Industry-Academia Collaboration for Competency-Based Curricula: A Study towards Enhancing Employability and Job Readiness

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Abstract

This project investigates industry-academia partnerships in Nepal to create competency-based curriculum that improve graduate employability. The study investigates the determinants propelling integrated curriculum design and evaluates the aspects affecting stakeholder engagement, considering the increasing disparity between academic outcomes and labor market requirements. Structured questionnaires employing a quantitative framework were administered to 65 educational and 162 corporate respondents from prominent Nepalese colleges and businesses. Logistic regression and factor analysis were employed to validate constructs and predict collaborative outcomes. The results show that there are big differences in how people see things: academic institutions have mixed attitudes on the importance of the curriculum and employability (α = .260–.407), whereas companies actively promote curriculum co-design and say there are critical skill gaps (α = .775). Two academic constructs displayed reliability: corporate contribution to learning (α = .661) and research collaboration (α = .603). Logistic regression shows that meaningful industry discussion is a strong predictor of collaborative curriculum practices. The study finds that institutional mechanisms, such as competency integration, curriculum advisory boards, and structured feedback loops, are essential to bridge the divide between academics and industry. Policy changes that institutionalize collaborative curriculum creation, incorporate industry-validated competencies, and encourage long-term research partnerships are some of the effects that will help generate graduates who are ready for the job market and meet market needs.

Keyword: *industry–academia collaboration, competency-based curriculum, graduate employability*

A curriculum is a structured plan guiding the development of knowledge, skills, and attitudes to meet societal and real-world demands, including employment, business, and civic engagement.

1. Introduction

1.1 Background

A curriculum is a path of action that a university or other organization suggests to businesses and industries to help people improve their existing experiences by giving them new skills, information, and attitudes. This helps society reach its goals for development. Tyler (1949) and Taba (1962) both wrote about the curriculum needing to meet the needs of society, even though they wrote before the contemporary industrial information economy. Tyler made a strong case for getting some of the curriculum's aims from "contemporary life outside the school," such work, business, and being an active citizen. Taba also stressed that the curriculum should be relevant to society and reflect its problems and demands.

1.2 Review of the literature

Recent studies on collaboration between business and academia highlight the critical role of coordinated initiatives in aligning higher education curricula with industry requirements to enhance graduate employability. Mahalingam (2024) examined the implementation of an Industry-Driven Curriculum (IDC) framework in a higher education institution, illustrating that structured collaboration between academia and industry promotes the creation of pertinent and effective curricula. However, the study primarily concentrated on certain institutional viewpoints, hence constraining its relevance to private institutions and wider industrial perspectives. In a similar fashion, Sui and Bharanidharan (2019) investigated undergraduate engineers' perceptions of industrial partnership programs through both

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quantitative and qualitative approaches. Their results suggest that students know a lot about employability skills including how to write a résumé and prepare for an interview. However, they also find that students are missing some technical and soft skills. Abbas, Kumari, and Al-Rahmi (2024) investigated the function of Quality Management Systems (QMS) in higher education. He discovered that QMS significantly enhances students' employability, with collaboration between industry and academics serving as a partial mediator, highlighting the strategic significance of industry participation in cultivating graduate competencies. Zeidan and Bishnoi (2020) emphasized the deficiencies of current curriculum in preparing undergraduates for Industry 4.0, identifying gaps in practical skills, technical knowledge, and interpersonal competencies vital for business success. These studies indicate that collaboration between industry and academia enhances employability and skill preparedness; however, current research frequently suffers from limited sample sizes or institutional biases, highlighting the necessity for more extensive and generalizable studies across varied academic and industrial settings.

Recent studies show that industry–academia collaboration boosts graduate employability by aligning curricula with real-world skills, but broader research across diverse institutions is needed.

1.3 Problem statements

For a long time, knowledge has been crucial for running businesses and industries. The world has witnessed this, and four revolutions have already transpired in the name of the Industrial Revolution. A recent book, Industrial Revolution in Knowledge Management and Technology (Author, Year, edited by Ismail, Zulkipli, Jaafar, and Öchsner, 2023), has shown how important knowledge is for industries to stay in business and grow. Many research studies have been done to show that there has to be a robust, well-organized, and mutually beneficial collaboration between industry and academia. But there are problems in our country and position. This gap prompted the authors to conduct this study, concentrating on the perceptions of knowledge within our universities, institutions, and colleges about the industrial and business sectors, and conversely, how the business and industrial sectors prioritize academic knowledge as topics of debate.

Sustainable industrial growth relies on strong academia–industry partnerships, but local gaps drive research on how universities and businesses perceive and apply knowledge collaboratively.

1.4 Objectives

The objective of this article is

- To identify different constructs underlying the academic and corporate leaders, to help them move in a coordinated manner for the development of both
- To find the significance of different factors that help their involvement in curriculum design and development

1.5 Significance of the study

This study is both contemporary and pertinent in the context of bridging the knowledge and talent gap between academics and industry. It helps a lot of important areas. First, it stresses the importance of aligning the curriculum with the needs of the workforce. This shows that a current, relevant curriculum is necessary to create a qualified and competent workforce that can satisfy the needs of today's industries and society. Second, the research talks about how to make graduates more employable. It says that graduates who are well-prepared don't need as much training from their employers, which lowers the cost of onboarding and lets them start working right away. Finally, the study emphasizes the advancement of research and innovation, demonstrating that enhanced collaboration between industry and academia fosters applied research that addresses tangible difficulties, resulting in practical, scalable solutions and facilitating sustainable development. This study is contemporary and relevant in the context of closing the gap between academics and business in terms of knowledge and skills. The following is a summary of the key areas of contribution of the research:

The study highlights that aligning curriculum with industry needs, enhancing employability, and fostering research collaboration are key to bridging the academia–industry gap and supporting sustainable development.

2. Materials and methods

2.1 Research design

This study utilized a quantitative research approach to investigate the alignment between academic institutions and the business sector in Nepal concerning curricular relevance, industry participation, research collaboration, competency

gaps, and graduate employability. A standardized questionnaire was distributed to academic participants (faculty and administrators) and corporate professionals (HR managers, training officers, and industry representatives). The questionnaire had Likert-scale items assessing perceptions of industry-academia collaboration and curriculum efficacy.

2.2 Sampling and data collection

Respondents were chosen intentionally and for convenience from leading universities, associated colleges, and significant corporate organizations in Nepal. The academic sample gathered opinions on curriculum design, student learning, and collaborative processes inside institutions. The corporate sample shed light on what the market expects, how ready graduates are, and how involved they are in research and curricular activities. We gathered data using self-administered surveys, both online and in person.

2.3 Instrument development

The first instrument was made up of things that came from research on how to work together in business and school, how to acquire a job, how to develop a curriculum, and how to get better at what you do. Items were categorized into thematic domains and later subjected to factor analysis to identify underlying constructs. We utilized Cronbach's alpha to check how reliable each construct was.

2.4 Data analysis

This study used a quantitative survey of academic and corporate respondents in Nepal, applying factor analysis and reliability testing to assess curriculum relevance, industry collaboration, competency gaps, and graduate employability.

We used factor analysis (principal component extraction with reliability testing) to examine the measurement scales and make them better. We deemed constructs with a Cronbach's alpha of 0.60 or above as reliable and appropriate for subsequent investigation. People were careful with constructions that had a Cronbach's alpha of less than 0.60 because they were regarded to be weak or unstable. Separate factor analyses were conducted for academic and business respondents, resulting in newly identified constructs for each group.

3. Result

3.1 Descriptive statistics

3.1.1 Descriptive statistics of academic sectors and corporate sectors

The descriptive data from the academic respondents (N = 65) indicate a moderately experienced cohort (M = 2.22 on a 3-point scale) with relatively modest involvement in curriculum design and industry collaboration (M = 1.75). Most people considered that contacts between industry and academics were good. Most participants (M = 4.28) agreed that talking to businesses helps students learn new things and improve their skills. Most people (M = 4.29) also agreed that businesses' involvement helps students learn better. People also said that there should be better ways to hold long-term conversations (M = 4.31). People thought that curriculum updates happened often (M = 4.00), but they also claimed that it was challenging to make modifications on time (M = 3.63). The amount of participation in cooperative research with industrial partners was moderate (M = 3.38), but participants thought that these relationships considerably improve career chances (M = 4.18). The students' readiness for competency was judged as modest (M = 3.60), and there were clear worries regarding new employability problems (M = 4.03). Respondents clearly saw that courses still lack important skills like problem-solving, digital literacy, crisis management, creating relationships, and working as a team (M = 3.80). In the corporate sector (N = 162), respondents reported a lower average of years of experience (M = 1.88 on a 2-point scale) and held diverse institutional positions (M = 3.60). Participation in academic curriculum design was minimal (M = 1.37), indicating limited structural collaboration. Businesses still said they were fairly involved in talks with universities about curriculum design and skills (M = 3.77), and talks about workforce needs were also seen as good (M = 3.84). Maintaining positive ties with schools was perceived as an ongoing challenge (M = 3.91). The amount of business representation in curriculum bodies was average (M = 3.49), although being involved in teaching and learning activities was thought to assist students learn (M = 3.57). Respondents strongly agreed that structured representation and

orientation programs, among other things, are necessary for making a good curriculum (M = 4.08). Corporate respondents moderately agreed that university curriculum are responsive to industry needs (M = 3.42) and technological changes (M = 3.99). Connecting curricula to real market trends, on the other hand, was considered as a big problem (M = 4.49). Collaboration on research and knowledge-sharing had a fair score (M = 3.77), but there was a lot of support for its role in improving graduate skills and making it easier for technology to move from one place to another (M = 4.33 and M = 3.99, respectively). People were only somewhat happy with how ready graduates were for work (M = 3.59). But they were worried that graduates didn't have the right technical, soft, interpersonal, and management abilities (M = 3.91). Everyone agreed that colleges and universities should help students become skilled enough to find work (M = 4.04).

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3.1.2 Construct from academia responses (Institutional perspectives)

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3.1.3 Constructs and reliability from Corporate Responses

Factor analysis was conducted separately for academic and business respondents to identify the essential elements of industry-academia collaboration and curricular relevance. The investigation generated multiple constructs; however, only a subset demonstrated acceptable reliability, as indicated by Cronbach's alpha coefficients ($\alpha > 0.60$), in alignment with the methodological standards set out by Nunnally (1978) and Hair et al. (2019). Five constructs emerged among academic respondents. Only two—Industry–Academia Research Collaboration ($\alpha = .603$) and Corporate Contribution to Student Learning ($\alpha = .661$)—satisfied the minimum dependability requirement, demonstrating consistency between them. These factors highlight the importance that scholars have on joint research initiatives and the influence of industry involvement on enhancing student learning outcomes. The other constructs—Industry Participation in Curriculum Design ($\alpha = .339$), Curriculum Relevance and Challenges ($\alpha = .407$), and Curriculum Competency Gaps and Employability ($\alpha = .260$)—were not very reliable, which means that the items that made up these factors were not very closely related to each other. This could suggest that the ideas are too similar, that the people who answered have different opinions, or that the measurement items need to be better. Four constructs were formulated for corporate responders. Three categories demonstrated strong reliability: Industry Participation in Curriculum Development ($\alpha = .749$), Competency Gaps and Graduate Readiness Challenges ($\alpha = .775$), and Industry–Academia Dialogue and Skill Alignment ($\alpha = .538$). These reliable designs highlight industry apprehensions regarding curriculum adaptability, persistent skill gaps among graduates, and the necessity of ongoing conversation to align university outputs with labor market requirements (Abbas et al., 2024; Zeidan & Bishnoi, 2020). The construct Industry Research Collaboration and Job Readiness ($\alpha = –.098$) was shown to be statistically unreliable, indicating that the items did not represent a singular underlying dimension and may require reconceptualization or removal from subsequent scales. The factor analysis results indicate that some aspects of collaboration, including joint research, skill alignment, and industry participation in curriculum, are consistently seen as significant. But the tools need more work in other areas, such competency gaps, curriculum problems, and job preparation. This aligns with contemporary research emphasizing the complexity of measuring industry-academia collaboration and the imperative for verified, context-specific indicators in developing countries such as Nepal (Mahalingam, 2024; Sui & Bharanidharan, 2019).

Descriptive statistics reveal that academics see moderate industry engagement and collaboration benefits but not competency gaps, while corporations report limited involvement and concerns over graduates' skills.

Factor analysis showed that research partnerships, corporate learning contributions, curriculum involvement, and skill alignment are reliable, but competency gaps, curriculum relevance, and graduate readiness need better measurement tools in Nepal.

3.2 Summary of the Comparative Interpretation

Table 3.2 Summary of the Comparative Interpretation

Area	Academia	Corporate	Alignment?
Research collaboration	Moderate	Weak	Partial alignment
Curriculum design participation	Weak	Strong	Divergence
Competency gaps & employability	Weak	Very strong	Major divergence
Corporate role in learning	Strong	Moderate	Alignment
Job readiness perception	Fragmented	Fragmented	Weak alignment

3.3 Logistic regression

Logistic regression indicates that active corporate dialogue is the key predictor of academia adopting workforce-aligned practices, while other collaboration factors have minimal impact.

3.3.1 Logistic regression from academia responds to the finding that academia and corporations join together to design curriculum

The logistic regression analysis of academia-related factors indicates that only one predictor—dialogues with the corporate sector concerning growing knowledge and skill requirements—was statistically significant (B = 2.207, p = 0.017, Exp(B) = 9.084). This means that organizations that value active corporate conversation are much more likely to adopt strategies that meet the demands of their employees. The other factors, such updating the curriculum, getting help from business experts, working together on research, and improving skills, didn't have a big effect on the outcome ($p > 0.05$), which means they didn't have much of an effect at all. The findings indicate that, although direct communication with business is crucial, other aspects of industry-academia collaboration are perceived variably across institutions. This shows how important it is to strengthen and organize collaborative efforts to make students more employable and the curriculum more relevant.

Logistic regression was inconclusive due to multicollinearity, suggesting that combining variables or using Structural Equation Modeling is needed to assess corporate engagement's impact on curriculum and graduate readiness.4. Discussion and findings.

3.3.2 Logistic regression from corporate responses to the finding that academia and corporations join together to design curriculum

Variables in the Equation

The logistic regression analysis of business engagement factors indicates that none of the individual predictors significantly elucidate the outcome. This is shown by very high standard errors, coefficients that change a lot, and p-values that are much higher than the usual level of significance. The results show that the 18 variables are multicollinear and duplicate each other, which means that the model can't accurately show how some business activities affect curriculum design, research cooperation, or readiness for graduation. The findings indicate that substantive interpretation necessitates the consolidation of related components into reliable constructs or the application of alternative modeling techniques, such as Structural Equation Modeling (SEM), to more effectively clarify the relationships between corporate engagement and employability outcomes. [The source table is reserved with the author.]

4. Discussion on the result

This study examined the reliability of constructs pertaining to industry-academia collaboration for competency-based curriculum creation in Nepalese universities and the business sector. The findings indicate notable alignment and essential divergence between the two industries in their views on collaboration, curriculum relevance, and graduate employability. The business community has strong and unambiguous ideas about what role it should play in designing curricula and worries about how ready graduates are to work. The constructs Industry Participation in Curriculum Development ($\alpha = .749$) and Competency Gaps & Graduate Readiness Challenges ($\alpha = .775$) exhibit excellent reliability coefficients. This suggests that business respondents think that problems with the curriculum and skill gaps are systematic, urgent, and intimately linked to job prospects. This implies that companies are under more pressure to hire graduates with both technical and soft skills. It also shows that schools need to focus on teaching techniques that are centered on what students can do. Nonetheless, academic institutions exhibit consistent perceptions, particularly in the areas of research collaboration ($\alpha = .603$) and business

contributions to student learning (α = .661). This illustrates that universities value business participation in collaborative research and teaching and learning activities because they know it helps students learn and grow. But factors connected to curriculum design and competency development have low reliability (e.g., α = .339 and α = .260), which means that there is a lack of internal understanding or inconsistent practices when it comes to modifications in the curriculum. People contribute in curriculum design in very different ways. Businesses think they work well with schools, but schools don't agree. This gap shows that there is a discrepancy between what businesses demand and what universities do. This could be because the laws aren't clear, the ways to get involved aren't regular, or the institutions don't have enough freedom. Another noteworthy finding is that businesses don't have a good opinion of research collaboration and job preparedness (negative dependability). This shows that even while there are research partnerships, not all companies see them as directly improving job readiness. Academics, on the other hand, think that these kinds of alliances are helpful for getting a job. The results reveal that both groups agree that working together is vital, but they disagree on how important it is and how clear it is. To make the job market in Nepal more employable and ready for work, it's vital to fill these gaps and create competency-based curricula.

The study highlights a gap in Nepal's education system, where industry focuses on skill-ready graduates, while academics emphasize research and funding, showing misalignment in competency-based curriculum development.

4.1 Findings from the results

Reliability and idea validation utilizing Cronbach's Alpha revealed that merely a segment of the proposed constructs exhibited adequate internal consistency for incorporation into subsequent study. The findings revealed diverse dependability results from both academic and corporate perspectives, establishing an exploratory threshold of α > 0.50. In the academic dataset, merely two variables met the minimum reliability criteria: Industry–Academia Research Collaboration (α = .603) and Corporate Contribution to Student Learning (α = .661). The remaining constructs—Industry Participation in Curriculum Design (α = .339), Curriculum Relevance and Challenges (α = .407), and Competency Gaps and Employability (α = .260)—were not dependable enough to be included in further structural analysis. Similarly, three of the corporate responses exhibited adequate internal consistency: Industry Participation in Curriculum Development (α = .749), Competency Gaps and Graduate Readiness (α = .775), and Industry–Academia Dialogue and Skill Alignment (α = .538). The construct Industry Research Collaboration and Job Readiness exhibited a negative dependability coefficient (α = –.098), indicating considerable inconsistency and unsuitability for further modeling. The findings demonstrate that certain items accurately represent the essential attributes of industry-academia collaboration, whilst others require refining or reconstruction to improve assessment validity in future studies.

Cronbach's Alpha showed that research collaboration and curriculum participation were reliable, but other constructs need refinement to improve future measurement validity.

This report provides numerous actionable recommendations for both academia and the corporate sector to strengthen industry-academia partnerships and enhance graduate employability. Colleges and universities need to set up proper, organized ways for corporations to get involved. This can be accomplished by forming permanent curriculum advisory committees that include representatives from various sectors, as well as by having curriculum review sessions with corporate partners twice a year. Moving toward a curriculum design based on skills is also very important. This means that schools should teach skills like problem-solving, digital literacy, teamwork, crisis management, and building relationships, and make sure that the curriculum results are in line with well-known industry skill frameworks. There should be more guest lecturers, co-teaching possibilities, mentoring programs, and internships to connect instructional methods more closely with the corporate world. Teachers should also be encouraged to adopt project-based learning that is focused on real-world business concerns. Schools also need to do a better job of figuring out how employable their students are by doing graduate tracer studies, employer feedback surveys, and competency evaluations, and then using the results to make the curriculum better. It is still highly vital for corporations to be involved in designing the curriculum. Companies should be a part of academic boards, curriculum committees,

Universities and businesses must collaborate to bridge the employability gap through competency-based curricula and industry-integrated learning.

and reviews of capstone projects. They should also give clear skill required frameworks to make sure the program stays useful. Seminars, certification courses, skill clinics, and the sponsorship of hackathons, innovation labs, and problem-based learning initiatives headed by businesses should all assist teachers and students work together better. It is also a good idea to encourage long-term research partnerships. You can accomplish this by helping each other produce articles, sharing data, and giving money to applied research grants. Lastly, companies should give universities structured feedback by regularly telling them about the skills shortages they detect in new hires and suggesting adjustments to the curriculum and specific training needs. These combined efforts can make the difference between what kids learn in school and what businesses expect much less. This will help graduates get ready for the job market and make the interaction between colleges and businesses stronger.

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