

Bridging the Algorithm and the Mentor: Personalized Adaptive Learning as an Emerging Architecture for Leadership Development in Indian Organizations

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Abstract: Organizations across India are converging on two ideas that, until recently, were treated as separate streams of management thought: that learning works best when it adapts to the individual, and that leadership cannot be developed through standardized, one-size-fits-all curricula. This paper presents a qualitative inquiry into how personalized adaptive learning (PAL) — technology-enabled systems that adjust content, pace, and feedback to a learner's profile — is being interpreted, adopted, and experienced as a vehicle for leadership development within Indian corporate and academic settings. Using thematic analysis of practitioner literature, policy documents, and a synthesis of published qualitative and mixed-method studies situated in Indian and comparable emerging-economy contexts, the study identifies five interlocking themes: (a) the andragogical legitimacy of personalization, (b) data-driven self-awareness as a leadership trigger, (c) the persistence of mentorship as a humanizing counterweight to algorithmic learning, (d) organizational readiness and infrastructural unevenness, and (e) the cultural specificity of adaptive leadership in collectivist, hierarchy-sensitive Indian workplaces. The paper argues that personalized adaptive learning is most effective for leadership development not as a replacement for human mentorship but as a diagnostic and pacing layer that frees mentors and coaches to focus on judgment, ethics, and contextual wisdom — capacities that adaptive algorithms cannot yet replicate. Implications are offered for HR and learning-and-development (L&D) leaders, business school administrators, and policymakers engaged in implementing the National Education Policy (NEP) 2020 and its emphasis on learner-centric, technology-enabled education.

Keywords: personalized adaptive learning, leadership development, adaptive leadership, andragogy, learning organizations, India, NEP 2020, qualitative research

I. INTRODUCTION

The vocabulary of Indian management education has shifted markedly over the past decade. Where leadership development programmes once relied on cohort-wide modules delivered identically to every participant, conversations among HR heads, business-school deans, and L&D consultants now routinely invoke terms such as “personalized learning paths,” “adaptive assessment,” and “learner analytics.” This shift is not merely semantic. It reflects a genuine reconsideration of how adults — particularly adults being prepared for or already occupying leadership roles — acquire the judgment, self-awareness, and adaptive capacity that leadership requires.

Personalized adaptive learning (PAL) refers to technology-mediated systems that adjust the sequence, difficulty, and format of instructional content in response to a learner's demonstrated knowledge, pace, and behavioural signals, rather than delivering a fixed curriculum to all learners uniformly. Although PAL has been studied extensively in K-12 and undergraduate settings, its scoping reviews show a still-young and fragmented evidence base. A recent scoping review of personalized adaptive learning in higher education identified sixty-nine studies published between 2012 and 2024,

the majority concentrated after 2018, and noted that researchers continue to use inconsistent terminology to describe what counts as “adaptive” versus merely “personalized” instruction (Mirata et al., 2024). Far less has been written about PAL specifically as an architecture for leadership development, and almost nothing has examined this question through a qualitative lens grounded in the Indian organizational context, where hierarchy, collectivism, and a strong cultural premium on mentorship (guru-shishya traditions of learning) interact with imported, technology-driven pedagogies in distinctive ways.

India presents a particularly instructive setting for this inquiry. The National Education Policy (NEP) 2020 explicitly commits the country’s education system to a learner-centric, technology-enabled model and calls for adaptive assessment, AI-driven recommendation systems, and competency-based learning to replace the “didactic learning approach” that has historically dominated Indian classrooms (Kasturirangan Committee, as cited in NEP 2020 analyses; Ministry of Education, 2020). The policy further positions platforms such as DIKSHA as vehicles for delivering multilingual, adaptive content at scale, while AI-driven adaptive frameworks are framed as central to bridging India’s digital divide (cf. arXiv comparative review, 2025, Section 4.4). At the same time, Indian conglomerates — from IT services majors to pharmaceutical and manufacturing firms — have invested heavily in leadership academies that blend self-paced digital modules with intensive, relationship-based mentoring, action-learning projects, and apprenticeship under senior leaders. This dual movement, in both the public education system and the private corporate sector, makes India a fertile site for examining how personalization and adaptivity are being reconciled with leadership development practices that have traditionally depended on tacit knowledge transfer between mentor and protégé.

This paper asks three interrelated research questions. First, how is personalized adaptive learning being conceptualized and operationalized as a leadership development mechanism in Indian organizational and academic settings? Second, what tensions arise between algorithmic personalization and the relational, mentorship-based traditions that have historically underpinned Indian leadership development? Third, what organizational and cultural conditions appear necessary for PAL to translate into genuine leadership growth rather than mere content consumption?

II. LITERATURE REVIEW

2.1 Adult Learning Theory and the Logic of Personalization

The theoretical foundation for personalized learning predates educational technology by decades. Knowles’s (1980) theory of andragogy proposed that adult learners are self-directed, draw on accumulated experience as a learning resource, and are motivated by problems relevant to their immediate roles — all premises that align naturally with adaptive systems that let learners progress at their own pace and according to their own knowledge gaps rather than a fixed syllabus. Bandura’s (1997) work on self-efficacy adds a second theoretical pillar: when learners receive feedback calibrated to their actual performance rather than generic benchmarks, they are more likely to develop the belief in their own capability that precedes sustained behavioural change — a mechanism directly relevant to leadership development, where confidence and self-belief are often as consequential as technical knowledge.

Contemporary adaptive learning systems operationalize these theories through technology. Such systems integrate instructional content, learning objectives, and assessment into modular units that can be resequenced or recommended according to individual learner data, with platforms ranging from learning-management-system plug-ins to dedicated engines such as Realizeit, ALEKS, and McGraw-Hill’s LearnSmart (1EdTech Consortium, n.d.). In the Indian K-12 and EdTech context, comparable adaptive logic underlies platforms such as Squirrel AI — which dynamically adjusts content difficulty using large-scale behavioural data — and DIKSHA, India’s national digital infrastructure for school education (Li & Chen, 2024; Ministry of Education, 2020).

2.2 Leadership Development as a Distinct Pedagogical Problem

Leadership development differs from technical skill acquisition in ways that complicate a straightforward transfer of adaptive learning logic. Day’s (2000) influential distinction between leader development (building an individual’s intrapersonal competence) and leadership development (building the relational and social capital of a collective)

suggests that any technology-mediated intervention addresses, at best, half of the developmental task. Heifetz's (1994) concept of adaptive leadership — leadership that mobilizes people to tackle tough, often value-laden challenges for which there is no technical fix — has itself become a recurring construct in recent Indian and South Asian management research. A study of 373 employees in Pakistan's pharmaceutical sector, for instance, found that adaptive leadership moderates the relationship between learning organizations and organizational innovation by strengthening employees' change self-efficacy, suggesting that leaders who model adaptive behaviour amplify the developmental returns of a learning-oriented culture (Channa et al., 2023). This finding is consistent with Senge's (1990) foundational argument that organizations sustain competitive advantage not through any single training intervention but through embedding continuous, systemic learning into their culture — the "learning organization" within which any adaptive learning technology must be embedded if it is to influence leadership outcomes rather than remain an isolated digital exercise.

2.3 The Indian Policy and Organizational Context

NEP 2020 marks the most significant attempt by the Indian state to institutionalize personalized, technology-enabled learning at national scale. The policy is explicit that education must shift from rigid, didactic instruction toward competency-based, learner-centric approaches, with technology positioned as a means of recognizing and nurturing individual student potential while preserving equity (Ministry of Education, 2020; Pathak, 2021). Scholars examining NEP 2020's implementation note that while AI-driven adaptive platforms hold considerable promise for personalizing learning pathways and augmenting teacher capacity in under-resourced contexts, the policy's ambitions are constrained by uneven digital infrastructure, limited rural connectivity, and a shortage of digitally proficient teaching staff — with some estimates suggesting only a small minority of Indian educators currently possess the digital competencies required to implement adaptive tools effectively (Comparative AI-education review, 2025). These same constraints — infrastructural unevenness and capability gaps among facilitators — recur, in modified form, in the corporate leadership development literature, where L&D functions report similar difficulty in equipping line managers and internal coaches to interpret and act on the data that adaptive systems generate (Channa et al., 2023; TechClass, 2026).

On the corporate side, Indian and global industry analyses report that AI-driven adaptive learning platforms can reduce training costs substantially — by as much as a third, according to one widely cited industry estimate — while simultaneously improving engagement and learning outcomes, with some organizations reporting double-digit gains in both engagement and measured performance after introducing adaptive, real-time personalization into their learning-and-development functions (TechClass, 2026). For leadership pipelines specifically, large Indian employers in IT services, banking, and pharmaceuticals have begun layering adaptive digital diagnostics — covering competencies such as decision-making style, delegation comfort, and stakeholder communication — atop traditional leadership academies that still rely on cohort-based action-learning projects, 360-degree feedback, and senior-leader mentoring. This hybrid model echoes a broader theme in the adaptive learning literature: personalization is most consistently linked to positive outcomes when it complements rather than displaces human facilitation, and when engagement, not merely content mastery, is treated as a primary outcome of interest (Mirata et al., 2024).

2.4 Gaps in the Existing Literature

Three gaps motivate the present study. First, the personalized adaptive learning literature remains overwhelmingly quantitative and outcome-focused, measuring test scores, completion rates, or engagement metrics, with comparatively little qualitative attention to how learners — particularly leaders and leader-aspirants — subjectively experience and make meaning of adaptive feedback. Second, almost all empirical PAL research originates from K-12 or undergraduate contexts in North America, Europe, and China; the Indian organizational and managerial-education context, despite its scale and its distinctive cultural emphasis on mentorship, remains comparatively under-examined. Third, the leadership development literature and the adaptive learning literature have evolved largely in parallel, with limited cross-pollination beyond passing references to "personalization" in leadership academy marketing materials. This paper addresses these gaps through a qualitative, interpretive synthesis grounded explicitly in the Indian context.

III. METHODOLOGY

3.1 Research Design

This study adopts a qualitative, interpretive research design appropriate to an exploratory question for which the relevant constructs — personalization, adaptivity, and leadership growth — are still being defined and contested in the literature (Creswell & Poth, 2018). The design draws on document-based thematic analysis, a recognized qualitative method for systematically identifying patterns of meaning across a corpus of texts, applied here to peer-reviewed studies, scoping reviews, national policy documents, and industry practitioner reports concerning personalized adaptive learning and leadership development, with particular attention to sources situated in or directly relevant to the Indian context.

3.2 Data Sources and Corpus Construction

The corpus comprises four categories of text: (a) peer-reviewed empirical and review articles on personalized adaptive learning, including a 2024 scoping review covering sixty-nine studies in higher education; (b) peer-reviewed studies on adaptive leadership and learning organizations situated in South Asian and other emerging-economy contexts; (c) Indian policy and analytical literature concerning NEP 2020 and its technology provisions; and (d) practitioner and industry sources describing the implementation of adaptive learning within corporate learning-and-development functions. Sources were purposively selected for relevance to the research questions rather than through exhaustive systematic-review protocols, consistent with the interpretive aims of the study.

3.3 Analytical Approach

Braun and Clarke's (2006) six-phase approach to thematic analysis guided the coding process: familiarization with the corpus, generation of initial codes, searching for candidate themes, reviewing themes against the coded extracts and the full corpus, defining and naming themes, and producing the final analytic narrative. Codes were generated inductively around recurring concepts — personalization, self-awareness, mentorship, infrastructure, and cultural fit — and then organized into the five themes presented in Section 4. Throughout, the analysis was oriented toward the leadership development application of PAL rather than its general educational use, with general PAL findings retained only where they illuminated the leadership-specific question.

3.4 Trustworthiness and Limitations

Trustworthiness was pursued through triangulation across the four source categories described above and through reflexive attention to the researcher's own positionality as an industry consultant and academic mentor embedded in the Indian management education ecosystem, consistent with Lincoln and Guba's (1985) criteria for credibility and confirmability in qualitative inquiry. The principal limitation of the study is that it synthesizes existing qualitative and mixed-method literature rather than presenting newly collected primary interview or observational data; the themes identified should therefore be read as an interpretive map of the current discourse and practice landscape, to be tested through future primary fieldwork with Indian leadership cohorts.

IV. FINDINGS: FIVE THEMES

4.1 Theme One — Andragogical Legitimacy: Personalization as Respect for the Adult Learner

Across both the educational and corporate sources reviewed, personalization is consistently framed not as a technological convenience but as a form of respect for the learner's existing competence and time. NEP 2020's rejection of the "didactic learning approach" in favour of competency-based, student-centric models (Pathak, 2021) mirrors almost exactly the rationale offered by corporate L&D leaders for introducing adaptive diagnostics into leadership academies: senior managers, already burdened with operational responsibility, resent being walked through content they have already mastered, and adaptive systems that allow them to "test out" of familiar material are perceived as honouring their seniority rather than infantilizing them. This finding aligns with Knowles's (1980)

andragogical premise that adult learners are motivated by relevance and self-direction, and it suggests that the appeal of PAL in Indian leadership contexts is as much cultural and motivational as it is pedagogical.

4.2 Theme Two — Data as Mirror: Self-Awareness as the Primary Leadership Output

A recurring pattern across the corporate and higher-education sources is that the principal value of adaptive systems for leadership development lies less in the content they deliver than in the diagnostic mirror they hold up to the learner. Where adaptive platforms in technical-skill contexts use pre-knowledge quizzes and clickstream data to route learners through content (Mirata et al., 2024), in leadership contexts the equivalent data — patterns in decision-making simulations, 360-degree input, or behavioural assessments — are valued primarily for the self-awareness they generate. This resonates with Bandura's (1997) self-efficacy theory: leaders who receive precise, individualized feedback about a specific blind spot (for example, a tendency to over-direct rather than delegate) appear more likely to internalize and act on that feedback than leaders given generic competency-framework scores. Several Indian corporate leadership academies have begun sequencing such diagnostics deliberately at the start of a programme, using adaptive assessment results to assign each participant a differentiated coaching and project track rather than a uniform curriculum.

4.3 Theme Three — The Mentor as Irreplaceable Counterweight

Despite enthusiasm for adaptive technology, the reviewed sources converge on a striking consistency: mentorship is repeatedly described as a humanizing counterweight to algorithmic personalization rather than a function the algorithm is expected to replace. This is especially pronounced in the Indian context, where management education retains a strong cultural inheritance from the guru-shishya (teacher-disciple) tradition of close, long-term, trust-based developmental relationships. Indian higher-education sources note that mentorship initiatives are positioned as essential to learners' academic and psychological development, particularly for those navigating unfamiliar or disorienting transitions (Olusegun, as cited in inclusive-education literature on NEP 2020; Full article, Pathways to Inclusive Higher Education, 2024). In leadership development specifically, the data-driven diagnostic functions of PAL appear to function best when paired with a human mentor or coach who interprets the data, asks the harder "why" questions an algorithm cannot pose, and provides the contextual and ethical judgment that Heifetz (1994) identifies as the essence of adaptive leadership — namely, the capacity to manage value conflicts and adaptive challenges that have no purely technical solution.

4.4 Theme Four — Organizational Readiness and Infrastructural Unevenness

A consistent constraint across both the national policy literature and the corporate practitioner literature is that the promise of personalization outruns the readiness of the systems meant to deliver it. NEP 2020 analyses note persistent challenges of ICT infrastructure, uneven internet access, and limited digital fluency among educators as obstacles to realizing the policy's adaptive-learning ambitions, with one comparative analysis estimating that only a small fraction of Indian educators currently possess the digital competencies needed to use AI-driven tools effectively (Comparative AI-education review, 2025). Within corporations, an analogous gap appears between the line managers expected to act as on-the-ground coaches and the sophistication of the learner analytics dashboards adaptive platforms generate; without deliberate manager enablement, the rich personalization data produced by these systems risks going uninterpreted and, consequently, unused. This theme suggests that organizational readiness — not algorithmic sophistication — is frequently the binding constraint on whether PAL translates into leadership growth.

4.5 Theme Five — Cultural Specificity: Adaptive Leadership in a Hierarchy-Sensitive Context

The final theme concerns the fit between adaptive learning's individualistic design logic and the more collectivist, hierarchy-sensitive norms of many Indian organizations (cf. Hofstede, 2001, on power distance and collectivism in Indian organizational culture). Adaptive systems are designed around the autonomous, self-directed individual learner; yet several of the leadership-specific sources reviewed emphasize that Indian employees often defer to managerial

authority when interpreting feedback and prefer that developmental recommendations be validated, contextualized, or even delivered by a respected senior figure rather than received as an anonymous algorithmic output. A study of adaptive leadership in the Pakistani pharmaceutical sector — a cultural and institutional context with notable similarities to India — found that the moderating, confidence-building effect of adaptive leadership on organizational innovation operated specifically through enhancing employees' change self-efficacy, implying that the human leader's endorsement of change (and, by extension, of a personalized learning recommendation) remains a critical amplifying mechanism in such cultural settings (Channa et al., 2023). This suggests that successful PAL-for-leadership models in India may need to be deliberately “co-designed” with hierarchy in mind — for instance, by having senior leaders review and personally endorse algorithmically generated development plans — rather than assuming individualistic, self-service adoption patterns common in Western enterprise contexts.

V. DISCUSSION

Taken together, these five themes suggest a more nuanced relationship between personalized adaptive learning and leadership development than either techno-optimist or techno-skeptical narratives typically allow. Adaptive systems appear best understood, in the leadership context, as a diagnostic and pacing layer rather than a comprehensive developmental solution. They excel at surfacing individualized data — a specific behavioural pattern, a specific competency gap, a specific pace of mastery — with a precision and consistency that human assessors cannot easily replicate at scale. What they cannot yet do is exercise the contextual judgment, ethical reasoning, and relational trust-building that Heifetz (1994) and Day (2000) identify as central to leadership development; this is the work that remains, and arguably should remain, with human mentors, coaches, and senior leaders.

This division of labour has a particular resonance in India, where NEP 2020 explicitly frames technology as a tool that should “never replace the teacher” but should instead “empower” the human educator (cf. NEP 2020 technology-integration literature, 2021). The same logic, this paper argues, should govern the design of leadership development architectures in Indian corporations: adaptive platforms can legitimately absorb the diagnostic and content-sequencing burden, freeing scarce senior-leader and coach time for the judgment-intensive, relationally embedded work that algorithms cannot perform. Conversely, where organizations have attempted to use adaptive platforms as a wholesale substitute for mentorship — treating a personalized dashboard as equivalent to a developmental conversation — the reviewed literature suggests engagement and behaviour change suffer, consistent with broader findings that engagement is too often treated as a secondary or mediating outcome rather than a primary design goal of personalized learning systems (Mirata et al., 2024).

The infrastructural and readiness gap documented in Theme Four also carries a specific Indian policy implication. If NEP 2020's ambitions for adaptive, technology-enabled learning are to extend meaningfully into the managerial and leadership talent pipeline — not only into school-level platforms such as DIKSHA — then business schools and corporate L&D functions alike will need parallel investment in facilitator capability, not merely in platform procurement. The risk, visible already in the school-education literature, is a widening gap between well-resourced metropolitan institutions that can pair adaptive technology with skilled human facilitation and less-resourced institutions or smaller firms that adopt the technology layer without the complementary human investment, potentially exacerbating rather than narrowing developmental inequities.

VI. IMPLICATIONS FOR PRACTICE

6.1 For HR and Learning-and-Development Leaders

Leadership academies should treat adaptive diagnostics as an intake and pacing mechanism that informs, rather than replaces, mentor and coach assignment. Investment in manager and coach capability to interpret adaptive-learning data should be budgeted alongside, not after, platform licensing.

6.2 For Business Schools and Academic Mentors

Institutions such as IIMs and affiliated management institutes can position post-doctoral and industry-mentorship arrangements as the human complement to adaptive coursework, explicitly training faculty mentors in how to read and contextualize learner analytics for the Indian, hierarchy-sensitive classroom.

6.3 For Policymakers

NEP 2020 implementation plans focused on school-level adaptive platforms (e.g., DIKSHA) should be extended, in spirit, to higher-education leadership and management programmes, with parallel attention to faculty digital-competency development as a precondition for adaptive technology to deliver its intended equity benefits.

VII. CONCLUSION

This paper has examined personalized adaptive learning as an emerging, still-contested architecture for leadership development in the Indian context. Drawing on a qualitative thematic synthesis of educational, organizational, and policy literature, it finds that adaptive technology is most valuable when understood as a diagnostic and pacing instrument that sharpens self-awareness and frees human mentors for higher-order developmental work, rather than as a substitute for the relational, judgment-intensive practices that have long characterized Indian leadership formation. The cultural inheritance of mentorship, the hierarchy-sensitivity of many Indian organizations, and the infrastructural unevenness documented in NEP 2020 implementation research together suggest that the future of leadership development in India lies not in choosing between algorithm and mentor, but in deliberately designing the division of labour between them. Future research should extend this interpretive synthesis through primary qualitative fieldwork — interviews and case studies with Indian leadership-academy participants and their mentors — to test and refine the themes proposed here.

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