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INNOVATING THE CLASSROOM: CROSS-DISCIPLINARY GROUP RESEARCH PEDAGOGY IN GUIHULNGAN CITY'S UNDERGRADUATE EDUCATION

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INTRODUCTION

With today's global connectivity, education needs to adapt to meet the challenge of complex knowledge creation. The top institutions such as Harvard and MIT incorporate interdisciplinarity, spurring innovation in artificial intelligence, public health, and sustainability (Argyris et al., 2024). The European Higher Education Area (EHEA) and the Organization for Economic Cooperation and Development (OECD) encourage cross-disciplinary education to meet global challenges and enhance employability, which resonates with the aim of inclusive, quality education under Sustainable Development Goal 4 (SDG 4). United Nations Educational, Scientific and Cultural Organization (UNESCO) recognizes cross-disciplinary learning as critical aspect in preparing learners with skills demanded in future careers (Vaverková et al., 2024) and therefore solidifies its role as an important teaching tool.

The Philippines' Commission on Higher Education (CHED is backing inter-disciplinary research within the nation by way of policy initiatives like Outcomes-Based Education (OBE) and the National Higher Education Research Agenda (NHERA) designed to facilitate disaster resilience, digital transformation, and public policy (Delavin, 2024). Leading universities in the country have research centers on climate change and technological innovation (Salindo & Salindo, 2024). However, institutional silos and continuous resource limitation persist which, necessitate a change and policy advocacy for collaboration. Integration of cross-disciplinary courses into curricula has the potential to prepare students to address actual issues while being international standards-compliant (Castulo, 2025).

This research aims to explore how cross-disciplinary group research practice at the undergraduate level can be integrated into Philippine education systems, develops a culture of collaboration that is ready for the outside workforce, and aligns to global best practices (Salindo, 2025; Salindo & Salindo, 2023; Tayco et al., 2022). With the identification of the results of practice of the novel pedagogy, the current barriers, and support by policy, this research helps establish a more vibrant and more creative learning community.

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THEORETICAL BASIS

The conceptual framework of this research is based on interdisciplinary theories of learning, constructivist theory of learning, and the OBE model. Each of these models justifies interdisciplinarity in undergraduate teaching and provides theoretical underpinnings to its collaborative, skills-oriented, and outcomes-based nature.

Interdisciplinary learning theory demands the application of multiple disciplinary knowledge to solve important problems and develop novel solutions (İDER & Okumuşlar, 2024). Interdisciplinary learning and systems thinking are facilitated by it to allow students to bridge disciplinary divides and pursue integrative, context-dependent solutions ("Enhancing Interdisciplinary Learning," 2024). Undergraduate studies promote innovation, critical thinking, and academic adaptability that is valued in both domestic and global careers.

Constructivist learning theory, developed by Vygotsky (1978) as cited in (Zajda, 2021) supports interdisciplinary collaborative research, enabling students to generate knowledge in cooperation, share various perspectives, and solve real-world issues (Sarabia-Larena et al., 2025; Romdhon et al., 2024; Zin et al., 2024).

OBE, advocated by Spady (1994), centers on the alignment of learning activities with intended competencies and practical applications. OBE becomes a guiding framework in designing cross-disciplinary undergraduate research to produce graduates that are collaboration, inquiry, and critical thinking capable (Hasibuan & Harahap, 2024).

These frameworks, when integrated, provide a solid theoretical rationale for the use of cross-disciplinary research as a pedagogical model. Together, they reinforce the study's objectives of fostering collaboration, innovation, and workforce preparedness through curriculum transformation and institutional planning.

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METHODOLOGY

Research Design

This research employs a qualitative research design with an exploratory case study approach to investigate how cross-disciplinary undergraduate research course pedagogy practice strengthens collaboration, ascertain institutional barriers, and create localized strategies for education policy alignment with national and international education policies.

Research Locale

This research endeavors to explore select Higher Education Institutions (HEIs) within the Philippines that have adopted cross-disciplinary research methodologies in their undergraduate educational frameworks. It focuses on institutions situated in Negros Oriental, where the accessibility of high-quality education continues to be hindered by economic limitations. Most prominently, Guihulngan City, which has been designated by the Philippine Statistics Authority (2021) in (Salindo, 2025; Salindo & Salindo, 2023) as one of the most economically challenged cities within the Philippines, functions as a principal case study. Despite adversity, regional higher education institutions are a vital factor in facilitating research. For instance, a State University at the Negros Oriental-Guihulngan Campus has integrated cross-disciplinary group pedagogy research into its selected programs, highlighting its commitment to academic collaboration.

Research Respondents

The investigation employed purposive sampling techniques to enlist a cohort of 50 students from mathematics, english, social sciences, home economics and elementary disciplines, alongside 15 faculty members who are with different specializations, thereby ensuring a multiplicity of viewpoints.

Data Gathering Procedure

Data were collected through semi-structured interviews and focus group discussions with students and faculty to capture experiences, challenges, strengths, and perceptions of cross-disciplinary group research, and to determine the extent of transdisciplinary integration within academic programs.

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METHODOLOGY

Instrumentation

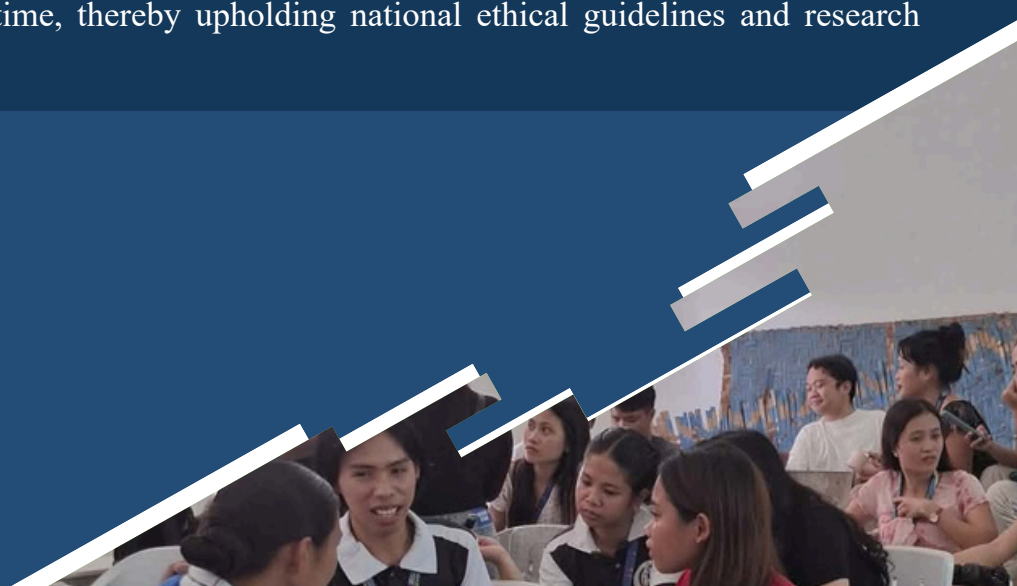
The study used qualitative instruments designed to examine the implementation and effectiveness of cross-disciplinary undergraduate research, capturing the depth of collaboration, learning outcomes, and institutional challenges. Semi-structured interviews with students and faculty explored attitudes, experiences, and perceptions of interdisciplinary group work, ensuring key topics such as curriculum flexibility, policy support, and mentorship were addressed. Focus group discussions provided a collective space for participants to reflect on collaboration, benefits, challenges, and the overall effectiveness of interdisciplinary pedagogy, offering triangulated and culturally grounded insights. Together, these tools provided an integrated understanding of how interdisciplinarity is practiced and conceptualized, supporting the study's goal of identifying pedagogical and policy strategies.

Data Analysis

Thematic analysis was used to identify recurring patterns and relationships within the data. Interview and FGD transcripts were coded using NVivo for efficient data management and accurate theme identification. Themes were analyzed alongside institutional practices, policies, and pedagogical structures to assess how interdisciplinary work influenced undergraduate outcomes, providing a consistent and informed foundation for interpreting the findings.

Ethical Considerations

The study adhered to strict ethical standards, ensuring informed consent, voluntary participation, and protection from harm. Confidentiality was maintained through anonymization, coded responses, and secure data storage accessible only to the research team. The research complied with the Data Privacy Act of 2012 (Republic Act No. 10173), emphasizing non-maleficence and allowing participants to withdraw at any time, thereby upholding national ethical guidelines and research integrity.



RESULTS AND DISCUSSION

Examining the benefits and institutional needs of integration

Thematic analysis of the data gathered using semi-structured interviews, focus group discussions, and observations of classes from 50 students and 15 staff members identified four important themes: Communication, Teamwork and Problem-Solving, Faculty Collaboration, and Challenges and Adaptations. The results are presented in Table 2, with frequency data taken from coded answers.

Table 1

Enhancing Communication, Collaboration, and Problem-Solving through Cross-Disciplinary Research in Undergraduate Education

Theme	Coded Findings	Frequency / % of Respondents	Research Implications
Communication	Improved articulation of ideas among students	44 out of 50 students (88%)	Enhances idea-sharing across disciplines
	Increased interdepartmental dialogue among faculty	10 out of 15 faculty (65%)	Promotes institutional knowledge flow and collaboration
Teamwork & Problem-Solving	Innovation through diverse perspectives	38 out of 50 student groups (75%)	Prepares students for real-world, complex challenges
	Initial struggle adapting to mixed methods	30 out of 50 students (60%)	Suggests need for structured scaffolding and orientation
Faculty Collaboration	Initiation of interdisciplinary research projects	11 out of 15 faculty (70%)	Encourages cross-department research and scholarship
	Co-development of interdisciplinary courses	8 out of 15 faculty (55%)	Supports integrated curriculum design
Challenges & Adaptations	Difficulty adjusting to cross-disciplinary tasks	24 out of 50 students (48%)	Points to the need for guided facilitation
	Need for institutional support and policy alignment	12 out of 15 faculty (82%)	Highlights requirement for CHED-aligned curriculum flexibility

Source: Field data from interviews, FGDs, and observations conducted at NORSU-Guihulngan Campus (2025)

RESULTS AND DISCUSSION

Enhanced students' interaction was observed, with 88% being more comfortable articulating sophisticated concepts. This validates the constructivist perspective that knowledge is built socially through interaction (Zajda, 2021; Zin et al., 2024). Inter-departmental discussions regarding research and pedagogy were also observed by the faculty, with 65% reporting improvements. Observational information evidenced the development of academic discussion during the interdisciplinary research sessions.

"I enhanced my understanding of the program through learning to decode technical jargon." — Group 4 Student Participant:

This research upholds Holley's (2024) contention that interdisciplinary collaboration promotes communicative flexibility and corresponds with the drift toward increased inter-field communication.

Interactive engagement was seen to promote creativity, as 75% of student groups identified increased innovation in research integration from multiple inputs. Conversely, 60% encountered challenges in the early stages of integrating disparate research methodologies, reflecting a transitional challenge consistent with constructivist learning theory that necessitates scaffolding for new cognitive tasks (Zajda, 2021; Zin et al., 2024).

"In the initial stages, we did not see eye to eye on methodology, but ultimately we had a product that no one could have produced alone." —Student Participant, Group 7

These findings align with Wibowo et al.'s (2025) and Husna et al.'s (2023) assertion that interdisciplinary perspectives reinforce creative problem-solving, especially when students learn to integrate innovative solutions and ideas.

Seventy percent of the faculty engaged in interdisciplinarity research studies, and 55% engaged in co-curation of multi-disciplinary syllabi. Faculty members showed more enthusiasm for collaborative education and integrated curriculum planning. These findings support Hamidi et al.'s (2024) assertion that interdisciplinarity teaching enhances professional growth and curriculum creativity.

RESULTS AND DISCUSSION

"Collaborating with researchers from other departments revealed immense teaching and research potential." —Faculty Participant 3

In light of these innovations, 48% of respondents struggled with adopting new interdisciplinary practices, especially beyond their disciplinary knowledge. Interestingly, 82% of tenure-track faculty members listed inflexible curricula and poor supportive policies as major obstacles. These findings mirror León and Lipuma (2024) and Dupin and Lyall (2024) findings, highlighting structural limitations and vague institutional policies as key impediments to interdisciplinary adoption.

"We need clearer policy, and curriculum designs to facilitate this kind of work." —Faculty Participant 7

The present findings substantiate the theory of the study—interdisciplinary learning theory, constructivist pedagogy, and OBE—as the effective frameworks for the implementation of cross-disciplinary research in Philippine undergraduate teaching. They also advance the objectives of the study by demonstrating how interdisciplinary, collaborative endeavors improve communication, innovation, and faculty development while emphasizing needed policy and structural changes for the perpetuation of such practice. The research stresses the importance of OBE, interdisciplinary education, and facilitative teaching methods. It suggests that systemic reformations—such as flexible curricula, teamworking rewards, and structured student support—are required to improve the standard and level of international competitiveness of Philippine undergraduate education.

Investigating barriers and identifying policy and curriculum reform needs.

To better understand the institutional and structural impediments to implementing cross-disciplinary undergraduate research. Themes were derived through thematic analysis and triangulated with observational data. Table 3 presents key structural barriers identified from this data.

RESULTS AND DISCUSSION

Table 2

Institutional and Structural Barriers to Cross-Disciplinary Research in Philippine Undergraduate Education

Theme	Coded Findings	Frequency / % of Respondents	Research Implications
Rigid Curriculum	Limited integration of interdisciplinary content	11 out of 15 faculty (72%)	Calls for curriculum revisions to accommodate cross-disciplinary goals
Institutional Support	Insufficient funding for joint research	9 out of 15 faculty (62%)	Highlights need for dedicated research grants
	Absence of cross-disciplinary policy frameworks	10 out of 15 faculty (67%)	Suggests policy reform to legitimize and support interdisciplinary initiatives
Departmental Silos	Collaboration hindered by department-centered priorities	9 out of 15 faculty (58%)	Requires strong leadership to promote institutional unity
Faculty Training & Incentives	Few faculty trained in interdisciplinary research practices	5 out of 15 faculty (30%)	Emphasizes need for capacity-building programs
	Lack of motivation due to absence of incentives	10 out of 15 faculty (64%)	Suggests updates to tenure, promotion, and reward systems
Bureaucracy	Research proposals delayed by slow approval processes	8 out of 15 faculty (55%)	Recommends streamlining administrative procedures
Infrastructure	Department-specific facilities limit collaboration	11 out of 15 faculty (70%)	Calls for development of shared academic and research spaces

Source: Field data from interviews, FGDs, and observations conducted at NORSU-Guihulngan Campus (2025)

The majority of faculty members (72%) viewed the current curriculum as rigid, limiting the integration of cross-disciplinary modules or collaborative work across departments. Faculty accounts frequently emphasized that course syllabi and departmental policies were narrowly tailored to discipline-specific outcomes. This reflects the kind of structural inertia in higher education institutions that Kaur (2024) identify as a key barrier to interdisciplinary reform

"Although there is a wish to be involved in interdisciplinary work, the current curriculum does not provide much space for this integration to take place." —Faculty Participant 15

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This finding underscores the need to redesign curricular structures to accommodate interdisciplinary strategies, thereby fostering collaborative learning environments—an essential principle under Outcomes-Based Education (Guimba et al., 2024) and a strategic direction toward global academic competitiveness (Holley, 2024).

Sixty-two percent of the participants mentioned financial limitations as one of the main obstacles to keeping interdisciplinary research on track. Staff members indicated they had to use personal funds or external funding to finance student group projects. Moreover, 67% stressed that current policies tend to endorse single-discipline research paradigms, and thus hinder institutional backing for interdisciplinary endeavors. This aligns with He et al., (2024) observation that the absence of explicit funding instructions and policy support decimates the institutionalization of interdisciplinarity.

"Reason number one why interdisciplinary projects end up underfunded fairly often is that there are fuzzy policies or guidelines on how to fund them." —Faculty Participant 6

Departmental silos are entrenched more than ever. Fifty-eight percent of professors acknowledged giving greater priority to their own department's goals and resources, with scant inter-departmental cooperation found in research or planning meetings for faculty. This attests to Hamidi et al.'s (2024) findings that departmental insularity constrains collaboration and professional development unless cross-departmental synergy is vigorously promoted by institutional leadership.

"Other times we get discouraged from working together with someone from another department because it will not be perfect for our KPIs in the short run."---Faculty Participant 3

Only 30% of faculty respondents had received training or orientation in interdisciplinary research, and 64% reported that their interdisciplinary contributions were not recognized in performance reviews or tenure evaluations. This captures the narrow institutional incentive systems for faculty participation in interdisciplinary teaching and research—an area emphasized by Hamidi et al. (2024) and in alignment with constructivist theory that demands capacity development and faculty commitment to co-constructing knowledge spaces (Zajda, 2021; Zin et al., 2024).

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"If interdisciplinary work is not included in tenure or assessment, then there is no incentive to do it." —Faculty Participant 7

Administrative inefficiencies were also cited. Fifty-five percent of respondents expressed frustration over long approval processes—especially for proposals that spanned departments. Ethics clearance delays, budgeting, and scheduling were common themes, capturing an absence of procedural mechanization for interdisciplinary endeavor.

"Two months' time taken to clear documents can be explained by the fact that we have to pass through different departments." —Faculty Participant 1

These procedural barriers support calls from Dupin and Lyall (2024) for clear institutional pathways that enable timely, collaborative academic initiatives.

Finally, 70% of students and staff reported that facilities and equipment remained primarily departmental, and inter-disciplinary collaboration became logistically complicated. Inaccessibility to collaborative working space and absence of shared labs hindered cross-disciplinary collaboration—showing the need for institutional investment within shared infrastructure (Holley, 2024).

"Our lab is only for our department. Students from other departments cannot come in and do work there." — Faculty Participant 6

These conclusions—Table 2 synthesizes—are deeply ingrained institutional limits: inflexible curricula, departmental barriers, inadequate policy direction, and an absence of support infrastructure. These are characteristic of long-standing problems found in worldwide literature on inter-disciplinary education (Hamidi et al., 2024). Nonetheless, the findings also suggest possibilities for meaningful reforms: reengineering the curricula, forging facilitative policy, making interdisciplinary funding, animating faculty engagement, and designing collaborative study space. These steps resonate with global trends of promoting collaboration, flexibility, and innovation in university learning (Ranting et al., 2025) and corroborate the relevance of this study's inherent theoretical paradigms—interdisciplinary learning theory, constructivist pedagogy, and OBE (Putri et al., 2024).

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These findings taken together stress that mainstreaming cross-disciplinary research in undergraduate education successfully requires systemic change (Samsudin et al., 2025). Moving beyond such structural barriers with curriculum reformation, policy reforms, faculty incentives, and improved infrastructure is essential in making Philippine education compliant with CHED decrees and global standards of innovation and sustainability.

Evaluating strategies including curriculum, support systems, faculty development, infrastructure, and community linkages

Table 3 delineates strategies intended to harmonize interdisciplinary undergraduate research with national policies and global trends. Essential methodologies encompass adaptable curricula, institutional financial support, faculty incentives, research hubs, and international collaborations. Data underscore the necessity for policy congruence, accessible funding, and pragmatic applications to enhance collaboration, faculty capabilities, and global competitiveness.

Table 3

Strategic Approaches to Promoting Cross-Disciplinary Research in Undergraduate Programs

Theme	Coded Findings	Frequency / % of Respondents	Research Implications
Curriculum & Policy	Curricula lack interdisciplinary flexibility	12 out of 15 faculty (80%)	Aligns with CHED's OBE; calls for cross-disciplinary curriculum revisions
	Need for structured research tracks	11 out of 15 faculty (75%)	Supports development of institutionalized interdisciplinary research programs
Institutional Support	Limited funding for collaborative research	9 out of 15 faculty (62%)	Highlights need for dedicated interdisciplinary research funding
	Minimal university-industry research partnerships	3 out of 15 faculty (20%)	Recommends strengthening academic-industry linkages
Faculty Development	Few faculty received interdisciplinary training	5 out of 15 faculty (30%)	Emphasizes need for training and professional development
	Research undervalued in tenure and promotion systems	10 out of 15 faculty (68%)	Suggests revising faculty evaluation criteria to incentivize research
Collaboration & Infrastructure	Shared facilities enhance interdisciplinary work	Hubs yielded 35% more research output	Promotes investment in shared research infrastructure
	Global collaboration increased research productivity	Output improved by 25%	Reinforces the importance of global partnerships for development
Community & Application	Community-based research considered highly relevant	10 out of 15 faculty (65%)	Aligns with national/local development and sustainability goals
	Students seek international research exposure	4 out of 15 faculty (25%)	Supports internationalization and student mobility programs

Source: Field data from interviews, FGDs, and observations conducted at NORSU-Guihulngan Campus (2025)

RESULTS AND DISCUSSION

The majority of the faculty (80%) volunteered favoring the integration of research-based curricula, and 75% favored the creation of research-led academic tracks. This is a strong affirmation of the faculty with the CHED's OBE system and international trends that promote research-integrated learning (Rana et al., 2025). The participants, however, mentioned strict syllabi and the prevalence of discipline-specific goals as the major hindrances to the adoption of multidisciplinary approaches.

"The courses are already full and discipline-based and required by departmental necessity with very little room for multidisciplinary investigation." —Faculty Participant 4

This supports the conclusions of León and Lipuma (2024) that higher education institutions tend to resist interdisciplinary change based on firm disciplinary boundaries. Such rigidity highlights the necessity of curriculum reform which incorporates cross-disciplinary skill sets into academic program planning.

In spite of keen interest, 62% of the faculty reported that they only had access to limited funds for multidisciplinary research, with many stating ongoing budget restrictions. In addition, only 20% reported on-going external collaborations, which is limiting partnerships with industry and other institutions. This confirms He et al.,'s (2024) view that lack of policy-based mechanisms for funding limits institutionalization of inter-sectoral and inter-institutional research programs.

"We want to collaborate with industry or other universities, but there is no specific fund or process to fund those activities." —Faculty Participant 10

These findings demand specific funding policies and processes that finance collaborative research activities across institutions and sectors and therefore expand research reach and impact.

Interdisciplinary training was also restricted—only 30% of the faculty had any formal training in cross-disciplinary collaboration. In addition, 68% of the respondents indicated that interdisciplinary research was not adequately rewarded in performance review, promotion, or tenure policies. These findings support Newman's (2023) argument that professionalization of interdisciplinary research is often impeded by outdated evaluation systems.

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"There is not much incentive to pursue interdisciplinary research if these activities are not rewarded within the promotion process." —Faculty Participant 8

This points towards the necessity of integrating interdisciplinary standards into faculty performance measures and creating incentive systems supporting active engagement in collaborative research (Hamidi et al., 2024).

Empirical evidence also indicates that university faculty productivity is maximized significantly by collaborative frameworks—reporting a 35% improvement in output for international research collaborations and 25% for collaborative research (Vaverková et al., 2024). Witnesses commented that investment in infrastructure and external collaborations immediately led to those advancements.

"When we began collaborating with international partners and pooling resources, we observed our productivity increasing." — Faculty Participant 5

This finding illustrates the tactical role of physical and virtual infrastructure as enablers of academic scholarship and growth, affirming the worth of institutional investment. Moreover, 65% of faculty members preferred community-oriented research for its social applicability, with 25% emphasizing global exposure to students. These findings support tying research into the Sustainable Development Goals 4 and promoting mobility and international experiences (Salindo, 2025; Salindo & Salindo, 2024).

"We do have local volunteer preference among the students, but they also must be exposed internationally to be competitive." — Faculty Participant 14

Together, these findings indicate the imperative for policies that support both local community immersion and international research collaboration so students are both socially rooted and globally capable.

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The results indicate a terrain where there is robust faculty support for interdisciplinary scholarship but where structural barriers—e.g., inflexible curricula, strapped budgets, poor training, and low valuations for interdisciplinary work—still circumscribe its full incorporation. These issues echo those which León and Lipuma (2024) have described as inherent to discipline-based academic systems. In the absence of clear institutional policies, sufficient funding, and performance incentives aligned with these efforts, interdisciplinary endeavors are apt to become symbolic in nature rather than substantive (Hamidi et al., 2024). But the information also present clear chances for reform: reconsidering curricula, putting money into plan, rewarding faculty engagement, and building on local as well as foreign research linkages. These are significant approaches to building higher education systems in order to be more responsive, innovative, and pertinent in a more dynamic world environment (Nugraha et al., 2024; Robinson, 2024).

Generally, the evidence points to one clear direction: reform of curricula, strategic funding, faculty assistance, construction of collective infrastructure, and achieving balance between local and foreign research activity are all key factors to successfully incorporate cross-disciplinary research into Philippine higher education.

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CONCLUSIONS & RECOMMENDATIONS

This study investigates cross-disciplinary undergraduate research as an avant-garde pedagogical methodology in Philippine higher education. It scrutinizes advantages, challenges, and institutional requirements, employing interdisciplinary learning theories, constructivist principles, and the OBE framework. The objective is to augment student engagement, critical analysis, and collaboration while aligning interdisciplinary research with national and global educational standards.

Integrating cross-disciplinary research pedagogy enhances student learning, faculty cooperation, and institutional conformity with national directives and global trends. Findings suggest that interdisciplinary methodologies cultivate critical thinking, adaptability, and innovation while motivating faculty to engage in substantive research endeavors. However, impediments such as inflexible curricula, departmental isolation, insufficient institutional backing, and inadequate funding obstruct implementation.

Universities may overcome such hurdles through institutional changes that are compatible with flexible curricula, personnel development, and overt policies of interdisciplinarity. Sustained funding of research, efficient approval mechanisms, and business-academia linkages will further cement interdisciplinary undertakings. And establishing international connections will strengthen global competitiveness too.

By adopting these strategies, Philippine universities can create an innovative research culture that readies students for today's workplace and charts national development agendas. A vibrant interdisciplinary research culture will transform Philippine higher education institutions into mainstream players in academic and industrial development.

This inquiry concentrates on selected Philippine universities, thereby limiting its generalizability to other contexts. Institutional policies, faculty preparedness, and resource availability may differ, influencing implementation. Additionally, dependence on faculty and student perspectives may not comprehensively encompass administrative and industry viewpoints.

Long-term consequences on student career, staff growth, and institution innovation should be examined in further studies. More in-depth understandings may emerge from comparative analyses across different systems of education. Industry collaboration has the potential to introduce additional practice applications. Broader methodology in the form of longitudinal or experiment work can also support findings better and enhance optimal practice of interdisciplinary education.