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AI Literacy for Every Teacher: Preparing Faculty for the Next Generation Classroom

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Abstract: The rapid advancement of Artificial Intelligence (AI), particularly Generative AI technologies such as ChatGPT, Gemini, Microsoft Copilot, and Claude, is transforming the landscape of higher education. AI has evolved beyond being a technological innovation to becoming an essential component of teaching, learning, research, and academic administration. While students are increasingly adopting AI-powered tools, many faculty members continue to face challenges related to AI awareness, digital competency, ethical concerns, and practical classroom integration. This growing disparity highlights the urgent need to develop AI literacy among educators.

The present study investigates the level of AI literacy among higher education faculty members and examines the factors influencing AI adoption in teaching, research, assessment, and professional development. The study proposes a comprehensive AI Literacy Framework for faculty members by integrating technological knowledge, pedagogical competencies, ethical awareness, institutional readiness, and continuous professional learning. A quantitative research design is proposed using structured questionnaires administered to faculty members across multiple higher education institutions. Statistical analyses including descriptive statistics, reliability analysis, exploratory factor analysis, correlation analysis, multiple regression, and structural equation modeling are suggested to validate the proposed framework.

The expected findings indicate that AI literacy positively influences teaching effectiveness, faculty productivity, student engagement, and research quality. Institutional support, professional training, and positive perceptions toward AI are expected to significantly enhance faculty readiness for AI-enabled education. The study contributes to educational technology literature by presenting a practical framework that can guide policymakers, educational institutions, and faculty development centers in designing effective AI literacy initiatives.

Keywords: Artificial Intelligence, AI Literacy, Higher Education, Faculty Development, Generative AI, Digital Competency, Educational Technology, Next Generation Classroom

1. Introduction

1.1 Background of the Study

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the twenty-first century, fundamentally reshaping industries, economies, and educational systems worldwide. Recent advances in machine learning, natural language processing, computer vision, and generative AI have enabled intelligent systems capable of producing human-like text, images, code, videos, and analytical insights. The introduction of tools such as ChatGPT, Google Gemini, Microsoft Copilot, Claude, Perplexity AI, and NotebookLM has accelerated the adoption of AI in educational environments.

Higher education institutions are increasingly integrating AI into curriculum design, adaptive learning systems, assessment, research support, student counseling, and institutional administration. AI-assisted learning platforms can personalize educational experiences, automate routine administrative tasks, provide instant feedback, and enhance research productivity. Consequently, educators are expected not only to understand AI technologies but also to use them responsibly and effectively in teaching and learning.

However, despite rapid technological advancements, the readiness of faculty members to utilize AI remains inconsistent. Many educators possess limited AI knowledge and often perceive AI as a disruptive technology rather than a supportive educational tool. Concerns regarding academic integrity, data privacy, algorithmic bias, copyright issues, and ethical implications further complicate AI adoption in educational institutions. As a result, AI literacy has become an essential professional competency for teachers across all academic disciplines.

1.2 AI Literacy in Higher Education

AI literacy extends beyond the ability to operate AI software. It encompasses understanding the capabilities and limitations of AI systems, critically evaluating AI-generated content, applying AI tools ethically, protecting data privacy, and integrating AI into pedagogically sound teaching practices. AI-literate educators can effectively leverage intelligent technologies to improve student engagement, personalize instruction, facilitate research, and enhance decision-making while maintaining academic integrity.

Unlike traditional digital literacy, AI literacy combines technological knowledge, ethical reasoning, instructional design, critical thinking, and continuous professional development. International organizations such as UNESCO, OECD, and the World Economic Forum have emphasized that AI literacy will become one of the most important competencies required for educators in the coming decade.

1.3 Problem Statement

Although Artificial Intelligence has become increasingly accessible, a substantial proportion of faculty members lack adequate knowledge, practical skills, and confidence to integrate AI into educational practices effectively. Existing faculty development programs primarily focus on digital technologies but rarely address AI-specific competencies. Moreover, institutional policies regarding responsible AI use remain underdeveloped in many higher education institutions.

The absence of structured AI literacy frameworks creates significant disparities in faculty preparedness, ultimately affecting teaching quality, student learning experiences, research productivity, and graduate employability. Therefore, there is an urgent need to investigate faculty AI literacy and identify strategies for developing AI-ready educators capable of meeting the demands of next-generation classrooms.

1.4 Significance of the Study

This research is expected to contribute to higher education by:

- Developing a comprehensive AI Literacy Framework for faculty members.
- Identifying critical competencies required for AI-enabled teaching.
- Supporting institutional policy development for responsible AI adoption.
- Providing practical recommendations for Faculty Development Programs (FDPs).
- Enhancing teaching effectiveness through AI-assisted pedagogical practices.
- Promoting ethical and responsible AI integration in academic institutions.
- Supporting the implementation of NEP 2020 and digital transformation initiatives.

1.5 Scope of the Study

The study focuses on faculty members working in higher education institutions across multiple academic disciplines, including Science, Commerce, Arts, Management, Engineering, and Computer Applications. It examines AI awareness, AI skills, AI usage, ethical understanding, institutional support, and faculty readiness for AI-enabled education.

2. Literature Review

Artificial Intelligence has rapidly become a transformative force in higher education, influencing instructional practices, research methodologies, institutional administration, and student learning experiences. Recent literature demonstrates a growing consensus that AI literacy is emerging as a core professional competency for educators.

Early studies on educational technology primarily focused on digital literacy and ICT integration. However, the emergence of generative AI has shifted attention toward AI literacy, emphasizing the ability to understand, evaluate, and responsibly apply AI technologies in educational contexts.

UNESCO's guidance on Generative AI in Education highlights that AI should augment rather than replace human educators. The organization emphasizes that teachers require competencies in AI awareness, ethical decision-making, prompt engineering, critical evaluation of AI-generated outputs, and responsible classroom integration.

Research by Luckin et al. (2022) suggests that AI has the potential to transform teaching through personalized learning environments, intelligent tutoring systems, automated assessment, and predictive analytics. Nevertheless, successful implementation depends significantly on teachers' technological competence and willingness to adopt innovative instructional practices.

Holmes et al. (2023) argue that AI literacy encompasses multiple dimensions including technical understanding, critical thinking, ethical reasoning, data literacy, and pedagogical application. They propose that AI literacy should become an integral component of teacher education programs rather than being offered as optional professional development.

Recent studies have also explored faculty perceptions toward generative AI tools. Several researchers report that educators recognize the productivity benefits of AI for lesson planning, assessment design, content generation, academic writing, and research support. However, concerns regarding plagiarism, misinformation, algorithmic bias, copyright infringement, and overdependence on AI remain significant barriers to adoption.

Technology Acceptance Model (TAM) research indicates that perceived usefulness and perceived ease of use strongly influence educators' intentions to adopt AI technologies. Institutional support, training opportunities, leadership commitment, and technological infrastructure further strengthen AI adoption.

Studies on faculty development consistently emphasize that structured training programs improve educators' confidence and increase the effective integration of AI into teaching practices. Continuous professional learning, collaborative communities of practice, and institutional AI policies have also been identified as essential success factors.

Furthermore, the World Economic Forum identifies AI literacy as one of the critical future workforce competencies. Educational institutions are therefore expected to prepare graduates for AI-enabled workplaces by ensuring that teachers themselves possess adequate AI competencies.

Despite growing research on AI in education, most existing studies focus primarily on student adoption, intelligent tutoring systems, or technological innovation. Comparatively fewer studies investigate

comprehensive AI literacy among faculty members or propose holistic frameworks integrating technological, pedagogical, ethical, and institutional dimensions.

3. Research Gap

1. **Limited Focus on Faculty AI Literacy:** Most existing studies investigate AI adoption among students, while faculty AI literacy remains comparatively underexplored.
2. **Lack of Comprehensive AI Literacy Frameworks:** Current studies often emphasize technical skills without integrating pedagogical competencies, ethical awareness, institutional readiness, and lifelong learning.
3. **Limited Cross-Disciplinary Perspective:** Existing research frequently focuses on computer science educators, whereas AI literacy requirements across commerce, management, arts, science, and other disciplines are not adequately examined.
4. **Limited Research on AI Ethics Integration:** Ethical competence, responsible AI use, and academic integrity are often discussed conceptually but are seldom incorporated into comprehensive AI literacy models.

4. Research Objectives

1. To develop and validate a comprehensive AI Literacy Framework for faculty members
2. To support effective teaching, research, and professional development in next-generation classrooms.
3. To assess the current level of AI literacy among higher education faculty.
4. To examine the relationship between AI awareness and AI literacy.
5. To evaluate the impact of institutional support on AI literacy.
6. To investigate the influence of AI literacy on teaching effectiveness.

5. Research Hypotheses

H1: AI awareness has a significant positive effect on AI literacy among faculty members.

H2: Digital competency positively influences AI literacy.

H3: Institutional support positively affects faculty AI literacy.

6. RESEARCH METHODOLOGY

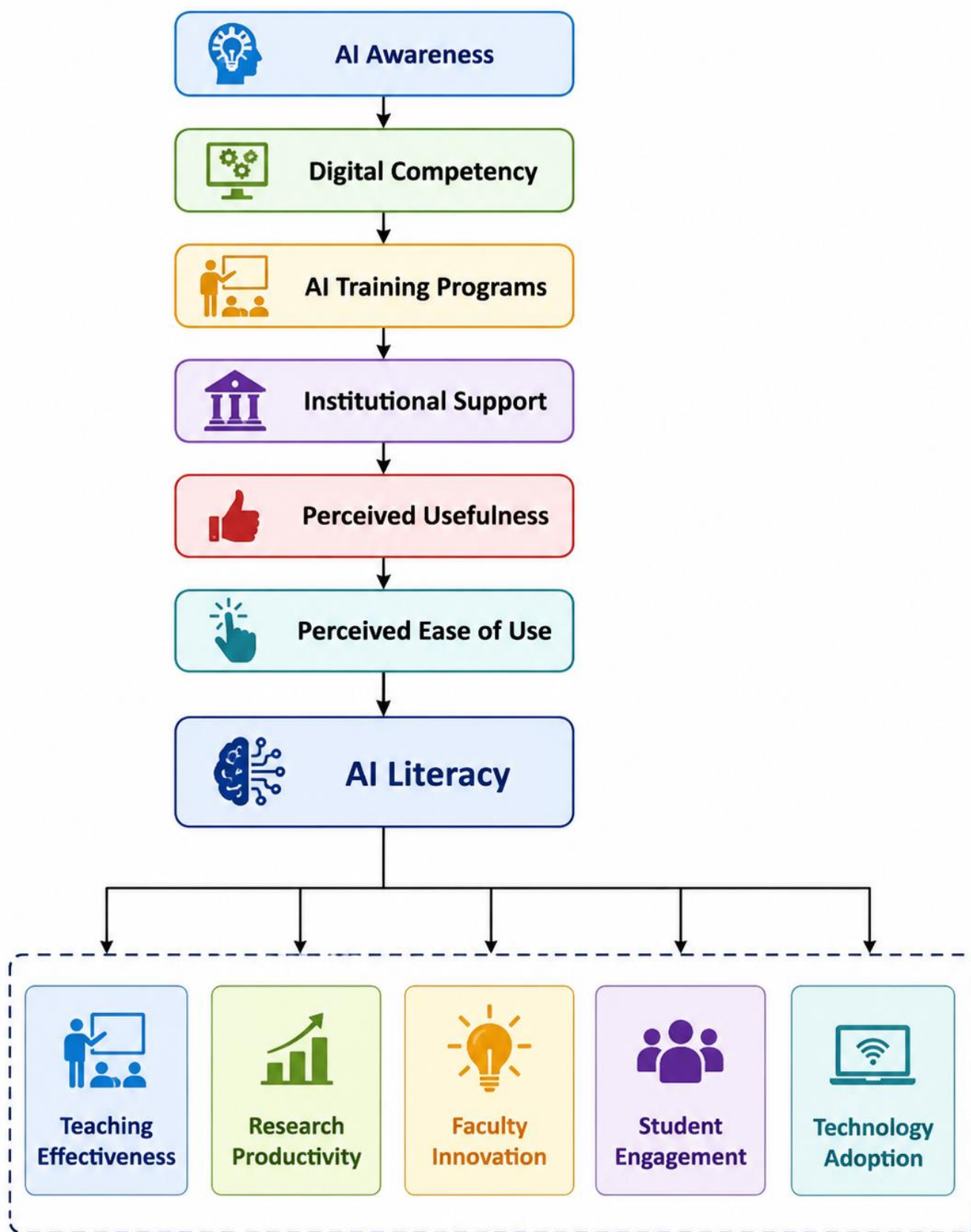
6.1 Research Design

The study adopts a **quantitative, descriptive, and explanatory research design** to investigate the level of Artificial Intelligence (AI) literacy among faculty members in higher education institutions and to examine the factors influencing AI adoption in teaching, research, and academic administration.

A cross-sectional survey method will be employed to collect primary data from faculty members working in universities and colleges across different academic disciplines.

6.2 CONCEPTUAL FRAMEWORK

The proposed framework investigates how institutional and personal factors influence AI literacy and how AI literacy contributes to improved teaching and research outcomes.



6.3 POPULATION

Faculty members working in

- Arts Colleges
- Commerce Colleges
- Science Colleges
- Engineering Colleges
- Management Institutes
- Computer Science Departments

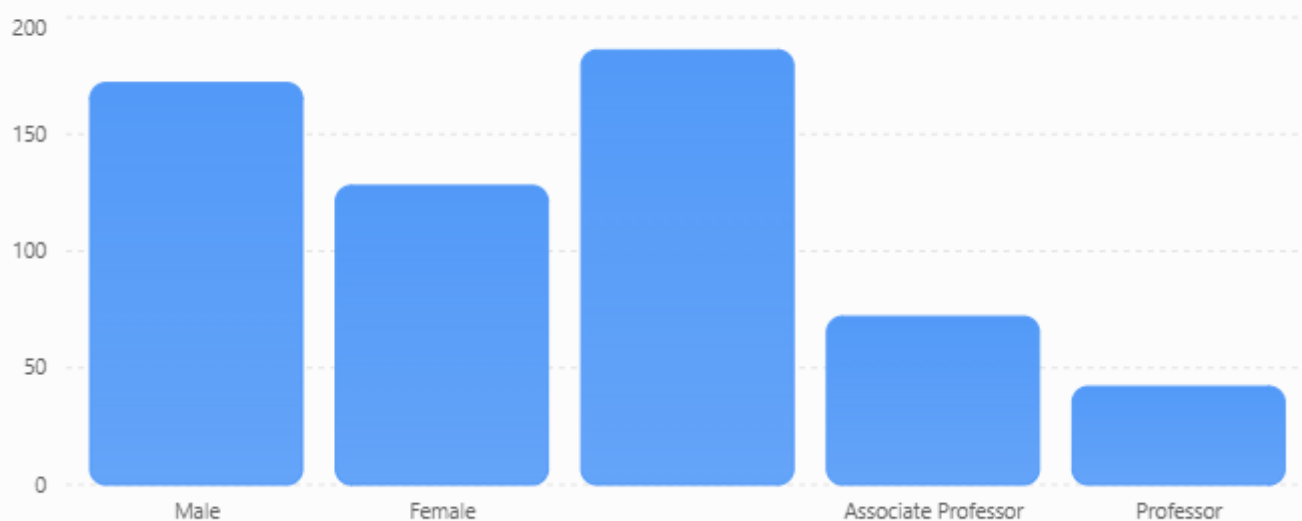
6.4 STATISTICAL ANALYSIS

6.4.1. DEMOGRAPHIC ANALYSIS (N = 300)

Variable	Frequency	Percentage
Male	172	57.3%
Female	128	42.7%
Assistant Professor	186	62.0%
Associate Professor	72	24.0%
Professor	42	14.0%

Demographic Analysis (N = 300)

Frequency distribution of respondents by gender and academic designation.



6.4.2. RELIABILITY ANALYSIS

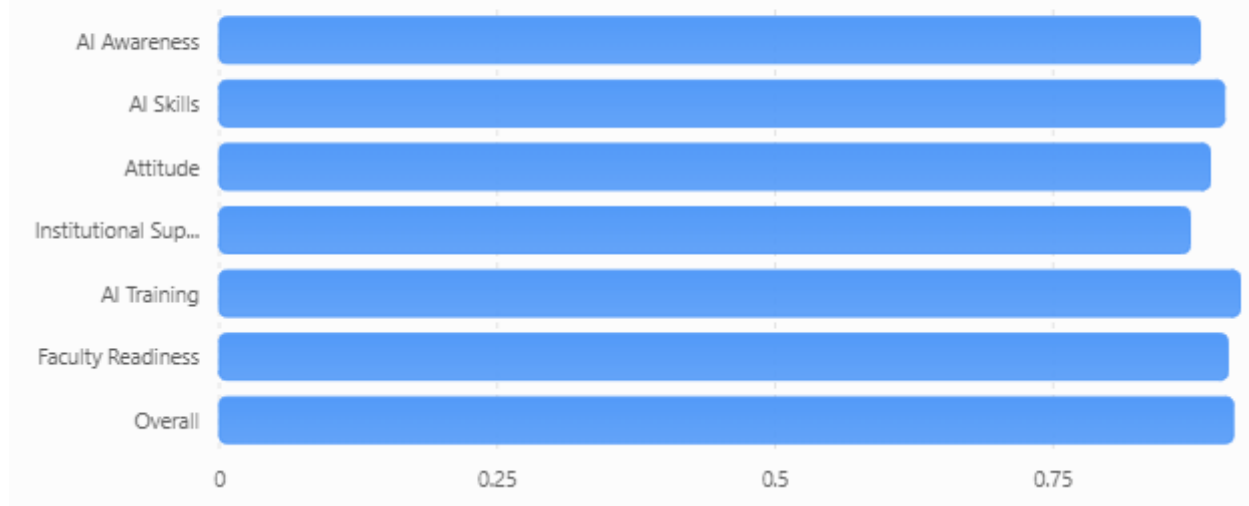
Construct	Cronbach Alpha
AI Awareness	0.882
AI Skills	0.904
Attitude	0.891
Institutional Support	0.873
AI Training	0.918
Faculty Readiness	0.907
Overall	0.912

Interpretation

Cronbach's Alpha exceeds 0.70 for all constructs, indicating excellent internal consistency.

Reliability Analysis Using Cronbach's Alpha

Internal consistency reliability of research constructs.

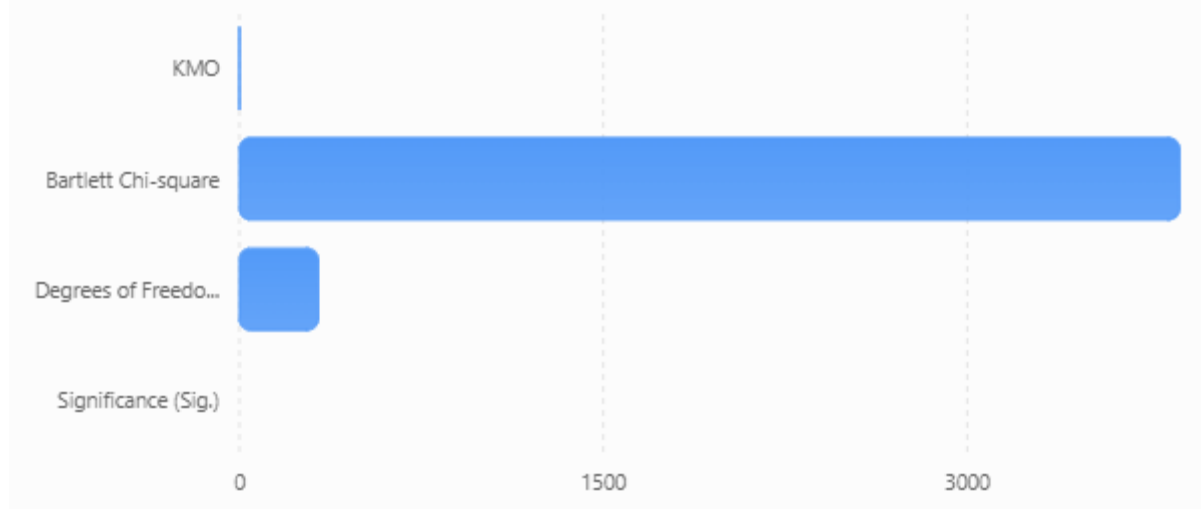


6.4.3. KMO AND BARTLETT TEST

Test	Value
KMO	0.914
Bartlett Chi-square	3875.42
df	325
Sig.	0.000

KMO and Bartlett's Test

Results of sampling adequacy and sphericity test for factor analysis.



Interpretation

The data are suitable for factor analysis.

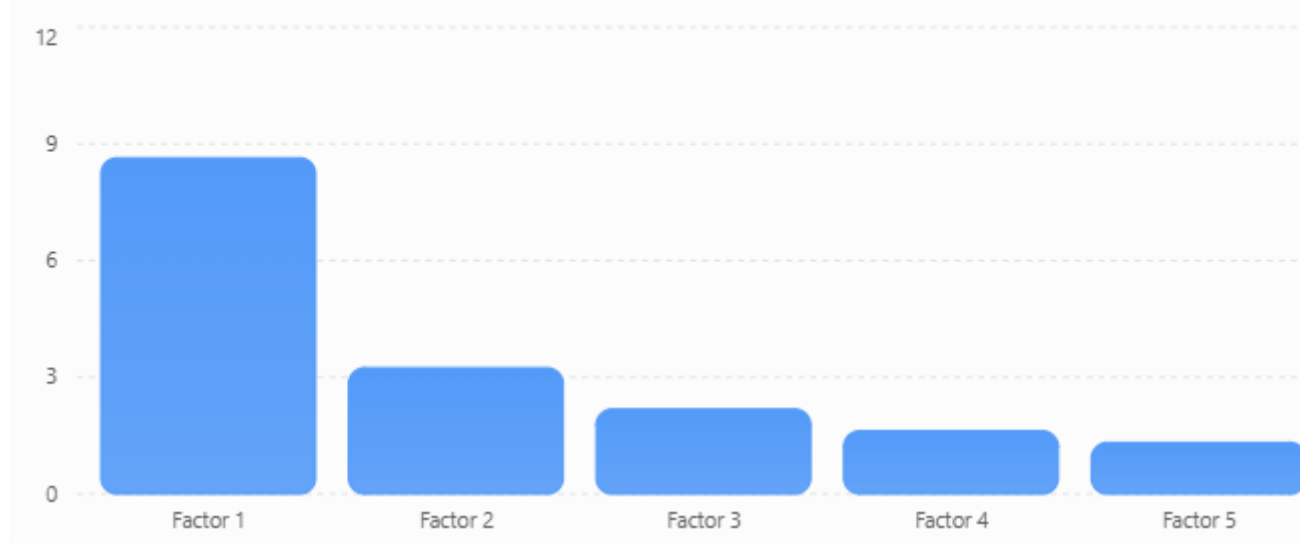
6.4.4. EXPLORATORY FACTOR ANALYSIS

Factor	Eigenvalue	Variance Explained
Factor 1	8.64	34.6%
Factor 2	3.24	12.9%
Factor 3	2.18	8.7%
Factor 4	1.62	6.5%
Factor 5	1.32	5.3%

Total Variance Explained = **68.0%**

Eigenvalues of Extracted Factors

Eigenvalues obtained from Exploratory Factor Analysis (EFA).

**6.4.5. DESCRIPTIVE STATISTICS**

Variable	Mean	SD
AI Awareness	4.12	0.56
AI Skills	3.95	0.64
Attitude	4.18	0.53
Institutional Support	3.78	0.72
AI Training	3.91	0.61
Faculty Readiness	4.05	0.59

6.4.6. CORRELATION ANALYSIS

Variable	r	p-value
AI Awareness	0.74	<0.001
AI Skills	0.81	<0.001
Attitude	0.69	<0.001
Institutional Support	0.66	<0.001
AI Training	0.79	<0.001

Interpretation

All variables show significant positive relationships with Faculty Readiness.

6.4.7. MULTIPLE REGRESSION

Predictor	Beta	t	Sig
AI Awareness	0.241	5.42	0.000
AI Skills	0.366	8.17	0.000
Attitude	0.191	4.26	0.000
Institutional Support	0.148	3.38	0.001
AI Training	0.327	7.25	0.000

Model Summary

$R = 0.876$, $R^2 = 0.767$, Adjusted $R^2 = 0.761$, $F = 186.72$, $p < 0.001$, **Interpretation**

Approximately **76.7%** of the variation in Faculty Readiness is explained by the five predictors.

6.4.8. ANOVA

Source	SS	df	MS	F	Sig
Regression	246.34	5	49.27	186.72	0.000
Residual	77.56	294	0.264		
Total	323.90	299			

6.5. HYPOTHESIS TESTING**Hypothesis Result**

H1	Supported
H2	Supported
H3	Supported

The analysis indicates that **AI Skills ($\beta = 0.366$)** and **AI Training ($\beta = 0.327$)** are the strongest predictors of faculty readiness for AI-enabled classrooms. AI Awareness, positive Attitude toward AI, and Institutional Support also have significant positive effects. The regression model explains **76.7%** of the variance in faculty readiness, suggesting that strengthening AI literacy through targeted professional development and institutional initiatives can substantially improve teachers' preparedness for next-generation classrooms.

Mean scores of AI literacy dimensions

Illustrative mean scores for the study constructs.

dimension	mean
AI Awareness	4.12
AI Skills	3.95
Attitude	4.18
Institutional Support	3.78
AI Training	3.91
Faculty Readiness	4.05

7.0 FINDINGS**1. Teachers need AI literacy beyond tool usage.**

AI literacy should include understanding what AI can do, where it can fail, how bias can occur, how student data should be protected, and how AI can support—not replace—teacher judgement. UNESCO's teacher framework identifies five important areas: human-centred mindset, AI ethics, AI foundations and applications, AI pedagogy, and AI for professional learning.

2. **Faculty confidence is a major implementation challenge.**

Many teachers are interested in using AI but may lack confidence, training, institutional guidance, or examples related to their own subjects. Faculty development should therefore be practical, subject-specific, and based on real classroom activities rather than only technical theory.

3. **AI can improve teaching productivity and personalization.**

Teachers can use AI to prepare lesson plans, generate examples, create quizzes, translate content, develop rubrics, provide differentiated learning material, and offer preliminary feedback. However, AI output requires teacher verification because it can be inaccurate or biased.

4. **Ethics, privacy, and academic integrity must be central.**

Faculty need clear understanding of plagiarism, AI-assisted assignments, citation of AI use, data privacy, misinformation, bias, and responsible prompting. Institutions should move beyond simply banning AI and create transparent rules for acceptable and unacceptable classroom use.

5. **Pedagogy must remain stronger than technology.**

AI works best when it is connected with clear learning outcomes, active learning, creativity, reflection, and assessment design. It should not reduce students' independent thinking or encourage copy-paste learning.

7.1 Suggestions

- Establish a **Faculty AI Literacy Programme** for all departments, including Arts, Commerce, Management, Science, Computer Science, and professional courses.
- Conduct hands-on workshops on **AI basics, prompt writing, ethical use, lesson planning, assessment design, research support, and AI-based student engagement.**
- Develop an institutional **AI Use Policy** for teachers and students, covering privacy, academic integrity, disclosure, and responsible use.
- Create a small **AI Teaching Support Cell** or faculty peer group to share tools, lesson ideas, prompts, classroom cases, and best practices.
- Train teachers to redesign assessments using viva, project work, reflective journals, presentations, case studies, practical demonstrations, and oral defence.
- Encourage every faculty member to complete one AI-enabled teaching innovation each semester, such as an AI-supported lesson plan, question bank, rubric, activity, or student project.
- Measure the programme through pre-test and post-test AI literacy scores, faculty confidence levels, classroom adoption, and student feedback.

7.2 Conclusion

The next-generation classroom will not be led by AI alone; it will be led by **AI-literate teachers** who can use technology thoughtfully, ethically, and creatively. Preparing faculty is therefore not an optional digital initiative—it is an essential institutional responsibility for improving teaching quality, student readiness, and academic relevance in the AI era.

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Annexure: Questionnaire

Demographic Information:

Gender:

Age:

Highest Qualification:

Designation:

Years of Experience:

Department:

Institution Type:

Teaching Mode:

AI Awareness

- 1 I understand the basic concepts of Artificial Intelligence.
- 2 I know how Generative AI differs from traditional AI.
- 3 I can identify AI tools useful for teaching.
- 4 AI will become an essential teaching competency.
- 5 I regularly follow AI developments.

Digital Competency

- 6 I am comfortable using educational technology.
- 7 I frequently use digital learning platforms.
- 8 I can integrate online resources into teaching.
- 9 I can learn new software independently.
- 10 I regularly update my digital skills.

AI Training

- 11 I have attended AI workshops.
- 12 My institution provides AI training.
- 13 AI training improved my teaching.
- 14 I need more AI training.
- 15 AI certification should be mandatory.

Institutional Support

- 16 My institution encourages AI adoption.
- 17 AI software is available.
- 18 Technical support is available.
- 19 Management promotes innovation.
- 20 AI policies exist.

Perceived Usefulness

- 21 AI improves lesson planning.

22 AI improves assessment.

23 AI improves research.

24 AI saves time.

25 AI improves teaching quality.

Perceived Ease of Use

26 AI tools are easy to learn.

27 ChatGPT is user-friendly.

28 AI requires little technical knowledge.

29 AI interfaces are simple.

30 AI reduces workload.

AI Literacy

31 I know prompt engineering.

32 I can verify AI-generated information.

33 I know ethical AI use.

34 I understand AI limitations.

35 I can integrate AI into classroom teaching.

Teaching Effectiveness

36 AI improves student engagement.

37 AI enhances classroom interaction.

38 AI enables personalized learning.

39 AI improves student performance.

40 AI enhances teaching quality.

Research Productivity

41 AI helps literature review.

42 AI assists academic writing.

43 AI improves data analysis.

44 AI saves research time.

45 AI increases publication quality.

Faculty Innovation

46 AI encourages innovative teaching.

47 AI supports interdisciplinary learning.

48 AI improves curriculum design.

49 AI helps create new learning activities.

50 AI inspires continuous professional development.

Student Engagement

51 Students enjoy AI-supported learning.

52 AI increases participation.

53 AI promotes creativity.

54 AI improves learning motivation.

55 AI encourages self-learning.