



Mahamana Malaviya's Vision for Science and Technology: A Comparative Study with NEP 2020 and BHU's Institutional Frameworks

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Abstract

Mahamana Pandit Madan Mohan Malaviya envisioned education as the cornerstone of India's progress, with science and technology serving as essential drivers of national development. His establishment of Banaras Hindu University (BHU) in 1916 reflected his commitment to integrating traditional Indian knowledge systems with modern scientific disciplines. This paper explores Malaviya's vision for science and technology, its alignment with the National Education Policy (NEP) 2020, and the institutional frameworks at BHU that continue to foster innovation, creativity, and research.

Keywords: Mahamana's Vision, Science and Technology, Banaras Hindu University, Innovation, NEP 2020, Creativity, Indigenous Industry

1. Introduction

Background

Education has historically served as a transformative force in shaping societies, and India's intellectual tradition has long emphasized the integration of knowledge with cultural values. Mahamana Pandit Madan Mohan Malaviya, the founder of Banaras Hindu University (BHU), envisioned an educational system that harmonized India's spiritual heritage with modern scientific progress. Established in 1916, BHU became a "Capital of Knowledge" respected across India and abroad, embodying Malaviya's belief that science and technology were essential for national revival. His vision extended beyond academic excellence to holistic development, where creativity, innovation, and moral values were interwoven into the curriculum. This approach anticipated the needs of a self-reliant society and resonates strongly with contemporary educational reforms such as the National Education Policy (NEP) 2020, which emphasizes critical thinking, innovation, and value-based learning.

Problem Statement

Despite Malaviya's pioneering vision and the establishment of BHU as a hub of knowledge, Indian higher education continues to face persistent challenges in aligning traditional values with modern scientific and

technological demands. While NEP 2020 seeks to address these issues by fostering creativity, innovation, and holistic learning, there remains a gap in understanding how historical frameworks like Malaviya's vision can be systematically integrated into contemporary policy and institutional practices. The lack of comparative studies that connect foundational educational philosophies with current reforms has limited the ability of policymakers and institutions to draw upon India's intellectual heritage for future development. This study addresses this gap by examining the resonance between Malaviya's vision, NEP 2020, and BHU's institutional frameworks, thereby providing insights into how historical ideals can inform modern educational transformation.

Objectives

This study seeks to:

- Examine Mahamana Malaviya's contributions to science and technology education and their historical context.
- Compare his vision with the principles and reforms outlined in NEP 2020.
- Analyse how BHU's institutional frameworks continue to embody and advance Malaviya's ideals.
- Highlight the role of creativity and innovation as central elements in both Malaviya's philosophy and NEP 2020's transformative agenda.
- Assess the relevance of Malaviya's vision in addressing contemporary challenges in higher education and nation-building.

Significance

The significance of this comparative study lies in its ability to connect historical vision with modern policy frameworks. Malaviya's emphasis on integrating Eastern and Western knowledge systems, fostering innovation, and embedding moral and cultural values into education provides a timeless model for holistic development. By juxtaposing his vision with NEP 2020, the study underscores the continuity of educational reform in India and its alignment with global trends toward knowledge-based societies. Furthermore, BHU's institutional practices demonstrate how creativity and innovation can be operationalized to address real-world challenges, thereby contributing to national progress. Understanding this synergy not only enriches academic discourse but also offers practical insights for policymakers, educators, and institutions striving to balance tradition with modernity in the pursuit of excellence.

2. Literature Review

Integration of Tradition and Modernity Malaviya's philosophy emphasized blending ancient Indian knowledge systems—such as Ayurveda, Sanskrit, and astronomy—with modern scientific disciplines like engineering and metallurgy (Mahandiratta, 2022) [1]. Holistic Education Scholars highlight his vision of nurturing intellectual, physical, emotional, and moral development, positioning education as a tool for national progress (Sharma, 2019)[2]. Institutional Legacy – BHU The establishment of Banaras Hindu University in 1916 is widely studied as a model of multidisciplinary education combining cultural heritage with modern science (Singh, 2018)[3]. Innovation and Entrepreneurship Research on the AIC-Mahamana Foundation illustrates how BHU continues Malaviya's ideals by fostering startups, creativity, and entrepreneurship (Sharma, 2021)[4]. Alignment with NEP 2020 Comparative studies show strong parallels between Malaviya's vision and the National Education Policy 2020, particularly in promoting multidisciplinary learning and global competitiveness (Government of India, 2020)[5]. Indigenous Industry and Self-Reliance Malaviya's emphasis

on technical education tailored to India's needs resonates with contemporary scholarship on Atmanirbhar Bharat and indigenous industry (Kumar, 2021)[6]. Curriculum Development Analyses of BHU's curriculum reveal a consistent focus on integrating vocational training with scientific knowledge, echoing NEP 2020's priorities (Gupta, 2020)[7]. Global Knowledge Superpower Literature situates Malaviya's vision within India's aspiration to become a global knowledge hub, a theme reinforced in NEP 2020 (Rao, 2022)[8]. Innovation Ecosystem at BHU Studies of centres like MCIIE and the Design Innovation Centre highlight institutional mechanisms that operationalize Malaviya's vision of creativity and applied science (Verma, 2021)[9]. Comparative Educational Philosophy Scholars compare Malaviya's ideas with other reformers, noting his unique balance of tradition and modernity as a foundation for sustainable educational reform (Chakraborty, 2019)[10].

3. Methodology

This paper adopts a qualitative research methodology, relying on:

- Document Analysis: Reviewing primary sources such as Malaviya's speeches, BHU's founding documents, and NEP 2020 policy papers.
- Secondary Literature Review: Examining scholarly articles, institutional reports, and historical accounts of BHU's development.
- Case Study Approach: Analysing BHU's innovation centres (IM-BHU, Design Innovation Centre, MCIIE) as contemporary manifestations of Malaviya's vision.

3.1 Mahamana's Vision for Science and Technology

Malaviya's educational philosophy was rooted in the belief that science and technology must serve both individual growth and national advancement. His vision can be summarized in the following dimensions:

- Integration of Tradition and Modernity: Malaviya sought to balance ancient Indian knowledge—such as Veda-Vedang, Sanskrit literature, Ayurveda, and astronomy—with modern scientific fields including metallurgy, mining, engineering, and agricultural science.
- Holistic Development of Students: He emphasized that education should nurture physical, intellectual, mental, and emotional attributes. Science and technology were seen as tools to cultivate creativity, innovation, and altruism among students.
- Curriculum Tailored to National Needs: Malaviya argued that curricula must reflect the specific demands of India, shaped by geography, history, and local conditions. Technical and scientific education was designed to strengthen indigenous industries and address societal challenges.
- Institutional Foundation – BHU: The establishment of BHU embodied his vision, creating a platform where traditional knowledge and modern science coexisted. This institution became a hub for multidisciplinary learning and research.

3.2 Alignment with National Education Policy 2020

The NEP 2020 echoes Malaviya's vision by promoting:

- Multidisciplinary and holistic education.
- Integration of vocational training with modern scientific approaches.
- Emphasis on creativity, innovation, and research.
- Transformation of India into a Global Knowledge Superpower.

This alignment demonstrates the enduring relevance of Malaviya’s educational philosophy in shaping contemporary policy frameworks.

Table 1. Alignment Between Mahamana’s Vision and NEP 2020 Goals — illustrating the convergence of traditional educational ideals with modern policy objectives to promote holistic, multidisciplinary, and globally competitive learning

Mahamana’s Vision	NEP 2020 Goals
Integration of tradition and modern science	Multidisciplinary and holistic education
Holistic student development	Emphasis on creativity and innovation
Curriculum tailored to national needs	Vocational training and indigenous industry support
Establishment of BHU as a knowledge hub	India as a Global Knowledge Superpower

3.3 Case Study: Innovation and Creativity Centres at BHU

Malaviya’s vision laid the groundwork for BHU’s innovation ecosystem, which continues to thrive through several initiatives:

- AIC-Mahamana Foundation for Innovation & Entrepreneurship (IM-BHU): Established in 2018, this centre supports startups, experimentation, and access to resources such as funding and mentorship.
- Design Innovation Centre (BHU-IIT collaboration): Provides a platform for students and faculty to transform creative ideas into practical design solutions.
- Malaviya Centre for Innovation, Incubation and Entrepreneurship (MCIIE): Supports student-led ventures, networking, and entrepreneurship programs, addressing the resource gaps faced by Indian startups

Table 2. Evolution of Innovation and Entrepreneurship Centres at Banaras Hindu University — highlighting the progressive establishment of institutions fostering creativity, startup incubation, and applied innovation from 1916 to the 2010s

Year	Centre Established	Focus Area
1916	Banaras Hindu University	Integration of tradition and modern science
2018	AIC-Mahamana Foundation (IM-BHU)	Innovation, entrepreneurship, startup incubation
2018	Design Innovation Centre (BHU-IIT collaboration)	Creative design solutions, applied innovation
2010s	Malaviya Centre for Innovation, Incubation and Entrepreneurship (MCIIE)	Student ventures, networking, entrepreneurship programs

4. Results and Discussion

4.1. Enduring Impact of Malaviya’s Vision

The findings reveal that Mahamana Malaviya’s philosophy of integrating tradition with modernity has had a lasting influence on Indian higher education. His establishment of BHU as a multidisciplinary institution continues to serve as a model for harmonizing spiritual heritage with scientific progress. The university’s curriculum demonstrates how ancient knowledge systems such as Ayurveda and Sanskrit can coexist with modern disciplines like engineering and technology, thereby creating a balanced educational framework.

4.2. Institutional Practices at BHU

BHU's innovation ecosystem—including the AIC-Mahamana Foundation, the Design Innovation Centre, and the MCIIE—embodies Malaviya's ideals of creativity, entrepreneurship, and applied science. These centres provide platforms for experimentation, mentorship, and startup incubation, ensuring that students are not only academically prepared but also equipped to contribute to India's industrial and technological growth. The progressive establishment of these centres highlights BHU's ability to adapt Malaviya's vision to contemporary challenges.

4.3. Alignment with NEP 2020

The comparative analysis shows strong convergence between Malaviya's vision and the National Education Policy 2020. Both emphasize:

- Multidisciplinary learning that integrates vocational and scientific training.
- Holistic student development through creativity, innovation, and value-based education.
- Support for indigenous industry as a pathway to self-reliance.
- Global competitiveness by positioning India as a knowledge superpower.

This alignment validates the relevance of Malaviya's philosophy in shaping modern educational reforms and underscores the continuity of India's intellectual tradition in policy frameworks.

4.4. Contribution to National Development

The results highlight that Malaviya's emphasis on indigenous industry and technical education resonates with contemporary initiatives like *Atmanirbhar Bharat*. By tailoring curricula to national needs, BHU has contributed to sustainable development and self-reliance. The integration of traditional knowledge with modern science ensures that graduates are culturally rooted yet globally competitive, addressing both local and international demands.

4.5. Critical Reflections

While the alignment between Malaviya's vision and NEP 2020 is evident, challenges remain in fully operationalizing these ideals across India's diverse higher education landscape. Issues such as resource constraints, uneven implementation of innovation ecosystems, and balancing global competitiveness with indigenous priorities require continued attention. Nevertheless, BHU's example demonstrates that historical educational philosophies can be successfully adapted to modern contexts.

5. Conclusion

Mahamana Pandit Madan Mohan Malaviya's vision for science and technology was revolutionary in its ability to harmonize India's spiritual heritage with modern scientific progress. By establishing Banaras Hindu University in 1916, he created a pioneering institution that embodied his ideals of holistic education, innovation, and national development. The study demonstrates that Malaviya's emphasis on integrating traditional knowledge systems with modern disciplines, fostering creativity and entrepreneurship, and tailoring curricula to national needs continues to resonate in contemporary educational reforms.

The comparative analysis with the National Education Policy (NEP) 2020 reveals a strong alignment between Malaviya's philosophy and modern policy objectives. Both frameworks advocate multidisciplinary learning, vocational integration, indigenous industry support, and the transformation of India into a global knowledge superpower. BHU's institutional practices—through centres such as the AIC-Mahamana Foundation, the

Design Innovation Centre, and MCIIE—illustrate how Malaviya’s ideals have been operationalized to meet the challenges of the 21st century.

Ultimately, this study underscores the enduring relevance of Malaviya’s educational philosophy in shaping India’s higher education landscape. His foresight provides a timeless model for balancing tradition with modernity, ensuring that education remains a catalyst for creativity, innovation, and sustainable national progress. By drawing upon this intellectual heritage, policymakers and institutions can strengthen the foundations of India’s knowledge society and advance its aspirations for global leadership in science and technology.

Declaration of Conflicting Interests

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