Curated Learning Paths for Faculty Upskilling in STEM Disciplines: An Institutional Best Practice

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Abstract— **India's rapid economic growth necessitates a higher education system adept at training students in emerging technologies, yet the scarcity of high-quality STEM faculty poses a significant challenge. This quantitative case study, conducted over two years at an Indian STEM institution, investigates the impact of formulating and implementing curated learning paths on faculty upskilling. Formulated through a consultative process aligned with institutional strategy, these learning paths incorporated courses/certifications from Coursera and Swayam, industry practitioner-led training and paid workshops to build competencies in emerging technologies. Tracking Learning and Development (L&D) outcomes, the study assessed 59 faculty members' competency acquisition, course delivery effectiveness and higher-order outcomes (research, institutional reputation, student learning experiences). Paired t-tests and regression analysis revealed a significant increase in faculty competency and course delivery effectiveness, with a strong correlation between tracking and performance improvements. Its impact on higher-order outcomes, including Scopus/WoS-indexed publications and institutional reputation, were also examined. The findings highlight the effectiveness of curated learning paths in bridging faculty talent gaps and driving the achievement of critical institutional outcomes.**

***Keywords*—Curated Learning Paths; Faculty Upskilling; Learning and Development; STEM Education.**

ICTIEE* Track—*Faculty Development and Educational Leadership
ICTIEE Sub-Track—Faculty Competency in Engineering Pedagogy.

I. INTRODUCTION

India has emerged as the fastest growing economy in the world with the largest population of youth often referred to as its demographic dividend. According to the United Nations Population Fund (UNFPA), India's youth population (aged 15-24) is projected to reach 243 million by 2030, making it a critical driver of economic progress (UNFPA, 2023). To continue accelerating economic growth and attaining the vision of "Viksit Bharat" or developed India by 2047, the higher education system needs to train students on emerging technologies that are reshaping global industries. Recognizing this imperative, India has launched several national missions in Artificial Intelligence, Cybersecurity, quantum computing and cyber-physical systems to foster innovation and technological self-reliance. The National AI Mission, rebranded as the India AI Mission, was approved in 2024 backed by an outlay of Rs 10,371.92 crore to boost AI innovation and infrastructure (MeitY, 2024). Similarly, the National Quantum Mission (NQM), introduced in April 2023 with a sanctioned budget of Rs 6,003.65 crore, aims to develop quantum computing capabilities and secure communications over the next eight years (DST, 2023). The National Mission on Interdisciplinary Cyber-Physical Systems, initiated in 2020 with Rs 3,660 crore, focuses on integrating cyber-physical technologies across sectors like healthcare and defense (DST, 2020). These missions reflect India's vision to establish itself as a global technology leader, but their success hinges on a robust higher education ecosystem, further centered around the availability of highly competent faculty members.

However, the biggest challenge is the availability of high-quality faculty, as academia is not an attractive career option for top-tier talent. According to the AICTE Approval Process Handbook (2022-23), many institutions struggle to attract and retain qualified educators, with only about 30% of engineering faculty holding a PhD. This is compounded by better remuneration and career growth opportunities in industry (Chauhan, 2019; AICTE, 2022). This talent gap is particularly acute in STEM disciplines, where emerging technologies demand specialized expertise that current faculty often lack. There is an urgent need for faculty upskilling to ensure that students receive high-quality instruction and training aligned with industry needs. Hence, Learning and Development (L&D) broadly and specific interventions to upskill faculty are critical to bridge this divide. Learning and Development, however, has not received much attention in Indian Higher Education, which has relied on outdated Faculty Development Programmes

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(FDPs). Steinert (2025) emphasizes that effective faculty development requires structured design, intentional goals, and alignment with core professional learning principles, which most traditional FDP models lack. These programs typically offer an assortment of expert lectures with no-defined or demonstrable learning outcomes for faculty members, failing to address the dynamic skill requirements of modern education (Sawant et al.,2023). For instance, traditional FDPs often lack structured curricula or measurable goals, leading to limited impact on teaching efficacy or research output (UGC,2021). AICTE's Quality Improvement Programme (QIP) facilitates advanced training and research opportunities for faculty at premier institutions. However, its limited reach underscores the need for wider adoption of structured L&D strategies (AICTE QIP-PG Portal, 2025).

It is time to rethink this approach. The higher education sector must adopt innovative strategies to upskill faculty, aligning their development with institutional goals, technological advancements and market demands. We present a longitudinal study related to curating learning paths for faculty members aligned with institutional strategy, technology landscape, faculty interests and aspirations, and market trends in a higher education institution in India in STEM disciplines. This study explores how a formal L&D plan, developed through a consultative process involving an expert team, can create well-defined curated learning paths supported by diverse resources (e.g., Coursera/Swayam certifications, industry practitioner-led training) and rigorous tracking mechanisms. The results of the study indicate significantly positive outcomes, including enhanced faculty confidence, improved research productivity, and the ability to effectively deliver courses in emerging technologies.

The rest of the paper is structured as follows: Section II reviews the literature, Section III outlines the research design, Section IV presents quantitative results and discussion, while section V concludes the paper.

II. REVIEW OF LITERATURE

Rapid advances in emerging technologies such as AI, cybersecurity, and Industry 5.0 have transformed the global technological landscape, requiring industries to pivot and focus energies on these domains to maintain competitiveness. This shift has necessitated the availability of skilled manpower, driving a demand for workforce training in cutting-edge areas (CSET,2024). Consequently, higher education institutions are also required to undertake massive revision of curricula to keep pace with these trends, integrating topics like machine learning, quantum computing, and smart manufacturing into academic programs (UNESCO, 2023). The challenge is greater for countries like India, which hosts one of the largest student populations in higher education, particularly in STEM programs, with over 4 million students enrolled in engineering alone (AICTE, 2022). However, the faculty availability for imparting high-quality instruction in these emerging domains is lacking, with only 30% of engineering faculty holding PhDs, highlighting a critical talent gap (AICTE, 2022). Hence, faculty development and upskilling are the need of the hour to align educational outputs with industry requirements.

Globally, studies on faculty development in emerging domains emphasize the importance of targeted upskilling. Recent systematic reviews also highlight emerging trends in STEM-focused professional development and emphasize structured, evidence-based strategies for upskilling faculty (Rehman etal., 2025). Research on AI education highlights the efficacy of structured training programs, such as those using online platforms like Coursera/Swayam, in enhancing faculty expertise and teaching effectiveness (Rivera and Varela,2024). Similarly, studies on cybersecurity and Industry 4.0 reflect the need for continuous professional development, with evidence suggesting that collaborative industry-academia initiatives improve faculty readiness for emerging technologies (James and Szymanezyk, 2021). Recent evidence shows that structured faculty development programs can significantly improve the adoption of active learning and modern pedagogical practices in engineering education (Dominguez et al., 2025)

In the Indian context, efforts to address faculty upskilling through structured learning paths and institutional L&D initiatives are gaining attention, as evidenced by APSCHE's recent programme to train 500 educators in emerging technologies across premier institutions (The Times of India, 2025). Studies indicate that customized training aligned with institutional goals can significantly enhance faculty competencies, though implementation remains inconsistent (Hadad and Smith, 2024). Another study by Das (2025) found that while MOOCs opened access to advanced material, its adoption among instructors is less because of lack of systematic guidance and institutional incentives. Research also suggests that integrating L&D with institutional strategy can foster a learning culture, though systemic barriers like funding and infrastructure persist (Zamiri & Esmaeili, 2024).

Although global studies emphasize the advantages of guided faculty development, there is limited Indian STEM institutional empirical research on the efficacy of guided learning trajectories. Few studies like Gupta et al., (2024) have focused on how the adoption of paid MOOC platforms leads to enhanced student experience and outcomes focusing primarily on the student perspective. Most previous endeavors do not have rigorous tracking mechanisms and fail to measure overall consequences such as teaching effectiveness, research productivity, and institutional reputation. Moreover, the long-term consequences of these interventions and the unique contribution of training intensity and monitoring are not well explored. This research fills the gaps by assessing the multi-level effect of consultatively drafted and strategically aligned learning routes within an institutional environment that is STEM-oriented.

III. RESEARCH DESIGN

A. Research Questions

To explore the impact of structured faculty development initiatives, particularly curated learning paths, this study seeks to examine their role in upskilling STEM faculty in emerging technologies. The following research questions guide the investigation:

1. Does formulating curated learning paths, aligned with faculty interests and institutional strategy, influence the acquisition of competencies in emerging technologies among STEM faculty?
2. To what extent does implementing curated learning paths and its effective tracking correlate with enhancing faculty effectiveness in delivering courses on emerging technologies?
3. What higher-order outcomes (e.g., research, institutional reputation, student learning experiences) can be attributed to the successful implementation of curated learning paths for faculty upskilling?

The survey instrument comprised 12 items grouped into four constructs: Competency in Emerging Technologies, Confidence in Teaching, Course Delivery Effectiveness, and Participation in Learning Paths. These constructs were developed through literature review and expert validation to align with the study's objectives.

B. Research Methodology

This study employs a quantitative, single-case study design to evaluate the impact of curated learning paths on faculty upskilling at an Indian institution of higher learning in STEM disciplines. The approach focuses on measuring outcomes related to competency acquisition, course delivery effectiveness, and higher-order impacts.

C. Context and Participants

The case study is conducted at a prominent Indian STEM institution over a 2-year period (June 2023 to June 2025). Participants include 59 faculty members from departments such as Computer Science and Engineering, Electronics and Electrical Engineering, and Civil Engineering. The need for the study stemmed from institutional strategic planning, aligned with developing and delivering a cutting-edge curriculum in emerging domains to stay relevant. This was informed by national strategic objectives, competitive landscape and student preferences. The institution needed to quickly build competencies in emerging domains to stay relevant and competitive, besides demonstrating leadership in the immediate regional neighborhood. This evolved into a top-down strategic learning and development approach for the institution, manifested in curation of learning paths reflecting synergy between faculty interests, emerging domains and institutional strategic needs. The strategic areas were identified, an expert team set up to identify the relevant course, platforms and certifications (if any). The faculty members were then oriented on the program, topically relevant emerging domains/sub-domains identified (AI, cybersecurity, IoT, Business Analytics etc.) and their interests elicited. The expert team from the institution's Learning and Development division oversaw the curation and implementation process. This included platform selection through consensus building. For industry-aligned courses, Coursera was selected due to the availability of 70+ industry certifications in the identified emerging domains and beyond. Swayam was selected for younger faculty members to help build theoretical foundations in specific subjects. The faculty members were then assigned curated learning paths in their chosen domain/subdomain with regular tracking by the expert-team till completion.

The demographic profile of the participants is presented in Table I.

TABLE I
DEMOGRAPHIC PROFILE OF THE PARTICIPANTS

Measures	Items	Frequency	Percentage
Department	Computer Science and Engineering	26	44.06
	Electronics and Electrical Engineering	17	28.81
	Civil Engineering	16	27.11
Designation	Assistant Professor	38	64.40
	Associate Professor	15	25.42
	Professor	6	10.17
Gender	Male	25	42.37
	Female	34	57.63
Academic Experience	Up to 5 Years	28	47.46
	5-10 Years	17	28.81
	More than 10 Years	14	23.73

This study is underpinned by a theoretical framework derived from Adult Learning Theory and Competency-Based Education, which collectively informs the design, sequencing, and outcome orientation of the curated learning paths-based study. This integrated framework guided both the design of curated learning paths-based approach and interpretation of findings to ensure alignment among pedagogical principles, measurable competencies, and applied teaching practice.

D. Data Collection

Pre-Intervention Baseline: The L&D division conducted initial surveys to assess faculty self-reported competencies in emerging technologies using a 5-point Likert scale (1 = Not Competent, 5 = Highly Competent). Course delivery effectiveness was evaluated through average student feedback scores, also on a 5-point scale. Baseline metrics for higher-order institutional outcomes such as research productivity, institutional reputation, and student learning experiences were drawn from the PI-360 Quality Analytics framework, which had already been implemented at the institution for performance tracking and benchmarking

Intervention Implementation: Curated learning paths were formulated through a consultative process with faculty, aligned with institutional strategy to build competencies in emerging technologies (e.g., AI, IoT, Cybersecurity, Drone Technologies, EV, AR/VR, Cyber-Physical Systems, Industry 4.0, VLSI/Semiconductors and Quantum computing etc.). Training modalities included Coursera industry certifications, custom training by industry practitioners, and workshops/conferences.

Post-Intervention Data: After 2 years (June 2025), follow-up surveys measured changes in self-perceived competency levels, course delivery effectiveness, and higher-order outcomes. Competency was assessed via self-reported skill gains and certification completion rates. Course delivery effectiveness was tracked through in-person expert evaluation. Higher-order outcomes included research output in emerging domains (publications), institutional reputation (social media sentiment/reputation analysis), and student learning experiences (student feedback).

E. Data Analysis

1. Exploratory factor analysis was performed using Principal Axis Factoring with Varimax rotation to assess the construct validity
2. Cronbach's alpha was calculated for each construct based on pre-intervention data to ensure internal consistency of the survey instruments. The results indicated strong internal reliability.
3. Quantitative Analysis: To address Research Question 1, a paired t-test compared pre- and post-intervention competency scores, with a significance level of $p < 0.05$, to determine if curated learning paths influenced competency acquisition. For Research Question 2, correlation analysis examined the relationship between training participation (e.g., hours spent on learning paths, completion rate and industry certification obtained) and course delivery effectiveness scores, while regression analysis assessed the impact of tracking on effectiveness enhancements. For Research Question 3, ANOVA was used to analyze differences in higher-order outcomes (research, reputation, student experiences) pre- and post-intervention, attributing changes to the curated learning paths under the L&D program.

All analyses were preceded by standard assumption checks, including Shapiro–Wilk tests for normality and Levene's tests for homogeneity of variance. Effect sizes (e.g., partial η^2, standardized β) and 95% confidence intervals were reported to aid interpretation. Given the limited number of planned comparisons, no multiple-comparison adjustments were applied, and results were interpreted alongside effect sizes and Confidence interval for rigor.

IV. RESULTS AND DISCUSSION

A. Exploratory Factor Analysis

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.81, and Bartlett's test of sphericity was significant ($\chi^2 = 624.35$, df = 136, $p < 0.001$), indicating the data were suitable for factor analysis as indicated in Table II.

TABLE II
KMO AND BARTLETT'S TEST OF SPHERICITY

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy		0.81
Bartlett's Test of Sphericity	Approx. Chi-Square	624.35
	df	136
	Sig.	.000

The results of the Exploratory Factor Analysis revealed a four-factor solution corresponding to the intended constructs, with all item loadings above 0.60, confirming good construct separation and convergent validity. Cross-loadings were minimal, and cumulative variance explained was 74.6%, supporting the dimensionality of the survey as indicated in Table III.

TABLE III
EXPLORATORY FACTOR ANALYSIS (EFA)

Factor	Associated Construct	Cronbach Alpha	Average Factor Loading	Variance Explained (%)
F1	Competency in Emerging Technologies	0.84	0.72	21.4
F2	Confidence in Teaching	0.88	0.76	19.8
F3	Course Delivery Effectiveness	0.82	0.74	17.6
F4	Participation in Learning Paths	0.86	0.71	15.8

B. Impact on Faculty Competency and Confidence

To assess whether formulating curated learning paths, aligned with institutional strategy, influences the acquisition of competencies in emerging technologies (Research Question 1), a paired t-test was conducted on pre- and post-intervention competency scores. Table IV displays the results of the t-test which is used to compare the participant scores before and after the intervention.

TABLE IV
T-TEST RESULTS

Variable	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	t-value	df	p-value	Cohen's d
Competency Score	2.8 (0.6)	4.1 (0.5)	12.34	49	< 0.001	2.35
Confidence Score	3.0 (0.7)	4.3 (0.4)	11.89	49	< 0.001	2.28

Note: Scores are on a 5-point Likert scale (1 = Not Competent/Confident, 5 = Highly Competent/Confident).

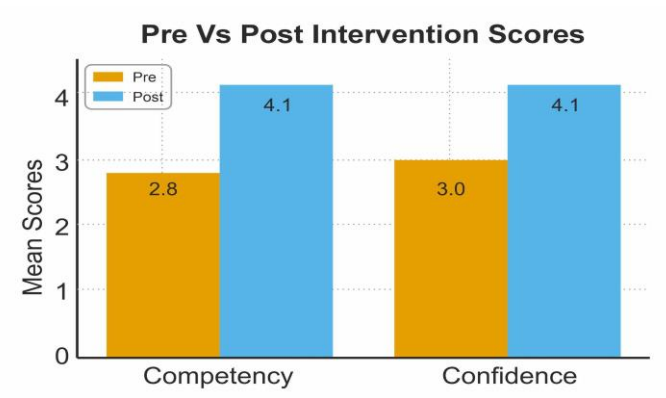

Fig.1. Pre- and Post-Intervention Competency and Confidence Scores

As shown in Figure 1, there was a marked gain in the competency and confidence of the faculty members after going through the curated learning paths. The visual comparison provides evidence of the intervention effectiveness and supports the significant pre–post differences identified through paired t-tests.

The results indicate a significant improvement in both competency (t (49) = 12.34, $p < 0.001$) and confidence (t (49) = 11.89, $p < 0.001$) among the 59 faculty members, supporting the assertion that curated learning paths enhance these attributes. Cohen's d value has been found to be 2.35 for competency score and 2.28 for confidence score. These results indicate very large effects, meaning the curated learning paths had a substantial impact on both faculty competency and confidence. These findings are supported by existing literature emphasizing the role of structured, goal-oriented upskilling pathways in enhancing faculty capacity (Hadad and Smith, 2024; Tariq, 2024).

C. Impact on Course Delivery Effectiveness

To examine the extent to which implementing curated learning paths and effective tracking correlate with enhancing faculty effectiveness in delivering courses on emerging technologies (Research Question 2), correlation and regression analyses were performed. Table V presents the correlation results.

TABLE V
CORRELATION MATRIX

Variable	Course Delivery Effectiveness (Post)	Training Hours	Tracking Frequency
Course Delivery Effectiveness (Post)	1.00	0.68**	0.72**
Training Hours	0.68**	1.00	0.65**
Tracking Frequency	0.72**	0.65**	1.00

Note: ** stands for correlation is significant at the 0.01 level(2-tailed). *Scores for Course Delivery Effectiveness are based on expert evaluation (10-point scale). Training Hours and Tracking Frequency are measured as total hours and number of assessments, respectively.*

The results reveal strong positive correlations between course delivery effectiveness and both training hours ($r = 0.68$, $p < 0.01$) and tracking frequency ($r = 0.72$, $p < 0.01$), suggesting that both components of the curated learning paths are positively associated with teaching performance post-intervention.

To further explore the predictive impact of these variables, a multiple linear regression model was constructed with course delivery effectiveness as the dependent variable and both training hours and tracking frequency as predictors. The regression results are presented in Table VI.

TABLE VI
MULTIPLE REGRESSION ANALYSIS

Variable	Coefficient (β)	Std. Error	t-Statistic	p-Value
Intercept	5.64	3.47	1.62	0.111
Training Hours	0.23	0.09	2.52	0.015
Tracking Frequency	0.07	0.25	0.27	0.788

The model explained 52% of the variance in course delivery effectiveness (*$R^2 = 0.52$*), which is considerable for educational intervention research. Among the predictors, Training Hours was found to be a significant predictor (*$\beta = 0.23$, $p = 0.015$*), indicating that more intensive engagement with curated learning paths leads to improved teaching effectiveness. Although Tracking Frequency was not a significant predictor ($p = 0.788$), its correlation with Training Hours ($r = 0.65$) prompted a check for multicollinearity. Variance Inflation Factor (VIF) scores were found to be below 2.0 for both predictors, indicating that multicollinearity did not compromise the model's estimates. Correlation analysis indicated that training hours (r = 0.68) and tracking frequency (r = 0.72) were highly correlated with enhanced course delivery effectiveness. Nevertheless, only training hours were a significant predictor in the regression model (β = 0.23, p = 0.015), whereas tracking frequency was not (p = 0.788). This indicates that actual faculty interaction through regular training had a more concrete effect on performance than the rate of being tracked.

These results align with previous research. Rivera and Varela (2024) discovered that time invested, and training intensity were more essential than passive monitoring to enhancing faculty instructional performance. The non-statistical significance for frequency tracking in the regression, despite having high correlation, also might indicate shared variance or conceptual overlap with training hours. Along the same lines, James and Szymanezyk (2021) contend that though monitoring software assists with shaping learning, tangible improvement in teaching competency arises from investing time in actively working on content and certification learning.

D. Higher-Order Outcomes

To investigate the higher-order outcomes attributable to the successful implementation of curated learning paths (Research Question 3), a repeated measures ANOVA was conducted to evaluate whether curated learning paths significantly influenced higher-order institutional outcomes over a two-year period. Table VII presents the pre- and post-intervention means with standard deviations, percentage change, and statistical significance.

TABLE VII
REPEATED MEASURES ANOVA

Outcome	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	% Change	F-value	p-value
Scopus/WoS Publication in Emerging domains	1.2 (4.1)	2.8 (4.8)	133.3	3.27	0.0769
Social Media Reputation	3.8 (6.9)	4.3 (6.3)	13.2	0.06	0.8107
Student Learning Experience	3.4(5.8)	4.6(5.1)	35.3	6.78	0.0123

Note: Publications are total Scopus/WoS indexed papers by the faculty in emerging domains. Social Media Reputation score is aggregated over user ratings on different platforms (Google, college aggregator and ratings websites etc.). Student Learning Experiences are assessed through structured course feedback surveys measuring student perceptions on teaching effectiveness, engagement, and satisfaction with digital tools and pedagogy.

The increases in publication output and social media reputation, though positive, were not statistically significant. This may be attributed to the short period of two years intervention as the research publication takes a longer time. Additionally, apart from the faculty upskilling there are certain external factors like institutional marketing, placement outcomes, and public perception which affect reputation metrics.

Similarly, student learning experience improved significantly from 3.4 (SD = 5.8) to 4.6 (SD = 5.1), a 35.3% increase (F (1,49) = 6.78, p = 0.0123). These findings suggest that curated learning paths not only enhance faculty preparedness but also positively influence student perception of teaching quality and institutional appeal. The results of the study are also consistent with the findings reported by Rivera and Varela (2024) where faculty trained through Coursera/Swayam-based modules showed statistically significant improvements in student satisfaction scores in technology-enhanced courses. Similar results were found in a study by Tariq (2024) where the digitally upskilled instructors led to higher student evaluations and improved outcomes in AI and data science programs.

Although the number of publications increased by 133.3%, the change was not statistically significant (F (1,49) = 3.27, p = 0.0769). This may be due to high variability among faculty and the time lag associated with research outputs and publication cycles. While a 133% increase in Scopus/WoS publications per faculty was observed over the intervention period, this change did not reach statistical significance, likely due to high variability in research output and the time-intensive nature of the publication cycle. This finding is consistent with existing literature that highlights the delayed effect of faculty development on research productivity. Hadad and Smith (2024), in a longitudinal study across European universities, concluded that faculty development interventions often require 3–5 years to translate into measurable increases in publication output, particularly in peer-reviewed and indexed journals. Similarly, Sawant et al. (2023) argue that while upskilling initiatives can enhance research intent and capacity, actual publication is often constrained by external factors such as research funding, mentorship availability, and the overall institutional research culture

Social media reputation also saw a modest increase of 13.2%, from 3.8 (SD = 6.9) to 4.3 (SD = 6.3), but the difference was not significant (F (1,49) = 0.06, p = 0.8107). This indicates that short-term faculty-focused interventions have a limited influence on broad reputation metrics, which are influenced by multiple external factors. Although social media reputation scores increased by 13.2%, the change was not statistically significant. This is expected, as online institutional reputation is shaped by multiple factors like placements, infrastructure, alumni engagement, and marketing, not just faculty performance. James and Szymanezyk (2021) note that reputation metrics are lagging indicators and rarely shift due to isolated interventions. Similarly, the UNESCO GEM Report (2023) emphasizes that public perception is influenced by broader institutional narratives, making it unlikely that short-term faculty upskilling alone would produce significant changes in online ratings.

Overall, the findings of Research question 3 partially support the assertion that curated learning paths lead to measurable improvements in higher order institutional outcomes. The results indicate that curated learning paths are most effective in outcomes closely tied to teaching quality and student interaction, while research and reputation require long term strategies and multi-dimensional inputs. The nonsignificant yet directionally positive trends in publication output and reputation metrics suggest potential for delayed or cumulative effects that warrant longer-term tracking.

These gains in faculty competency, confidence, and effective teaching are very consistent with the underlying concepts of Adult Learning Theory and Competency Based Education. Adult Learning Theory postulates that adults learn best when training is self-directed, relevant, and immediately applicable. The curated learning paths in this project followed this logic by permitting faculty to select emerging-technology domains aligned with their needs, which likely contributed to the high level of engagement and large competency gains.

The present study has several practical implications. Institutions need to develop proactive strategies to keep pace with a rapidly changing technological landscape.

CONCLUSION

The findings of this study indicate that formulating curated learning paths, developed consultatively aligned with institutional/program-level strategy and effectively tracked, is a viable and effective approach to faculty upskilling in STEM disciplines. The significant improvements observed in faculty competency, faculty confidence, course delivery effectiveness, and partial impact on higher-order outcomes such as research productivity, institutional reputation and improved student learning experiences highlight the potential of this model. This approach should serve as a best practice across all institutions, particularly non-top-top-tier institutions which are currently struggling to deliver cutting-edge courses effectively due to faculty skill gaps. To maximize impact, L&D outcomes based on faculty upskilling should also be incentivized through recognition, promotions, or financial rewards, fostering a culture of continuous learning and truly creating a learning organization. Only then will the teeming higher education institutions in India remain relevant in a rapidly changing technology-driven landscape. The present study is limited by its single institution focus and reliance on self-reported data, which may affect generalizability. Future research can expand this study through multi-institutional implementation and analysis in diverse contexts, incorporating a control group to strengthen causal inferences and including qualitative methods such as interviews or focus groups to capture deeper insights into faculty experiences, motivations, and barriers.

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