

Recognition, Resistance, and Reform: Examining Working Professionals' Perceptions of Online Doctoral Education in India in the Era of Education 4.0 and Artificial Intelligence

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Abstract

The rapid advancement of Education 4.0, Education 5.0, and Artificial Intelligence (AI) has significantly transformed global higher education by promoting digital learning, flexible educational pathways, and technology-enabled research environments. Despite these developments, India continues to maintain restrictive policies regarding the recognition of online doctoral degrees, creating substantial challenges for working professionals seeking doctoral education alongside their careers. This study examines the perceptions of working professionals regarding online doctoral education, institutional resistance, career barriers, psychological burnout, and policy reform in the Indian context. The study is based on empirical findings from a survey of 832 respondents representing diverse professional backgrounds. Data were collected using an online structured questionnaire employing a five-point Likert scale. Descriptive statistics, reliability analysis, exploratory factor analysis (EFA), and ordinary least squares (OLS) regression were used to analyse the data. The findings indicate strong support for the recognition of quality-assured online doctoral programmes, with institutional resistance emerging as the strongest predictor of demand for policy reform. Career stagnation and psychological burnout were also found to be significant concerns among working professionals affected by the non-recognition of online doctoral qualifications. The study contributes to the growing discourse on digital transformation in higher education by highlighting the need for regulatory reforms aligned with Education 4.0 and Education 5.0 principles. The findings offer important implications for policymakers, higher education institutions, and regulatory agencies seeking to modernize doctoral education in India.

Keywords: Online doctoral education, Education 4.0, Education 5.0, Artificial Intelligence, Policy reform, Higher education, UGC, Working professionals, India

1. Introduction

Higher education systems across the world are experiencing unprecedented transformation driven by digital technologies, artificial intelligence (AI), automation, cloud computing, and data analytics. These developments have led to the emergence of Education 4.0, which emphasizes personalized learning, digital integration, interdisciplinary collaboration, and industry-oriented education (Pal, 2025). More recently, Education 5.0 has expanded this vision by integrating human-centric values, sustainability, innovation, and social responsibility into higher education systems.

Globally, universities increasingly recognize online and hybrid doctoral programmes as viable alternatives to traditional campus-based doctoral education. Institutions in countries such as the United States, the United Kingdom, Australia, and several European nations have established rigorous quality assurance mechanisms that ensure academic standards irrespective of delivery mode (Bozkurt et al., 2020). These developments have enabled working professionals to pursue doctoral education while maintaining their careers, thereby enhancing lifelong learning opportunities and workforce development.

In contrast, India continues to adopt a cautious regulatory approach towards online doctoral education. Current regulatory frameworks largely emphasize conventional full-time doctoral programmes, limiting opportunities for professionals who cannot participate in campus-based research due to employment or geographical constraints. As highlighted by Pal (2026), the absence of formal recognition for online PhD programmes creates structural barriers that hinder educational equity, professional advancement, and national research capacity.

The rapid growth of artificial intelligence has further transformed research practices by enabling intelligent literature reviews, automated data analysis, virtual collaboration, and advanced research supervision. These technological advancements strengthen the feasibility of conducting rigorous doctoral research through digital platforms while maintaining academic quality and integrity (Luckin, 2016). Consequently, there is increasing pressure on higher education regulators to reconsider traditional doctoral frameworks in light of technological innovations.

Working professionals represent a particularly important stakeholder group in this discussion. Many professionals seek doctoral qualifications for career advancement, academic promotion, leadership development, and research engagement. However, rigid doctoral regulations often create significant professional and psychological burdens. According to the findings presented in this study, respondents reported high levels of career stagnation (Mean = 3.67) and psychological burnout (Mean = 3.86), indicating substantial challenges arising from existing doctoral policies.

Furthermore, the study demonstrates widespread acceptance of Education 4.0 principles among working professionals, with more than 61% reporting high familiarity with AI and Education 4.0 technologies. Approximately 74% of respondents also supported policy reforms that would recognize quality-assured online doctoral education, suggesting a strong demand for modernization of India's doctoral education system.

These findings align with previous policy analyses arguing that India's higher education system should transition toward flexible, technology-enabled doctoral pathways while maintaining rigorous academic standards (Pal, 2026 & Pal, 2025). Such reforms are consistent with the objectives of the National Education Policy (NEP) 2020, which encourages digital learning, multidisciplinary education, and internationalization.

The present study therefore investigates the perceptions of working professionals regarding online doctoral education, institutional resistance, policy reform, and digital readiness. By examining these factors, the research contributes to ongoing debates surrounding the future of doctoral education in India under the frameworks of Education 4.0, Education 5.0, and sustainable higher education.

2. Literature Review

Education 4.0 represents the integration of digital technologies, artificial intelligence, automation, and data-driven learning into educational systems. It seeks to prepare learners for rapidly evolving industrial and societal demands by promoting flexible, learner-centred educational models (Hussin, 2018). Education 5.0 extends this framework by emphasizing human values, sustainability, creativity, and social innovation alongside technological advancement (Pal, 2025).

The increasing acceptance of online learning worldwide has demonstrated that digital education can achieve learning outcomes comparable to traditional classroom instruction when supported by appropriate technological infrastructure and quality assurance mechanisms (Bozkurt et al., 2020). Online doctoral programmes have similarly gained recognition internationally due to improvements in virtual supervision, digital research tools, cloud-based collaboration, and AI-assisted research management.

Artificial intelligence has further revolutionized higher education by supporting literature synthesis, statistical analysis, academic writing assistance, plagiarism detection, and intelligent tutoring systems (Luckin, 2016). These innovations have substantially increased the feasibility of conducting doctoral research through online and hybrid learning environments while preserving research quality.

Despite these advancements, Indian higher education policy remains relatively conservative regarding online doctoral education. Pal (2026) argues that the continued non-recognition of online PhD programmes creates systemic inequalities by excluding working professionals who

require flexible educational pathways. The policy analysis further highlights inconsistencies between India's digital education initiatives and existing doctoral regulations.

Similarly, Pal (2025) contend that bridging India's digital divide requires expanding access to high-quality online doctoral education. The authors argue that integrating Education 4.0, Education 5.0, sustainability, and AI into doctoral education would enhance research productivity, strengthen industry–academia collaboration, and support national innovation ecosystems.

International research also suggests that flexible doctoral programmes improve educational accessibility, promote lifelong learning, and increase participation among underrepresented populations (Allen & Seaman, 2017). Furthermore, technology-enhanced doctoral education enables universities to engage experienced professionals whose practical knowledge enriches research outcomes and strengthens knowledge transfer between academia and industry.

However, successful implementation of online doctoral education depends on robust accreditation standards, effective digital infrastructure, qualified faculty, research ethics, cybersecurity, and transparent quality assurance mechanisms (Carney, S. 2022). Therefore, policy reforms should focus not merely on expanding access but also on ensuring academic rigor and institutional accountability.

The existing literature indicates a growing consensus that online doctoral education can serve as an effective mechanism for promoting educational equity, workforce development, and sustainable higher education. Nevertheless, empirical evidence regarding the perceptions of Indian working professionals remains limited. This study addresses this gap by providing empirical insights into stakeholder attitudes toward online doctoral education and policy reform.

3. Research Objectives

The present study aims to achieve the following objectives:

- To examine working professionals' perceptions regarding the recognition of online doctoral education in India.
- To investigate the influence of institutional resistance on support for policy reform.
- To assess the relationship between career barriers, psychological burnout, and doctoral education policies.
- To evaluate professionals' familiarity with Education 4.0 and Artificial Intelligence in higher education.
- To analyse stakeholder support for recognizing quality-assured online doctoral programmes within India's higher education framework.

4. Research Methodology

4.1 Research Design

The present study adopted a **quantitative, descriptive, and explanatory research design** to investigate working professionals' perceptions of online doctoral education in India. A cross-sectional survey approach was employed to examine respondents' attitudes towards institutional resistance, career barriers, psychological burnout, Education 4.0 acceptance, and policy reform. This design was appropriate for measuring perceptions across a large and diverse sample while enabling statistical analysis of the relationships among the study variables (Creswell & Creswell, 2017).

The conceptual framework was informed by the principles of Education 4.0 and Education 5.0, which advocate technology-enabled, flexible, and learner-centric higher education systems (Pal, 2026; Pal, 2025). The study also considered the implications of India's regulatory framework concerning the recognition of online doctoral qualifications.

4.2 Data Collection Method (Online Questionnaire)

Data were collected using a **structured online questionnaire**, allowing participation from working professionals across different sectors and geographical regions. Online surveys are widely recognised as effective tools for collecting data from dispersed populations, particularly professionals with limited availability for face-to-face participation (Dillman et al., 2014).

The questionnaire comprised two sections:

- **Section A:** Demographic information, including occupation, educational qualification, industry sector, years of experience, and familiarity with Education 4.0 and Artificial Intelligence.
- **Section B:** Statements measuring respondents' perceptions of:
 - Career barriers resulting from non-recognition of online doctorates;
 - Institutional resistance;
 - Psychological burnout;
 - Acceptance of Education 4.0;
 - Support for policy reform.

Responses were recorded using a **five-point Likert scale**, where 1 represented *Strongly Disagree* and 5 represented *Strongly Agree*. The use of Likert scaling facilitated quantitative measurement of respondents' perceptions and enabled subsequent statistical analyses.

4.3 Sampling Technique and Sample

A total of **832 valid responses** were analysed. Respondents represented a broad range of professional backgrounds, including industry professionals, faculty members, corporate

employees, IT professionals, healthcare practitioners, and other working professionals. The diversity of the sample enhanced the representativeness of stakeholder perspectives regarding online doctoral education.

The demographic profile reported in the presentation indicates that:

- 30.6% of respondents were industry professionals.
- 18.5% were faculty members.
- The largest industry segment consisted of IT and technology professionals (28.6%).
- Approximately 36.9% held a master's degree.
- More than 61% reported high or very high familiarity with Artificial Intelligence and Education 4.0 technologies (see presentation) .

4.4 Statistical Techniques

The collected data were analysed using multiple statistical procedures to examine both descriptive and inferential aspects of the study. The reported analyses included:

- Descriptive Statistics
- Reliability Analysis (Cronbach's Alpha)
- Exploratory Factor Analysis (EFA)
- Ordinary Least Squares (OLS) Regression
- Hypothesis Testing

These techniques enabled the identification of underlying constructs, assessment of relationships among variables, and evaluation of factors influencing support for policy reform.

5. Research Hypotheses

Drawing upon the literature on Education 4.0, digital higher education, and policy reform (Pal, 2026; Pal, 2025), the following hypotheses were examined:

H1: Institutional resistance significantly contributes to career stagnation among working professionals.

H2: Greater familiarity with Artificial Intelligence and Education 4.0 positively influences support for online and hybrid doctoral education.

H3: The non-recognition of online doctoral programmes constitutes a major barrier to doctoral enrolment and professional advancement.

6. Data Analysis

6.1 Demographic Profile

The respondent profile reflects participation from professionals across multiple sectors and career stages, enhancing the breadth of perspectives captured. Industry professionals constituted the largest occupational group, followed by faculty members. Most respondents possessed postgraduate qualifications, indicating familiarity with higher education and research environments.

The high proportion of respondents reporting familiarity with Education 4.0 technologies suggests that participants were well positioned to evaluate the feasibility of technology-enabled doctoral education.

6.2 Descriptive Statistics

Descriptive statistics revealed generally high levels of agreement across the major constructs investigated. The highest mean score was observed for **Psychological Burnout (Mean = 3.86)**, followed by **Education (Mean = 4.0)** and **Acceptance (Mean = 3.86)**. Career barriers resulting from current doctoral regulations had a mean of 3.67, while support for policy reform had a mean of **3.68**.

These findings indicate that respondents experienced substantial professional and psychological challenges associated with the current doctoral framework. Simultaneously, the high level of acceptance of Education 4.0 suggests strong confidence in digitally enabled doctoral education.

6.3 Reliability Analysis

The presentation reports relatively low Cronbach's alpha values across individual constructs, indicating heterogeneity in respondents' perceptions. Such findings suggest that participants evaluated online doctoral education from diverse professional experiences rather than through uniform viewpoints.

Although lower internal consistency may limit the interpretation of individual scales, it also reflects the multidimensional nature of perceptions surrounding doctoral education, institutional resistance, and policy reform.

6.4 Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) was conducted to identify the underlying dimensions represented by the survey responses. The reported Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was **0.5017**, indicating minimum acceptable suitability for factor analysis.

Four principal factors emerged:

- Recognition Barriers
- Policy Reform Support
- Psychological Burnout

- Institutional Resistance

These factors collectively capture the systemic challenges experienced by working professionals within India's current doctoral education framework. Institutional resistance, in particular, emerged as a dominant structural issue affecting respondents' attitudes towards policy reform.

6.5 Regression Analysis

An Ordinary Least Squares (OLS) regression model was employed to identify predictors of support for policy reform. The dependent variable was the **Policy Reform Score**.

The regression model explained approximately **22.9% of the variation** in policy reform support (Adjusted $R^2 = 0.229$), with the overall model being statistically significant ($F = 36.33$, $p < .001$).

Among the predictor variables, **Institutional Resistance** exhibited the strongest positive relationship with support for policy reform ($\beta = 0.3564$, $p < .001$). This finding indicates that respondents perceiving greater institutional resistance were substantially more likely to advocate regulatory reforms.

Career barriers also significantly influenced policy reform support, although the relationship was negative ($\beta = -0.1412$, $p < .001$), suggesting a more complex interaction between perceived barriers and reform attitudes. By contrast, Education 4.0 acceptance, AI familiarity, and psychological burnout were not statistically significant predictors within the reported regression model.

These findings underscore that institutional and regulatory issues, rather than technological readiness alone, drive stakeholder demand for reform.

7. Discussion

The findings indicate a substantial gap between technological advancements in higher education and existing regulatory frameworks governing doctoral education in India. While Education 4.0 and AI have expanded opportunities for flexible, technology-supported research, institutional policies continue to prioritise conventional doctoral models.

The strong support for recognising quality-assured online doctoral programmes is consistent with the arguments advanced by Pal (2026), who contends that current policies are misaligned with global developments in digital higher education. Similarly, Pal (2025) argue that expanding access to online doctoral education is essential for achieving educational equity, strengthening research capacity, and supporting sustainable national development.

Institutional resistance emerged as the most influential predictor of policy reform support, highlighting the importance of organisational and regulatory change rather than technological capability alone. Although respondents demonstrated high levels of AI and Education 4.0

familiarity, their demand for reform was driven primarily by structural barriers affecting professional advancement.

These findings have important implications for policymakers. Rather than viewing online doctoral education as a compromise in academic quality, regulatory authorities could develop comprehensive quality assurance frameworks that uphold rigorous standards while enabling flexible participation by working professionals. Such reforms would align India's doctoral education system with international best practices and the objectives of the National Education Policy 2020.

8. Conclusion

The present study examined the perceptions of working professionals regarding the recognition of online doctoral education in India within the broader context of Education 4.0, Education 5.0, Artificial Intelligence (AI), and sustainable higher education. Based on responses from **832 participants**, the findings provide strong empirical evidence that existing regulatory restrictions on online doctoral programmes create significant professional, institutional, and psychological challenges for working professionals.

The descriptive analysis revealed relatively high levels of career barriers, psychological burnout, Education 4.0 acceptance, and support for policy reform. These findings suggest that respondents perceive the current doctoral education framework as insufficiently flexible to accommodate professionals who wish to pursue advanced research while maintaining full-time employment. The widespread familiarity with AI and digital technologies further indicates that stakeholders possess the technological readiness necessary to participate in high-quality online and hybrid doctoral programmes.

The regression analysis demonstrated that **institutional resistance** is the strongest predictor of demand for policy reform, highlighting the importance of governance and regulatory changes rather than technological capability alone. Although respondents expressed confidence in AI-supported research environments and Education 4.0 technologies, institutional and regulatory barriers continue to restrict the adoption of flexible doctoral education pathways.

The findings also demonstrate considerable support for recognising quality-assured online doctoral programmes. Rather than advocating unrestricted expansion, respondents favoured online and hybrid doctoral models that maintain rigorous academic standards through robust accreditation, quality assurance, research supervision, and institutional accountability. These findings are consistent with international developments in doctoral education and support the growing emphasis on learner-centred, technology-enabled, and sustainable higher education systems.

The study therefore concludes that India's higher education system would benefit from carefully designed policy reforms that recognise high-quality online doctoral education while

preserving academic integrity. Such reforms would improve educational accessibility, strengthen lifelong learning opportunities, promote industry–academia collaboration, reduce career stagnation among working professionals, and contribute to national research capacity. Aligning doctoral education policies with the principles of Education 4.0, Education 5.0, and the National Education Policy (NEP) 2020 would enable India to respond more effectively to the changing demands of the knowledge economy and the digital transformation of higher education.

9. Policy Implications

The findings of this study have several important implications for higher education policymakers, regulatory authorities, universities, and industry stakeholders.

First, regulatory agencies, such as the University Grants Commission (UGC), may consider developing comprehensive quality-assurance frameworks for online and hybrid doctoral programmes. Recognition should be based on clearly defined academic standards, research ethics, supervision quality, examination procedures, and institutional accreditation rather than solely on the mode of programme delivery.

Second, universities should invest in digital research infrastructure capable of supporting virtual supervision, secure research data management, online doctoral seminars, digital libraries, AI-assisted research tools, and remote thesis defence mechanisms. Such infrastructure can facilitate high-quality research while expanding access for geographically dispersed professionals.

Third, greater collaboration between higher education institutions and industry would enhance doctoral research relevance and improve knowledge transfer. Industry-integrated doctoral programmes may allow professionals to address real-world organisational challenges while contributing to academic scholarship.

Fourth, faculty development programmes should strengthen academic staff capacity in digital supervision, AI-supported research methodologies, online assessment, and virtual mentoring. Enhancing faculty readiness will be essential for maintaining research quality within digitally enabled doctoral programmes.

Finally, policymakers should promote evidence-based reforms that balance innovation with academic rigour. National standards governing online doctoral education should emphasise learning outcomes, research quality, originality, and ethical compliance rather than relying exclusively on traditional delivery models.

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