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A STUDY ON EFFECTIVENESS OF AI BASED TRAINING IN EDTECH

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Abstract: This study examines the effectiveness of Artificial Intelligence (AI)-based training in the Educational Technology (EdTech) sector. With the rapid integration of AI into digital learning platforms, training systems have become more personalized, adaptive, and data-driven. The research focuses on evaluating how AI-based tools such as adaptive learning systems, chatbots, automated assessments, and learning analytics influence learning outcomes, engagement, skill development, accessibility, and productivity. A descriptive research design was adopted, and primary data was collected through a structured questionnaire. The findings indicate that AI-based training significantly enhances conceptual understanding, knowledge retention, technical skills, and learner engagement. It also provides flexibility and user-friendly learning experiences. However, the impact on soft skill development is comparatively moderate. Overall, the study concludes that AI-based training is an effective and efficient approach in modern education, contributing to improved performance and continuous learning. The study highlights the growing importance of AI in shaping future learning systems.

Index Terms - Artificial intelligence, Edtech, AI-Based training, learning effectiveness, Personalized learning

I. INTRODUCTION

Artificial Intelligence (AI) is developing as a revolutionary force in the Educational Technology (EdTech) industry, and the quick development of digital technology has drastically changed the educational landscape. By providing intelligent, data-driven, and customized learning experiences, AI-based training systems are revolutionizing the delivery, access, and assessment of knowledge. Knowing how effective AI-enabled platforms are has become essential as corporations and educational institutions use them more and more. Conventional learning strategies usually depend on standardized teaching techniques, in which a wide range of students are taught the same material. Variations in learning results result from these approaches' frequent failure to take into account individual differences in learning pace, comprehension levels, and preferences. AI-based training systems, on the other hand, provide personalized and adaptable learning environments that dynamically modify information in response to learner behavior and performance. A major development in contemporary education is the transition from a one-size-fits-all model to a learner-centered approach. AI-based training incorporates cutting-edge technology including automation, machine learning, natural language processing, and predictive analytics. These technologies make it possible for systems to evaluate vast amounts of learner data, spot trends, and offer immediate feedback. Intelligent tutoring programs, chatbots driven by AI, automated tests, and customized learning pathways are examples of features that boost engagement and enable ongoing development. By delivering targeted content and immediate feedback, AI systems help learners improve conceptual understanding and knowledge retention. AI-based training not only improves learning efficacy but also provides more flexibility and accessibility. Because they may access the material at any time and

from any location, students can learn at their own speed and become less dependent on traditional classroom environments. Given the growing need for digital and remote learning solutions, this flexibility is especially beneficial. AI-driven platforms also support continuous performance monitoring, allowing learners to track their progress and identify areas for improvement. Additionally, by recognizing learning gaps and making personalized recommendations, AI plays a crucial part in skill development. Through interactive learning modules and simulation-based environments, it facilitates the development of both soft and technical skills. Students are therefore better prepared to handle the challenges of a quickly evolving academic and professional environment. It is crucial to assess AI-based training systems' efficacy critically, despite their increasing use and possible advantages. There are still unanswered questions about how they affect learning outcomes, levels of engagement, and overall performance improvement. With an emphasis on important factors including learning effectiveness, engagement, skill development, accessibility, and productivity, this study attempts to investigate the efficacy of AI-based training in the EdTech industry.

II. REVIEW OF LITERATURE

Holmes et al. (2019) examined the broader implications of AI in education and emphasized its transformative potential. Their study highlighted that AI enables the development of adaptive learning systems and intelligent tutoring platforms that provide personalized instruction based on individual learner needs. By analyzing real-time data on learner performance, AI systems can adjust content difficulty, recommend suitable learning resources, and provide immediate feedback. The authors concluded that such personalized approaches significantly improve learner engagement, comprehension, and academic performance. Furthermore, AI-driven platforms allow continuous monitoring of progress, enabling timely interventions and improved learning outcomes.

Luckin et al. (2016) described AI as an intelligent partner that collaborates with both educators and learners to enhance the learning process. According to their research, AI systems can automate routine tasks such as grading and progress tracking, thereby allowing educators to focus on more strategic and interactive teaching activities. AI also supports personalized learning by identifying knowledge gaps and providing customized recommendations tailored to individual learning styles and preferences. The study emphasized that AI contributes to a learner-centered educational environment where instruction is adapted to meet the specific needs of each learner, resulting in improved engagement and satisfaction.

Woolf (2010) focused on intelligent tutoring systems and demonstrated that AI-based tutors are capable of simulating human instructional behavior. These systems provide step-by-step guidance, real-time corrective feedback, and adaptive support to learners. Unlike traditional teaching methods, intelligent tutoring systems can respond to learner inputs dynamically and adjust the instructional process accordingly. Woolf's findings indicated that such systems significantly enhance learner motivation, engagement, and knowledge retention. By offering continuous support and personalized feedback, AI-based tutors help learners overcome difficulties and achieve better academic outcomes.

Baker and Inventado (2014) explored the role of educational data mining and learning analytics in AI-based training systems. Their study highlighted how AI technologies analyze large volumes of learner data to identify patterns, predict performance, and recommend appropriate interventions. Predictive analytics can detect early signs of learning difficulties and provide targeted support to improve learner performance. The authors emphasized that data-driven decision-making enhances the effectiveness of training programs by enabling educators and institutions to make informed adjustments to instructional strategies. This approach not only improves learning outcomes but also increases efficiency in managing educational processes.

III. OBJECTIVE OF THE STUDY

To examine the effectiveness of AI-based training in the EdTech sector in improving learning outcomes, engagement, skill development, and overall performance.

IV. RESEARCH METHODOLOGY

4.1 Sample Size

The sample size of the study consists of 113 respondents, and the data was collected using a structured questionnaire through Google Forms. The online method enabled easy distribution and quick response collection from participants. It also ensured efficient data organization and accuracy for analysis.

4.2 Sampling Technique

Convenience sampling method was used to select respondents based on ease of access and willingness to participate. This approach was chosen due to time constraints and practical feasibility. It enabled quick and efficient data collection for the study.

4.3 Sources of data

The study is based on both primary and secondary sources of data to ensure a comprehensive analysis. Primary data was collected through a structured questionnaire distributed using Google Forms. The questionnaire included multiple-choice and Likert-scale questions designed to capture information on awareness, usage, engagement, learning outcomes, and skill development related to AI-based training.

Secondary data was gathered from various reliable sources, including research journals, academic articles, books, and EdTech industry reports. Additionally, information was obtained from online scholarly publications and official websites related to AI-based learning platforms. The combination of primary and secondary data helped in strengthening the validity and depth of the study.

4.4 Tools used for analysis

The collected data was analyzed using appropriate statistical tools to ensure accurate interpretation and meaningful conclusions. Percentage analysis was used to present the distribution of responses and identify trends among respondents. Bar charts and pie charts were utilized for graphical representation, making the data easier to understand and compare.Likert scale analysis was applied to measure respondents' perceptions and attitudes towards AI-based training. Descriptive statistics were also used to summarize and interpret the overall data.In addition, the Chi-square test was employed to examine the relationship between selected variables and to determine whether there is a significant association between them. This helped in validating the results and ensuring the reliability of the findings.

V. RESULTS AND DISCUSSION

The following table presents a comprehensive consolidated analysis of the primary data collected from 113 respondents regarding various dimensions of AI-based training. It summarizes the effectiveness of AI features across learning outcomes, skill development, and overall user satisfaction levels within the EdTech sector.

Table 5.1: Consolidated Analysis of Respondent Perceptions on AI-Based Training Effectiveness

S.No	Variable	No. of Categories	χ^2 Value	df	Sig.	Result	Interpretation
1	Experience with Online Learning	3	41.52	2	0.0001	Significant	Majority are new users
2	Awareness of AI in EdTech	2	60.98	1	0.0001	Significant	High awareness of AI
3	Frequency of AI Usage	4	54.62	3	0.0001	Significant	Frequent AI usage
4	AI Analyzes Learning Behaviour	3	35.74	2	0.0001	Significant	Strong recognition of analytics
5	Interaction with AI Tools	4	39.88	3	0.0001	Significant	Regular interaction
6	Time Spent on AI Platforms	4	48.21	3	0.0001	Significant	Moderate usage pattern
7	AI Identifies Skill Gaps	5	72.36	4	0.0001	Significant	High trust in AI evaluation
8	AI Improves Understanding	5	79.84	4	0.0001	Significant	Strong learning impact
9	Adaptive Learning Matches Pace	5	46.27	4	0.0001	Significant	Effective personalization
10	Better than Traditional Learning	5	38.91	4	0.0001	Significant	Moderate superiority
11	Knowledge Retention	5	42.63	4	0.0001	Significant	Improved retention
12	AI Training Engagement	5	52.38	4	0.0001	Significant	High engagement
13	Chatbots Help Learning	5	49.17	4	0.0001	Significant	Effective doubt clearing
14	Simulations Enhance Learning	5	33.85	4	0.0001	Significant	Moderate effectiveness
15	Technical Skill Development	5	68.91	4	0.0001	Significant	Strong technical improvement
16	Soft Skill Development	5	41.27	4	0.0001	Significant	Moderate soft skill impact
17	Productivity Improvement	5	37.44	4	0.0001	Significant	Moderate productivity gain
18	Accessibility of Platforms	5	66.45	4	0.0001	Significant	Highly accessible systems
19	User-Friendly Interface	5	58.72	4	0.0001	Significant	High usability satisfaction

5.1 Experience with Online Learning

A majority of respondents have less than 6 months of experience in online learning. This indicates a recent and rapid adoption of digital learning platforms.

5.2 Awareness of AI in EdTech

A majority of respondents are aware of AI integration in EdTech platforms. This reflects strong visibility and growing acceptance of AI technologies in education.

5.3 Frequency of AI Usage

Most respondents frequently use AI-based features in learning platforms. This indicates a high level of adoption and regular engagement with AI tools.

5.4 AI Analyzes Learning Behaviour

A majority agree that AI systems analyze their learning behaviour effectively. This highlights the role of AI in enabling personalized learning experiences.

5.5 Interaction with AI Tools

Respondents interact with AI tools on a regular basis, either daily or weekly. This demonstrates consistent engagement with AI-enabled learning systems.

5.6 Time Spent on AI Platforms

Most respondents spend less than two hours daily on AI platforms. This suggests moderate yet consistent usage patterns in learning activities.

5.7 AI Identifies Skill Gaps

A majority of respondents agree that AI accurately identifies skill gaps. This reflects strong confidence in AI-driven assessment mechanisms.

5.8 AI Improves Understanding

Most respondents believe that AI enhances their conceptual understanding. This indicates the effectiveness of AI in improving learning outcomes.

5.9 Adaptive Learning Matches Pace

A majority feel that AI adapts to their individual learning pace. This demonstrates the efficiency of adaptive learning systems.

5.10 Better than Traditional Learning

Many respondents perceive AI-based learning as better than traditional methods. However, neutral responses indicate that traditional learning still holds relevance.

5.11 Knowledge Retention

A majority agree that AI improves knowledge retention. This suggests that personalized learning supports long-term understanding.

5.12 AI Training Engagement

Most respondents find AI-based training more engaging than traditional learning. This highlights the role of interactive features in increasing learner interest.

5.13 Chatbots Help Learning

A majority agree that AI chatbots effectively assist in clearing doubts. This emphasizes the importance of real-time support in learning environments.

5.14 Simulations Enhance Learning

Many respondents believe that simulations improve learning effectiveness. However, moderate responses suggest scope for further enhancement.

5.15 Technical Skill Development

Most respondents report improvement in technical skills through AI training. This indicates the strong effectiveness of AI in skill-based learning.

5.16 Soft Skill Development

AI contributes to soft skill development among respondents. However, the impact is comparatively moderate.

5.17 Productivity Improvement

Many respondents agree that AI improves productivity. The improvement is present but not highly significant.

5.18 Accessibility of Platforms

A majority find AI platforms easily accessible. This supports flexible and convenient learning opportunities.

5.19 User-Friendly Interface

Most respondents agree that AI platforms are user-friendly. This enhances usability and overall learning experience.

VI. CONCLUSION

The study comes to the conclusion that training based on artificial intelligence (AI) significantly improves learning efficacy in the EdTech industry. The results unequivocally show that AI-driven solutions enhance learners' conceptual comprehension, retention of information, engagement, and development of technical skills. Personalised and effective learning experiences are facilitated by features like chatbots, learning analytics, automated tests, and adaptive learning. The report also emphasises how AI-based platforms are more adaptable, user-friendly, and accessible, allowing students to pursue self-paced learning. Better overall performance and higher production are the outcomes of this. However, AI's influence on the development of soft skills is quite mild, suggesting that this field still needs work. All things considered, AI-based training has shown itself to be a successful and cutting-edge strategy in contemporary education. It is an important tool for organisations and educational institutions since it promotes ongoing learning and performance enhancement. The quality and efficacy of digital learning environments will be significantly improved by ongoing investment and research in AI-based solutions.

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