

Bridging the Skills Gap Through Education Supply Chain to Meet Industry Requirements

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Received Oct 28, 2024, **Revised:** Oct 26, 2024, **Accepted:** Aug 27, 2024, **Published Online:** Aug 28, 2024

Reviewers: Anonymous Peer Review

Citation: Chowdhury, R., Habib, M. M. (2024). Bridging the Skills Gap Through Education Supply Chain to Meet Industry Requirements. *International Journal of Supply Chain Management*, 13(5), 27-36, <https://doi.org/10.59160/ijscm.v13i5.6270>

Abstract— In Bangladesh, a persistent mismatch exists between the skills fresh graduates possess and the competencies demanded by employers. This gap affects graduate employability and hampers economic growth. This article explores how key components— Program Curriculum Development (PCD), Instructor Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF)—can collectively address this issue. By integrating these elements into the educational supply chain, universities can produce skilled graduates who are better equipped to meet industry needs. The proposed framework offers a comprehensive approach to align academic outputs with labor market demands. The study highlights the importance of adapting curricula, engaging industry professionals in teaching, fostering strong university-industry connections, and investing in modern facilities to close the skills gap. This holistic approach ensures that graduates are employable, contributing to national development and societal betterment. The article concludes by emphasizing the need for further research on technological advancements and policy reforms to enhance higher education in Bangladesh.

Keywords— Skills gap, Educational supply chain, Curriculum development, Graduate employability, Bangladesh higher education

1. Introduction

The disconnect between the skills that fresh graduates possess and the expectations of employers has emerged as a significant concern in many countries, including Bangladesh. As the global economy becomes increasingly competitive and technologically advanced, employers are demanding

a more skilled and adaptable workforce. However, there is growing evidence that many fresh graduates are ill-equipped to meet these demands, particularly in the Bangladesh context. This gap between education and employability highlights a fundamental issue within the country's higher education system—one that requires urgent attention. In recent years, higher education institutions have come under scrutiny for their role in producing graduates who are not only academically proficient but also capable of thriving in the workplace. Despite the growing number of universities and graduates, the employability of graduates remains an area of concern [1].

Addressing this gap between fresh graduates' skills and employers' expectations is crucial not only for individual career success but also for broader societal and economic development. Skilled graduates (SG) play a pivotal role in driving innovation, boosting productivity, and contributing to sustainable economic growth. When the education system fails to align with industry requirements, it results in a workforce that is underprepared for the challenges of the modern job market. This, in turn, leads to higher rates of underemployment, reduced economic efficiency, and slower national progress [2]. In this context, improving the alignment between educational outcomes and labor market demands becomes a priority for Bangladesh's higher education institutions, industries, and policymakers.

The root cause of the skills gap in Bangladesh's education system can be traced to several key factors: outdated curricula, insufficient instructor development, a lack of university-industry networking opportunities, and inadequate facilities that hinder practical skill acquisition. These factors

collectively contribute to the misalignment between the skills graduates possess and the skills required by employers. Studies have shown that higher education institutions often fail to integrate industry feedback into curriculum design, resulting in programs that do not adequately prepare students for the workplace [3]. In addition, the quality and diversity of instructors play a significant role in shaping the learning experience and the employability of graduates. Outdated teaching methods and a lack of continuous professional development for instructors further exacerbate the problem [4].

The role of university culture and networking platforms is another critical element that affects graduate employability. In Bangladesh, many universities do not offer adequate opportunities for students to engage with industry professionals, participate in internships, or gain real-world experience. Networking platforms within universities are essential for bridging the gap between academia and industry, allowing students to develop professional connections, gain insights into market trends, and acquire practical skills that are often not taught in the classroom [1]. Furthermore, universities in Bangladesh often struggle with inadequate facilities, such as research labs and modern technology, which are vital for practical learning and skill-building. Without access to these resources, students are unable to fully develop the competencies required in today's job market [5].

This research explores four fundamental areas—Program Curriculum Development (PCD), Instructor Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF)—and how they combine to influence the production of skilled graduates in Bangladesh. Program Curriculum Development (PCD) focuses on how universities design and update their curriculum to reflect the changing needs of the job market. Instructor Portfolio Management (IPM) addresses the importance of continuously developing and diversifying the teaching staff to ensure that they can offer students a broad range of perspectives and skills, keeping up with the latest industry trends and educational techniques. University Culture and Networking Platform (UCN) emphasizes the significance of fostering a strong academic environment that encourages collaboration, innovation, and networking. It also highlights the need for students to engage with

industry professionals to gain valuable insights and build their professional networks. Lastly, University Facilities (UF) examines the role of physical and technological infrastructure in enhancing the learning experience, particularly in providing students with the tools they need to acquire practical skills.

In the context of Bangladesh, where higher education is undergoing rapid transformation, these four factors play a crucial role in shaping the education supply chain. The education supply chain refers to the interconnected processes that universities must manage to deliver educational services that meet the demands of students and employers. When Program Curriculum Development (PCD), Instructor Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF) are aligned and effectively managed, they can produce graduates who are not only academically capable but also equipped with the practical skills and professional networks necessary to succeed in the workforce (Sun & Song, 2018). Ultimately, this contributes to the betterment of society (BS) by creating a more skilled workforce, reducing unemployment, and fostering economic development.

This research aims to explore the ways in which these four components—PCD, IPM, UCN, and UF—collectively impact the education supply chain in Bangladesh and how they contribute to producing skilled graduates who can drive societal betterment. The objective is to provide a comprehensive understanding of the interplay between these factors and to offer insights into how universities in Bangladesh can better align their educational programs with the needs of the job market. By closing the skills gap and producing more employable graduates, universities can play a pivotal role in supporting Bangladesh's economic growth and improving the overall quality of life for its citizens.

The skills gap between fresh graduates and employer expectations represents a critical challenge for Bangladesh's higher education system. This gap has far-reaching implications for both individual graduates and the broader society, affecting employability, economic growth, and societal progress. By focusing on Program Curriculum Development (PCD), Instructor

Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF), this research seeks to identify key areas where universities can make meaningful improvements to better align their educational outcomes with labor market demands. In doing so, it contributes to the growing body of literature on higher education reform and provides actionable insights for policymakers, educators, and industry leaders who are committed to closing the skills gap and promoting the betterment of society.

2. Background and Context

The tertiary education sector in Bangladesh is at a critical juncture, facing multiple challenges that have been exacerbated by the COVID-19 pandemic. These challenges extend beyond immediate logistical hurdles and touch upon deeper structural issues within the education system, including a widening gap between the skills fresh graduates possess and what employers in the job market demand. As Bangladesh seeks to leverage its demographic dividend with a growing youthful workforce, the mismatch between educational outputs and labor market requirements presents significant obstacles to the nation's economic and social development [6].

Bangladesh Tertiary Education: Recent Crisis

The COVID-19 pandemic has had a profound impact on tertiary education in Bangladesh, leading to widespread disruptions in the learning process and the overall academic experience. Government measures to curb the spread of the virus, such as closing educational institutions and shifting to online learning, have redefined the traditional educational landscape. Research conducted by [7] highlights the dissatisfaction among tertiary students due to the sudden shift to online learning, a sentiment that is echoed across various studies. This shift has led to disruptions in students' routines and restricted access to vital resources such as libraries and laboratories, critical for higher education [8].

The psychological effects of the pandemic have also been significant, with many students experiencing heightened feelings of isolation, stress, and anxiety due to the lack of structure and social interaction that traditional in-person education provides [9]. These mental health challenges have inevitably affected students' academic performance and motivation,

further complicating the transition to remote learning environments. In addition to these psychological impacts, the social aspects of education, such as peer interactions, group studies, and academic collaboration, have been severely curtailed, undermining the sense of community that is essential to the university experience [10].

Economically, the shift to online education has introduced new financial burdens, especially in a developing country like Bangladesh, where access to reliable internet and digital devices is not universal. Many students have struggled to afford the necessary technology to participate in remote learning, a problem exacerbated by the broader economic downturn resulting from the pandemic, which has led to job losses and reduced family incomes [11]. These disruptions have not only affected the quality of education but have also raised concerns about the long-term employability and skill development of graduates, which are essential for their integration into the workforce and their ability to contribute to the country's economic recovery.

The Fresh Graduate Skills Gap in Bangladesh

Bangladesh is currently experiencing a "youth bulge," which presents a unique opportunity to harness the potential of its growing workforce. However, the education sector's inability to align with labor market demands has hindered this opportunity. Despite the expansion of higher education, many graduates remain ill-equipped to meet employers' expectations, particularly in the context of a rapidly evolving economy [12]. This skills gap is particularly pronounced as Bangladesh undergoes structural shifts from an agrarian-based economy to one focused on industry and services. The lack of alignment between educational outputs and the demands of employers is reflected in high unemployment rates among graduates, many of whom have been job-seeking for over a year [13].

The Fourth Industrial Revolution (4IR) has further intensified the need for skilled graduates who can adapt to technological advancements and new working practices. However, the education system in Bangladesh has struggled to keep pace with these developments. Sector-specific studies, particularly in the ready-made garments (RMG), agro-food, and IT industries, have revealed significant skill gaps that prevent graduates from contributing effectively to the workforce [14]. Moreover, the digital divide

in Bangladesh, where a large portion of the population lacks basic computer and ICT skills, further limits the employability of graduates in an increasingly digital global economy [15].

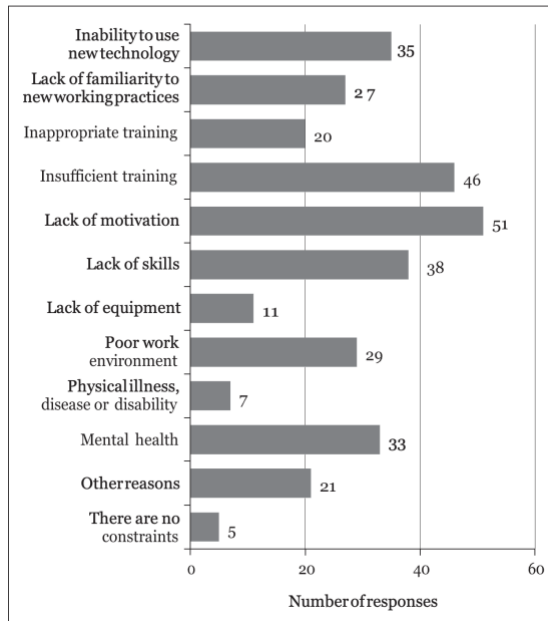


Figure 1. Employers in Bangladesh identified a lack of skills among fresh graduates.

A comprehensive online survey conducted by [16] revealed that employers in Bangladesh identified a lack of skills, particularly in areas such as communication, critical thinking, and numeracy, as significant barriers to optimal employee performance which is shown in figure 1. Employers also pointed out that technological advancements and new working practices would require their workforce to acquire new skills within the next year. However, filling job vacancies remains a challenge, as many applicants lack the necessary qualifications and work experience [16]. The mismatch between the skills employers seek and the competencies graduates possess has been further highlighted by employers' emphasis on the importance of soft skills—such as communication, teamwork, and problem-solving—over hard skills, including technical knowledge and computer literacy.

The Urgency of Addressing the Skills Gap

The tertiary education crisis in Bangladesh, exacerbated by the COVID-19 pandemic and ongoing structural shifts in the economy, underscores the urgency of addressing the skills gap

between graduates and employers. The implications of this gap are far-reaching, affecting not only individual graduates' career prospects but also the broader economic landscape. As the country seeks to recover from the pandemic and capitalize on its demographic dividend, it is imperative for higher education institutions to realign their programs with market needs, ensuring that graduates are equipped with both the technical and soft skills required for the modern workforce.

In a nutshell, the skills gap in Bangladesh's higher education system is a pressing issue that requires immediate attention. By improving Program Curriculum Development (PCD), Instructor Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF), the country can better align its educational outputs with the needs of the labor market, ultimately contributing to the betterment of society. This research aims to explore how these four components can work together to produce skilled graduates who are ready to meet the challenges of the modern economy.

3. Literature Review

In the context of addressing the graduate skills gap in Bangladesh, several key components—Program Curriculum Development (PCD), Instructor Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF)—emerge as pivotal elements in bridging the gap between academic preparation and industry requirements. These components work in concert to enhance the employability of graduates and contribute to the betterment of society by producing a workforce that is both skilled and adaptable. This literature review explores each of these components, drawing on theoretical frameworks and real-world examples to demonstrate their significance in aligning educational outcomes with market demands.

Program Curriculum Development (PCD)

Program Curriculum Development (PCD) plays a fundamental role in ensuring that the education system remains relevant and responsive to the needs of the labor market. As [17] emphasize, PCD is essential for aligning educational programs with industry requirements, creating a pathway for graduates to seamlessly transition into the

workforce. The Triple Helix model, which promotes collaboration between academia, industry, and government, has been particularly effective in fostering curriculum innovations that support employability and entrepreneurship.

The success of PCD lies in its ability to incorporate continuous feedback from various stakeholders, including industry partners, students, and faculty members. By doing so, universities can tailor their programs to meet the evolving demands of the global economy [18]. Historical examples, such as Seagate's collaboration with universities to create specialized training programs, demonstrate the benefits of industry-academia partnerships in shaping curriculum design [19]. These programs equip graduates with the skills necessary for specific sectors, particularly in high-tech industries, ensuring that they are well-prepared to meet the challenges of their respective fields.

Furthermore, curriculum development must be adaptive, regularly updated to reflect changes in technology, industry trends, and societal needs. A static curriculum that fails to evolve risks producing graduates who are unprepared for the demands of the modern workforce. A dynamic and well-rounded curriculum is essential not only for the personal development of students but also for the advancement of society as a whole. This alignment between education and industry needs is critical in reducing the skills gap and enhancing graduate employability.

Instructor Portfolio Management (IPM)

Instructor Portfolio Management (IPM) is another critical factor in bridging the skills gap between graduates and employers. By integrating industry professionals into academic teaching, universities can offer students a richer learning experience that combines theoretical knowledge with practical insights. [20] argue that the collaboration between academic professors and industry professionals provides students with a comprehensive understanding of both academic principles and real-world applications.

Industry professionals bring unique perspectives to the classroom, offering students insights into current market trends, organizational systems, and operational challenges [21]. Their involvement in the teaching process ensures that students are exposed to the practical skills required by

employers, making them more competitive in the job market. This approach is particularly valuable in fields where technology and industry practices evolve rapidly, such as information technology and engineering.

Moreover, industry professionals often possess extensive networks, providing students with valuable opportunities for internships, mentorships, and job placements [22]. The integration of professionals into the academic environment not only enhances the curriculum but also creates a direct link between education and employment. In regions like South Asia, including India and Bangladesh, the trend of engaging industry professionals as full-time instructors is gaining momentum, further blurring the lines between theoretical education and practical application [23].

In conclusion, IPM plays a pivotal role in producing graduates who are well-rounded and industry-ready. By leveraging the expertise of industry professionals, universities can better prepare students for the demands of the modern workforce, enhancing their employability and ensuring a smoother transition from academia to industry.

University Culture and Networking Platform (UCN)

The establishment of a University Culture and Networking Platform (UCN) is essential for helping students navigate the transition from education to employment. Such platforms provide students with access to a wealth of resources, including mentorship opportunities, job listings, and professional development workshops. [24] highlight the importance of professional networking in enhancing graduates' understanding of industry expectations and job market dynamics.

A well-established networking platform connects students with alumni and industry professionals, creating a supportive ecosystem that facilitates career development. Alumni engagement is particularly valuable, as it provides students with insights into real-world challenges and offers them guidance on how to effectively position themselves in the job market [25]. Additionally, mentorship programs enable students to receive personalized advice from experienced professionals, helping them make informed decisions about their education and career paths.

The integration of networking platforms within the university culture fosters a community-centric approach to career development, where students can access both the academic and professional resources they need to succeed. This approach not only enhances employability but also ensures that graduates are equipped with the skills and connections necessary to thrive in the competitive job market [26].

University Facilities (UF)

University facilities, including career fairs, guest lectures, and job boards, play a crucial role in preparing students for the workforce. Career fairs, in particular, provide students with the opportunity to engage directly with employers, learn about job openings, and understand industry trends [27]. These events serve as a platform for both employers and students to explore potential job matches, offering students valuable insights into the recruitment process and the skills that are in demand.

Guest lectures by industry professionals also provide students with practical knowledge and networking opportunities. [27] emphasize that these lectures offer students a window into various industries, helping them discern their career interests and develop a clearer understanding of the professional world. Additionally, university job boards serve as a central hub for job postings, internships, and career development resources, further supporting students in their transition from academia to employment.

The role of university facilities in enhancing graduate employability cannot be understated. By providing students with access to industry professionals, job opportunities, and career development resources, universities can better equip them for the challenges of the job market.

4. Conceptual Framework

The concept of Supply Chain Management (SCM) has long been applied to the business world, but its relevance to the education sector has gained prominence in recent years. Lau [28] introduced the idea of applying SCM principles to educational institutions, emphasizing the need for universities to adopt a more structured and efficient approach to producing skilled graduates. Building on this foundational theory, Pathik and Habib [29] developed the Integrated Tertiary Educational

Supply Chain Management (ITESCM) model, which specifically focuses on the role of universities in contributing to societal betterment by delivering competent graduates to the labor market.

The ITESCM model suggests that universities act as key players in the educational supply chain, where the main input is students, and the primary output is skilled graduates (SG), who are expected to contribute to the betterment of society (BS). However, despite the model's comprehensive structure including its four factors: programs establishment, faculty capabilities, university culture and facilities, there remains a significant gap between the skills that fresh graduates possess and the competencies required by employers in the job market. This research seeks to enhance the existing ITESCM model by integrating four key elements: Program Curriculum Development (PCD), Instructor Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF). These elements, when effectively implemented, can help bridge the skills gap and contribute to the production of graduates who are well-equipped to meet industry demands.

Interaction Between Key Components

The proposed conceptual framework incorporates PCD, IPM, UCN, and UF as critical components that influence the effectiveness of the educational supply chain. The interaction between these elements is vital for shaping the quality of graduates and their readiness for the workforce:

1. **Program Curriculum Development (PCD):** Curriculum development plays a central role in shaping the competencies of graduates. By aligning academic programs with industry needs, PCD ensures that students receive relevant and up-to-date education, enhancing their employability. Continuous feedback from industry partners and the integration of real-world experiences into the curriculum are essential for equipping students with practical skills that align with market demands.
2. **Instructor Portfolio Management (IPM):** The quality and diversity of instructors have a profound impact on student learning outcomes. IPM focuses on the strategic engagement of industry professionals in the academic process, ensuring that students benefit from a blend of

theoretical knowledge and practical expertise. This approach not only enhances the learning experience but also provides students with valuable industry connections and mentorship opportunities.

3. **University Culture and Networking Platform (UCN):** The university culture, supported by strong networking platforms, fosters connections between students, alumni, and industry professionals. This interaction is crucial for providing students with access to job opportunities, internships, and mentorships. A

well-developed UCN helps students navigate the transition from academia to the professional world, supporting their career development and enhancing their employability.

4. **University Facilities (UF):** Adequate facilities, such as research labs, career fairs, and guest lectures, play a crucial role in practical skill-building. Universities that invest in state-of-the-art infrastructure provide students with opportunities to apply theoretical knowledge in real-world scenarios, gaining hands-on experience that is highly valued by employers.

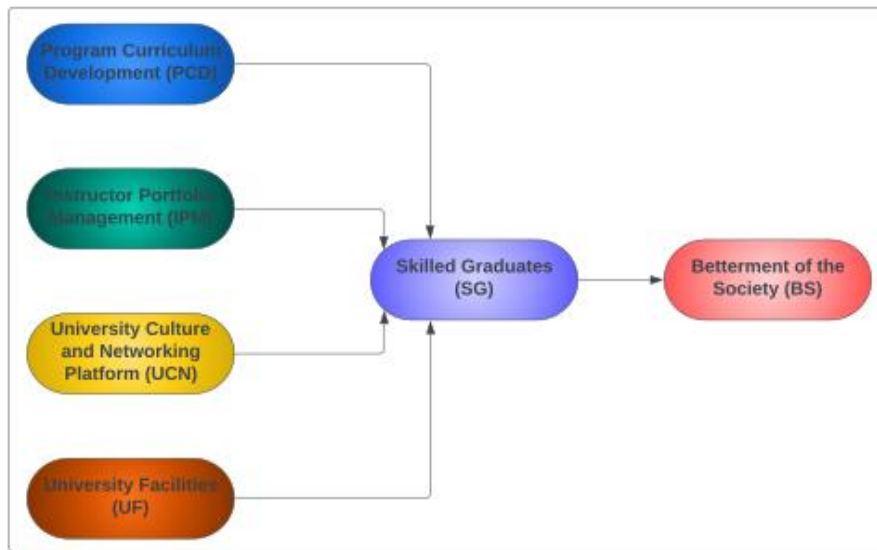


Figure 2. Conceptual Framework.

Integration and Impact on the Educational Supply Chain

The interaction of these four components—PCD, IPM, UCN, and UF—within the educational supply chain has a cascading effect on the overall quality of education and graduate outcomes. When these components are aligned and effectively implemented, they collectively contribute to the production of Skilled Graduates (SG) who possess the knowledge, skills, and connections needed to succeed in the labor market. The model shown in the figure 2 ensures that universities not only produce employable graduates but also contribute to the broader societal goal of driving economic growth and innovation. As such, this framework highlights the importance of a holistic approach to educational reform that integrates curriculum development, instructor quality, networking opportunities, and facilities to close the skills gap and produce

graduates who can make meaningful contributions to society.

5. Discussion

The education supply chain in Bangladesh faces significant challenges in aligning academic outputs with industry demands. The mismatch between the skills of fresh graduates and the competencies required by employers continues to be a pressing issue, leading to high levels of unemployment and underemployment among young graduates. To address this gap, the integration of Program Curriculum Development (PCD), Instructor Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF) into the education system is essential. These elements work together to shape an efficient educational supply chain that produces graduates

who are well-equipped to meet the evolving needs of the job market.

The Role of Program Curriculum Development (PCD) in the Supply Chain

Program Curriculum Development (PCD) plays a vital role in addressing the skills gap by ensuring that the curriculum is aligned with industry demands. In Bangladesh, many university programs are outdated and fail to incorporate practical skills needed in modern workplaces. By involving industry stakeholders in curriculum design, universities can provide students with real-world experience, ensuring that graduates possess both theoretical knowledge and practical competencies. This alignment is critical to enhancing the employability of graduates and ensuring that the educational supply chain produces a workforce that can meet the needs of various sectors in Bangladesh's economy.

Instructor Portfolio Management (IPM) and its Influence on Graduate Employability

Instructor Portfolio Management (IPM) strengthens the education supply chain by bringing industry professionals into the academic sphere. In Bangladesh, where many institutions struggle with a shortage of experienced instructors, integrating professionals with industry expertise can significantly enhance the quality of education. This collaboration enriches the curriculum, providing students with practical insights and professional networks, which are essential for improving their job prospects and ensuring that they are job-ready upon graduation.

University Culture, Networking, and Facilities (UCN and UF)

University Culture and Networking Platforms (UCN) and University Facilities (UF) further bolster the education supply chain by providing students with the resources and connections they need to transition into the workforce. In Bangladesh, where job placement services are often lacking, developing a robust networking platform is crucial for linking students with alumni and potential employers. Career fairs, guest lectures, and internships offered through university facilities provide students with opportunities to gain practical experience and establish professional networks, enhancing their employability and reducing the skills gap in the job market.

The integration of PCD, IPM, UCN, and UF into the education supply chain in Bangladesh is crucial for producing skilled graduates who meet the expectations of employers. These components work together to ensure that the education system is aligned with industry demands, ultimately contributing to economic growth and societal betterment.

6. Conclusion

The gap between the skills fresh graduates possess and the competencies required by employers in Bangladesh highlights the need for an integrated approach to higher education reform. This paper has explored how Program Curriculum Development (PCD), Instructor Portfolio Management (IPM), University Culture and Networking Platform (UCN), and University Facilities (UF) can collectively address this skills gap within the educational supply chain. The combination of these components ensures that universities can produce Skilled Graduates (SG) who are equipped to meet the demands of the job market and contribute to the Betterment of Society (BS).

Program Curriculum Development (PCD) is essential in ensuring that academic programs are aligned with the needs of industries, providing graduates with the practical knowledge and skills necessary to thrive in the modern workforce. By involving industry partners in curriculum design and regularly updating the courses to reflect technological and market changes, universities can better prepare students for real-world challenges. Instructor Portfolio Management (IPM), by integrating industry professionals into the academic environment, further strengthens the education system. These professionals bring valuable insights and real-world experience that enrich the learning process, offering students the practical knowledge and connections needed to succeed in the labor market.

The role of University Culture and Networking Platforms (UCN) and University Facilities (UF) is equally critical in preparing graduates for employment. Networking opportunities, career fairs, and mentorship programs provided by universities bridge the gap between academia and industry, helping students build professional connections and access job opportunities. Moreover, modern university facilities that offer state-of-the-art

technology and practical learning environments are crucial for ensuring that students gain the hands-on experience required in today's job market.

The integration of PCD, IPM, UCN, and UF into Bangladesh's educational system is a comprehensive approach to addressing the skills gap. By aligning education with labor market demands, universities can produce graduates who are not only knowledgeable but also highly employable, driving economic growth and societal progress. Future research should focus on exploring additional factors that influence graduate employability, such as the role of technology in education and the impact of policy reforms on higher education institutions. Policymakers and educational leaders must prioritize these areas to further improve the education supply chain and contribute to national development in Bangladesh.

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