
DIGITAL TRANSFORMATION IN INDIAN HIGHER EDUCATION: A SYSTEMATIC REVIEW OF SWAYAM AND MOOCS ADOPTION, CHALLENGES, AND PEDAGOGICAL IMPACTS**Alka Preeti¹, Dr. Shruti Pandey²**DOI: <http://doi.org/10.5281/zenodo.21362572>**Review: 22/06/2026****Acceptance: 25/06/2026****Publication: 14/07/2026**

Abstract

The paradigm shift from teacher-centric to learner-centric frameworks in Indian higher education has been significantly accelerated by state-sponsored digital learning initiatives, prominently the Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM) platform. Grounded in the Technological Pedagogical Content Knowledge (TPACK) and Transactional Distance educational frameworks, this systematic review synthesizes institutional reports, budgetary trends, and empirical studies between 2017 and 2026 across Indian higher education institutions. This paper maps the digital architecture across three thematic axes: technical versus pedagogical equilibrium, systemic structural execution via the four-quadrant instructional model, and core socio-technological inhibitors that perpetuate a significant "completion gap" where terminal certification indices hover between 5% and 15% despite a cumulative enrolment of 5.80 crore learners. The findings reveal a profound structural imbalance marked by higher enrolment in brief, technical skills courses over extensive pedagogical training, coupled with systemic barriers driven by infrastructural deficiencies, temporal scarcity, and platform awareness gaps among educators. Based on these findings, we outline a sustainability model and actionable integration pathways to align India's National Education Policy (NEP 2020) objectives with global quality benchmarks.

Keywords: SWAYAM, MOOCs, NEP 2020, Teacher Education, Four-Quadrant Approach, Completion Gap, TPACK Framework.

INTRODUCTION

The contemporary global educational ecosystem is undergoing a profound digital reconfiguration, driven by rapid advancements in information and communication technologies (ICT) and open-access architectures. In the context of India's highly distributed higher education landscape, this transition is not merely logistical but conceptual, marking a definitive paradigm shift from traditional, teacher-centric models to distributed, learner-centric frameworks. This democratization of higher learning has been formalized under the national "**Digital India**" flagship initiative, establishing a legislative and operational mandate to expand access, maximize equity, and elevate instructional quality across regional, economic, and geographic boundaries. Central to this digital pivot is the deployment of Massive Open Online Courses (MOOCs), implemented through the indigenous national platform, SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds), launched in 2017 by the Ministry of Education. Designed as an integrated repository offering complete higher education curricula, vocational certifications, and continuous professional development for teachers, SWAYAM functions as the

¹ *Doctoral Researcher, Faculty of Education, Banaras Hindu University, Varanasi, Uttar Pradesh, India*

² *Assistant Professor, Faculty of Education, Banaras Hindu University, Varanasi, Uttar Pradesh, India*

operational core for credit-transfer frameworks sanctioned by the University Grants Commission (UGC). However, despite robust administrative backing and escalating aggregate platform metrics—culminating in over 5.80 crore cumulative enrollments by early 2026 localized research highlights substantial variance in course design, stakeholder engagement, and structural readiness among end-users.

While macro-level evaluations celebrate SWAYAM's capacity to host thousands of courses, micro-level empirical research reveals critical gaps. These include pedagogical imbalances between purely technical training and advanced innovative instructional methods, low baseline levels of Open Educational Practices (OEP) among active research scholars, and deep-seated systemic friction preventing faculty members from developing or successfully completing online certifications. This systematic review synthesizes localized empirical data and policy progress reports to provide a comprehensive analysis of the SWAYAM platform's educational efficacy, instructional architectures, and socio-technological friction points, offering an empirical foundation to guide future policy alignment under the National Education Policy (NEP 2020).

RESEARCH QUESTIONS AND OBJECTIVES

RQ1: What are the structural and architectural differences between indigenous platforms (SWAYAM) and major international MOOC providers (Coursera, edX, Udacity) regarding credit frameworks, monetization strategies, and accessibility models?

RQ2: How effectively does the SWAYAM instructional architecture support the dual development of teachers' pedagogical knowledge and technical integration skills?

RQ3: To what degree do research scholars and educators utilize Open Educational Resources (OER) and practice-centric strategies (OEP) to enhance learning outcomes?

RQ4: What are the primary socio-technological and structural inhibitors creating the persistent "completion gap" preventing higher education faculty from adopting and completing MOOC certifications?

The accompanying operational objectives are to evaluate the functional execution of the platform's four-quadrant design, categorize the empirical friction points limiting faculty onboarding, analyze recent budgetary allocations, and provide structured policy modifications to bridge current execution deficits.

METHODOLOGICAL FRAMEWORK

This study employs a systematic review design to identify, critically appraise, and synthesize recent peer-reviewed empirical studies, national datasets, and ministerial reports focusing on the SWAYAM framework in India. The review isolates and cross-examines data across three specific evaluation categories:

Content and Domain Analysis

Synthesizing granular content audits of running digital portfolios (e.g., active teacher education segments during specific academic cycles between 2023 and 2025), analyzing enrollment distribution metrics ($N = 57$ active courses across key domains), temporal preferences (4–8 week versus 16-week courses), and the operational output of primary national coordination networks like the National Institute of Technical Teachers Training and Research (NITTTR).

Quantitative Survey Appraisals

Extracting data from broad random-sampling surveys ($N = 300$) measuring the baseline adoption indices of Open Educational Resources (OER) and Open Educational Practices (OEP) among research scholars located

within regional state universities (e.g., Alagappa, Periyar, and Annamalai Universities), alongside macroeconomic datasets published by the Press Information Bureau (PIB) up to 2026.

Qualitative Phenomenological Appraisals

Incorporating qualitative insights using Interpretative Phenomenological Analysis (IPA) extracted from semi-structured faculty interviews regarding structural on boarding, platform confusion, and infrastructure deficits within state institutions to capture the lived experiences of academic stakeholders.

THEORETICAL GROUNDING

To ensure robust academic validity, this study grounds its analysis of digital learning in two established theoretical frameworks: the **Technological Pedagogical Content Knowledge (TPACK)** model and **Moore's Theory of Transactional Distance**. The TPACK framework posits that effective digital instruction requires a complex, overlapping integration of Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK). In evaluating SWAYAM's teacher education portfolios, TPACK allows us to analyze whether courses merely introduce technical software (TK) or holistically merge technology with pedagogical strategies (TPK) and content delivery (TPACK). Second, Moore's Theory of Transactional Distance is utilized to explain the psychological and communicative gap between instructors and learners in asynchronous online spaces. The theory asserts that transactional distance is a function of *Dialogue* (interaction), *Structure* (course design), and *Learner Autonomy*. This framework is vital for understanding why specific components of SWAYAM's instructional model succeed or fail in engaging distant learners.

PLATFORM STRUCTURAL ARCHITECTURE: SWAYAM VS. INTERNATIONAL MOOCS

A fundamental dimension of evaluating India's digital transformation involves contrasting the organizational architecture of SWAYAM with primary international platforms (Coursera, edX, Udacity). The structural divergence is characterized by distinct philosophies concerning monetization, systemic integration, and certification mandates.

Table 1: Comparative Architectural Analysis of SWAYAM and International Platforms

STRUCTURAL DIMENSION	SWAYAM PLATFORM (INDIA)	INTERNATIONAL PLATFORMS (COURSERA, EDX, UDACITY)
Monetization Strategy	Strictly Free- to- Access: Content delivery, evaluation materials, and interaction forums are fully subsidized by the state. Nominal fees are restricted to physical proctored examinations.	Freemium Model: Initial audit pathways are frequently restricted; certification, graded elements, and specialization modules require recurring subscriptions or high fees.
Institutional Credit Integration	Systemic Credit Transfer: Directly linked to the UGC Credit Framework. Up to 40% of standard semester course loads can be transferred directly into regular university transcripts.	Isolated Micro-credentials: Independent corporate badges or specialized certificates that require separate, ad-hoc institutional verification for traditional credit mapping.

Instructional Design Framework	Standardized Four-Quadrant Rule: Mandatory adherence to rigorous national guidelines spanning e-tutorials, texts, open forums, and formal quiz structures.	Variable Architecture: Highly adaptive and flexible formats; driven by specific university designs or corporate priorities, ranging from pure text to interactive code blocks.
Primary Target Demographic	Equity and Remediation: Explicitly targeted at bridging regional, digital, and economic divides among rural, marginalized, and underserved learner pools.	Upskilling and Global Mobility: Optimized for corporate upskilling, technological certifications, and high-income professionals tracking industry skills.

The comparative data establishes that while international platforms excel in content diversity and global market visibility, SWAYAM holds a structural advantage regarding national credit alignment. By transforming external digital certifications into formal credits that count toward degrees through the Academic Bank of Credits (ABC), SWAYAM effectively bridges the gap between alternative online learning and traditional university systems.

FINANCIAL ALLOCATIONS AND MACRO TRENDS

The financial investment in the SWAYAM platform is managed through the National Mission on Education through Information and Communication Technology (NMEICT). The budget covers course development, infrastructure maintenance, and compensation to content creators across its nine designated National Coordinators. The Union Budget consistently allocates significant funds to digital learning initiatives. For the fiscal years 2022-2023 and 2023-2024, the budget allocation for NMEICT was maintained at a steady state of ₹400 crore annually, expanding on post-pandemic digital infrastructure needs. Historical course development costs show that during the foundational expansion phases (2016–2020), over ₹250 crore (\$30 million) was disbursed for the curation of approximately 2,000 baseline courses. To offset continuous operational costs while preserving equitable access, SWAYAM maintains free learning content but charges a nominal, uniform proctored examination fee (typically ₹1,000) for formal certification.

SYNTHESIS OF EMPIRICAL FINDINGS

The Technical-Pedagogical Knowledge Imbalance an essential focus within the literature involves analyzing the qualitative composition of the teacher education programs deployed on SWAYAM. Recent comprehensive evaluations auditing the June 2024 academic cycle reveal a noticeable structural imbalance between courses targeting purely technical skill-building and those targeting core pedagogical innovation. Out of the active portfolio audited ($N = 57$), technical skills development courses significantly outnumbered foundational pedagogical knowledge courses ($N = 15$ versus $N = 10$). This imbalance is further reflected in learner enrollment. Technical integration courses captured an aggregate enrollment of 32,863 learners, whereas pedagogical development stagnated at 17,676. Furthermore, a clear negative correlation was observed between course duration and learner engagement: the highest enrollment densities were concentrated in short-form, 4-to-8-week courses, while comprehensive 16-week structures faced high drop-out rates. The domain distribution analysis shows Technology leading at 26.3%, followed by Psychology at 22.8%, and basic Pedagogy at 17.5%. Critically, the portfolio suffers from a deficit in advanced 21st-century instructional design; innovative

frameworks such as Artificial Intelligence (AI) integration or specialized design-thinking frameworks were absent from all but a single audited course, indicating an urgent need to update outdated teacher education models. Execution of the Four-Quadrant Instructional Model As documented by regional directors and digital content creators, the instructional design of SWAYAM relies heavily on the strict execution of its Four-Quadrant Approach. This design acts as a quality control mechanism across national coordination systems including NPTEL, CEC, UGC, and IGNOU. The operational success of this model depends on its structural integration across four distinct layers:

Quadrant I (e-Tutorial): High-definition video segments, narrative audio overlays, digital animations, and integrated virtual laboratory environments forming the primary visual delivery layer.

Quadrant II (e-Content): Searchable, high-density self-learning materials, standalone e-books, localized research papers, and open-access text files meant for independent study.

Quadrant III (Discussion Forum): An asynchronous, peer-to-peer and expert-led digital forum designed to resolve lingering doubts, encourage collaborative reflection, and enhance social presence in virtual spaces.

Quadrant IV (Self-Assessment): Formal, continuous testing mechanisms consisting of automated multiple-choice questions (MCQs), complex problem sets, short-form quizzes, and structured assignments linking directly to final exam eligibility.

Empirical analysis shows that while Quadrants I and II are robustly maintained due to rigorous preliminary review processes overseen by bodies like NITTTR (which produces 38.6% of the teacher portfolios), Quadrant III (Discussion Forums) remains severely underutilized. It frequently suffers from low expert participation, transforming potentially vibrant collaborative spaces into unmoderated text boards. From the perspective of Transactional Distance Theory, this failure in dialogue drastically expands the psychological distance between the student and the institution, contributing to lower final completion rates despite high initial enrolment.

Open Educational Practices (OEP) and Scholar Engagement

Focusing on research scholars within state university frameworks, quantitative assessments reveal a distinct divide between basic Open Educational Resources (OER) consumption and actual Open Educational Practices (OEP). While a baseline awareness of OER (the passive retrieval and consumption of freely available online research files and public texts) is common among scholars, actual practice-centered strategies (OEP)—defined as the collaborative creation, adaptation, modification, and open redistribution of localized knowledge products—remains low.

Statistical evaluations indicate that this engagement gap is influenced by contextual factors such as institutional location, gender distribution, and economic constraints. Scholars within rural-tier universities demonstrate significantly lower OEP participation indices compared to urban-tier counterparts, driven by limited local mentorship and institutional research support. This confirms that platform access alone does not automatically translate into active digital knowledge production without structured academic scaffolding.

Socio-Technological Barriers and Institutional Resistors: While policy objectives focus on widespread faculty onboarding, qualitative phenomenological analysis utilizing IPA frameworks highlights three deep-seated systemic barriers preventing higher education teachers from engaging with MOOCs:

Acute Platform and Functional Unawareness: Educators frequently struggle to navigate the platform interfaces, understand examination registration processes, manage fee structures, or distinguish between SWAYAM, NPTEL, and external platforms like Coursera. This lack of structural clarity causes friction during initial on boarding.

Pervasive Technical Infrastructure Deficiencies: Faculty members report persistent technological challenges, including outdated institutional hardware, un optimized software setups, lack of high-speed internet in localized provincial settings, and frequent power outages that disrupt live teaching blocks and time-sensitive assessments.

Institutional Time Scarcity and Burnout: Higher education faculty face heavy administrative demands, routine exam coordination, and personal obligations. The requirement to dedicate strict daily time windows to rigid, time-bound digital courses creates significant pressure, driving down voluntary engagement.

LONGITUDINAL ANALYSIS OF EDUCATION DISCIPLINE (2023–2025)

The development of courses in the Education discipline (encompassing teacher education, digital pedagogy, and educational technology) saw a substantial policy-driven expansion between 2023 and 2025. Driven by the NEP 2020 mandate requiring 50 hours of continuous professional development for educators, the platform scaled its catalog. However, macro-level data compiled from the Ministry of Education highlights a stark "completion gap." Out of 5.80 crore cumulative enrollments platform-wide by early 2026, only 52.88 lakh terminal certifications were successfully awarded.

Table 2: Enrollment and Certification Funnel in Prominent Education Courses (2023–2025)

COURSE NAME	DURATION	NATIONAL COORDINATOR	ESTIMATED ENROLLED STUDENTS	ESTIMATED SUCCESSFUL CERTIFICATIONS	CALCULATED EFFICACY (CERT. %)
Educational Technology	12 Weeks	CEC / Uttarakhand Open Univ.	23,000+	2,100	9.13%
AI for Educators (FDP)	14 Hours	SWAYAM Plus / Industry Partner	55,000+	38,000	69.09%*
Foundations of Heutagogy	8 Weeks	IGNOU	12,000+	1,100	9.16%
Digital Pedagogy	4 Weeks	NITTTR	18,500+	2,550	13.78%
Early Childhood Care & Education	15 Weeks	NCERT	45,000+	4,850	10.78%

Note: Asterisk (*) indicates participation-based certification without mandatory physical proctored examinations.

The empirical data within Table 2 reveals a critical behavioral trend: traditional, long-form academic modules (12 to 15 weeks) suffer from low certification rates hovering between 9% and 11%. This low conversion rate is a direct manifestation of the "completion gap." Conversely, short-form, high-intensity micro-credentials launched under the "SWAYAM Plus" framework in February 2024 (e.g., AI for Educators, developed in tandem with industry technology partners) exhibit radically high completion profiles (69.09%). This divergence confirms that when structural temporal constraints are minimized and content is aligned with immediate professional utility, educator engagement spikes dramatically.

DISCUSSION AND POLICY ALIGNMENT:

The findings compiled in this review point to a critical challenge in India's digital education strategy: a clear disconnect between high-level macro policy design and grassroots execution. The National Education Policy (NEP 2020) advocates for flexible, interdisciplinary learning pathways facilitated by online tools. Yet, the current implementation faces low faculty engagement, uneven content distribution, and technical barriers that widen the transactional distance.

To address the technical-pedagogical knowledge imbalance identified under the TPACK lens, SWAYAM's curriculum strategy must evolve from long, traditional academic modules toward shorter, "bite-sized" micro-credentials focusing on contemporary pedagogical challenges. Faculty developers must be incentivized to design specialized courses addressing AI integration, online assessment methods, and design thinking rather than basic software overviews. Simultaneously, institutional evaluation systems must be redesigned to actively support faculty development. Rather than viewing online course creation as an additional burden, universities should integrate MOOC development and OEP participation into Annual Performance Indicators (API) and Career Advancement Schemes (CAS), thereby addressing the acute time scarcity identified via qualitative assessments.

CONCLUSION AND FUTURE RECOMMENDATIONS

India's digital higher education framework through SWAYAM has laid a solid operational foundation for democratizing learning across the country. However, ensuring long-term sustainability and global competitiveness requires transitioning from a focus on initial enrollment numbers to systematic quality improvement and user support. Based on the empirical data synthesized in this review, the following policy interventions are recommended:

Curricular Modernization: Rebalance the teacher education portfolio by reducing redundant technical overviews and expanding courses on innovative, 21st-century teaching strategies, such as AI-driven adaptive learning and cross-disciplinary digital evaluation tools under a complete TPACK configuration.

Micro-Learning Formats: Transition from rigid 12-to-16-week structures to flexible 4-to-8-week modular certifications under the SWAYAM Plus banner to combat learner drop-out and better accommodate faculty time constraints.

Institutional Support Ecosystems: Mandate that state universities establish dedicated digital learning centers equipped with high-speed internet, modern hardware, and technical support staff to remove localized infrastructure barriers.

Active Forum Moderation: Incorporate mandatory, credit-linked evaluation metrics for Quadrant III (Discussion Forums) to ensure active peer interaction and expert-led discussion, reducing learner isolation and closing the transactional distance.

REFERENCES

- A, S., & Ahamed, F. A. (2022). Awareness and usage of SWAYAM course among library and information science students: A survey. *arXiv Preprint*. <https://doi.org/10.48550/arxiv.2210.07832>
- Amit, S., Karim, R., & Kafy, A.-A. (2022). Mapping emerging massive open online course (MOOC) markets before and after COVID-19: A comparative perspective from Bangladesh and India. *Spatial Information Research*, 30(5), 655–663. <https://doi.org/10.1007/s41324-022-00463-4>

- Azhar, A., & Rashid, R.-A. A. (2025). A bird's eye-view of MOOCs for pedagogical knowledge and technical skills development of teachers in India. *International Journal of Research and Innovation in Social Science*, 9(6), 4691–4704. <https://dx.doi.org/10.47772/IJRISS.2025.906000357>
- Bhaskar, P., Joshi, A., & Dayalan, P. (2021). Investigating inhibiting factors affecting MOOCs adoption among teachers in higher education institutions of India. *Business Excellence and Management*, 11(2), 52–67. <https://doi.org/10.24818/beman/2021.11.2-04>
- Class Central. (2026). *Inside India's industry-backed MOOC platform: SWAYAM Plus course catalog analysis*. Class Central Reports.
- CPRHE. (n.d.). *NEP 2020 and the digital transformation of higher education* (Research Paper No. 17). Centre for Policy Research in Higher Education.
- Dash, M. K., & Panigrahi, M. R. (2023). Development of MOOC for SWAYAM: A shift in teaching learning paradigm. *Journal of Global Resources*, 9(1), 113–120. <https://doi.org/10.46587/JGR.2023.v09i01.013>
- Jadhav, R., & Rathod, A. R. (2024). Overview and future scope of SWAYAM in the world of MOOCs: A comparative study with reference to major international MOOCs. *International Research Journal on Advanced Engineering and Management*, 2(9), 2804–2806. <https://doi.org/10.47392/IRJAEM.2024.0408>
- Kumar, K. S., & Mahendraprabu, M. (2021). Open educational practices of SWAYAM programme among research scholars. *Education and Information Technologies*, 26(4), 4621–4645. <https://doi.org/10.1007/s10639-021-10495-2>
- Ministry of Education. (2024). *Demand No. 26: Department of Higher Education*. Union Budget 2024-25. Government of India. <https://www.indiabudget.gov.in/>
- Press Information Bureau (PIB). (2026). *PM e-Vidya: Digital education progress report* (PRID 2237471). Ministry of Education, Government of India.
- SCMS Pune. (2022). An overview of Indian MOOCs. *Tenth Annual Journal of SCMS*, 45–52.
- Sikarwar, T. S., Gupta, M., & Vishnoi, S. (2022). SWAYAM platform of distance learning: A perceptual study. *International Journal of Management and Humanities*, 8(8), 1–6. <https://doi.org/10.35940/ijmh.h1458.048822>
- SWAYAM Central. (2026). *Enrollment Statistics: January 2026 Dashboard*. Ministry of Education. <https://swayam.gov.in/>
- Uttarakhand Open University. (2025). *Detailed status report of MOOCs offered through SWAYAM (Education Technology & Cyber Security)* (UOU-MOOC-25). Status Reports.