

Balancing Online Theory and Face-to-Face Laboratory Learning: Support Strategies and Barriers in a Philippine Bachelor of Industrial Technology Program

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ABSTRACT

This qualitative phenomenological study examined how stakeholders in a Bachelor of Industrial Technology (BIndTech) program in the northern Philippines perceived the possible sustained adoption of online lecture delivery while preserving face-to-face laboratory learning. Fourteen participants were purposively selected: four administrators, three core faculty members, and seven first-year student leaders, all of whom had direct experience with the program and its existing Flexible Learning Mode. Data were gathered through semi-structured interviews and a focus group discussion and analyzed through an iterative thematic process involving familiarization, initial coding, category development, cross-stakeholder comparison, theme review, and selection of representative excerpts. Findings showed a pattern of conditional acceptance. Online lecture delivery was considered useful for theory-oriented content and continuity of learning, but participants associated it with risks to discipline, interaction, and engagement. Barriers included unstable internet connectivity, device and financial constraints, uneven participation, increased faculty workload, assessment concerns, and the inability of online delivery to reproduce hands-on laboratory competencies. Participants recommended low-bandwidth and multi-channel materials, clearer communication and feedback, faculty development, infrastructure and device support, and differentiated alternatives for learners with limited access. Interpreted through Moore's Transactional Distance Theory and Prosser's vocational education principles, the findings support a differentiated blended model in which online delivery is used selectively for theory while laboratory competencies remain anchored in supervised face-to-face practice. The study contributes context-sensitive evidence for flexible learning policy and instructional design in technical-vocational higher education.

Keywords: flexible learning; online lecture delivery; technical-vocational higher education; blended learning; transactional distance; laboratory learning; Philippines

INTRODUCTION

Flexible and technology-enabled learning has moved from an emergency response to a continuing concern in higher education policy and instructional design. Universities are increasingly expected to provide learning arrangements that are resilient, accessible, and responsive to changing learner circumstances while still protecting academic standards and program outcomes. The experience of large-scale emergency remote teaching demonstrated that digital delivery can preserve continuity, but it also showed that effective online education requires purposeful design rather than the simple transfer of classroom practices to an online platform (Hodges et al., 2020).

In the Philippines, the Commission on Higher Education (CHED) has institutionalized flexible learning as a legitimate approach that can combine different modes of delivery according to program context and learner needs (CHED, 2020, 2022). For industrial technology programs, the policy context is especially important because laboratory-based learning is central to competence formation. CHED Memorandum Order No. 31, series of 2021, issued pandemic-era guidance specifically for Industrial Technology and preserved laboratory-based learning while permitting alternative learning activities for part of the required laboratory experience. Although that issuance responded to pandemic conditions, it illustrates an important program-level principle:

flexible delivery must be differentiated according to the nature of the intended learning outcomes rather than applied uniformly across lecture and laboratory components (CHED, 2021).

The issue is therefore more complex in technical-vocational higher education than in programs dominated by conceptual or text-based learning. BIndTech courses require students not only to understand principles but also to demonstrate applied competencies through tools, materials, equipment, procedures, safety practices, and supervised performance. In these settings, theory and practice are closely connected but not interchangeable. Online environments may support conceptual preparation and continuity, whereas laboratory learning often depends on physical access, demonstration, corrective feedback, and repeated hands-on performance.

Recent scholarship reinforces this distinction. A systematic review of blended learning in engineering education found that well-designed combinations of face-to-face and digital activities can support flexibility and industry-relevant problem solving when the mix of modalities is deliberately aligned with learning outcomes (Sala et al., 2024). Similarly, a review focused on vocational learners found that blended teaching can strengthen engagement when it combines sound instructional strategies, cohesive learning communities, and appropriate technologies rather than relying on technology alone (Chen et al., 2024). These findings suggest that the central question is not whether digital learning belongs in technical education, but how it should be bounded, supported, and integrated with authentic practical experience.

Engagement is another central concern. A recent systematic review identified instructor support, collaboration, interaction, digital platforms and equipment, self-directed learning, and learner motivation among the recurring factors associated with online engagement (Hu & Xiao, 2025). Transactional Distance Theory is one of the frameworks frequently used to explain these patterns because it conceptualizes educational distance as a psychological and communicative phenomenon shaped by structure, dialogue, and learner autonomy, not simply by physical separation (Moore, 1993). Contemporary research has likewise connected lower-quality interaction and greater transactional distance with weaker online engagement through reduced social presence and autonomous motivation (Chen, 2023).

Digital inequality remains equally important. Online learning may appear flexible at the institutional level while placing substantial costs and constraints on individual learners. Unstable connectivity, reliance on mobile data, limited access to laptops or appropriate devices, and uneven home learning environments have repeatedly been identified in Philippine and international research (Czerniewicz et al., 2020; Fabito et al., 2020; Potoy et al., 2023). These conditions can affect whether students can join sessions, understand lessons, communicate with teachers, and complete requirements. Thus, decisions about online lecture delivery are also decisions about equity and institutional responsibility.

At the study site, the BIndTech program had already experienced an institutional Flexible Learning Mode in which asynchronous activities could be used when normal face-to-face delivery was disrupted. Full and sustained online lecture delivery, however, had not yet been institutionalized as the routine mode for lecture-oriented courses. This situation created a useful setting for examining how administrators, faculty members, and student leaders interpret the possible expansion of online lecture delivery based on their direct experience with flexible arrangements and the practical demands of the program.

Although research on online and flexible learning is extensive, fewer studies examine the issue within a single Philippine technical-vocational degree program while triangulating administrative, faculty, and student perspectives. Existing work often concentrates on general higher education, emergency remote teaching, or student-only survey data. The present study addresses this gap by examining not only perceived barriers but also the conditions under which stakeholders believe online lecture delivery could be educationally acceptable alongside face-to-face laboratory instruction.

REVIEW OF RELATED LITERATURE

Flexible and Blended Learning in Higher and Technical Education

Flexible learning is best understood as a design orientation rather than a single delivery technology. CHED (2020) emphasizes flexibility in time, place, pace, and mode, while subsequent guidance has sustained flexible

learning as part of Philippine higher education practice (CHED, 2022). This policy direction requires institutions to align modality with course outcomes, learner circumstances, and available support systems. For technical fields, this alignment is especially important because online activities may serve some outcomes well but may be insufficient for outcomes involving manual performance, equipment handling, or supervised practice.

The engineering education literature offers a useful parallel. Sala et al. (2024) describe blended learning as the deliberate combination of face-to-face and digital activities and show that its value depends on how learning expectations are distributed across the two environments. In vocational education, Chen et al. (2024) similarly found that engagement in blended settings depends on both pedagogical design and a cohesive learning community. Together, these studies support a differentiated approach in which digital resources extend learning without assuming that every learning outcome should migrate online.

Engagement, Interaction, and Transactional Distance

Online engagement is multidimensional, involving behavioral participation, cognitive investment, emotional connection, and interaction with teachers, peers, content, and learning systems. Hu and Xiao's (2025) systematic review shows that online engagement is shaped by learner characteristics as well as environmental conditions, including instructor support, collaboration, interaction, platform quality, and equipment. This is particularly relevant in technical-vocational education, where learning frequently depends on immediate feedback, modeling, demonstration, and collaborative problem solving.

Moore's (1993) Transactional Distance Theory provides a useful conceptual lens for interpreting these concerns. The theory proposes that educational distance increases or decreases through the relationship among dialogue, course structure, and learner autonomy. A highly structured environment with insufficient dialogue may intensify psychological distance, while responsive communication and appropriate autonomy can reduce it. Recent reviews continue to identify Transactional Distance Theory as a productive framework for distance-learning research (Abuhassna & Alnawajha, 2023), and Chen (2023) found that interaction-related dimensions of transactional distance are associated with learning engagement through social presence and autonomous motivation.

Digital Equity and Institutional Readiness

Access to online learning is mediated by material conditions. Czerniewicz et al. (2020) showed how emergency remote teaching exposed and intensified existing inequalities, while Philippine studies documented problems involving internet reliability, devices, flexible-learning pedagogy, and ICT resources (Fabito et al., 2020; Potoy et al., 2023). These barriers are not simply technical inconveniences because they can shape comprehension, participation, assessment, and persistence.

Institutional readiness therefore extends beyond the availability of a learning management system. It includes faculty preparation, workload planning, instructional support, technical assistance, communication protocols, assessment safeguards, accessible content design, and mechanisms for students who cannot participate under standard online conditions. In technical programs, readiness must also include a plan for preserving access to laboratories, equipment, and supervised practice.

Theoretical and Conceptual Framework

The study is interpreted through two complementary lenses: Moore's Transactional Distance Theory (1993) and Prosser and Quigley's (1949) vocational education principles. Transactional Distance Theory explains why an online lecture can remain educationally distant even when content is technically accessible: weak dialogue, rigid structure, and insufficient support may reduce engagement and understanding. Prosser's vocational perspective explains why technical competence cannot be treated as conceptual knowledge alone; effective vocational learning requires conditions that approximate the tasks, tools, and performance expectations of practice.

Together, these lenses support a conceptual distinction between modality suitability and implementation conditions. Theory-oriented content may be suitable for online delivery when dialogue, clarity, feedback, autonomy, and access are adequately supported. Laboratory-oriented competencies require authentic or closely supervised practical conditions and therefore remain principally face-to-face. Digital access, institutional support, and faculty readiness are treated as contextual implementation conditions that shape perceived viability. They are not treated as statistical moderators because the present study is qualitative and does not test a causal model.

Table 1. Conceptual lenses used to interpret the study

Conceptual lens	Core idea	Relevance to this study
Transactional Distance Theory (Moore, 1993)	Educational distance is shaped by dialogue, structure, and learner autonomy.	Interprets concerns about interaction, discipline, communication, feedback, self-regulation, and engagement in online lecture delivery.
Vocational education principles (Prosser & Quigley, 1949)	Vocational learning is strongest when training reflects authentic work conditions and performance requirements.	Interprets the strong preference for supervised, face-to-face laboratory learning and protection of hands-on competencies.
Equity and institutional readiness	Access and quality depend on infrastructure, devices, support systems, and faculty capacity.	Interprets connectivity, financial, device, workload, training, and differentiated-delivery concerns as system-level implementation conditions.

Research Questions

1. How do first-year students, faculty members, and administrators of the BIndTech program perceive the possible sustained adoption of online lecture delivery?
2. What barriers may hinder the adoption of online lecture delivery in the BIndTech program?
3. What strategies may address these barriers and support online lecture delivery alongside face-to-face laboratory instruction?

METHOD

Research Design

The study employed a qualitative phenomenological design. The design was retained because the inquiry sought to understand how stakeholders made sense of a developing instructional shift through their lived experience with the program's existing Flexible Learning Mode and their interpretations of sustained online lecture delivery. Rather than measuring readiness through a standardized scale, the study examined meanings, concerns, and conditions articulated by participants themselves. The phenomenological orientation was therefore used to foreground stakeholder experience while thematic analysis provided the procedure for identifying patterns across accounts.

Research Setting and Participants

The study was conducted in the College of Industrial Technology of a Philippine state university during School Year 2025-2026. The BIndTech program was newly established and, at the time of the study, only first-year students were enrolled. The program had experience with asynchronous and flexible instructional arrangements but had not yet adopted sustained online lecture delivery as a routine program-wide mode. This bounded context made the stakeholders directly involved in first-year program implementation the most information-rich participants for the research questions.

The final analytic sample comprised 14 participants: four administrators (A1-A4), three core faculty members (F1-F3), and seven first-year student leaders (S1-S7). Administrators were included because they were involved in academic planning, program supervision, or coordination. Faculty members were included because they handled BIndTech lecture-oriented or mixed lecture-laboratory courses and had experience with

flexible/asynchronous delivery. Student participants were elected section leaders from the first-year cohort and had direct experience of the program's flexible learning arrangements. Their inclusion allowed triangulation across institutional, instructional, and learner perspectives.

Table 2. Participant composition and selection rationale

Stakeholder group	n	Selection criteria / role in the phenomenon	Data collection
Administrators	4	Direct involvement in BIndTech academic planning, supervision, or program coordination; familiarity with institutional flexible-learning arrangements.	Semi-structured individual interviews
Core faculty members	3	Teaching BIndTech lecture-oriented or mixed lecture-laboratory courses; direct experience preparing and implementing flexible/asynchronous learning activities.	Semi-structured individual interviews
First-year student leaders	7	Elected section leaders in the first BIndTech cohort; direct experience receiving flexible/asynchronous instruction and representing section-level learner concerns.	Focus group discussion
Total	14	Role-based, information-rich participants from the same bounded program context.	Interviews + FGD

Sampling Technique

Purposive-homogeneous sampling was used. Homogeneity was established by limiting participation to stakeholders directly connected to the same BIndTech program and its first-year implementation, while role variation was intentionally retained to capture administrative, instructional, and learner perspectives. The sample was not intended to achieve statistical representativeness. Instead, it was designed to provide information-rich accounts from the specific actors responsible for, or directly affected by, the instructional shift under consideration. Because the program was newly established and only first-year students were enrolled, the eligible participant pool was naturally bounded by the program structure.

Data Collection

Data were gathered using semi-structured interviews with administrators and faculty members and a focus group discussion with student leaders. Separate guides were used for the stakeholder groups, but all prompts were aligned with the three research questions: (a) experiences and perceptions of flexible or online lecture delivery, (b) barriers or risks associated with sustained adoption, and (c) strategies that could support online lectures while protecting laboratory instruction. Follow-up questions were used when participants raised issues concerning engagement, connectivity, workload, assessment, equipment, or laboratory practice.

With consent, the sessions were audio-recorded and supplemented with field notes. Participant codes were used during transcription and analysis. The combination of individual interviews and a student focus group was selected to elicit both role-specific reflections and shared learner experiences.

Data Analysis

The analysis followed an iterative thematic procedure consistent with the logic of thematic analysis (Braun & Clarke, 2006). First, recordings were transcribed and the transcripts were read repeatedly for familiarization. Second, meaning units relevant to the research questions were coded, including references to flexibility, engagement, discipline, internet access, devices, faculty workload, assessment, laboratory learning, institutional support, and equity. Third, related codes were clustered into preliminary categories. Fourth, categories were compared across administrators, faculty members, and student leaders to identify convergence, divergence, and role-specific emphasis. Fifth, candidate themes were reviewed against the original excerpts and refined to avoid themes that were too broad or redundant. Finally, themes were named and representative participant excerpts were selected to preserve voice and demonstrate the evidentiary basis of the interpretation.

As part of the revision for resubmission, the analytic presentation was expanded from four broad summary themes into research-question-aligned thematic groups. A cross-stakeholder matrix was used to make relationships among perceptions, barriers, and proposed strategies explicit. Theme importance was not inferred from numerical frequency alone; the analysis considered recurrence across roles, explanatory depth, and direct relevance to the research questions. No normality tests, multicollinearity diagnostics, regression models, or moderation analyses were conducted because the dataset consists of qualitative interview and FGD narratives rather than continuous quantitative variables.

Trustworthiness

Trustworthiness was strengthened through stakeholder triangulation, repeated comparison of themes with the original transcripts, and preservation of participant excerpts. Including administrators, faculty members, and student leaders allowed the researcher to examine whether similar issues appeared across different roles and to retain differences in emphasis rather than assuming uniform agreement. During reanalysis, coded excerpts, category groupings, and theme-refinement notes were maintained as an analytic trail. The results also report selected divergent or conditional views—for example, participants who saw online delivery as useful under favorable access conditions—to avoid presenting the dataset as more homogeneous than it was.

Ethical Considerations

Participants received informed-consent information explaining the study purpose, voluntary participation, confidentiality, and data handling. Pseudonyms or participant codes were used during transcription and reporting. Audio recordings, transcripts, and field notes were stored securely and were accessible only to the researcher. Participant quotations are reported using role-based codes to protect identity while preserving the link between evidence and stakeholder perspective.

RESULTS

The expanded thematic analysis generated nine themes organized under the three research questions. The themes show a consistent pattern of conditional acceptance: stakeholders saw value in online lecture delivery for theory, but only when engagement, access, institutional support, and the integrity of laboratory learning were protected.

Table 3. Research-question-aligned thematic structure

Research question	Themes	Cross-stakeholder pattern
RQ1: Perceptions	1. Weakens discipline, interaction, and engagement	Conditional acceptance: flexibility is recognized, but stakeholders distinguish sharply between lecture and laboratory learning.
	2. Requires careful planning and faculty commitment	
	3. Effective for theory but inadequate for laboratory learning	
RQ2: Barriers	4. Limited stable internet and technological resources	Barriers are intertwined: technological access affects participation; pedagogical constraints affect quality; institutional capacity shapes feasibility.
	5. Technical limitations, low engagement, and lack of practical laboratory experiences	
	6. Resource gaps, faculty workload, and laboratory challenges require institutional support	
RQ3: Strategies	7. Flexible, low-bandwidth, multi-channel learning support	Participants recommend a layered blended model rather than a uniform online solution.
	8. Training, infrastructure, and backup systems	
	9. Equity and inclusivity through localized and differentiated delivery	

Perceptions of the Possible Adoption of Online Lecture Delivery

Theme 1. Online lecture delivery may weaken discipline, interaction, and engagement

Participants across roles expressed concern that sustained online lectures could reduce student accountability and interpersonal connection. Administrators focused on the difficulty of maintaining schedules and monitoring participation without physical presence, while students described self-learning, signal problems, and the loss of peer interaction as factors that make online learning more difficult.

“Some students have big problems keeping up with a set schedule and discipline in focusing without face-to-face guidance. It’s difficult to administer.” (A1)

“There are lesser engagement between me and my students in flexible mode. Meaning, engagement will be the challenge if we will embrace this online lecture.” (A3)

“A bit unhappy kasi iba pa rin kapag kasama mo classmates mo habang gumagawa ng activities/laboratory. [It is still different when you are with classmates while doing activities or laboratory work.]” (S3)

The convergent concern is not simply physical separation; it is the potential weakening of routines, feedback, and social presence that keep students connected to learning. Student accounts also show that engagement problems may be compounded by connectivity problems, making it difficult to separate motivational concerns from material access conditions.

Theme 2. Online lecture delivery requires careful planning and faculty commitment

Stakeholders nevertheless recognized practical value in online lecture delivery when it is intentionally designed. Administrators described flexible learning as convenient but difficult to monitor, while faculty members noted that it can sustain instruction when regular face-to-face meetings are disrupted. Students also acknowledged that flexible modes can develop independence, although inconsistent release of learning materials or unclear schedules can undermine that benefit.

“Online teaching in the BlndTech program is a useful tool, but it requires careful planning and flexibility to work well. As for Online Lecture Delivery, this is [a] good start to integrate in the program.” (A2)

“Having a Flexi mode during classes for me is helpful, especially when there are events that faculty members need to attend. During this time of digital age, we can adopt this kind of lecture delivery to address some issues/problems of the college.” (F2)

The theme therefore positions online lecture delivery as a planned instructional option rather than an automatic replacement for classroom teaching. Participants linked success to timely materials, consistent communication, teacher accountability, and purposeful organization of tasks.

Theme 3. Online lecture delivery is effective for theory but inadequate for laboratory learning

The clearest consensus concerned the distinction between theoretical and laboratory learning. Faculty and administrators considered asynchronous or online lectures potentially effective for conceptual content when assessment and follow-up discussion are provided. They were far less confident about laboratory sessions, where evidence of competence depends on students actually handling equipment, following procedures, and receiving real-time corrective feedback.

“Asynchronous lecture in my experience is effective if proper assessment and supplemental lectures are conducted... For laboratory session, it is very difficult to ascertain that the essential competencies are acquired by my learners.” (A4)

“When it comes to lecture I think fleximode is effective, but for laboratory exercises, students cannot create a proper output. Thus, online lecture could possibly [be] adopted.” (F1)

“Simulations and assignments at home help, [but] they cannot replace the real experience of handling equipment inside the laboratory.” (F3)

Students similarly valued the extra time and flexibility of online learning but linked its usefulness to favorable conditions such as stable internet and safe weather. Across groups, the distinction was consistent: online lecture delivery can support theory, but hands-on competency development requires protected face-to-face laboratory opportunities.

Barriers to Adoption

Theme 4. Limited access to stable internet and technological resources hinders online lecture delivery

Connectivity was the most recurrent barrier across stakeholder groups. Administrators framed the issue in terms of unequal resources and student financial capacity. Faculty members described poor connectivity and limited devices as barriers to instruction, participation, and assessment. Students described the direct learning consequence: when the signal is weak, they miss explanations and struggle to understand the lesson.

“The biggest barrier for online lectures is still the internet and device issue—not all students have good Wi-Fi or their own laptop and do rely on mobile data, which is expensive and unstable.” (A1)

“By far, it is [the] digital gap that hinders effective online lecture delivery. Many of my students have limited financial capacity to use the appropriate technology for online lectures.” (A4)

“Online lectures can be hard because of lack of internet connection [and] that also struggles me to understand the instruction given by our teachers.” (S5)

These accounts show that connectivity, devices, and finances operate together. Poor access is not an isolated inconvenience but a mechanism through which students may lose comprehension, participation, and continuity. It also increases faculty workload because instructors must create alternative channels and follow up individually with students who cannot join or submit as expected.

Theme 5. Technical limitations, low engagement, and lack of practical laboratory experiences reduce effectiveness

Participants emphasized that barriers persist even when students are technically able to join an online class. Administrators pointed to lower participation and the challenge of conducting hands-on work remotely. Faculty expressed concern about educational quality when technical programs rely too heavily on online delivery. Students emphasized concentration and difficulty obtaining sufficiently detailed explanations online.

“The main obstacles to online lectures are tech issues, such as weak internet and limited equipment, plus lower student participation and the challenge of doing hands-on lab work remotely.” (A2)

“Signal and concentration.” (S2)

“Explanation and the real meanings... concentration in understanding the lesson.” (S4)

This theme demonstrates that access alone does not guarantee effectiveness. Participation, comprehension, interaction, and practice remain pedagogical concerns after the connectivity problem is addressed. In a BIndTech context, the absence of authentic laboratory experience creates an additional limit that cannot be solved by stronger internet alone.

Theme 6. Adoption requires institutional support to address resource gaps, faculty workload, and laboratory challenges

Faculty accounts made clear that sustained online lecture delivery would shift significant work to content preparation, technical troubleshooting, communication, monitoring, and assessment. These demands were seen as institutional concerns because individual faculty commitment cannot compensate indefinitely for inadequate infrastructure, limited devices, or the difficulty of translating laboratory learning to an online environment.

“Faculty also face heavier workloads in preparing digital materials, while student engagement and fair assessment may be harder to maintain. These issues show that strong support and blended approaches are necessary for success.” (F3)

The barrier is therefore organizational as well as technological. Participants implicitly linked feasibility to policy clarity, faculty development, workload recognition, technical support, and preservation of laboratory access. The institution, rather than individual teachers or students alone, was viewed as the level at which many of these constraints must be addressed.

Strategies to Support Adoption Alongside Face-to-Face Laboratory Instruction

Theme 7. Accessibility and engagement require flexible, low-bandwidth, and multi-channel support

Participants recommended designing online lecture delivery around uneven connectivity rather than assuming permanent high-speed access. Administrators proposed downloadable presentations or recordings, low-bandwidth options, live question-and-answer sessions, group chats, forums, and technical support. Faculty members suggested modular alternatives and face-to-face reinforcement of previously distributed lecture material. Students emphasized regular updates, feedback, and clear instructions.

“We shall also offer low-bandwidth and offline options like downloadable PowerPoint presentations or recorded lectures for those with poor connections... [and] group chats or dedicated forums, so students who miss the live sessions can also ask questions.” (A1)

“During face-to-face classes, faculty members should discuss well the summary of the lecture or topic that have been sent to the students.” (F2)

“Regular updates, evaluation or feedback, and clear instructions or communications.” (S1)

These proposals reduce dependence on a single synchronous channel and increase opportunities for dialogue. They also protect continuity during disruptions such as severe weather, while allowing face-to-face sessions to be used strategically for clarification and application.

Theme 8. Institutional support should include training, infrastructure, and backup systems

Participants proposed a support package rather than a single technological solution. Administrators emphasized faculty and student training, stronger campus internet, technical assistance, and backup materials. Faculty recommendations included data assistance or device lending, digital-content and online-assessment training, IT support, interactive methods, virtual consultation, and explicit institutional policies.

“Offer ongoing training for teachers and students, strengthen campus internet and tech support, and prepare backup options like offline materials or recorded lectures to keep fleximode classes going during unexpected problems.” (A2)

“For skill-based learning, blended approaches that combine online theory with limited face-to-face laboratory sessions or access to simulation software can ensure that technical competencies are still developed.” (F3)

Students complemented these institutional suggestions by asking for clear communication, recorded sessions, accessible learning materials, and strong teacher support. Across roles, effective adoption was framed as an

ecosystem of infrastructure, pedagogy, communication, and student support rather than the mere availability of an online platform.

Theme 9. Equity and inclusivity require localized and differentiated delivery approaches

Some participants recommended that implementation be differentiated according to learner resources. Administrators proposed community-based approaches and alternative modes for students who lack the resources required for online delivery. Students also called for broader government or institutional support for internet access and devices. These proposals reflect concern that a uniform online requirement could deepen existing inequalities.

“A university-led community engagement, where technical students can learn and be trained in their community.” (A3)

“There has to be a multilayer approach... students who can comply with the resource requirement can be assigned to the online delivery mode, while those with financial difficulty could be... provided alternative learning delivery aside from online delivery.” (Administrator participant)

The theme extends the idea of flexibility beyond scheduling. Participants understood equity as the capacity to offer meaningful alternatives when learners cannot meet a standard technological requirement. This supports a differentiated blended model in which access limitations trigger support or alternative delivery rather than exclusion.

DISCUSSION

The analysis reveals a consistent pattern of conditional acceptance. Stakeholders did not reject online lecture delivery as incompatible with technical-vocational higher education. Instead, they drew a boundary around its appropriate use. They generally accepted online delivery for theory-oriented content, especially when continuity or flexibility was needed, but rejected the idea that it could replace laboratory instruction. This boundary is the central contribution of the study because it shifts the discussion from a binary online-versus-face-to-face question to a curricular question about which learning outcomes can be supported by which modality.

The engagement findings are well explained by Transactional Distance Theory. Participants repeatedly linked online delivery with weaker interaction, reduced monitoring, delayed communication, and greater demands for self-discipline. From Moore's (1993) perspective, these are not secondary inconveniences but mechanisms through which psychological and communicative distance may increase. Recent work supports this interpretation: Chen (2023) connects interaction-related dimensions of transactional distance to engagement through social presence and autonomous motivation, while Hu and Xiao (2025) identify instructor support, collaboration, interaction, self-directed learning, and equipment as recurring engagement factors. The findings add a technical-vocational context in which engagement is tied not only to discussion but also to demonstration, immediate correction, and shared practical activity.

The digital divide emerged as a structural condition shaping the feasibility of online lecture delivery. Connectivity, device access, and financial capacity were mentioned by administrators, faculty, and students, but each group experienced the problem differently. Students described interrupted comprehension and participation; faculty described additional preparation and follow-up work; administrators interpreted the problem as an equity and resource issue. This cross-role convergence is important because it shows that digital inequality is simultaneously a learner problem, an instructional problem, and an institutional problem. The pattern is consistent with Czerniewicz et al. (2020) and with Philippine evidence documenting connectivity, ICT, and flexible-pedagogy constraints (Fabito et al., 2020; Potoy et al., 2023).

The strongest consensus concerned laboratory competency. This finding aligns with Prosser and Quigley's (1949) emphasis on vocational learning under authentic or closely approximated work conditions. Participants were willing to use recordings, online explanations, simulations, or take-home activities as supplements, but they resisted treating these as equivalent to supervised equipment use and real laboratory performance. The

finding also corresponds with recent engineering and vocational blended-learning reviews, which emphasize purposeful integration of digital and face-to-face activities according to the nature of the learning outcomes (Chen et al., 2024; Sala et al., 2024).

The Philippine policy context reinforces this differentiated logic. CHED's general flexible-learning policy encourages varied modes responsive to context (CHED, 2020, 2022). More specifically, CMO No. 31, series of 2021, addressed Industrial Technology laboratory-based learning by retaining limited face-to-face laboratory experience while permitting alternative learning activities for part of the required hours during pandemic conditions (CHED, 2021). The current study should not be read as treating that temporary 50-50 arrangement as a permanent prescription. Rather, the policy provides a program-specific precedent for the principle that flexible activities and physical laboratory experiences should be deliberately allocated rather than treated as interchangeable.

The participants' strategy proposals also clarify how institutional support conditions perceived viability. In a quantitative study, such a relationship might be modeled statistically as moderation. In the present qualitative study, however, the data support an interpretive claim: stakeholders regarded infrastructure, faculty preparation, communication systems, device or data support, and backup modalities as contextual conditions that could reduce or intensify the barriers they described. This relationship is best understood qualitatively as conditional feasibility rather than as a tested causal interaction.

Taken together, the findings support a differentiated blended implementation model. Online lecture delivery is most defensible when it is used for theory-oriented material, designed for low-bandwidth access, supported by multiple communication channels, and linked to timely feedback. Face-to-face periods should prioritize laboratory practice, demonstration, supervised performance, and correction. Equity mechanisms should provide alternative access for students with weak connectivity or limited devices, while institutional mechanisms should support faculty training, technical assistance, workload planning, and consistent standards.

Table 4. Data-grounded differentiated blended implementation model

Implementation layer	Recommended function	Evidence from participants
Online theory layer	Deliver theory-oriented content through downloadable, mobile-friendly, recorded, or asynchronous materials; use synchronous sessions selectively.	Participants valued flexibility and self-paced learning but warned against dependence on stable high-speed connections.
Interaction layer	Use clear schedules, Q&A sessions, forums/group chats, consultations, regular feedback, and face-to-face reinforcement.	Discipline and engagement concerns were repeatedly linked to reduced dialogue and delayed communication.
Face-to-face laboratory layer	Protect hands-on practice, equipment use, safety supervision, demonstration, and performance assessment.	Strongest cross-stakeholder consensus: online delivery cannot replace laboratory competence formation.
Equity layer	Provide low-bandwidth/offline options, device lending or data support where feasible, modular fallbacks, and localized/community alternatives.	Internet, device, and financial constraints were described across all stakeholder groups.
Institutional/faculty layer	Provide digital-pedagogy and assessment training, IT support, workload planning, implementation standards, and backup systems.	Faculty workload and institutional readiness were identified as central conditions for sustainable adoption.

CONCLUSION

Stakeholders in the BIndTech program viewed online lecture delivery as potentially useful for theory-oriented learning but insufficient as a substitute for laboratory-based instruction. Their acceptance was conditional on the quality of interaction, the reliability and affordability of access, faculty readiness, institutional support, and

explicit protection of hands-on learning. The major barriers were not independent: poor connectivity and device limitations affected comprehension and participation; reduced interaction affected engagement; faculty workload and assessment concerns affected instructional feasibility; and the practical nature of the curriculum limited what could reasonably be moved online.

The most defensible pathway is therefore a differentiated blended model rather than full online substitution. Online lecture delivery may support conceptual preparation, continuity, and flexible access, while face-to-face sessions remain central to laboratory demonstration, equipment use, supervised practice, and competency assessment. Adoption should be accompanied by low-bandwidth design, multi-channel communication, faculty development, access support, and alternatives for students whose resources make standard online participation difficult.

PRACTICAL IMPLICATIONS

For institutional leaders, the findings support a phased implementation rather than immediate program-wide conversion. A pilot may begin with clearly theory-dominant course components and should include minimum standards for content accessibility, communication, feedback, and contingency arrangements. Institutional monitoring should examine participation, faculty workload, learner access, and whether online components actually reduce or increase barriers.

For faculty, online lectures should be designed as part of an integrated sequence with face-to-face reinforcement and laboratory practice. Shorter and downloadable materials, clear weekly structures, consultation opportunities, and assessment methods that emphasize understanding rather than mere submission can help reduce transactional distance.

For policy makers and program planners, flexible-learning decisions should remain sensitive to program type. Technical-vocational programs require stronger protection of laboratory outcomes than courses where learning can be demonstrated primarily through text or discussion. Equity measures should be treated as part of instructional quality, not as optional welfare support.

LIMITATIONS AND FUTURE RESEARCH

The study is bounded to one BIndTech program in one state university and involves a purposively selected sample of administrators, core faculty, and first-year student leaders. The findings therefore provide contextual depth rather than statistical generalizability. Student participants were leaders rather than a random cross-section of the cohort, which may mean that some experiences of less engaged or less connected students were not directly represented. The study also examines perceptions and prior flexible-learning experiences rather than measured learning outcomes under a fully implemented online-lecture policy.

Future research can test the proposed differentiated blended model through a pilot implementation and examine student learning outcomes, laboratory competency, engagement, satisfaction, retention, and faculty workload. A follow-up quantitative or mixed-methods study could operationalize barriers and institutional support as measurable constructs and examine relationships or moderation statistically. Such work would extend, rather than retroactively change, the qualitative contribution of the present study.

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