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Challenges in Transitioning Single-Stream Colleges into Multidisciplinary Institutions Under NEP 2020

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Abstract

The transition of single-stream colleges into multidisciplinary institutions, as envisioned under NEP 2020, marks a transformative shift in India's higher education landscape. This research critically examines the core challenges hindering this transition, including infrastructural inadequacies, faculty shortages, regulatory bottlenecks, weak industry collaborations, and limitations in academic research. Institutional constraints, coupled with rigid accreditation frameworks and financial limitations, impede the seamless adoption of multidisciplinary education. Furthermore, a lack of industry-academia linkages restricts experiential learning, skill development, and employability outcomes. Addressing these barriers necessitates policy reforms, faculty training, research incentives, and enhanced corporate partnerships to foster a robust academic ecosystem. By evaluating structural inefficiencies and proposing strategic interventions, this study underscores the necessity of a holistic approach in driving institutional evolution. Strengthening governance, funding mechanisms, and interdisciplinary pedagogies will be instrumental in realizing NEP 2020's vision, ensuring that Indian higher education remains globally competitive and future-ready.

Keywords: multidisciplinary institutions, single-stream colleges, industry-academia collaboration, interdisciplinary education

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Introduction

> "Large multidisciplinary HEIs [Higher Education Institutions] to be established in or near every district by 2030 is one of the most significant recommendations in the NEP [National Education Policy] 2020. A multidisciplinary institution should not only have different departments, but also should have innovative programmes of a multi- and interdisciplinary nature to help widen learners' thinking and learning capability and train them to address emerging challenges" (University Grants Commission, n.d.).

The cited excerpt from the University Grants Commission (UGC) website highlights the key initiatives undertaken by the Ministry of Education, Government of India, in formulating guidelines and establishing standards for HEIs. As mentioned, the NEP 2020 envisions a fundamental restructuring of India's higher education system, advocating for the transition of single-stream colleges into multidisciplinary institutions. This aims to provide students with holistic and flexible learning opportunities that integrate sciences, social sciences, humanities, and professional disciplines. However, the shift from a rigid, discipline-specific model to an interdisciplinary framework is fraught with challenges. Many single-stream institutions lack the infrastructure, faculty expertise, and financial resources necessary for such an expansion. Additionally, they face difficulties in meeting accreditation standards, establishing industry collaborations, and modernizing pedagogical approaches to align with global education trends.

To successfully implement NEP 2020's vision, it is essential to critically examine the key challenges hindering this transition. First, limitations in institutional capacity and facilities. Second, obstacles in regulatory compliance and accreditation. Third, weak industry-academia linkages affecting campus placements. Fourth, complexities in integrating traditional and interdisciplinary pedagogies, and fifth point is the shortcomings in academic research and innovation. Addressing these challenges requires a strategic approach involving policy reforms, enhanced funding, faculty development, and strengthened academic-industry partnerships. This paper explores these five core issues in depth, emphasizing their significance in the transition of single-stream colleges into multidisciplinary institutions and advocating for further research to identify effective policy interventions and structural solutions.

Figure 1

Challenges in Transitioning Single-Stream Colleges into Multidisciplinary Institutions

Definitions

A Single-Stream College refers to an educational establishment that confines its academic offerings to a singular broad discipline- such as arts, sciences, commerce, or engineering- without incorporating a diverse range of subjects. These institutions generally lack the independent authority "to provide degree on their own and are necessarily have to be attached with a University/University level institution for the purpose of awarding degree" (Ministry of Education, Government of India, 2011, Annexure-III). Conversely, a Multidisciplinary Institution is a higher educational entity that fosters an integrative approach to learning by encompassing multiple academic domains. This model enables students to pursue a comprehensive and adaptable education across various disciplines. According to the Ministry of Education, Government of India, multidisciplinary institutions amalgamate sciences, social sciences, humanities, and professional studies, thereby nurturing "intellectual, aesthetic, social, physical, emotional, ethical and moral facets of an individual in an integrated manner, thereby contributing directly to transformation of the country and making India a global knowledge superpower" (Ministry of Education 2).

Explanation of the Title

The title underscores the critical hurdles faced in restructuring India's higher education landscape. NEP 2020 mandates a shift from rigid, discipline-specific institutions to holistic, multidisciplinary models, yet several challenges hinder this transitional shift. Institutional capacity constraints- including inadequate infrastructure and faculty shortages- impede expansion. Regulatory and accreditation obstacles create compliance difficulties. Weak industry collaboration limits employability-driven education and campus placements. Integrating traditional and interdisciplinary pedagogies presents instructional complexities, while deficiencies in academic research and innovation restrict knowledge creation. This paper explores these five barriers in depth, highlighting the need for future research to develop strategic solutions that drive institutional evolution and facilitate the transition to multidisciplinary education.

NEP 2020 and the Evolution of Higher Education

NEP 2020 envisions a paradigm shift in India's higher education system, striving to cultivate a globally competitive, knowledge-driven society. At its core lies the transformation of single-stream colleges into multidisciplinary institutions, fostering comprehensive learning, interdisciplinary research, and innovation. This vision aligns with the "Citizen's Charter of Higher Education" (Ministry of Education, 2022), which seeks to maximize India's human resource potential while upholding both equity and excellence. Echoing this commitment, the UGC Chairman reaffirms commitment in "supporting the aspirations of our universities to be world-class institutions" (University Grants Commission, n.d.), nurturing future talent and advancing knowledge for national and global progress.

NEP 2020 underscores the necessity of "holistic and multidisciplinary education approach" (Ministry of Education 36) to equip students with diverse competencies, integrating sciences, humanities, and vocational skills to foster adaptability and critical thinking. This approach aims to eliminate rigid academic boundaries and promote a more flexible learning paradigm through innovative curricular structures and "multiple exit options" (37). And carrying forward the idea of comprehensive development, Vice Chancellor of Amity University and his colleagues (Shukla et al., 607) examined the impact of a holistic and multidisciplinary education approach on diverse career opportunities, student placement, and stakeholder alignment. Through 52 Focus Group Discussions involving institutional heads across India, the study highlighted existing career counselling systems and institutional action plans. Findings revealed that flexible credit systems, industry-aligned courses, and mentor-mentee frameworks facilitate well-rounded education. This underscored teachers' pivotal role in curriculum execution and emphasizes that multidisciplinary education fosters students' mental, emotional, physical, and social development, enabling them to identify their strengths and adapt to global career landscapes.

In order to equip oneself with a deeper level understanding, Roy (5) provided critical insights into the contextual framework leading to the introduction of NEP 2020, enabling readers to comprehend the historical evolution of Indian education policy. Employing a philosophical research approach, the study examined the intersection of education and life philosophy, emphasizing the significance of holistic education in modern curricula. That highlighted the multidisciplinary approach as fundamental for adaptability and survival—core objectives of education. This approach tries to strategically integrates India's educational heritage with future career prospects, fostering critical thinking and interdisciplinary correlations, ultimately shaping a skilled, adaptable workforce prepared for virtual and global education.

As the world's largest democracy, India ensures that any democratic welfare government prioritizes not only the advancement of educational infrastructure but also the enhancement of quality, equity, and inclusivity in education. Aligned with Sustainable Development Goal 4, India's focus is to enhance living standards through lifelong learning, transcending regional, racial, and socio-economic barriers. Muralidharan et al. (16) highlighted the transformative intent of NEP 2020, emphasizing its role in structural educational reforms amid rapid economic, social, and scientific advancements. However, challenges persist in policy execution, particularly concerning digitalization and quality enhancement. Flexible, lifelong education and vocational training are imperative to bridge skill gaps, foster employment opportunities, and ensure sustainable improvements in the quality of life.

Beyond prioritizing learners, greater emphasis must also be placed on the role of teachers. Gupta and Gupta (93) proposed a mentoring framework to develop educational leaders and faculty in HEIs, enhancing their capacity to implement NEP 2020 provisions. The holistic institute-level programme included mentor-mentee selection, structured mentoring processes, and outcome evaluation in academics and research. Beyond personal and professional growth, the initiative aimed at quality enhancement, accreditation, and institutional excellence. This way it integrated curriculum implementation strategies including content analysis, learner-centric pedagogy, AI-driven education, virtual reality, flipped classrooms, industrial training management; thus fostered creativity, critical thinking, and higher-order cognitive skills to align with NEP 2020 objectives.

Next, NEP 2020 emphasizes the integration of "research and innovation at education institutions" (Ministry of Education 45) as a crucial factor in advancing knowledge creation and fostering an interdisciplinary academic environment. Recognizing this necessity, the “policy envisions the establishment of a National Research Foundation (NRF)" (46) to provide systematic funding and institutional support for research, thereby strengthening India's position as a global knowledge leader. Kearney (22) highlighted research as a key driver of innovation, requiring interdisciplinary collaboration and sustained investment to build dynamic knowledge ecosystems. The study further emphasized evidence-based policies, strategic partnerships, and funding reforms to bridge research disparities, particularly in developing nations.

Building on the role of research in driving innovation and interdisciplinary collaboration, Tarman (91) explored globalization’s transformative impact on education, emphasizing advancements in science, technology, and economics. The study assessed Turkey’s educational progress relative to global trends, analyzing U.S. Charter Schools' potential to drive innovation-driven reforms and revitalize Turkey’s education system.

Expanding on the role of innovation-driven research in education and the transformative impact of globalization on educational reforms Caniëls and Bosch (283) examined HEIs' role in regional innovation, emphasizing knowledge development, interorganizational learning, and economic growth through strategic academia-industry collaborations.

Adding further, NEP 2020 emphasizes the establishment of a "graded accreditation and graded autonomy" (Ministry of Education 49) framework to enhance institutional self-governance while fostering academic and administrative excellence. Through the Higher Education Commission of India (HECI), the policy envisions a "single point regulator" (47) to streamline accreditation, funding, and academic standard-setting, strengthening global competitiveness and institutional autonomy. India's higher education system, among the world's largest and most diverse, has expanded through privatization, increased autonomy, and emerging academic programs, improving accessibility but raising concerns regarding quality and relevance. To address these, the National Policy on Education (NPE,

1986) and the Programme of Action (PoA, 1992) proposed an independent accreditation agency, leading to the establishment of National Assessment and Accreditation Council (NAAC) in 1994. Institutional autonomy strengthens quality and competitiveness, enabling self-governance in curriculum design, faculty recruitment, and evaluation. Aithal and Kumar (173) analyze autonomy-accountability linkages, advocating Accountability Management as a governance model to ensure institutional responsibility, creativity, and sustainable performance.

Building on the discourse of institutional autonomy and accountability, Gupta (2019) examines NEP 2020's vision for self-governing higher education institutions, identifying challenges in achieving and sustaining autonomy through quality education, research, services, and accreditation. Key hurdles include breaking traditional practices, securing funding, fostering academic culture, and combating institutional obsolescence and malpractice.

Also, NEP 2020 underscores the necessity of strengthening industry-academia partnerships to enhance skill-based education, ensuring students acquire practical competencies aligned with evolving economic demands. The policy advocates for vocational education integration, industry collaborations, and "start-up incubation centres" (Ministry of Education 38) within higher education institutions to bridge the gap between academia and employability. Gandhi (2014) examined Industry-Academia Collaboration in India, tracing trends, challenges, and policy frameworks from NPE 1968, NEP 1986, PoA 1992, and constitutional educational objectives. The study explored collaborative mechanisms aligned with NEP 2020, advocating the integration of education with production, employment, and R&D to cultivate self-reliant citizens through systemic educational reforms. Kaicker et al. (20) further analyzed industry-academia collaboration, highlighting NEP 2020's role in bridging skill gaps through policy-driven reforms, research parks, and incubation centres, emphasizing private sector engagement as crucial for fostering innovation, economic growth, and global competitiveness. Now let us undertake a detailed examination of each of the five critical issues individually.

Limitations in Institutional Capacity and Facilities

> "The main thrust of this policy regarding higher education is to end the fragmentation of higher education by transforming higher

education institutions into large multidisciplinary universities, colleges, and HEI clusters/Knowledge Hubs, each of which will aim to have 3,000 or more students" (Ministry of Education 34).

The transformation of single-stream colleges into multidisciplinary institutions, as envisioned under NEP 2020, is severely hindered by limitations in institutional capacity and infrastructure. Restricted funding has curtailed the expansion of classrooms, laboratories, and libraries, leading to overcrowded classrooms and compromised learning experiences. The absence of well-equipped research centres stifles innovation and faculty development, while poor technological integration, such as the lack of smart classrooms, e-learning platforms, and high-speed internet, hampers digital learning. In addressing these challenges, institutional reforms focused on quality enhancement become imperative. Maiya and Aithal (2023) reviewed strategies for enhancing quality services in higher education, focusing on academic, administrative, and research improvements at Srinivas University, India. The study systematically analyzed institutional strengths, innovations, and best practices, emphasizing autonomy-driven reforms for excellence through academics, administration, research, and industry collaboration.

One critical aspect of digital learning enhancement is the integration of e-learning platforms, which remain underutilized due to infrastructural and organizational constraints for single-stream colleges. Eze et al. (13) examined factors influencing e-learning adoption in Nigerian private HEIs using the Technology-Organisation-Environment (TOE) framework. Through semi-structured interviews and thematic analysis, findings revealed limitations in technological resources, organizational capacities and enabling environmental factors were the significant reasons and at the same time the study also identified strategies to enhance e-learning adoption which primarily hints towards augmentation of facilities.

Beyond technological integration, broader institutional transformation is essential for fostering an adaptive and student-centric educational environment. Poole et al. (2023) examined institutional transformation within the Frontier Set network, analysing how structural, procedural, and cultural redesign fosters student-centred reforms. Findings emphasize institutional responsibility for change and the scalability of transformation across diverse higher education contexts to enhance student success and equity.

In parallel, enhancing infrastructure and student support mechanisms remains critical to sustaining this transformation. Moreover, outdated laboratory equipment in science and engineering disciplines weakens hands-on education, reducing students' preparedness for industry and research. The limited availability of student support services, including career counselling, mental health support, and mentorship programs, further exacerbates student well-being challenges, affecting their academic and professional growth. These challenges significantly impede the functioning of single-stream colleges.

Beyond academic concerns, inadequate hostel and accommodation facilities create difficulties for outstation students, while limited sports and recreational infrastructure restricts holistic development. Compounding these challenges, deficiencies in industry-linked infrastructure further impede students' experiential learning and professional readiness. The absence of industry-linked infrastructure, such as incubation centres, innovation hubs, and industry-sponsored labs, diminishes practical exposure and skill-based learning. Weak library resources, including outdated books and limited access to digital databases, hinder research and academic excellence. Addressing these gaps requires leveraging successful industry-academia collaboration models. Lee and Lai (4) examined Taiwan's incubation centres (ICs) in engineering education, highlighting success factors such as core competency utilization, industry alignment, emerging technologies, and technology transfers. If effectively implemented in the Indian MSME sector, similar collaborations with HEIs could yield mutual benefits for both industries and academic institutions. These challenges are routinely encountered by single-stream colleges, thereby limiting growth opportunities for both the institution and its students.

Patil et al. (2023) emphasized the shift from funding-based academia-industry interactions to long-term innovation partnerships in HEIs. Building upon successful incubation models like those in Taiwan, the study proposed the I5 framework to strengthen entrepreneurial ecosystems, guiding startups from idea generation to commercialization through incubation, mentorship, and intellectual property protection. Expanding on this perspective, Jamil et al. (160) examined incubators' role in fostering knowledge-driven economies, emphasizing their impact on entrepreneurship, research commercialization, and economic growth. The study highlighted policy recommendations to enhance incubator efficacy, advocating for structured entrepreneurial ecosystems that integrate HEIs, universities, industry, and government for sustainable development.

Further reinforcing the significance of structured incubation ecosystems, Hassan (447) highlighted the role of university business incubators (UBIs) in accelerating entrepreneurship by linking research with economic development. Findings underscored UBIs' contributions to innovation, industry collaboration, and entrepreneurship, advocating policy reforms and financial incentives to enhance their impact on economic growth and knowledge commercialization.

Building on the above perspective, Bikse et al. (86) analysed the transformation of Latvian universities into Entrepreneurial Universities, emphasizing business incubation, industry collaboration, and knowledge co-creation. Findings revealed positive trends in university-business partnerships, yet challenges in institutionalizing entrepreneurial ecosystems persist, necessitating stronger cooperation networks for sustainable higher education development. And similarly Kang (177) analysed Korea's higher education policies, emphasizing efforts to establish globally competitive HEIs through multifarious initiatives at the government and private institutions level. The implementation of incubation centres remains unfeasible in single-stream colleges due to resource constraints within their institutional framework.

Additionally, poor accessibility for differently abled students, coupled with inefficient administrative support systems, creates an exclusionary and ineffective institutional environment. To successfully transition towards a multidisciplinary model, these infrastructural and systemic deficiencies must be urgently addressed.

Obstacles in Regulatory Compliance and Accreditation

> "To address the above-mentioned issues, the regulatory system of higher education will ensure that the distinct functions of regulation, accreditation, funding, and academic standard setting will be performed by distinct, independent, and empowered bodies" (Minsitry of Education 47).

The National Assessment and Accreditation Council (NAAC) evaluates HEIs in India based on seven assessment criteria, ensuring quality assurance and institutional excellence. These criteria include: (1) Curricular Aspects, focusing on curriculum design, enrichment, and academic flexibility; (2) Teaching-Learning and Evaluation, assessing student enrolment, faculty quality, and learning outcomes; (3) Research, Innovations, and Extension, emphasizing research output, consultancy, and collaborations; (4) Infrastructure and Learning Resources, evaluating physical and digital facilities; (5) Student Support and Progression, examining student services and alumni engagement; (6) Governance, Leadership, and Management, measuring institutional strategy and financial management; and (7) Institutional Values and Best Practices, ensuring social responsibility and innovation (NAAC, 2023).

Complementing NAAC's accreditation system, the National Institutional Ranking Framework (NIRF), launched by the Ministry of Education, India, ranks higher education institutions based on five core parameters: Teaching, Learning & Resources (TLR), Research & Professional Practice (RP), Graduation Outcomes (GO), Outreach & Inclusivity (OI), and Perception (PR). These parameters include faculty qualifications, research publications, student diversity, employability, and institutional reputation. The ranking system ensures quality benchmarking, transparency, and continuous institutional improvement. It also influences academic decision-making, student preferences, and policy reforms in Indian higher education institutions (NIRF, 2024).

The accreditation process poses significant challenges for single-stream colleges transitioning to multidisciplinary institutions under NEP 2020. Stringent quality benchmarks demand substantial infrastructural and financial investments, often beyond the capacity of smaller institutions. However, accreditation remains crucial for institutional excellence, ensuring quality assurance, resource optimization, and global recognition. Kumar et al. (163) highlighted its role in improving institutional rankings, student enrolment, and academic reputation, emphasizing its impact on research innovation and policy implementation. Furthermore, accreditation facilitates credit transfers, benchmarking, and continuous institutional improvements, reinforcing its importance in shaping global competitiveness and student preferences. Due to the inherent deficiencies in human, infrastructural, and technological resources, single-stream colleges face significant challenges in obtaining accreditation. Even when accreditation is achieved, it often results in mediocre rankings, which ultimately offer limited advantages in institutional recognition and academic credibility.

Additionally, Frequent policy changes demand continuous adaptation, increasing administrative burdens and diverting resources from core academic functions. Limited institutional autonomy and strict curriculum regulations further hinder innovation in course design and industry-aligned education. Manimala et al. (17) advocated shifting accreditation from an input-based model to an outcome-driven approach, emphasizing institutional accountability, student outcomes, and long-term educational impact. Accreditation fosters self-regulation, continuous improvement, and strategic planning, enhancing global competitiveness. Key benefits include institutional credibility, improved employability, and research collaborations. However, challenges persist in integrating educational research, balancing quality with affordability, and developing standardized outcome-based accreditation metrics.

Furthermore, complex documentation requirements and bureaucratic accreditation procedures create significant compliance challenges especially for single-stream colleges, often necessitating administrative restructuring and dedicated personnel. Additionally, strict faculty qualification norms and student-teacher ratio mandates complicate recruitment, particularly within budgetary constraints. Addressing these concerns, Duarte and Vardasca (16) analysed global accreditation processes, highlighting bureaucratic inefficiencies, approval delays, and institutional compliance challenges. Their findings emphasize collaboration with accrediting agencies, adherence to regulatory standards, and governmental transparency as essential strategies for streamlining accreditation and improving institutional quality assurance. However, single-stream HEIs may find this process particularly cumbersome due to resource limitations. Complementing this perspective, Aithal et al. (43) examined NAAC’s accreditation framework in India, using the ABCD (Advantages, Benefits, Constraints, and Disadvantages) technique to assess its assessment criteria and methodology through focus group analysis, identifying key institutional challenges and influencing factors.

Beyond administrative and financial constraints, infrastructure mandates—such as advanced laboratories, libraries, and research centres—present major challenges for resource-limited institutions. Analysing NAAC accreditation outcomes, Ravikumar et al.

(2021) assessed regional, state-wise, and criterion-wise variations in institutional performance. Their findings revealed notable quality improvements post-reaccreditation, yet persistent disparities remain, particularly in teaching standards, governance efficiency, and student support services. While universities in the Southern region demonstrated strong accreditation outcomes, institutions in the Eastern and Northern regions require significant quality enhancements to bridge existing gaps and achieve national educational benchmarks.

Building upon the challenges of institutional capacity and accreditation disparities, Ali (2022) systematically examined the NIRF India Rankings (2020), identifying inconsistencies, ranking volatility, and gaps in data verification and institutional research output. The study critiques discrepancies between NAAC accreditation and NIRF rankings, emphasizing the need for methodological refinements. Key recommendations include strengthening research innovation, improving ranking frameworks, integrating institutional h-index, and ensuring dynamic ranking parameters for greater accuracy. Additionally, the study underscores the importance of enhanced data authentication and funding considerations to bolster ranking credibility. These insights provide policymakers and institutional leaders with strategies to refine ranking methodologies, ensuring transparency, stability, and a more reliable evaluation of institutional performance.

Additionally, periodic audits and inspections by accreditation bodies, while essential for quality assurance, often disrupt academic operations, particularly when institutions struggle with compliance. Research output remains a crucial accreditation criterion, placing single-stream colleges at a disadvantage due to their limited research focus. Aithal and Aithal (283) examined NAAC's seven-criteria accreditation model, emphasizing its influence on institutional credibility. Their analysis of nine A++ graded universities revealed that low research productivity significantly impacted accreditation scores, exposing disparities in assessment metrics and the need for a more balanced accreditation framework that considers institutional diversity and resource limitations.

Failure to comply with evolving regulations may lead to penalties, loss of accreditation, or even institutional derecognition, threatening their long-term viability. Lengthy regulatory approval processes for new courses further hinder academic expansion, while high accreditation costs and inconsistent expectations across regulatory agencies add to institutional confusion. To navigate these obstacles, a balanced regulatory framework is essential, allowing colleges greater flexibility while maintaining rigorous academic standards.

Issues in Industry Collaboration and Campus Placements

> "HEIs will focus on research and innovation by setting up start-up incubation centres; technology development centres; centres in frontier areas of research; greater industry-academic linkages" (Ministry of Education 40).

Single-stream colleges face challenges in fostering industry collaborations and ensuring strong graduate placements, as companies often prefer multidisciplinary institutions with diverse talent pools. Limited industry partnerships restrict placement opportunities, research sponsorships, and corporate-backed student projects. Singh and Kaundal (112) analysed academia-industry collaboration, identifying structural barriers and recommending action research to strengthen knowledge transfer and economic growth. Similarly, Tran (66) emphasized the role of experiential learning, industry partnerships, and structured frameworks in aligning curricula with labour market needs, highlighting their significance in enhancing job readiness and vocational outcomes in higher education.

Building upon these challenges, limited brand recognition among recruiters and a weak alumni network hinder single-stream colleges in attracting top employers, reducing recruitment referrals. Additionally, curriculum-industry misalignment results in graduates lacking cross-disciplinary skills and practical exposure, lowering employability. The scarcity of internships further deprives students of real-world experience, making competition with graduates from industry-aligned institutions difficult. Ashraf et al. (230) analysed university-industry linkages in Pakistan, emphasizing the importance of internships, stipends, and collaborative projects in enhancing employability. Findings underscored the need for industry participation in curriculum development and structured policies to bridge skill gaps, particularly within the China-Pakistan Economic Corridor (CPEC) framework.

Expanding on these employability challenges, unrealistic salary expectations among students, coupled with industry scepticism toward single-discipline colleges, further limit hiring prospects.

Shenoy and Aithal (774) explored the transition from traditional placements to online recruitment models, emphasizing global job accessibility, employer-student interaction, and sustainability. The study highlighted e-recruitment benefits, including corporate time efficiency and environmental advantages, advocating for digital-first hiring strategies in higher education. Complementing this, Sheridan and Linehan (2013) examined structured work placements as a critical link between academia and industry, emphasizing early engagement, experiential learning, and collaboration as key factors in enhancing employability and fostering stronger industry-academia partnerships.

Beyond direct placement challenges, outdated training methods in placement cells hinder students from acquiring essential job market skills, leaving them unprepared for evolving industry demands. Additionally, insufficient soft skills development—including communication, leadership, and problem-solving abilities—further limits employability. Mathur (260) analysed graduate and postgraduate recruitment trends in India, highlighting stable recruitment patterns despite temporary declines in intake post-pandemic, with digital hiring becoming increasingly prominent. Liew et al. (409) emphasized the importance of university-industry collaboration (UIC) in bridging these gaps, advocating for research partnerships, student placements, and consultancy models. The study underscored financial support, technology transfer mechanisms, and long-term planning as critical factors in fostering sustainable academic-industry engagement.

Moreover, Limited research and innovation tie-ups discourage companies from engaging with single-stream colleges for collaborative projects, further restricting industry-academia synergy. As industries increasingly prioritize interdisciplinary expertise and adaptability, these institutions struggle to stay relevant, lagging behind emerging trends. Additionally, lower employer participation in job fairs and industry workshops reduces students' career exposure and networking opportunities. Addressing these challenges necessitates a strategic overhaul of industry-academia collaborations, emphasizing curriculum modernization, enhanced corporate partnerships, and skill-based training programs. Zhang and Chen (10) highlighted similar concerns in Chinese applied sciences universities, recommending engineering practice integration, improved collaboration mechanisms, and dual-supervisor faculty systems to enhance graduate employability.

Difficulties in Blending Traditional and Interdisciplinary Pedagogies

> "[Multidisciplinary] education will help develop well-rounded individuals that possess critical 21st century capacities in fields across the arts, humanities, languages, sciences, social sciences, and professional, technical, and vocational fields" (Ministry of Education 36).

The shift from single-discipline education to an interdisciplinary learning model poses significant challenges for single-stream colleges. Limited subject diversity and rigid curriculum structures restrict students from exploring cross-disciplinary connections, hindering holistic learning. Mishra and Aithal (10) emphasized the role of innovative pedagogies such as case-based, experiential, and project-based learning in enhancing employability, advocating faculty engagement, industry collaboration, and policy reforms for skill-oriented education. Similarly, Lousley (126) examined interdisciplinary studies as a response to knowledge fragmentation, underscoring collaborative learning, structured pedagogical frameworks, and cross-disciplinary engagement as essential for fostering interdisciplinary research and addressing complex real-world challenges.

Additionally, faculty expertise constraints hinder the adoption of interdisciplinary pedagogies, as many educators lack cross-domain teaching experience. This challenge is compounded by resource limitations, including inadequate digital tools, laboratories, and modern infrastructure—key components for fostering interdisciplinary learning. Brint and Clotfelter (28) analysed U.S. higher education effectiveness, highlighting disparities in access, skill development, and research output, with funding and institutional selectivity playing pivotal roles. The study advocated policy reforms, interdisciplinary collaboration, and data-driven evaluations to enhance educational quality and workforce alignment. Similarly, Singh (31) examined NEP 2020's innovations, emphasizing active learning, technology integration, and curriculum redesign as essential strategies for improving student engagement, skill development, and workforce preparedness through teacher training and assessment reforms.

Moreover, traditional assessment methods often fail to measure interdisciplinary competencies, limiting students' ability to integrate knowledge across domains. Institutional reluctance to change, coupled with rigid accreditation policies, further impedes interdisciplinary curriculum reform. Faculty and administration frequently resist departing from conventional teaching models, while regulatory constraints reinforce disciplinary silos, making compliance challenging. Abrol (2023) examined multidisciplinary approaches in multicultural education, emphasizing holistic learning, cultural integration, and leadership development. Findings highlighted the role of interdisciplinary education under NEP 2020, advocating flexible curricula, digital tools, and skill-based learning to enhance student adaptability, innovation, and educational equity.

Building on the need for interdisciplinary reforms in higher education, Fung (79) explored its role in holistic learning, problem-solving, and addressing global challenges. Findings highlight structured curriculum frameworks, experiential learning, and cross-disciplinary collaboration as essential for faculty engagement, institutional reforms, and real-world knowledge application in dynamic career landscapes.

Beyond academic challenges, student engagement in interdisciplinary learning remains a concern, as many struggle with the cognitive shift required for multi-domain problem-solving. Limited industry collaboration further isolates single-stream colleges from industry-driven interdisciplinary advancements, making alignment with workforce demands difficult. Scalability also poses a challenge, as institutional constraints hinder the expansion of interdisciplinary initiatives. Moreover, the absence of cross-department collaboration restricts exposure to interdisciplinary research, depriving students of holistic learning experiences. Ribéreau-Gayon and d'Avray (148) advocate for research-based interdisciplinary teaching, emphasizing its role in bridging research-teaching gaps, fostering critical thinking, and reforming pedagogical approaches to enhance academic outcomes.

Additionally, Fields such as AI, sustainability, and data science demand interdisciplinary expertise—an area where single-stream colleges struggle due to rigid curricula and limited cross-domain exposure. As employers increasingly prioritize interdisciplinary competencies, graduates from these institutions face placement challenges. Addressing these gaps requires curricular flexibility, faculty training, and strengthened industry-academic partnerships to align education with evolving job market demands. Oudenampsen et al. (10) explored interdisciplinary education's impact on student learning, emphasizing problem-solving, integrative thinking, and epistemic differences. Findings highlight curricular refinement, student dialogue, and addressing perceptual biases as essential strategies for fostering interdisciplinary collaboration and enhancing professional preparedness.

Building on the need for interdisciplinary expertise in emerging fields, structured pedagogical approaches can further enhance student adaptability and skill development. Chesley et al. (13) explored interdisciplinary pedagogy, emphasizing its role in integrating STEM and humanities education. Findings highlighted improved student collaboration, critical thinking, and communication skills. The research recommended structured interdisciplinary curricula, faculty cooperation, and experiential learning to enhance professional development and academic engagement in higher education.

Expanding on interdisciplinary pedagogy, effective curriculum design plays a crucial role in fostering integration across disciplines. Klaassen (857) explored interdisciplinary education in engineering, emphasizing problem definition, disciplinary integration, and alignment in curriculum design. Findings highlighted challenges in structuring interdisciplinary programs, requiring pedagogical innovations and faculty collaboration. The study recommended refining curriculum frameworks to enhance integration, fostering interdisciplinary competencies, and aligning educational practices with real-world problem-solving needs.

Shortcomings in Academic Research and Innovation

> "National Research Foundation to fund outstanding peer-reviewed research and to actively seed research in universities and colleges" (Ministry of Eduation 34)
> .

Academic research and innovation in single-stream colleges remain constrained by insufficient funding, limiting research projects, laboratory infrastructure, and technological advancements. The predominant focus on teaching over research further weakens research culture, discouraging faculty and student participation in scholarly activities. Aithal and Aithal (283) analysed NEP 2020, highlighting its emphasis on fostering a research-driven academic ecosystem through multidisciplinary education, technology integration, and policy reforms. Findings suggested structured governance, faculty accountability, and industry collaboration as key enablers for enhancing research output. The study concluded that institutional autonomy and policy coherence are crucial for optimizing higher education outcomes.

Additionally, excessive teaching responsibilities limit faculty engagement in research, reducing opportunities for meaningful academic contributions. The lack of interdisciplinary collaboration further weakens research quality, as single-stream colleges remain isolated from cross-domain insights that drive innovation. Aithal and Aithal (283) examined NEP 2020's implementation strategies, highlighting faculty overload, research integration, and institutional restructuring as key concerns. Findings emphasized the need for multidisciplinary education, balanced faculty workload distribution, and policy reforms to foster a research-driven ecosystem. The study recommended enhanced research incentives and strategic workload management to ensure faculty engagement in both teaching and innovation.

Building upon these concerns, Singh and Baghel (40) further explored the impact of NEP 2020 on faculty workload, identifying excessive teaching responsibilities as a major obstacle to research productivity. The study advocated for workload flexibility, institutional restructuring, and increased research funding to foster innovation and interdisciplinary collaboration. Findings emphasized the necessity of global academic competitiveness, recommending policy reforms to balance teaching and research commitments, ultimately enhancing institutional research output and faculty engagement in scholarly activities. Limited industry partnerships restrict applied research, industry-funded projects, and technology commercialization, while inadequate research infrastructure—outdated labs, software, and digital resources—further hampers academic output. The absence of experienced research mentors compounds these challenges, making it difficult for faculty and students to secure grants, publish, or file patents. Kumar (122) analysed NEP 2020's role in transforming higher education, highlighting the adverse effects of weak academia-industry collaboration on innovation and research. The study suggested policy reforms to strengthen interdisciplinary research and institutional competitiveness, ultimately fostering economic growth. Similarly, Maseeh (2023) examined research infrastructure gaps in teacher education, advocating modernization, digital integration, and faculty training to enhance pedagogical quality.

Beyond institutional limitations, regulatory and accreditation constraints often deprioritize research in teaching-focused colleges thus limiting funding opportunities and institutional recognition. Additionally, low student engagement in research arises from insufficient incentives and awareness, discouraging scholarly exploration. Smitha (1885) examined NEP 2020's impact on teacher education, highlighting these constraints and emphasizing policy reforms, faculty training, and infrastructure development to align teacher education with multidisciplinary frameworks. Similarly, Gaur (636) analysed NEP 2020's effect on research engagement, identifying low student participation as a key challenge. Findings emphasized structured research initiatives, faculty mentorship, and institutional support to foster inquiry-driven education, recommending research-based learning integration to enhance innovation and skill development.

Furthermore, limited access to research grants places single-stream colleges at a disadvantage compared to multidisciplinary institutions with greater financial backing. Additionally, restricted international collaborations hinder global knowledge exchange, limiting exposure to advanced methodologies and emerging fields. Even when research is conducted, weak industry linkages prevent practical implementation, reducing societal and economic impact. Furthermore, slow adoption of emerging technologies, such as AI and data analytics, diminishes research competitiveness. Kumar (123) emphasized the need for structured partnerships, faculty mobility, and policy reforms to strengthen interdisciplinary engagement. Similarly, Wankhade (55) highlighted weak industry linkages under NEP 2020, recommending structural reforms and faculty incentives to enhance research commercialization.

Ultimately, these limitations contribute to a brain drain, with talented faculty and students seeking opportunities in research-intensive or multidisciplinary institutions, exacerbating the research stagnation in single-stream colleges. Addressing these challenges requires strategic investments in research infrastructure, policy reforms, and stronger academia-industry partnerships to foster a sustainable culture of research and innovation.

Conclusion

The transformation of single-stream colleges into multidisciplinary institutions, as envisioned by NEP 2020, is a critical step toward a more holistic and flexible higher education system. However, this transition presents formidable challenges, including inadequate infrastructure, faculty shortages, regulatory hurdles, weak industry linkages, and research limitations. Addressing these barriers requires a comprehensive strategy that integrates policy reforms, enhanced funding, and faculty development initiatives. Additionally, fostering strong industry-academia collaboration and modernizing accreditation frameworks will be crucial in ensuring a seamless transition. The study underscores the necessity of interdisciplinary education, digital integration, and research-driven curricula to enhance institutional competitiveness and employability outcomes.

Moving forward, a multi-pronged approach involving institutional autonomy, structured governance, and innovation-driven academic models is essential for sustainable educational reforms. Strengthening research capabilities through targeted investments, faculty incentives, and global collaborations will further elevate India's higher education landscape. Ultimately, the success of this transformation depends on proactive policy implementation and the collective efforts of stakeholders, ensuring that single-stream institutions evolve into dynamic, multidisciplinary hubs that align with global education standards.

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