technical-vocational teacher education	Curriculum model development with stakeholder input	Gender and industry responsiveness	A gender- and industry-responsive model is proposed; gender gaps persisted in technical versus administrative role assignment even after reform.	Two lenses only; disability, UDL and inclusive assessment are not integrated into the model.

Study	Context	Method	Inclusion focus	Principal finding	Gap remaining
Wignall et al. (2023)	Sub-Saharan Africa; TVET	Qualitative multi-country study	Gender transformation; decent work	TVET should de-skill patriarchal structures rather than merely up-skill women within them.	A system-level argument that is not operationalized into course outcomes, project briefs or rubrics.
Korthals Altes et al. (2024)	Higher education, international	Systematic literature review	Disability and diverse learner needs	Lecturers' challenges concern knowledge, skills, and experience; institutional support is decisive.	Not vocational-specific; no gender lens and no role for external partners.
Ramadhan et al. (2025)	Indonesia; vocational high schools	Model development on school–industry cooperation	Partnership; SDGs	Work-based learning outcomes depend on structured cooperation between school and industry.	Partnership framed as skills alignment; gender, disability and inclusive assessment are absent.
Robiah & Islam (2025)	Indonesia; ESP for an international community-service program	Qualitative case study needs analysis	Learner needs; curriculum responsiveness	A systematic, multi-method and iterative needs analysis produced a learner-centered, responsive curriculum.	Needs are read mainly from one institutional informant; no gender, disability or partnership constructs.

Note. Compiled by the authors from the studies cited. VET = vocational education and training; TVET = technical and vocational education and training; UDL = Universal Design for Learning; ESP = English for Specific Purposes.

These studies show that the four domains have been investigated in parallel but seldom in one design. Gender-focused work (Rahayu & Aryanti, 2022; Wignall et al., 2023) diagnoses structural inequality without producing curriculum artifacts; disability-focused work (Korthals Altes et al., 2024) identifies lecturer capacity as decisive but is not vocational;

partnership-focused work (Ramadhan et al., 2025) optimizes industry linkage without asking who benefits; and needs-analysis work in Indonesian curriculum development (Robiah & Islam, 2025) demonstrates a rigorous procedure but reads needs from a narrow informant base. The present study differs in three respects that follow directly from this comparison: it collects perceptions from five stakeholder roles simultaneously rather than from teachers or managers alone; it treats gender, disability, sustainability and partnership as four constructs of one instrument rather than as separate agendas; and it is explicitly the diagnostic phase of a design cycle, so that every identified need is required to name the curriculum artefact it will change. Its remaining limitation relative to this body of work, a single site and a small sample, is stated in the Limitations subsection.

The research questions guiding the preliminary stage were as follows: (1) How do stakeholders perceive current readiness, gaps, and support needs for an inclusive vocational curriculum based on women's roles, disability access, SDGs, and partnerships? (2) Which curriculum components are perceived as most in need of redesign to become more inclusive? (3) How can the needs identified by different stakeholder groups be translated into design principles for a vocational curriculum model? The study is expected to contribute theoretically by advancing an intersectional curriculum perspective, methodologically by offering a preliminary needs-analysis procedure for the first phase of design-based curriculum research, and practically by providing a basis for developing learning outcomes, course plans, project briefs, rubrics, and monitoring tools that are more inclusive, locally grounded, and partnership-based.

The scope of the study is bounded explicitly. This is an exploratory, preliminary needs analysis: the first of the phases described by McKenney and Reeves (2018), carried out before any curriculum prototype exists. It is not an evaluation study, an effectiveness study, or a test of a curriculum intervention, and no intervention was administered. The data are perceptual and self-reported, collected at a single point in time at a single institution, and analyzed descriptively. The study can therefore support three kinds of claim: descriptive claims about how this particular group of stakeholders perceived readiness and gaps at the time of data collection; design claims, meaning reasoned proposals about which curriculum components should be prioritized in the co-design phase; and methodological claims about the usefulness

of a cross-role needs-analysis procedure at the outset of DBR. It cannot support causal claims, claims about the effectiveness of any curriculum model, or claims that generalize to other polytechnics. Where the term "gap" is used below, it denotes a perceived readiness gap, not a statistically tested difference; no inferential test was performed at any point in the analysis.

Methods

A preliminary needs-analysis design was employed as the first empirical stage of a larger design-based research project. The research used a small-scale mixed-methods approach because the early curriculum design phase required both a broad indication of perceived readiness and a contextual explanation of the gaps behind the scores (Creswell & Plano Clark, 2011). The quantitative component mapped perceptions across stakeholder groups through descriptive statistics, while the qualitative component interpreted the meanings behind the scores and identified concrete design requirements through thematic analysis (Braun & Clarke, 2021, 2023). The design was therefore not intended to test causal hypotheses but to produce an evidence-based design brief for an inclusive vocational curriculum prototype.

Participants were recruited purposively because input was needed from actors involved in curriculum policy, teaching, learning, student support, and partnership implementation. Purposive selection followed explicit criteria set before recruitment. Curriculum managers were eligible if they held a formal curriculum role, head or secretary of a study program, vice-director for academic affairs, or member of the institutional curriculum task force (*PPMPP or Pusat Penjaminan Mutu dan Pengembangan Pembelajaran*), and had taken part in at least one *CPL/CPMK* revision cycle. Lecturers were eligible if they had taught at least one practical or project-based course in the current academic year and were responsible for its *RPS* and assessment rubric. Students were eligible if they had completed at least one project-based or practicum course, and were selected across study programs so that engineering, informatics, business and environmental fields were each represented. Education support staff were eligible if they worked in units that handled academic administration, student affairs, or student services and had direct contact with students seeking academic or accessibility support. External partners were eligible if their institution held an active MoU or MoA with the polytechnic and had previously been involved in student

projects, internships, or certification. Excluded were members of the research team and anyone who had contributed to drafting the questionnaire, individuals with no direct experience of practical or project-based learning, partners whose agreement had lapsed, and returns with incomplete role-specific sections.

Group sizes were determined by role coverage rather than by a power calculation, since no inferential test was planned. The target was to obtain at least two respondents from each role occupying a distinct position in the curriculum ecosystem with wider coverage for roles with the most within-role variation students who differ by study program and managers who differ by program portfolio. The realized numbers reflect the eligible people who consented within the data-collection window. Twenty stakeholders completed the questionnaire: five curriculum managers, four lecturers, six students, three education support staff, and two external partners from industry, government, or community institutions. Although small, this distribution was appropriate for the preliminary phase of DBR because each group represented a distinct position in the curriculum ecosystem (Bakker, 2018).

The questionnaire was organized into role-specific sections, and all participants provided consent and role information. Curriculum managers responded to fifteen items covering policy, curriculum documents, gender analysis, disability needs, UDL, SDG integration, project-based learning, partnership, monitoring, training, data availability, and leadership readiness. Lecturers responded to fourteen items on project-based learning, gender integration, women's contributions, UDL, accessible materials, flexible participation, rubric quality, stereotype prevention, partner involvement, referral procedures, classroom safety, and pilot readiness. Students responded to fourteen items on objective and criteria clarity, accessible materials, classroom safety, gender-fair group roles, women's representation, learning flexibility, disability support, real-world projects, assessment rubric fairness, partner interaction, community benefit, and service awareness. Support staff and external partners answered parallel sections on inclusive procedures, accessible communication, gender-responsive services, referral and accommodation flows, confidential data handling, partner coordination, role clarity, sustainable partnership, and co-design interest.

The instrument was constructed by the research team rather than adapted from a published scale because no existing instrument covers the four target domains simultaneously in a vocational setting. Items were generated from three sources. The first was the four GAP categories (access, participation, control and benefit) each of which was translated into curriculum-facing questions about representation in materials, allocation of technical roles, selection of project problems and distribution of project benefits. The second was the three UDL principles of engagement, representation, and action or expression, together with the reasonable accommodation and accessible service provisions applicable to Indonesian higher education. The third was the institution's own curriculum documents (*CPL*, *CPMK* and *RPS* templates, project briefs and partnership agreements), which supplied the vocabulary in which respondents work. Each item was mapped a priori to one of the seven analytic constructs, and the role-specific sections were written so that parallel constructs could be compared across roles.

No formal content-validity assessment using expert ratings and an agreement index, and no internal-consistency testing, were carried out at this stage, because the instrument was used as a design-brief tool for generating a shared problem statement rather than as a measurement scale intended to produce stable construct scores. The absence of psychometric validation is a limitation of the study and is stated as such below; item wording was checked for clarity by the four authors and piloted informally before distribution, but this does not substitute for formal validation, and construct means should accordingly be read as summaries of item responses rather than as validated construct scores.

Data were collected from consenting adult stakeholders within the researchers' own institution as part of internal curriculum development, under the institution's policy on curriculum evaluation activities. The study was not submitted to a separate research ethics committee and did not receive formal IRB approval. It was treated as exempt from formal ethical review because it was an internal curriculum-evaluation activity, involved only consenting adult stakeholders, posed minimal risk, and collected no identifying or sensitive personal data. Participation was voluntary and unpaid. The first screen of the online instrument carried a consent statement setting out the purpose of the study, the role-specific sections, the estimated completion time, the voluntary nature of participation, and the right

to withdraw at any point before submission without giving a reason and without academic or professional consequence; respondents proceeded only after affirming the statement. No item required a participant to disclose a disability diagnosis, a personal experience of discrimination, or any other sensitive personal characteristic but the items asked about perceptions of institutional provision, not about the respondent's own status. Confidentiality safeguards beyond aggregate reporting were as follows: names, student and staff identification numbers and e-mail addresses were not collected; responses were held in a password-protected file accessible only to the four authors; partner institutions are described by sector rather than named; and open-ended responses are reported without detail that could identify an individual respondent, study program or partner. Because the groups are small, open-ended responses are reported in paraphrase rather than as verbatim quotations, since even short extracts could identify an individual respondent.

Data analysis was conducted in four stages. First, the dataset was cleaned by checking role labels, branching-caused empty cells, and item types. Second, descriptive statistics (means and standard deviations) were produced for each role-specific item, and means were grouped into seven cross-role constructs: (1) policy and curriculum embedding, (2) gender and women's roles, (3) disability and UDL accessibility, (4) SDGs and project-based learning, (5) industrial or community partnership, (6) assessment and monitoring, and (7) capacity or support demand. Construct-level means and standard deviations are reported in Table 2, and the item-level means cited in the narrative are given with the size of the group concerned. Third, thematic analysis of open-ended responses was conducted following the procedures described by Braun and Clarke (2021), identifying patterns related to barriers, design needs, and local project ideas. Fourth, quantitative and qualitative results were integrated through a needs-priority matrix.

Two computational conventions should be stated because they affect how the tables are read. The Overall mean reported for each stakeholder group is the unweighted mean of every item that group completed including fifteen items for managers, fourteen for lecturers, fourteen for students, and the parallel sections for support staff and partners. It is therefore item-weighted, and it is not the arithmetic mean of the seven construct means, which would give equal weight to each construct regardless of how many items it contains. The two

quantities differ by up to 0.13 in this dataset and should not be compared as though computed identically. Cross-role construct means, as reported in Figure 1, are the unweighted means of the five stakeholder-group values for that construct, so that each group contributes equally irrespective of its size; these are reported to two decimal places throughout rather than as approximations.

Low means were treated as weak-readiness signals; high scores on support-demand items were treated as capacity-building needs. The integrated interpretation was translated into design implications through GAP (access, participation, control, benefit) and UDL (flexible materials, engagement, assessment options, rubrics, reasonable accommodation). Priority for the needs-priority matrix was assigned using two criteria applied jointly, and a need entered the matrix only if it satisfied both. The quantitative criterion was that the item or construct mean fell in the lowest tertile of the observed range for the relevant group, or that the corresponding support-demand item fell in the highest tertile. The qualitative criterion was that the need was raised independently by respondents in at least two of the five stakeholder groups. Needs were then ordered by the size of the quantitative gap, lowest mean first, which is why disability and UDL head the matrix. Where the two criteria pointed in different directions, the qualitative criterion was treated as decisive, on the reasoning that a low score on a construct nobody mentions is more likely to reflect unfamiliarity with the terminology than a design need.

The matrix and the initial needs-priority model derived from it are an interpretive synthesis by the research team, not an output of the statistical procedure. They were developed through iterative discussion among the four authors, with each proposed priority traced back to the specific items and open-response extracts that supported it, and were retained only when all four authors agreed on both the priority and its evidential basis. The model is accordingly offered as a design hypothesis to be tested in the co-design phase rather than as a validated framework.

Result and Discussion

The preliminary analysis produced five sets of findings, each corresponding to a stakeholder group. Construct-level means confirmed that the lowest readiness was

concentrated in disability and UDL integration, gender and women's roles, and partner involvement in instruction, while the highest readiness was found in external partner willingness, classroom safety, and project-based learning capacity. Table 2 reports construct-level means for each stakeholder group together with a standard deviation (SD) for each group, and item-level means are cited in the text with the size of the group concerned. Open-ended responses are summarized in paraphrase (see Ethical considerations). Because each group is small, between two and six respondents, group means are sensitive to individual responses, and the standard deviations should be consulted alongside every mean cited below; a mean derived from two partners is not evidence of the same weight as one derived from six students.

Curriculum managers (n = 5) produced an overall mean of 3.11 (SD = 0.98) across fifteen role-specific items. The strongest signal was external partner involvement in curriculum review, assessment, or student projects (M = 4.40), followed by partner leadership readiness (M = 3.80) and student data availability (M = 3.80). These items indicate a favorable institutional infrastructure for living-lab collaboration. However, core pedagogical design items were markedly weaker. Systematic consideration of students with disabilities or diverse learning needs received the lowest score (M = 2.20), followed by UDL familiarity and use (M = 2.40), gender analysis in curriculum review (M = 2.60), and women's roles as learning resources (M = 2.60). Inclusive curriculum policy and SDG translation into *CPL*/*CPMK* each received a mean of 2.80. Training and professional development support for lecturers was also low (M = 2.60). These values indicate that partnership and data infrastructure were more visible than the pedagogical frameworks needed to make partnership inclusive.

Open-ended responses from curriculum managers explained the patterns. It was stated that current curricula, particularly in the computer and business fields, had not yet been clearly oriented towards inclusive education. Learning outcomes (*CPL*) and course learning outcomes (*CPMK*) were described as too focused on a narrow set of abilities. Rubrics, evaluation systems, strategies, materials, and representations were identified as components needing revision. Available support was reported to include academic regulations, SOPs, curriculum documents, stakeholder data, and physical facilities such as access routes and toilets. Barriers were described as limited lecturer training, limited references from

comparable institutions, unstructured integration of *CPL*, *CPMK*, and *RPS*, and the tendency to treat gender, disability, and SDGs as additional content rather than integral learning outcomes.

Lecturers (n = 4) produced an overall mean of 3.95 (SD = 1.13) across fourteen items. The highest scores were found for availability of project-based or problem-based learning spaces (M = 4.75), classroom safety for asking, expressing views, and requesting support (M = 4.75), and readiness to implement an inclusive curriculum prototype in a practical or project-based course (M = 4.75). Multiple participation pathways (M = 4.50) and strategies to prevent gender stereotypes in project task division (M = 4.50) also received strong scores. These results indicate that lecturers perceived a solid pedagogical basis for piloting an inclusive model.

However, a critical gap was also observed. Partner involvement as guest speakers, project sites, or assessors received the lowest lecturer mean of 2.50, suggesting a disconnect between institutional-level partnership claims and classroom-level practice. UDL understanding received a moderate-low mean of 2.75, and knowledge of referral procedures for students requiring academic or accessibility support was uneven (M = 3.25). In addition, rubric guidance for process, collaboration, accessibility, and social impact emerged as a strong support need (M = 4.00 need for guidance), reflecting the difficulty of making assessment inclusive rather than a lack of readiness.

In open-ended responses, lecturers identified course learning outcomes (*CPMK*), project assessment rubrics, and inclusive assessment criteria as the most difficult components to make inclusive. Local project ideas proposed by lecturers included food safety in micro and small enterprises (*UMKM*), IoT systems, environmental and energy issues, and digitalization of *UMKM* promotion. Support requested included link-and-match mechanisms with industry, curriculum and assessment flexibility, partner engagement support, lecturer training, technical assistance from support units, and authentic learning opportunities from external partners.

Students (n = 6) produced an overall mean of 3.49 (SD = 0.75) across fourteen items, indicating moderate perceived inclusion with visible areas for improvement. The highest student means were recorded for learning objective and criteria clarity (M = 4.00), classroom safety (M = 4.00), and real-world project understanding (M = 4.00). Accessible materials

received a mean of 3.67, and SDG or sustainability connection received 3.50. Mid-range items included community benefit of projects (M = 3.83), assessment rubric clarity and interaction with external partners (M = 3.50 each), and inclusive participation for quieter or marginalized students (M = 3.00).

Weaker areas included gender-fair group role distribution (M = 3.33), women's contributions visible in learning (M = 3.33), disability support adequacy (M = 3.33), and learning flexibility or choice (M = 3.17). The lowest student score was service awareness (M = 2.67), which represents students' limited knowledge of campus services available when learning barriers arise. Students' open-ended responses gave the quantitative results concrete texture. Practical and project learning was described as constrained by time management, unequal understanding among group members, uneven task division, cost and administrative requirements for printed reports or posters, limited technical instructions, limited equipment, and unclear assessment criteria. One of the six student respondents reported that technical tasks were sometimes entrusted more often to male students, so opportunities to learn and participate directly became less balanced, an observation consistent with findings on gendered task allocation in TVET settings (Rahayu & Aryanti, 2022; Wignall et al., 2023). Fair and safe learning was described as present when every student was treated equally, facilities were adequate, and group tasks were allocated by interest and learning opportunity rather than gender. Students proposed inclusive vocational project topics including eco-friendly products from local waste, sexual violence prevention digital systems, *UMKM* promotion, simple IoT projects, public health awareness campaigns, bio-pellets from coffee waste, and water catchment monitoring in campus areas.

Education support staff (n = 3) produced the second-highest overall mean of 4.10 (SD = 0.55). Gender-responsive and non-discriminatory service awareness was the strongest signal (M = 4.67). The safety of complaint or need-reporting channels received M = 4.33, and readiness to support ethical and orderly pre–post data collection also received M = 4.33. The strongest support-demand signal was the need for training to support the implementation of an inclusive curriculum, with all support-staff respondents selecting the highest score.

Open responses identified access barriers related to a new academic system that is not yet fully integrated, a need for psychological services, and information channels that do not

yet reach all students. Coordination needs were framed as shared understanding, brainstorming sessions, focus group discussions, structured academic information flow, and one-door coordination between lecturers, programs, service units, and partners. This finding is important because curriculum inclusion cannot be implemented at the course level alone. Students who experience barriers require administrative clarity, referral flows, accessible communication, ethical data handling, facility support, and coordination with partners.

External partners (n = 2) produced the highest overall mean of 4.38 (SD = 0.57), although this figure rests on two respondents and is reported here as an indication of openness rather than as a stable estimate. Partner readiness to serve as project-based learning partners received the maximum score (M = 5.00), as did the need for role, schedule, output, and communication clarity (M = 5.00). Women's involvement in project planning, implementation, and evaluation received M = 4.50. Benefit for women or vulnerable groups, reasonable accommodation, SDG relevance, technical competence with social and ethical impact, a safe, non-discriminatory culture, and interest in co-design each received a strong means rating.

Open responses from partners revealed two types of living-lab possibilities. The first was social protection and community empowerment: authentic problems included low economic independence among vulnerable women, violence against women and children, low community participation in protection efforts, weak partnership networks, and the need to strengthen women's roles in family resilience and economic empowerment, with beneficiaries including socio-economically vulnerable women, children and families needing protection, victims of violence, and underserved poor communities. The second was professional certification and digitalization: one of the two partner respondents proposed digitizing practicum programs in auditing, accounting, and taxation, along with competency certification through MoU, MoA, and implementation arrangements; the other partner did not raise certification, and this proposal should therefore be read as a single partner's priority rather than as a shared partner position.

Table 2

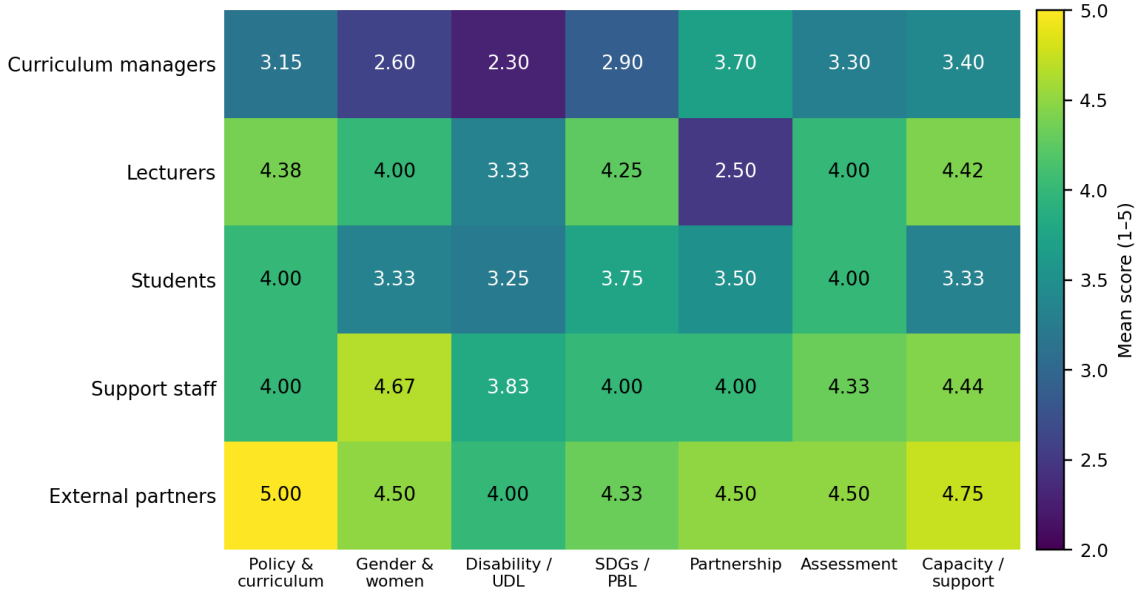
Construct Mean Scores by Stakeholder Group

Stakeholder group	Policy & curriculum	Gender & women	Disability / UDL	SDGs / PBL	Partner-ship	Assess-ment	Capacity / support	Overall mean	SD
Curriculum managers (n = 5)	3.15	2.60	2.30	2.90	3.70	3.30	3.40	3.11	0.98
Lecturers (n = 4)	4.38	4.00	3.33	4.25	2.50	4.00	4.42	3.95	1.13
Students (n = 6)	4.00	3.33	3.25	3.75	3.50	4.00	3.33	3.49	0.75
Support staff (n = 3)	4.00	4.67	3.83	4.00	4.00	4.33	4.44	4.10	0.55
External partners (n = 2)	5.00	4.50	4.00	4.33	4.50	4.50	4.75	4.38	0.57
Cross-role mean	**4.11**	**3.82**	**3.34**	**3.85**	**3.64**	**4.03**	**4.07**	**—**	

Note. Scores are on a 1–5 scale. SD = standard deviation of responses within the group. The overall mean is the item-weighted mean of all items completed by the group; the cross-role mean is the unweighted mean of the five group values. PBL = project-based learning. *Source:* authors' survey data.

Figure 1

Heat Map of Preliminary Inclusive Curriculum Needs by Stakeholder Group

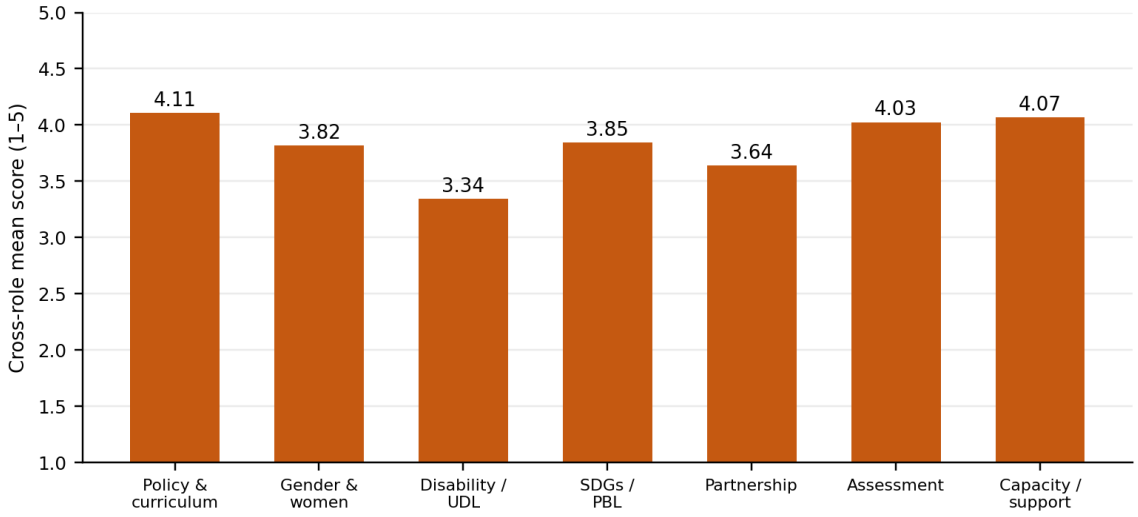


Note. Cell values are the construct means reported in Table 2. *Source:* authors' survey data.

The construct heat map (Figure 1) showed the same pattern, and Figure 2 ranks the cross-role means for comparison. The lowest cross-role construct mean was disability and UDL accessibility (3.34), followed by partnership (3.64) and gender and women's roles (3.82). SDGs and project-based learning reached 3.85, assessment and monitoring 4.03, capacity and support demand 4.07, and policy and curriculum embedding 4.11. These are the unweighted averages of the five group values shown in Table 2 and are reported to the same precision as the underlying data. The pattern is consistent with the view that the largest gaps lie in the deeper design mechanisms required to embed gender, disability, and UDL in *CPL*, *CPMK*, *RPS*, project briefs, materials, facilitation procedures, assessment rubrics, and monitoring indicators.

Figure 2

Cross-Role Mean Scores by Construct



Note. Bars show the unweighted mean of the five stakeholder-group values for each construct (Table 2). *Source:* authors' survey data.

The findings can be interpreted through the three frameworks. From a DBR perspective, the analysis confirmed that the design problem is authentic and context-bound, because concrete gaps appeared at every level of the curriculum ecosystem: managers reported weak systematic consideration of disability and UDL; lecturers, difficulty with inclusive course outcomes and assessment; students, unequal technical role distribution, unclear assessment, limited equipment, and limited knowledge of support services; support staff, information-system and coordination barriers; and partners, high readiness alongside a

strong need for role clarity. These multi-level signals justify an iterative design process rather than a one-time curriculum revision (Bakker, 2018; McKenney & Reeves, 2018; Schmalenbach & Ashouri, 2025).

From a GAP perspective, the curriculum must address access, participation, control, and benefit. Access appeared in the need for accessible materials, facilities, information channels, referrals, and reasonable accommodations; participation in classroom safety, opportunities to ask questions, flexible submission, and project involvement. Control surfaced in project-role distribution: when technical tasks are automatically assigned to male students, women may be present yet lack control over the opportunities that build technical confidence and competence. Benefit appeared in partner calls for outcomes supporting vulnerable women, children, victims of violence, and poor communities. GAP therefore positions women not only as participants or beneficiaries but also as learning cases, sources of expertise, project leaders, partners, users, and evaluators (Alinea & Reyes, 2023; Ray & Zarestky, 2022; Wignall et al., 2023).

From a UDL perspective, inclusion should be embedded before learning difficulties occur. The low UDL familiarity among curriculum managers and the moderate-low UDL understanding reported by lecturers are notable because UDL bridges inclusive principles and classroom design; without it, disability inclusion may remain limited to physical facilities or individual accommodation (Almeqdad et al., 2023; Cumming & Rose, 2022; Wahyuni et al., 2025). Students' comments about unclear technical instructions, cost burdens, limited equipment, and uneven participation are consistent with this interpretation. Vocational courses require accessible instructions, safety briefings, media formats, equipment access, group-work arrangements, project timelines, and assessment methods — all areas where proactive UDL planning reduces barriers.

The findings support the argument that inclusion must become a system-level design issue. Stentiford and Koutsouris (2022) warned that an inclusive curriculum can be narrowed to individual support if structural questions are not addressed, and Korthals Altes et al. (2024) found that lecturers' challenges concern knowledge, skills, and experience, with institutional support being critical. This study extends the argument to vocational higher education, where system-level design involves not only classrooms but also industry partners, support units,

data ethics, course documents, and local project ecologies (Moriña, 2017; Stentiford & Koutsouris, 2021).

The study also contributes to gender-responsive TVET research. Wignall et al. (2023) argued that TVET must challenge patriarchal structures rather than merely up-skill women within unequal systems. The student response about technical tasks being assigned more often to male students illustrates this in the Indonesian polytechnic context: a curriculum may appear gender-neutral, yet gendered assumptions still shape who handles tools, leads decisions, and presents products. Gender responsiveness should therefore be embedded in project design through role rotation, reflection on gendered assumptions, and documentation of women's contributions, aligning with Alinea and Reyes (2023), who found that gender gaps persisted in technical versus administrative role assignment even in reformed curricula (Ebrahimi et al., 2022).

Industrial and community partnerships can serve as a mechanism for inclusion when designed as living labs. The survey confirmed that external partners were both willing to participate in co-design and strongly requested clear role protocols. This finding is consistent with work-based learning research showing that partnership success depends on explicit expectations, mutual benefits, and governance structures (Ramadhan et al., 2025). It also echoes what needs-analysis research in Indonesian curriculum development has found more generally: a systematic, multi-method and iterative reading of stakeholder needs is what makes a curriculum responsive, and the analysis has to be repeated as conditions change rather than performed once (Robiah & Islam, 2025).

The partner-generated problems in this study which concerning women's economic independence, violence prevention, family resilience, and empowerment networks were highly aligned with the proposed emphasis on women's roles. These problems can be transformed into vocational projects across disciplinary fields: multimedia students can develop accessible public campaigns or digital storytelling products; informatics students can develop data dashboards or digital platforms for women's economic products; business and accounting students can develop bookkeeping, taxation, and audit support for women-led micro-enterprises; and engineering or environmental students can develop waste-based products, safety monitoring tools, or energy-efficient prototypes.

Assessment emerged as a central design challenge. Lecturers identified project assessment and rubrics as difficult to make inclusive, and students mentioned unclear assessment criteria. In vocational education, assessment frequently emphasizes the final technical product, but an inclusive curriculum requires a broader view of competence. A rubric that assesses only the final artifact cannot capture the quality of collaboration, accessibility provisions, ethical decision-making, communication with partners, or social benefit. The point is not merely that rubrics are incomplete but that they carry norms: work in language education has shown that assessment criteria can encode hierarchies of legitimacy, and that teachers who notice this sometimes rewrite the criteria themselves in order to widen what counts as competent performance (Anwar et al., 2025). The same logic applies to vocational project assessment, where an unexamined rubric can quietly privilege whoever handled the tools. Inclusive assessment rubrics should therefore combine technical criteria with process, inclusion, and impact criteria, informed transparently at the beginning of the project (Braun & Clarke, 2023).

The support-staff findings demonstrate that inclusive curriculum implementation depends on invisible infrastructure. Even a well-designed inclusive *RPS* can fail if service information is fragmented, referral procedures are unclear, academic systems are not integrated, or data about student needs cannot be ethically used. The one-door coordination mechanism requested by support staff is not a peripheral administrative preference; it is part of the curriculum's inclusion architecture. A course-level inclusive *RPS* should therefore be accompanied by a referral map, contact points, accommodation request flow, and communication templates for students and partners.

Table 3

Needs-Priority Matrix for Initial Curriculum Design

Priority need	Evidence from the survey and open responses	GAP/UDL interpretation	Initial design response
Disability and UDL embedded from the start	Lowest manager means for disability systematic consideration (M = 2.20) and UDL familiarity (M = 2.40). Student service awareness was also low (M = 2.67).	Access barriers are produced when materials, procedures, group work, and assessment are designed for a narrow learner profile.	A UDL checklist should be attached to *CPL*, *CPMK*, *RPS*, project briefs, and rubrics. Referral and accommodation flows should be made visible from the beginning.
Women's roles as curriculum-generating cases	Gender analysis (M = 2.60) and women's roles as learning resources (M = 2.60) were the weakest manager items. Students reported unequal technical roles in projects.	Participation without control does not guarantee benefit. Women's contributions must appear in examples, problem selection, leadership roles, and assessment.	Project briefs should require gender analysis, fair task rotation, women's contribution mapping, and reflection on benefits for women or vulnerable groups.
Inclusive assessment rubrics	Lecturers identified assessment and project rubrics (M = 4.00 need for guidance) as difficult to make inclusive. Managers noted monitoring needs.	Assessment reproduces exclusion when only the final product is valued and when collaboration, accessibility, and social benefit are not assessed.	Rubrics should assess technical process, role equity, accessibility, ethics, communication, and impact, not only final artefacts.
Formalized living-lab partnership	Partners showed the highest readiness (M = 4.38) but also the highest need for role, schedule, and communication clarity (M = 5.00).	Partnership can become extractive if benefits and responsibilities are unclear.	MoU/MoA/IA templates should be linked to project briefs, partner feedback forms, beneficiary safeguards, and communication protocols.
Capacity-building and one-door coordination	Support staff universally requested training (highest demand). Lecturers requested *RPS* and rubric guidance. Open responses called for one-door coordination.	Inclusive curriculum requires coordination across academic, service, and partner systems.	A co-design workshop should be preceded by short training on GAP, UDL, SDG project design, data ethics, and inclusive facilitation.

Note. A need entered the matrix only if it met both criteria described under Data Analysis, and needs are ordered by the size of the quantitative gap. *CPL* = learning outcomes; *CPMK* = course learning outcomes; *RPS* = semester learning plan; MoU/MoA/IA = memorandum of understanding/agreement/implementation arrangement. *Source:* authors' analysis.

Based on the integrated findings, an initial needs-priority model can be proposed: (1) a UDL-based curriculum design checklist applied when *CPL*, *CPMK*, *RPS*, project briefs,

materials, and rubrics are prepared; (2) a GAP-based project design template identifying women's roles, gendered barriers, vulnerable beneficiaries, participation safeguards, and benefit indicators; (3) an inclusive assessment rubric for project-based learning covering technical quality, accessibility, collaboration, role equity, partner communication, ethics, and social impact; (4) a living-lab partnership protocol clarifying roles, schedules, outputs, communication, accessibility, and feedback; and (5) a coordination and capacity-building package for lecturers, support staff, and partners, with short training on UDL, GAP, SDG project mapping, referral pathways, data ethics, and inclusive facilitation. As set out in the Data analysis subsection, this model was derived by author consensus from the prioritized needs and is a design hypothesis rather than a validated framework. As this represents only the preliminary DBR phase, the next stage is a co-design phase followed by a pilot in project-based courses, specified in the Conclusion (Xie & Rice, 2021).

It is worth separating what this study contributes to theory from what it contributes to practice, since the two are often conflated in curriculum research. Theoretically, the study extends GAP beyond its origins in policy and program analysis into curriculum analysis, by treating access, participation, control and benefit as questions about learning materials, project-role allocation, problem selection and assessment rather than about budget lines and beneficiaries. It extends UDL beyond the lecture hall into the vocational laboratory and the partner site, where barriers arise from tool access, safety procedures, equipment cost and group-work dynamics as much as from representation of content. Combining the two under a DBR logic yields an intersectional curriculum perspective in which gender and disability are read together at the level of the artifact — the *CPMK*, the project brief, the rubric — rather than as parallel policy commitments. Practically, the study yields five design outputs that can be built and tested: a UDL curriculum-design checklist, a GAP-based project design template, an inclusive project assessment rubric, a living-lab partnership protocol, and a coordination and capacity-building package. These are institutional deliverables, and their value does not depend on the generalizability of the survey; they depend on being tested in the pilot described below.

Four limitations bound what may be concluded. First, the study was conducted at a single institution with twenty respondents, and several groups are very small (two partners,

three support staff, four lecturers). Group means, particularly the partner mean, can be moved substantially by one respondent, and no claim of representativeness for Indonesian polytechnics generally is made or intended. Second, the instrument was purpose-built and, as stated in the Method, was not subjected to formal content-validity assessment or internal-consistency testing; the seven constructs are analytic groupings decided by the research team, not empirically validated factors, and the construct means should be read accordingly. Third, the topics are socially desirable ones. Respondents were asked, within their own institution, about gender fairness, disability provision and non-discriminatory service, and social-desirability bias is a plausible influence which most obviously on the high scores for classroom safety and service awareness, and on the willingness of partners to declare readiness to co-design. The anonymity of the instrument reduces this risk but does not remove it, and the qualitative material, which was less uniformly positive than the ratings, may be the more reliable guide where the two diverge. Fourth, the analysis is descriptive only. No inferential test was performed, and none was intended, so the study cannot establish relationships between constructs, differences between groups, or any effect of the conditions described; apparent contrasts, such as the gap between manager-reported partnership strength and lecturer-reported partner involvement in class, are described but not tested. These limitations are consistent with the exploratory purpose of a first DBR phase, but they mean the findings should be treated as a design brief for one institution rather than as evidence about the state of Indonesian vocational education.

Conclusion

This article reported a preliminary needs analysis for developing an inclusive vocational curriculum based on women's roles and industrial partnerships. Survey data from twenty stakeholders indicated that the curriculum ecosystem already contains enabling conditions, including project-based learning readiness (lecturer M = 4.75), overall partner openness (M = 4.38), student interest in local problems, and support-staff service awareness. Substantial gaps were identified in systematic disability and UDL integration (manager construct M = 2.30), gender analysis in curriculum review (M = 2.60), representation of women's contributions (M = 2.60), partner involvement in instruction (lecturer M = 2.50), and service coordination. On this evidence, inclusion could usefully be embedded across learning

outcomes, course plans, project briefs, materials, rubrics, support procedures, partnership agreements, and monitoring indicators, with women's roles positioned as curriculum-generating knowledge and partners as living-lab co-designers. Because the evidence is perceptual, descriptive, and drawn from a single site with twenty respondents, these are design directions to be tested rather than conclusions about what inclusive vocational curricula require in general.

The integration of DBR, GAP and UDL offers a practical pathway, and the next phase is specified here rather than left open. A two-day co-design FGD is planned for September 2026, bringing together approximately 25 participants drawn from the five stakeholder roles, and preceded by a half-day briefing on GAP, UDL and inclusive assessment so that participants share a working vocabulary. The workshop will produce the first version of the five design outputs. A pilot will then run for one semester in two project-based courses across the Teknologi Rekayasa Multimedia (TRM) and Rekayasa Keamanan Siber (RKS) study programs, with a target of 92 students in the TRM study program and 94 students in the RKS study program and at least three external partners, so that the prototype is tested in more than one disciplinary field. Evaluation will be formative and mixed-methods, matching the DBR logic: a pre- and post-semester administration of the stakeholder instrument to the participating lecturers and students; analysis of the completed project artefacts against the inclusive rubric, with double-marking of a sample to check rubric usability; observation of two project sessions per course focused on task allocation and participation; partner feedback forms at project close; and focus groups with lecturers and students to surface barriers the ratings do not capture. Design principles will be revised after each cycle and reported with the prototype, so that what is published is the refined principle and the evidence that refined it, not only the artifact.

Author Contributions

All four authors contributed to the conceptualization and design of the study, the development of the instrument, data collection, analysis and interpretation of the results, and the drafting and revision of the manuscript. All authors read and approved the final version.

Conflict of Interest Statement

The authors declare that they have no competing financial interests or personal relationships that could have appeared to influence the work reported in this article. The authors are members of the institution studied, which is disclosed here as a potential conflict of interest: the study was conducted as part of internal curriculum development, and this position provided access to stakeholders while also introducing the social-desirability risk acknowledged in the Limitations subsection. The funders had no role in the design of the study, in the collection, analysis, or interpretation of data, in the writing of the manuscript, or in the decision to publish.

Ethical Approval and Informed Consent

All participants gave informed consent before completing the questionnaire; participation was voluntary and unpaid, and participants were free to withdraw at any point before submission without giving a reason. Data are reported in aggregate, and no individual, study program or partner institution is identifiable in this article. The study was not reviewed by a separate research ethics committee; it was treated as exempt from formal review as an internal curriculum-evaluation activity involving minimal risk and no identifying or sensitive personal data.

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