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Sameeksha

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Special Issue

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About Sameeksha: Shodh

Sameeksha: Shodh is an Annual, double-blind peer reviewed, interdisciplinary research journal of Manghanmal Udharam College of Commerce. The journal focuses on integrating theory, research and practice in the area of Commerce, Management, English, Sindhi, Hindi, Sports, Law, Economics, Banking and Library Science. The journal gives a platform to Academicians and Researchers to publish their research papers for the above subjects at the National level.

Sameeksha – Shodh

Special Issue

on

Artificial Intelligence in Teaching, Learning and Research

JHSE Trust's Manghanmal Udharam College of Commerce

Pimpri, Pune – 411017

Foreword

It is a matter of great pleasure to present this volume of conference proceedings emerging from the National Seminar on **'Artificial Intelligence in Teaching, Learning and Research'.** The seminar addresses one of the most significant developments of our time, as Artificial Intelligence continues to reshape education, research, and professional practices across disciplines.

Higher education institutions today are entrusted with the responsibility of preparing learners for a rapidly evolving digital world. In this context, Artificial Intelligence offers immense opportunities to enhance teaching effectiveness, personalize learning experiences, facilitate research, and improve access to knowledge. At the same time, it invites us to reflect on important ethical, social, and pedagogical concerns associated with its use.

The papers published in this volume reflect thoughtful scholarly engagement with these opportunities and challenges. The contributions demonstrate the growing interest among academicians and researchers in exploring innovative applications of AI while maintaining a commitment to academic integrity and human values.

I congratulate the organizers, editors, reviewers, and contributors for their dedicated efforts in making this seminar a success and for bringing out this valuable publication. I am confident that the proceedings will serve as a useful reference for researchers, educators, students, and policymakers.

I extend my best wishes for the success of this publication and hope it inspires further research and meaningful academic dialogue in this emerging field.

Dr. Parag Kalkar

Pro Vice-Chancellor

Savitribai Phule Pune University

Message from the President

The college has continued its tradition of organizing quality national seminars on contemporary and relevant themes in higher education. In February 2026, the college successfully organized a National Seminar on **'Artificial Intelligence in Teaching, Learning and Research'.** The seminar received an overwhelming response from academicians, researchers, and scholars from various states across the country. Participants enthusiastically presented research papers on diverse sub-themes related to the application and impact of Artificial Intelligence in education and research.

The seminar provided an excellent platform for intellectual exchange, discussion, and dissemination of innovative ideas. The quality of the papers presented reflects the growing interest in exploring the transformative role of Artificial Intelligence in academic and research practices.

I am pleased to note that the selected research papers presented during the seminar have been compiled and published in this special issue as conference proceedings. This publication is a valuable contribution to the existing body of knowledge and will serve as a useful resource for teachers, researchers, students, and policymakers interested in the evolving landscape of Artificial Intelligence in education.

I congratulate the organizing committee, editors, contributors, and all stakeholders for their dedicated efforts in making both the seminar and this publication a success. I am confident that this volume will inspire further research and meaningful academic discourse in the field.

I extend my best wishes for the successful publication of this special issue and hope it reaches a wide readership.

Mrs. Nalini Gera

President, Jai Hind Sindhu Education Trust

Message from the Principal

It is a matter of great pride and pleasure to present the proceedings of the National Conference on **'Artificial Intelligence in Teaching, Learning and Research'.** The emergence of Artificial Intelligence has significantly influenced educational practices, creating new possibilities for knowledge creation, dissemination, and academic inquiry. As educational institutions adapt to the demands of the digital era, it becomes essential to examine the opportunities and challenges presented by these technological advancements.

The papers included in this volume represent diverse perspectives and scholarly contributions on contemporary issues in the field. They highlight emerging trends, innovative methodologies, and critical reflections that can guide future educational and research practices. I am confident that this publication will serve as a valuable reference for teachers, researchers, students, and policymakers seeking to understand and effectively utilize AI-driven technologies in academic environments.

I extend my best wishes for the success of this publication and hope that it stimulates further research, collaboration, and innovation in the field of Artificial Intelligence and education.

Dr. Rekha Dilip Chetwani
In-charge Principal
Manghanmal Udharam College of Commerce

Editorial

It is our pleasure to present the proceedings of the National Conference on **'Artificial Intelligence in Teaching, Learning and Research'.** The conference brought together academicians, researchers, and professionals to discuss the transformative impact of Artificial Intelligence (AI) on education and society.

The papers included in this volume explore diverse themes related to AI in teaching, learning, research, management, literature, library services, entrepreneurship, and wellness. They highlight the potential of AI to enhance personalized learning, improve educational outcomes, support research activities, and promote innovation across disciplines. At the same time, the contributors draw attention to important issues such as ethics, privacy, accountability, and the need for responsible use of emerging technologies.

A common thread running through these studies is the recognition that AI should complement rather than replace human intelligence. The effective integration of AI requires critical thinking, creativity, ethical awareness, and continuous professional development among educators and researchers.

The conference reflects the growing academic interest in understanding the opportunities and challenges associated with AI-driven transformation. The contributions published in this volume offer valuable insights for scholars, teachers, students, and policymakers seeking to engage with this rapidly evolving field.

I sincerely thank all authors, reviewers, delegates, and members of the organizing committee for their support and contributions. I hope that this publication will stimulate further research and meaningful academic dialogue on AI and its role in shaping the future of education and research.

Dr. Dnyaneshwar Babulal Shirode

Editor-in-Chief

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Artificial Intelligence in Teaching and Learning in Commerce and Management

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Abstract

This study analyses how Artificial Intelligence (AI) can be included into education of Commerce and Management. AI tools have revolutionized the Traditional pedagogy by improving student engagement, improving personalised learning, and automating administrative work. Recent research provides empirical information about student views, preparedness of faculty, and quantifiable effects on learning outcomes. There was a rapid surge in usage of AI by students with the increase from 64% in 2024 to 90% in 2025 which actually made them self-reliant. The results show a high level of interest but a lack of faculty expertise, as well as good relationships between student satisfaction and the efficiency of learning with AI tools. The recommendations to incorporate AI competencies in management and commerce courses are Programs for training teachers, ethical frameworks, and curriculum revision.

Keywords: *Teaching and Learning, Commerce Education, Management Education, Faculty Readiness, Personalized Learning.*

1. Introduction

Tasks like Patterns recognition, natural language comprehension, and decision-making that have traditionally called for human intelligence can be done by computer systems having Artificial Intelligence (AI). AI's promise in modern education includes automated evaluation, r support research, personalised learning systems, and administrative efficiency, particularly in commerce and management. Expansion of AI was really quick but it still has some concerns related to, teacher readiness, student's results, and successful integration techniques in higher education still exist.

1.1 Background of the Study

With the development of AI technologies, a new era of digital pedagogy has come especially with generative AI such as ChatGPT. AI is being used for helping in designing

curriculum of students, personalising the feedbacks, and data-driven insights for educators and students in both business as well as management environments.

2. Literature Review

AI in Pedagogy and Education

AI-driven instructional content has been tailored according to the learner's pace, his ability and performance, enhancing the student engagement and overall performance of academics. Educators also got support by AI through automatic administrative functions such as generating automatic feedbacks, grading papers, and also with the schedules which further helps faculty members to give more time to instructional design and learner interaction (Chaudhery, 2025; Hegde & Shetty, 2024).

Empirical Studies on AI Adoption

Faculty Perception in India

In Chhatrapati Sambhajinagar City a study was conducted among commerce and management faculty (n = 56) which revealed limited formal training in artificial intelligence, with nearly 80% had no idea about AI exposure. However, further 89% of faculty members wanted to undergo AI-related training and showed strong willingness to do the same.

AI in Higher Education Teaching and Learning

In Indian higher education institutions Quantitative research was conducted (n = 200) which demonstrated a positive correlation between AI adoption and teaching effectiveness, adoption and AI adoption, learner satisfaction, and pedagogical innovation. The findings from the research stipulated that AI improves learning outcomes by supporting adaptive instruction, improving content delivery, and encouraging innovative teaching methodologies. The role of AI in promoting student-centered learning environments was also highlighted by the participants (Chaudhery, 2025).

Generative AI and Student Learning

Studies focusing on generative AI tools highlight their growing influence on student learning experiences. A large-scale survey was conducted which involved 485 college students, which later found out that learners' attitudes toward AI significantly affects the outcomes of the learner.

Student Perception and Ethical Concerns

Mostly, AI is pursued as a very useful for students as it helps them with their academic work as well as personalised learning, but ethical issue is also a very big concern among students. Issues like privacy related to their data, overdependence on technology, and vey less human interaction. These concerns states the importance of responsible AI practices

and implementation of ethical frameworks in higher education which will further ensure transparent and balanced use of technology (Carmi, 2025; Hegde & Shetty, 2024).

3. Methodology

The research presented here blends quantitative surveys and empirical data from several peer-reviewed publications. Among the data sources are

1. Higher education institutions' quantitative institutional case studies
2. Large-scale student surveys on attitudes of AI learning
3. Research on how students see the usage of AI in education.
4. Surveys of faculty in Indian context of commerce education.

4. Results

The results of the study are based on responses collected from a total of 200 respondents, which were postgraduate students and faculty members from commerce and management disciplines. These findings provide insights into readiness of the faculty, student learning experiences, and the overall pedagogical effectiveness of Artificial Intelligence (AI) in higher education.

4.1 Faculty Adoption and Readiness

According to the findings of this research the faculty members which are teaching commerce and management courses were highly aware about the AI and also had a very positive attitude towards it. The majority of faculty members who responders recognised how much transformative potential AI has related to academic delivery, also increasing classroom efficiency and engaging students. In spite of this optimistic perspective, a sizable proportion of faculty members indicated weak technical proficiency and insufficient formal training in AI-based techniques.

Faculty members who responded, amongst them approximately 72–78% of member respondents said that they had not received any proper structured training in how AI is applied in teaching and assessment purposes. Also, almost 85% expressed a strong desire to take up a professional development programs to improve their AI-related competencies.

4.2 Learning Experiences of Students

According to the analysis of students, their responses show an overall positive learning experience with AI-enabled. Many students stated that working with AI has helped them a lot with their academic area. Especially, with the concerns like understanding the concept, preparing assignments, assistance with their research work and support with their personalized learning.

More than 78–82% of students agreed that AI tools helped them a lot with their understanding of complex commerce and management concepts by providing clear and instant explanations with relatable examples. Students also stated how useful AI is in enhancing self-learning and improving academic confidence.

However, there were some concerns related to AI. Like reduction in face-to-face interaction, overdependence on AI, also concerns related to safety of their data and ethical usage.

4.3 Effectiveness of Pedagogy

According to the Study there is a strong positive relationship between integration of AI and teaching effectiveness. Both faculty and students are in the favor of AI and its innovation.

Respondents noted that AI-supported teaching:

- Personalized learning is supported student are encouraged for more participation and more engagement
- Lesson planning and delivery of content are improved
- students are encouraged for more participation and more engagement
- Overall satisfaction for students

Approximately, 80% of the members who responded stated that AI has the capability to reshape the education of commerce and management by promoting experiential learning and curriculum innovation. However, the findings also emphasize that AI should be used as a supportive tool for education rather than a replacement for human instruction.

5. Discussion:

The incorporation of Artificial Intelligence into commerce and management education has resulted in substantial transformation in both teaching and learning techniques. Based on the findings of the study, a SWOC (Strengths, Weaknesses, Opportunities, and Challenges) analysis is provided to critically evaluate the impact and future potential of AI in higher education.

5.1 Strengths

One of the key benefits of AI implementation lies in its ability to improve personalized learning. AI tools can help students according to their pace, their academic performance etc. This personalised approach of AI helps students to learn complex topics of commerce and management easily and according to their pace, which further helps in self-learning. AI applications also further helps in grading the papers with its automated feature, this is AI’s another strength, administrative efficiency.

5.2 Weaknesses

Many educators possess limited knowledge of AI tools, which restricts their effective classroom implementation. According to the study, one of the main and prominent weakness is lack of adequate knowledge of AI tools among the educators, many educators do not possess required expertise and training required for the proper use of AI technology. Additionally, the overdependence on technology which might further reduce in critical thinking and might also reduce the problem-solving skills among students if not properly regulated.

5.3 Opportunities

AI gives notable opportunities for transforming commerce and management education. One of the key opportunities is providing with flexible timing for learning. It also provides continuous professional development for faculty members which further help them to upgrade their digital competencies and align teaching practices with industry requirements. AI also gives opportunities to add emerging topic into the universities curriculum like data analytics, digital transformation which will further help students in employment make them industry ready.

5.4 Challenges

Even if AI has a lot of potential, it has to face some criticism, which further makes its implementation challenging. Both faculty and students have expressed about their concerns related to being overly dependent on technology, further stating that AI has reduced the human interaction in the learning process. Issues related to Privacy and ethics are also a very big concern related to AI. Another critical challenge is making sure that AI is used ethical and in a right way.

6. Conclusion

This research examined the role of AI in amplifying teaching and learning processes in commerce and management education. The faculty members and students, both of them showed a positive attitude toward the adoption of AI tools.

However, the study also shows many difficulties and criticism that hamper the effective implementation of AI in higher education. Teachers being not trained technically and them being not digitally ready too is a big concern. Despite a strong interest is shown for adopting AI tools, not enough support from the institution and very limited opportunities in professional development restrict their optimal utilization. Moreover, there are other concerns related to data privacy, being overly dependent on technology and academic integration further hinders the implementation of AI.

The SWOC analysis further shows that while AI offers meaningful opportunities for curriculum innovation, helping faculty in development, and learner-centric education approach, its success depends on responsible and structured implementation.

In conclusion, Artificial Intelligence holds huge capability to revaluate the commerce and management education by improving the end results and preparing students for the digital economy. However, for AI to be effectively and sustainably integrated, higher education institutions must focus on its ethical use, empowerment of faculty, and learner-centered pedagogy. The research in the future could concentrate on longitudinal studies, discipline-specific AI applications, and the long-term impact of AI on teaching effectiveness and student employability.

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The Role of Artificial Intelligence in Shaping Technology Startups: Opportunities, Challenges and Future Directions

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Abstract

This research elaborates on the importance of the use of Artificial Intelligence (AI), particularly in industries. Artificial Intelligence has been useful for the transformation of the positive force in the startup ecosystem, particularly for working structure, Educational Information, Standardization & structural Process. By considering existing practices to use conventional technologies in Startups, Technology enhancement and the progress i.e. Productivity, Quality, Cost, Safety, Delivery etc. Through the analysis of existing strategies particularly in the small-scale industries in the entire manufacturing areas including machining, sheet metal and Assembling process, the research methodology involves addressing questions related to Current practices, Performance measurements, Manpower Utilizations, Systems, Organizational Cultures, Safety processes, Safety precautions and new technology adopts which give the better idea about the Work, Work Standardization, Product Cost, Market Situation and Financial Stability. Concentrating on Technology and building the smooth & stress-free work culture through integrating standards of the cultural, ethical and motivated things really helps to find out the betterment. The research problem highlights the importance of Adoptions of Technology, Roles of AI to shaping startups & consideration important parameters while defining the Mechanism specially in the startups and revisit the existing & traditional technology in case of established firms. Overall, the research aims to assess the current scenario toward looking at Conventional technology over the improvement through introduction of AI in the startups particularly for shaping excellence in startups.

Keywords: *Artificial Intelligence (AI), Startups, Technology Adoption, Starup Mechanism, Technology Enhancement, Innovation, Automation*

1. Introduction

Through the Globalization moving the things are rapidly which may be related to Industry, Educational Institutes, Environmental, Financial, Agricultural, Human Life, Medical, Infrastructure and many other. Technology is the prime and its very essential parameters in an industry. Technology excellence creates the multi directional benefits of an Organizations through the Productivity, Quality, Cost, Safety, Delivery & Motivation. The base of **AI** (Artificial Intelligence) is Records & data. Through the analysis & evaluation of the records & data we will get better ideas for generating motivating & encouraging work environment which is the key to attraction of employees towards the employment industry. To state the role of AI in the Industry is the uncountable, as now a days scope has been increasing and the functional use of the AI based modern technology has been drastically increased. The use of AI particularly in startups will be always beneficiary in sustainable growth, enhance capacity, enhance excellence, boost innovation capabilities and change the strategies based on market behaviors. Through the **AI** ecosystem strategic changes will be easier to understand the upcoming challenges, take proactive actions to resolve the upcoming issues, analyze the market condition, and better forecast by considering the demand, choice, product, cost and functions. AI will be worked as a baseline platform and an important role in any kind of manufacturing process. To increase the working atmosphere, implementation of automation & increase level of excellence on the shop floor the process & layout design, development AI will play a vital role. In the manufacturing process, there are several critical challenges that occurs day by day in terms of Dimensional errors, Accuracy, Quality, Aesthetical issues and fit for functions etc. Such a Challenging & Excellent working culture is one of the main mottos of every organization. There is always having positive interrelationship between Operational Excellence & organizational culture. This research helps to highlight the startup leverage for betterment to achieve the desired sustainable growth, enhancing innovative capabilities through better judgement of forecasting according to market change. Ultimately, this research contributes to understanding the role of AI for the shaping of technology in the startups through the terms of Challenges, Opportunities to get better direction for the future.

2. Need for the Study:

2.1 Operational Efficiency: Operational efficiency is one of the most important parameters in any industry. The main objective of operations management is to increase, maintain, and monitor operational efficiency at the desired level. To achieve this, organizations need to adopt appropriate and required technologies and continuously improve their operational processes. Maintaining operational efficiency also requires enhancement of organizational capability and the

establishment of a well-managed organizational culture. To increase efficiency and productivity, organizations must maintain an excellent work environment and focus on continuous improvement. The adoption of advanced technologies, especially with Artificial Intelligence (AI), work as an important element in improving operational efficiency and achieving sustainable performance.

2.2 Decision Making: To evaluate the requirement of the advanced technology adoptions, Automations, Process & system excellence through the enhancement of the internal working environment by analyzing market situation, demand forecasting, investment, motivation, trainings, Rewards, recognition and employee satisfactions through implementation of ideal work culture. By considering the current facts, quality requirements, demand forecasting, the role of AI is much more important in the listed cases, namely, Investment Decision, Market Situation, Demand Forecasting, Adoptions of Advanced Technology, Cost Optimization, Plant Expansion, Identify need for training, Finalize the Strategies, Designing the Policies and Build the Capacity

3. Research Methodology:

3.1 Research Questions:

- What is the role of AI to analyse existing scenario to take the decision to adopt advanced technology in the startup?
- What are the focused elements while considering the role of AI to increase the operational efficiency in the startups?
- How can AI help to get ideas about the demand & market forecasting?

3.2 Research Problem:

Assessment of the existing literature to find out the existing approach towards analyzing and evaluating the role of AI while adopting Advanced Technology, enhancement of the operational excellence practices while consideration of efficient working culture, safe & motivated work environment with desired productivity. In startups at present very few focus on Advanced Technology, Process excellence, Safety, Safe working culture, Productivity, Quality and build motivated work culture. There is having **lack of focus on Process Excellence** in the small-scale industry. The challenge lies in enhancing advanced systems & mechanisms will be little bit costly initially. The question is how can we convince the introduction of Advanced technology at the initial phase of the startups? Also, Current factory layout design in small-scale industries is done through limited focus on the demand forecasting, safety, technology enhancement etc. Here question is what are the essential factors which need to be considered for increase the Operational Efficiency using AI?

4. Research Objectives:

1) To Assess existing literature to understand the current practices while technology enhancement in the startups and small-scale industries
2) To describe role of AI in shaping technology in startups.
3) To find out the inter-relationships between Technology Excellence & demand forecasting through use of AI.

5. Literature Review

Through the review of the existing literatures analyses & evaluations the current technology adoption approaches in the startups are,

KPMG (2018) elaborated about the "India Trends 2018: Trends Shaping Digital India". In this report explained thoroughly about the Internet & e-commerce business opportunities through the application of the Internet. The focus on this research is on e-business and virtual advertisements by using the advanced tactics to increase sales & the customer base. There are various factors are work as a driver for the growth in terms of economical, transactional, logistical, warehouses and automation.

Bouwman (2018) explored the importance & impact on the Digitalization in his research paper i.e. The Impact of Digitalization on Business Models. In this study focuses on how reconsideration of business models contributes to their innovativeness and business performance. In this research, it concluded that with use of digital platforms like social media, online Marketing, globalization, faster communication, better advertising, there is positive result will be achieved with the desired level of performance & targets.

Rao (2016) described management and transformation through using ideas like big data. In this research the author has suggested using data from social networking sites to establish several different business concepts. Through this research study a strong focus on the contribution & value of using social media sites, software capabilities for better business performance & efficiency. The author concluded that the use of technology is always better to understand customer preferences.

Eksell & Harenstam (2017) explained in the research of Business Model Innovation for a Digital Future regarding the digital business model and highlights the benefits and challenges that a business faces while adopting a digital business model. In this research focused on digitalization, its present & future impact on the business. Due to the digitalization, there is positive impact on the business performance and on the decided

KPI's. There is identified scope of improvements related to new and innovative job prospects in terms of Technology, Challenges & Opportunities.

Data Base:

Through the reviewing of the existing literature, it's stated that, the use of Technology, Automations and Digitalization's are adopted most of the organizations that are already established. The data below focuses on the current limitations and the scope of future improvements to elaborate the Role of AI in an Industry.

Sr. No.	Key Parameters	Conventional Method	Impact
1	Technology	Use of Existing, Conventional Machines / Concepts	Losses in Productivity, Increases Cost
2	Area	Non-standard working Approach, Limited use of digital platform	Inadequate Work Area, Safety issues, Impact on Space Productivity
3	Quality	Conventional Work Set up, Lack of advanced Quality Instruments	Higher rejection, Customer Dissatisfaction, Cost of Poor Qualities
4	Cost	Process Time is more; Manufacturing cost is higher	Comparatively higher cost, Impact on Delivery
5	Delivery	Higher Process time due to conventional working structure	Delays in Delivery
6	Culture	Lack of Trainings, Lack of adherence of Policies, Conventional working style	Demotivated Woking culture
7	Moral	Dependencies on Manual skill	Uneven workload, Impact on utilizations
8	Marketing	Conventional Methodologies, Older Marketing style	Less response, impact on Reputation, Less Orders

Table 1

(Source: Existing Literature Review – Gap Analysis)

6. Findings:

a) **Cost Reduction:** From the evaluation of existing related literatures, it comes to know that there is limited use of technologies & online platform for the upgradation of

existing setup, enhancement of technology, adoption of new concepts etc. Here the role of AI enables predictive maintenance, automation, waste reduction, which helps to lower operational costs, minimizes downtime, and optimizes resource utilization.

b) **Foster Innovation:** Through the review of existing literature, it has been observed that there are delays for the decision to Adoptions & Implementation of advanced technology, Automations, Innovative ideas. In other side AI explores in the different Innovative verticals that are product design, process optimization, and decision-making through simulations, data analytics, and machine learning, significantly reducing development cycles.

c) **Sustainable Startups:** Through the analysis of existing literature, it has been concluded that there is an almost 90% failure rate of Startups due to the different reasons these may be related to technology, skill sets, automation, financial stability, Market flotation, lack of knowledge and the lack of training. The base of all these failures is limited focus on Technology, Operational Excellence, Productivity, Cost, Quality, Employee motivations, Trainings & development, new part introduction, Employees – Rewards & recognition etc.

7. Recommendations:

a) TECHS Principle: To build the robust work atmosphere with the AI techniques TECHS principle will be usable in terms of Machine Learning, Predictive Analysis, Data Analysis, Data Processing in the case of Start-up ecosystem.

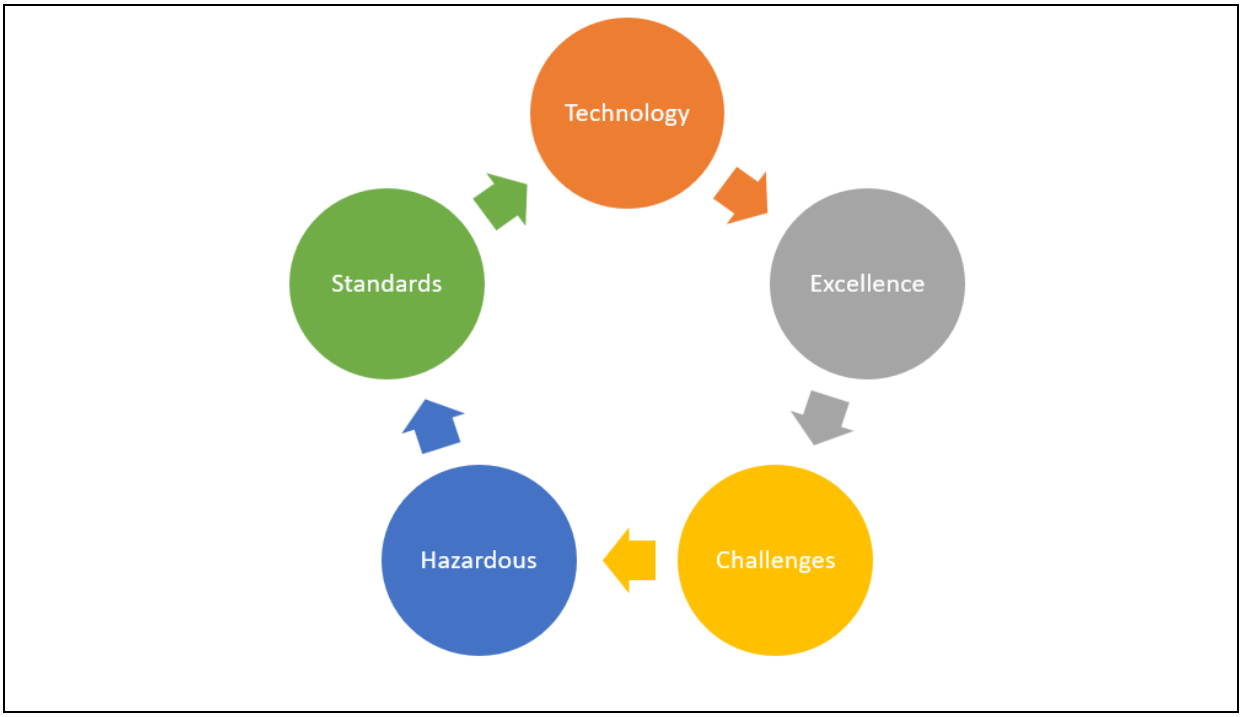

Chart 1

(Source: Existing Literature Review – Gap Analysis- recommendations)

By consideration of **TECHS** principle while development of Startup Ecosystem with AI, the following listed positive things will be done to increase the Operational Efficiency & Overall performance of those organizations.

1) Strategic decision will be done to adoption of new advanced technology
2) Through the BEP (Break Even Point) analysis – **RoI** will be calculated
3) Robust factory layout design
4) Demand forecasting to be analysed
5) Market Floating situation to be considered
6) Upcoming challenges to be noted
7) Considered Safety & Hazardous through priority while designing Layout
8) Work Standardization to be made
9) Periodically Learning & Development activities to be conducted
10) Sustainability to be monitored

Using **TECHS** principle particularly in startups, it will be beneficial to get the desired results in the terms of,

- Requirement of Capacity Enhancement
- Necessity of Technology Enhancement
- Desired Production Output
- Desired Quality
- Optimum Cost
- Work Standardizations
- Financial Stability
- Return On Investment

b) R-C-O Framework (Risk–Cost–Opportunity Framework): To analyse the Risk, Cost and Opportunities in the new development or initial stage of startups, the R-C-O framework will be helpful. In this framework, multidirectional thoughts are described related to Risk, Cost and Opportunities.

Through risk analysis, we can identify potential hazards, system failures, possible risks and the scope of improvements to strengthen the entire process. Using AI, it becomes easier to predict and identify the current gaps based on similar conditions occurring in other startups.

Another important factor is Cost. Ideally, in the initial phase of a startup, cost is a very important and impactful factor. In this case, through AI it becomes easier to predict **BEP**, **RoI**, fund requirements, real benefits and current trends. After a multidirectional view, strategic decisions can be made.

The important feature of this framework is Opportunity. Opportunity means nothing but the scope of improvements. Through gap analysis of different processes and concepts, we can easily identify the further scope of improvements, feasibility requirements and new benefits after implementation. Using AI, we can find improvements in the process system such as automation needs, adoption of technology, enhancement of capacity, training needs and strategic decisions. In the R-C-O framework it is clearly indicated that the Positive Inter-relationships between Risk, Cost & opportunities with each other.

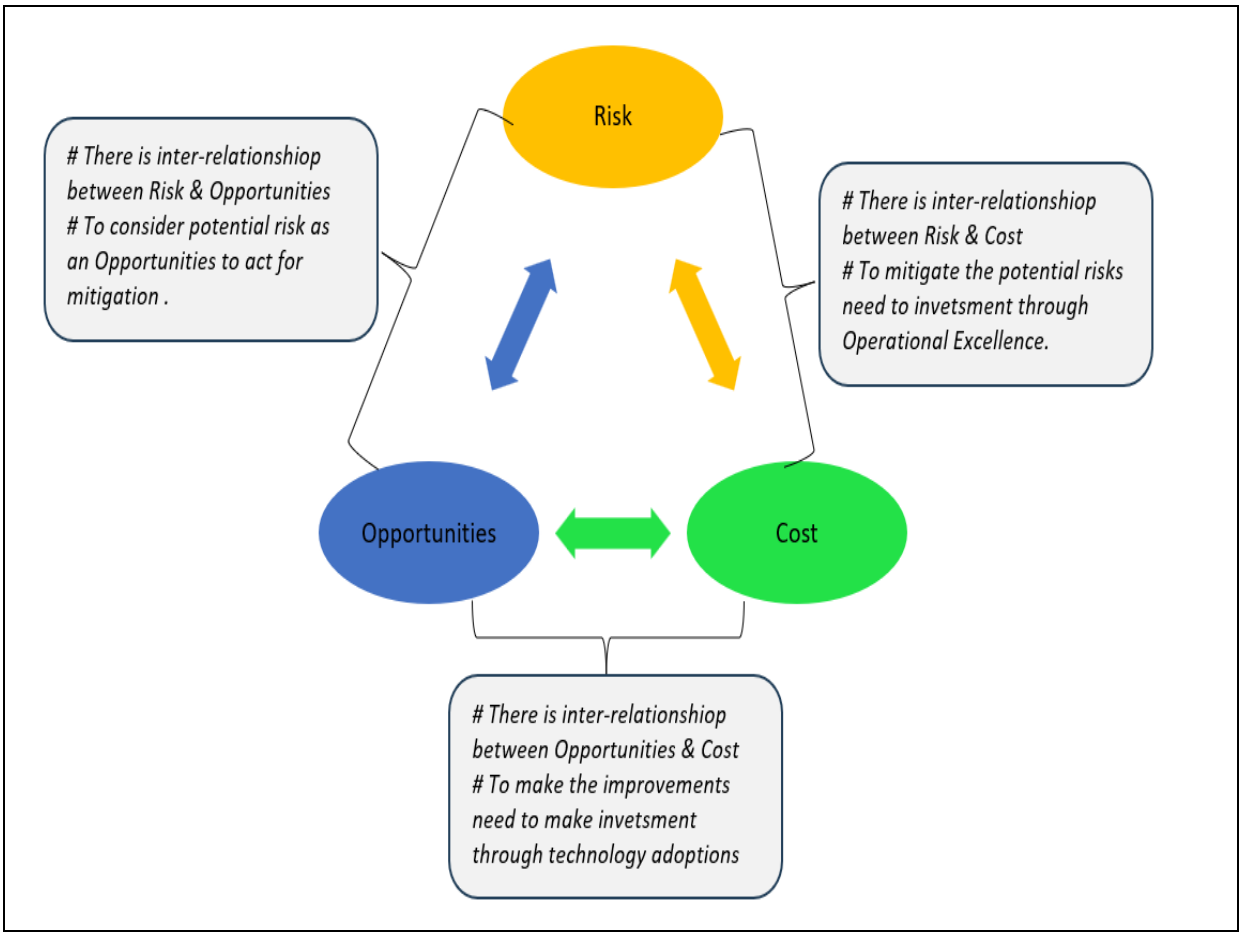

Chart 2

R-C-O Framework

(Source: Existing Literature Review – Gap Analysis- recommendations)

In short, the **R-C-O** Framework is not only usable to address related to Risk, Cost & Opportunities but also helping to take the strategical decisions for the implementation of different projects, technology adoptions, technology enhancement etc. Through this framework management can get structural and crystal clear though about the upcoming projects with the level of implementation strategies with different feasible options.

8. Conclusion:

As per the current database, it shows that around **90%** of failures in the startup ecosystem occur due to several reasons. Most startups fail due to lack of technology adoption, lack of technology integration, wrong strategic decisions, poor management strategies and lack of skill development and enhancement.

To overcome these problems and transform failure into success in the startup ecosystem, there is a need to predict the market in advance related to market fluctuations, market requirements, quality aspects and predictive systems. There is also a need for development of systems, enhancement of capacity and increasing competency, and to explore the market through high-tech advancements.

Ultimately, in this research, we can formulate the R-C-O principles which will always help promoters to analyze risk, cost and opportunities by adopting technology, building strong processes through continuous improvement, predicting challenges in advance, identifying potential hazards and safety points, making standardized systems, proper digitization and avoiding wrong projections to increase operational efficiency.

Also, through the **TECHS** principle it gets more clarity about Technology, Excellence, Challenges, Hazardous & Standardizations in the prospectus of the startups, new venture development, Capacity building, Technology Enhancement, Technology Know-How, New process development etc.

Through the R-C-O framework, managers of startup enterprises can predict multiple factors related to **Risk, Cost and Opportunities**, which will be helpful to understand the required actions and to develop a sustainable work environment.

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Organisational Culture and Task Performance: Examining the Mediating Role of Employee Engagement

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Abstract

The current socio- economic scenario has led to stress on organisations and their employees, due to which they are expected to, double their efforts with resources. It has been observed that employee engagement and organisational culture is directly or indirectly linked with performance. Organisational culture is the core competency for an organisation, and it will impact the performance of the individuals. Employee performance is a critical concern for public sector banks, which operate in a highly regulated and competitive environment. The purpose of the present study is to examine the relationship between organisational culture and task performance, with employee engagement action as a mediating variable. The Study adopts a quantitative research design where data were collected from employees of public sector banks using a questionnaire based on standardised measuring scales.

Keywords: *Organisational Culture; Employee Engagement; Task Performance*.

1. Introduction

The Banking Industry is a major service industry in India. The banking sector plays a vital role in the economic development of India by facilitating financial inclusion, credit expansion, and economic stability. In today's competitive business environment, organisations are increasingly focusing on improving employee performance to achieve sustainable growth. Employee performance is a critical concern for public sector banks, which operate in a high reglated and competitive environment. Employees are seen as

part of an Organisation that are involved in the organisation day to day actions to ensure that the organisation continue to survive or exist (Abdullahi et al. 2020: wambugu.,2014). Wambugu (2014) claimed that employees are vital component of an organisation, and organisation success depends on employee performance.

Organisational culture represents the shared values, norms, and practices that guide employee behaviour within an organisation. An Organisation overall performance is higly dependent on employee performance via employee engagement (Ganyan, 2019).

In line with that, each Organisation is in business to male profit, so the organisation ability to earn more profit and maintain a competitive edge is decided by a concerted engagement effort of employees of organisation (Dobre, 2013). Moreover, May et al. (2004) conveyed EE as the mixture of emotional and cognitive job as well as Work related Interaction that make an employee behave while doing a job.

For banks, Organisational culture is ubiquitous and powerful; it is a Catalyst for progress. Organisational culture therefore has the power to affect Employee performance through employee engagement as it empowers employees to act genuinely at workplace (Saks, 2006). Social exchange theory (SET) explains the phenomenon between Organisational culture and employee engagement (Sak, 2006)

The nature of the whole relationship is interesting and significant, despite the number of studies over the past few decades, it is empirically proved that numerous studies on the effect of effect of organisational culture on employee performance through employee engagement has yielded mixed outcome which are uncertain and inconsistent. Therefore, the question of whether Organisational culture influence employee performance through employee engagement is still worthy.

2. Literature Review and Hypothesis development

2.1. Organisational culture and employee performance

According to Stewart (2010) organisational culture principles and values have a significant effect on workers that are explicitly or implicitly affiliated with the organisation. Researchers have concluded that norms or expectations are intangible but have a significant effect on employee performance and productivity (Shahzad, et al.2013). A study performed by Zehra et al (2020) revealed that each employee has a range of personal needs and therefore any given organisational culture may or may not satisfu or match some specific need, further emphasize that individuals are more satisfied in organisations where their right and needs are met than those organisation where their right and needs are not met. Empirical studies conducted by shahzad, Iqbal and Gulzar (2013), Wambugu (2014), Imam et al (2013), Shahzad (2014) on different Field of studies revealed that Organisation culture significant influences on employee performance.

SET is used to support the relationship between Organisational culture and employee performance, whereby if employee of an organization is offered with a fair culture, the employee will be satisfied and reciprocate by putting more effort in his/her work in order to achieve positive result that will boost the organization performance as well (Blau, 1964). On the basis of the stated theoretical support, we hypothesize as:

H1: Organisational culture has significant effect on task performance.

2.2. The mediation role of employee engagement

In the study conducted by Mensah (2015) employee engagement appears to be a clear motivating factor for success. Effective organisational culture have positive influence on employee performance (Wambugu 2014; Mohamed and Abukar, 2013; Shahzad, 2014). Similarly organisational cultures have positive influence on employee engagement (Wambugu 2014).

Furthermore, Employee Engagement has positive influence on employee performance. A number of studies have found that engagement mediates the relationship between job resources and work outcomes. Schaufeli and Bakker (2004) found that engagement mediated the relationship between job resources and turnover intention. Sakes (2006) found that job and organisation engagement mediated the relationships between several antecedents (e.g., job characteristics) and work outcomes (e.g. job performance). Tensay and Singh (2020) established that employee engagement enhances job performance. The high level of employee engagement among employee's results in a positive evaluation of task and contextual performance of employees (Bakker et al., 2007). Therefore, the following hypothesis is established on the basis of empirical evidence and Theoretical support:

H2: Employee engagement mediates the relationship between organisational culture and Employee task performance.

2.3. Research model and theoretical foundation

Following a thorough review of literature on employee engagement, performance and organisational culture, the following theoretical framework was developed in Figure 1.

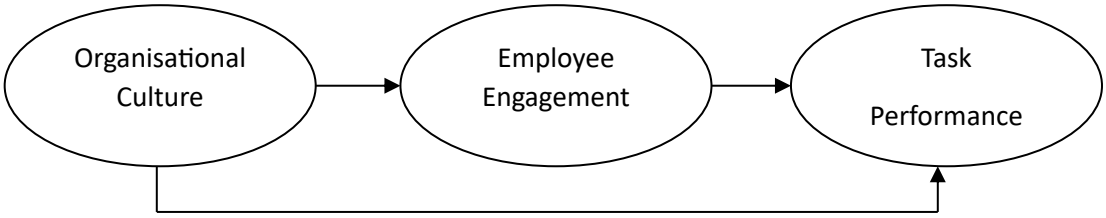

Figure 1 Model

3. Methodology

A quantitative research design was used in the present study. The data were collected through a structured questionnaire from employees of public sector banks across the northern region of India. In this survey, a questionnaire was distributed online amongst the public sector bank employees in the northern region of India. A total of 126 participants responded to the questionnaire. The present study utilized the Statistical Package for Social Science (SPSS) for the analysis.

3.1. Measure

The study consists of 3 variables, Employee engagement was assessed with the UWES of Schaufeli et al. 2002 was shortened to nine items by Schaufeli, Bakker, and Salanova's (2006), and was used to measure work engagement. Sample items included: "When I get up in the morning, I feel like going to work (dedication)," "At work, I feel bursting with energy (vigor)," and "I am immersed in my work (absorption). Participant's responses were given on a five – point likert scale ranging from 1(never) to 5 (always). Organisational Culture was assessed with Widerom and Vandernberg (2004). The Scale consisted of five dimensions of *Autonomy*, *External Orientation, Interdepartmental Co-operation, Human Resource Orientation and Improvement Orientation*. Work performance was measured by the IWP questionnaire developed by Koopmans et al. (2012). The bank employees were asked to rate their organisational culture on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). Reliability (internal consistency) among the items was also assessed through Cronbach's Alpha (α). The result showed that Cronbach's αfor TP was 0.921, Cronbach's α for EE was 0.871, while Cronbach's α for OC was .920. This demonstrated that the instruments are accurate since the Cronbach's α are all above 0.70 as recommended by Hair et al. (2010).

3.2. Data Analysis

A Pearson correlation was conducted to test hypothesis 1 and examine the relationship between organisational culture and task performance among employees (N=126), and the results of the test are given in table 1. The result indicated a weak positive correlation between the organisational culture and task performance, r =.263, p=.003. As the p- value is less than .01, the relationship is statistically significant. Therefore, the Hypothesis H1 is accepted.

Correlations			
		ORG CUL	TASK PER
ORG CUL	Pearson Correlation	1	.263**
	Sig. (2-tailed)		.003
	N	126	126
TASK PER	Pearson Correlation	.263**	1
	Sig. (2-tailed)	.003	
	N	126	126
Table 1 **. Correlation is significant at the 0.01 level (2-tailed).			

A mediation analysis was done to determine if the relationship between organisational culture and task performance of employees is mediated by employee engagement using PROCESS Macro Model 4 (Hayes, 2022).

Results showed organisational culture was a significant predictor variable for employee engagement, $\beta = .588$, $t = 5.963$, $p < .001$, accounting for 22.3% of the variance in employee engagement, $R^2 = .223$. With both organisational culture and employee engagement as predictors of employee performance, it was found that employee engagement would significantly predict the performance, $\beta = .343$, $t = 4.293$, $p < .001$, while the effect of organisational culture would be non-significant, $\beta = .082$, $t = .827$, $p = .410$.

Concerning the analysis by bootstrapping, where 5,000 samples were used, the analysis showed that the indirect effect of organisational culture on employee task performance through employee engagement was statistically significant, as the confidence interval didn't contain zero, Effect = .202, 95% CI [.068, .347].

These findings demonstrate that employee engagement fully mediates the relationship between organisational culture and employee performance. Thus, Hypothesis 2 is confirmed.

Table 2

Mediation Effect of Employee Engagement on the Relationship between Organisational Culture and Employee Performance

Path	β	SE	t	p	Result
Org. Culture → Employee Engagement (a)	.588	.099	5.963	.000	Significant
Employee Engagement → Performance (b)	.343	.080	4.293	.000	Significant
Org. Culture → Performance (Direct, c')	.082	.100	.827	.410	Not Significant

Indirect Effect (Bootstrapping)

Effect	BootSE	LLCI	ULCI	Mediation
.202	.073	.068	.347	Significant

4. Discussion

The proposed hypothesized hypothesis 1 suggested that *Organisational culture has a significant effect on task performance*. The study outcome Table 1 indicated that Organisational Culture has a significant effect on Task performance. The finding implies that Organisational Culture is one of the factors that determine performance among public sector banks. This implies that a value-based, supportive organisational culture is likely to influence better employee performance in task execution. This is because when employees feel a sense of shared values and a supportive work environment, they are likely to execute their roles in a manner yielding better performance outcomes. However, the explanatory power of organisational culture was relatively low ($R^2 = .069$), and therefore it was shown to explain just 6.9% of the total variance in task performance.

The hypothesized hypothesis 2 narrated that Employee engagement mediates the relationship between organisational culture and Employee task performance. The study outcome in Table 2 indicated that employee engagement fully mediates the relationship between organisational culture and task performance in public sector banks. In this research, organisational culture is a good predictor for employee engagement, and at the

same time, employee engagement significantly predicts task performance, but the direct effect of organisational culture on performance became non-significant.

5. Conclusion

The aim of the present study is to investigate the effects of organisational culture on employee performance, as well as to explore the mediating effect of employee engagement in the public sector banks in India. The findings also revealed that employee performance mediates organisational culture and the employee performance relationship.

More importantly, it established the mediating role of employee engagement in the culture– task performance relationship. An organizational culture significantly enhanced employee engagement, leading to improved performance by employees.

Given the nature of the business of public sector banks in India, which often functions within rigid structures, formal hierarchies, and policy-driven environments, the challenge of building employee engagement is imperative. A positive organizational culture will work to overcome bureaucratic inertia, enhance morale, and help employees provide quality service despite operational constraints.

The study sums up that public sector banks need to look beyond the structural and procedural reforms and zero in on building a motivating organisational climate. The current research contributes by improving the body of knowledge in the focused domain and also expands established literature based on the relationships between organisational culture, employee engagement, and task performance. Therefore, the management of a Bank or the policymaker needs to shape and develop corporate cultures that are more conducive to the staff and to the bank's setting toward the realization of bank's mission, values, and long-term strategic objectives. Finally, the management of the bank should note that employee engagement completely mediates the relationship between Organisational Culture and Task performance. Based on that, the management of banks should invest in OC that can enhance EE to achieve full positive performance from the staff.

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A Study of the Role of AI in Learning: Perspectives From Commerce and Management Students

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Abstract

The Role of AI is increasing in Education field due to fast transforming technologies of the 21st Century. Commerce and Management Students are influenced and using AI tools for analysing data, financial management-models, marketing, HR, operational research and also using in academic research. Students are also reshaping their learning methodologies, decision making skill development by using AI. The Research paper is based on secondary data and explores defining the role of AI in education field and finds out its importance in learning prospectives of Commerce and Management Students. The Study aims to express the AI conceptual definitions, features, usage, benefits and its challenges in Commerce and Management field. It focuses on the use of AI in personalised learnings, Skill development, Professional preparedness. It concludes that importance of AI is increasing among Commerce and Management students due to its speedy problem-solving skills which is required for decision making in Business and it also help Students in their academic performances and preparing them to enter in fast growing technological global economy with confidence and knowledge though requires to check its authenticity, dependency concern along with ethical practices need to be addressed.

Keywords: *Artificial Intelligence, Learning, Commerce and Management students, academic performance, decision making, business*.

1. Introduction:

Technological advancements are affecting all sectors rapidly including educational field. It's altering the structure of Education field with innovative technologies like Artificial Intelligence (AI). AI is a revolutionary force which is redefining Teaching and learning process in Education. "AI is nothing but the ability of machines to simulate Human Intelligence processes like learning, reasoning and problem solving". Machine learning algorithms, predictive data analysis, intelligent tutorials systems, etc has integrated in educational environment.

Commerce and Management education is experiencing the major transformation due to AI adoption in this field. This field is majorly depended on data Analysis, forecasting, financial modelling, marketing Analytics, Strategic decision making.AI tools like ChatGPT, Business simulation Modules, Predictive analytics, AI based accounting systems are helping students to understand the complex concepts in easier ways and its usage in real world. Understanding the definition and conceptual framework of AI in learning is essential to evaluate its impact on academic development. This paper gives a definition-based analysis of AI learning and see its significant role from perspectives of Commerce and Management.

2. Objective of the Study

1. To know the conceptual understanding of AI
2. To analyse the use of AI in Learning prospectives of students
3. To understand the use of AI in Commerce and Management
4. To explore the challenges, risk, potentials of AI Learning prospectives of commerce and management students.

3. Methodology:

This paper based on secondary data and collected through the academic resources, books, research publications, articles on AI and AI driven reports of companies to showcase Comprehensive scenario of AI learning Prospectives of Commerce and Management Students

4. Definitions of Artificial Intelligence

The Oxford English Dictionary defines Artificial Intelligence as "the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and language translation."

Russell and Norvig (2021) define AI as "The study of intelligent agents that perceive their environment and take actions to maximize their chances of achieving specific goals." According to **Kaplan and Haenlein (2019),** AI refers to "A system's ability to interpret external data correctly, learn from such data, and use those learnings to achieve specific objectives through flexible adaptation."

In the educational context, AI can be defined as: "The application of intelligent computer-based systems that simulate human cognitive functions to enhance teaching, learning, assessment, and academic decision-making processes."

Definition of AI in Learning

AI in learning can be defined as "application of intelligent computer systems into educational systems to support, improve and personalize the educational experience of students through data analysis, automation in administrative tasks, interactive technologies, provide real time feedback and enhance academic performance."

For Commerce and management students, AI helps them business data analysis using data tools, financial forecasting through predictive algorithms, Market Research and analysis through machine learning models, data interpretation, Automatic Report generation, Academic report writing Support.

So Artificial Intelligence in Learning can be defined as its technological driven educational approach that uses intelligent algorithms and data analytics to automate, improve the personalized academic experience of students of their interest.

Learning Theories: AI facilitates learning foundation to students through different ways and it's supported by several **learning theories** like

Constructivist Theory- AI tools help students to construct knowledge through simulations, case studies, interactive problem solving

Cognitive Learning Theory: AI enhances memory retention and conceptual clarity through adaptive learning platforms

Behavioural Theory: Automated quizzes and its immediate answers boost positive learning behaviour among students

Experiential Learning Theory: Management Students uses Business simulation Software to experience real-time decision-making scenarios.

5. Features / Characteristics of Artificial Intelligence in Learning

- Personalization-AI provides contents based on students' performance and learning speed,

- AI Automates administrative tasks required to learn by students in real life,
- it gives adaptive learning as per individual learning pattern,
- AI systems learn from students' interactions and improve their future recommendations which will help students for continuous improvement in specific field.

Benefits of AI in Learning

Improved conceptual clarity, Faster assignment completion, Enhanced research capabilities, Greater academic engagement, Increased technological competency, Preparation for AI-driven corporate environments

6. Use of Artificial Intelligence in Commerce and Management

The era before AI was time consuming process in business. Its significant use helping in fast decision making in commerce and management field. AI is integrated in business and management in various ways as in form of machine learning, NLP(Natural Language Processing), Computer vision, robotics. AI applications such a predictive analytics, automated customer service, decision support systems have proven impactfulness in commerce and management.

In commerce also, both online and offline used AI application like Personalized shopping experiences through AI driven recommendations systems, the retail Industry uses AI to optimize supply chain, improve their customer engagement and enhance product recommendations for e.g. Amazon, Alibaba (Kaptan & Heaenlein 2019)

In E-commerce, AI supports in demand forecasting, pricing models, personalized marketing strategies, all helps in contributing increased efficiency and customer satisfaction.

AI Plays a significant role in management in decision making process, data analysis and process automation. AI systems analyze vast data like to predict market trends, asset risks and optimizing future profits.

AI driven automation is reshaping HRM for recruitments, Performance Evaluation, work force planning, scheduling., can assess candidates resume, predict employee turnover and even recommend personalized training programmes based on performance data.

Following AI based tools can help students in commerce and management to strengthen their learning in this field

a) AI writing Assistants like ChatGPT and Grammerly assist in Report writing and academic documents.

b) Business Analytics Software- AI powered software analyse large database for financial and marketing insights

c) Predictive Modeling Tools- Used for Forecasting sales, stock prices and business trends

d) Intelligent Tutorial Systems- provide subject specific guidance in accounting, finance and management

e) AI based Learning Management Systems offers performance tracking and adaptive course recommendations

7. Role of AI in Commerce and Management Learning

AI is majorly helping in learning in all fields of commerce and management. AI enhances academic performance. It simplifies complex statistical and financial concepts and improves understanding. It strengthening Analytical Skills- AI based tools helps students' interpretation of business data efficiently. It helps students in Literature review, idea generation, citation forming, Simulation software allows students to practice managerial decision making. AI tools reduce time spent on manual calculations and data processing

8. Challenges and Ethical Concerns

Students may rely excessively on AI for problem-solving, AI-generated content may encourage plagiarism, it may sometimes provide incorrect information, Continuous AI assistance may weaken independent reasoning skills, Data Privacy Concern**-**Student data may be exposed to security risks.

9. Perspectives of Commerce and Management Students

Makes learning more interactive, Simplifies complex accounting and finance problems, Assists in project preparation, Improves business analytics skills, Increases digital literacy However, some students express concerns about reduced originality and dependency.

10. Implications for Higher Education Institutions

Educational institutions should provide AI literacy training, establish ethical usage guidelines, integrate AI into curriculum responsibly, encourage critical thinking alongside AI usage and promote research on AI applications.

11. Future Scope of AI in Learning:

The future of AI in education includes fully adaptive learning systems, AI-driven career guidance, virtual reality business simulations, automated skill assessment and smart classrooms. AI will likely become an integral component of higher education globally.

12. Conclusion

Artificial Intelligence is transforming the landscape of educational environment in Commerce and Management field. From the perspectives of Commerce and Management students, AI serves as a powerful educational tool that improves understanding and performance. However, ethical concerns, over-dependence, and critical thinking challenges must be addressed through responsible usage policies. Institutions must ensure that AI supports rather than replaces human intelligence and creativity.

In conclusion, AI in learning represents a paradigm shift in higher education. When used responsibly, it can prepare Commerce and Management students for leadership roles in an increasingly digital and AI-driven global economy.

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A Study on Speculative trading and Risk Perception among Gen Z Investors in the Indian Equity Market

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Abstract

The entry of to-use digital brokerages has attracted another generation of Gen Z in the Indian equity market. The paper is an investigation into the trading behaviour and risk perception of Gen Z investors with the view of exploring how they invest the risks they take and how the behavioural forces influence their decision-making. A structured questionnaire was used to collect primary data of 102 respondents in Pune with the help of a design. Findings indicate to high levels of speculative trading where many players are seeking short term gains. A significant portion is not afraid of making bets of greater risk and a small proportion is concentrated on capital preservation-leading to a risk profile. Media and FOMO, overconfidence and emotional response to losses are all behavioural drivers that have an apparent impact on trading decisions. The risk-management tools are well-known, but not practiced disciplinarily. Concisely, risk perception is core to the behaviour of Gen Z and there is an apparent necessity to reinforce financial education and more consistent investment practices.

Keywords: *Speculative Trading, risk perception, Gen Z investors, behavioural bias, Indian Equity Market, Investment Behaviour*.

1. Introduction

The Indian stock market has transformed quickly. It is so easy to trade with platforms such as Zerodha, Groww and Upstox now. Generation Z/ Gen Z are natives. Their like of derivatives and short-term speculative plays are greater as compared to groups they like direct equity. In this research speculative trading refers to the process of buying and selling in order to get a profit out of short-term price fluctuations and not buy to appreciate over the long-term. This typically represents intraday trades, options and futures and

momentum-based stock selections in India. Risk perception influences whether one is inclined to speculation or not. To Gen Z, that image is mediated through platforms, online communities, influencers and breaking headlines. There is increased entry of young traders in the market. It is important, therefore, to research Gen Z behavior when it comes to speculation and risk perception.

2. Review of Literature

a) Trading Is Hazardous to Your Wealth: Individual Investor Performance in the Common Stocks. Brad M. Barber & Terrance Odean (2000) demonstrates that overtrading is damaging to investment. Trading is caused by overconfidence and ineffective risk assessment. Active traders do not perform well in the market.

b) Finfluencer. Gen Z Investment Behavior. International Journal of Economics and financial management (2025). This paper establishes that social media influences the perception of risk and speculative decisions of Gen- investors. The community norms and social influence augment trading.

c) Behavioural. Decision Making in Indian Stock Market in relation to investment. N. D. Reddy et al. (2026) This paper finds prejudice of Indian investors. Biases are moderated by financial literacy and experience in the speculative trading.

3. Methodology

Primary Objective: To examine the investment behavior pattern and speculative trading behavior of Gen Z investors.

Secondary Objectives: To investigate the risk perception, as well as the impact of behavioral biases on the speculative trading decision-making among Gen Z investors.

The research was done in Pune involving 102 respondents. The sampling was Non-Probability Convenience. A questionnaire was used in collecting primary data.

4. Discussion and Analysis

Gen Z is represented by most of the respondents (43.1) in 2003-2005. Female investors (63.7) have been included in the sample. Majority of the respondents (84.4) are postgraduates or undergraduates. Over half (52.9%) are students. Nearly half (47.1%) are investors. Investment channels are stocks (61.8%) and mutual funds (49%). There is a high percentage (37.3%) trade. The common ones are long-term investing (28.4%) and speculative trading (24.5%). Majority of the respondents (76.5 76.5) invest 25 percent or below in speculative trading. Investment decisions are highly affected by news and social media (28.4%). Majority (65.7) use stop-loss occasionally or frequently. Behaviour is highly influenced by social media (54.9%). FOMO has a moderating effect on trading decisions

(42.2%). A large number of them engage in term speculative trading (53.9%). Others are trading behaviour (33.3%). Many of them are fond of high risk (40.2%). Many rely on trends (43.1%). Majority of the traders are close to their investments (51%). There are those that do not give up when they make losses (39.2%). There is long-term risk tolerance in respondents (51%). A large number of them are confident with knowledge of risks (49%). Losses have high emotional effects (50%). Others embrace risk-management (46%). Many of them (41%) are ready to risk in order to earn higher returns. Protecting capital is an important concern to 49%. There are mixed responses concerning patience when there are short term losses. Some respondents are observed to be having a high-risk appetite (56%).

The objective of the current research is to learn the trading behaviour and risk perception among Gen Z investors in the Indian equity market. The evaluation of the data gathered among 102 participants and the information in the literature provides significant trends in terms of risk appetite, emotional factors, speculative behaviour and investment decision-making behaviour in relation to Gen Z investors.

4.1 Investor Profile and Market Participation

The data is analysed to show that the vast majority of the respondents are of the 1997-2012 birth years, which proves the substantial participation of Gen Z investors in the study. A good number of the respondents are students. The majority of them have undergraduate or postgraduate degrees that signify a youthful and educated investor base of Gen Z investors. This means that many of the participants are relatively new investors with regard to investment experience almost half of them being exposed to the stock market with less than one year of experience. Even though the level of experience market participation is high with over half of them investing in stocks and nearly half investing in mutual funds or ETFs. Also, a significant percentage is in intraday trading. Trade derivatives indicative of a tendency towards relatively active and speculative investment instruments among Gen Z investors.

4.2 Speculative trading Behaviour

The results portray a to high extent of speculative trading behaviour by Gen Z investors. Over a half of the participants confirm that they speculate actively in order to make short-term profits in the course of the speculative trading exhibiting the evident preference to the quick profits. Moreover, they have a high percentage of trading on a basis that would indicate high activity in the market and high frequency with which decisions may be made concerning speculative trade. Although long-term investing is the trading type of preference to most of the speculative traders, a significant percentage of the traders consider speculation to be a standard way of trading. In terms of portfolio allocation a

significant percentage of investors have up to 25 percent of their investment portfolio in speculative trading which means that even though speculative behaviour is common among Gen Z investors majority of investors have limited exposure to speculative trading and instead of investing the majority of funds to speculative trading.

4.3 Risk Perception and Risk Appetite

The study results indicate that Gen Z investors have a moderate aggressive risk perception. Although a significant share of the respondents report their preference of risky speculative opportunities to stable long-term investments, a significant share of them also focus on capital protection of Gen Z investors. Almost half report readiness to invest part of their portfolio in risky assets and a majority of more than half report to be open to borrowing money by trading on the margin so that they can increase their potential returns based on speculative trading. Nonetheless, a significant percentage concur that risk aversion is better than making returns that can be attributed to a twofold mentality of Gen Z investors. This indicates that Gen Z investors will be enticed by returns and other speculative gains of speculative trading but they will be risk averse and aware of the risks incurred.

4.4 Emotional and Behavioral Influences

The discussion indicates how the emotional and behavioral variables affect the speculative trading decisions of Gen Z investors. Most of the respondents concur that the contents of social media and online success stories make people want to participate in trading that depicts the impact of the digital platforms on Gen Z investors. Also a significant percentage claims that FOMO influences their trading behavior suggesting that herd behavior is present among Gen Z investors. About fifty percent of the respondents admit that losses affect them emotionally and decrease their confidence whereas a significant percentage of them still trade even after they have incurred losses. Moreover a good percentage of them confess to getting into trades without analyzing it in respect to speculative trading.

4.5 Risk Management Practices

Despite the tendency to speculation, which is also evident in the study, there is an understanding of the risk management strategies among Gen Z investors. Two-thirds report the use of stop-loss orders either occasionally or frequently suggesting the awareness of risk-control mechanisms. Also almost half concur that they observe risk-management procedures like position sizing and risk-reward analysis to speculative trading. Almost half of the interviewees have confidence that they know about trading risks before they get into a trade. The lower rate of respondents who always use stop-loss orders is however an indicator of lack of consistency of disciplined trading by Gen Z investors.

4.6 Overall Interpretation

The trading activity of Gen Z investors in this Pune sample is materially involved with opportunities that have a short-term focus with a tendency of limiting exposure to speculative trading very often. Most of them are new but busy moving toward the stocks and high involvement instruments involving trading. The perception of risk is subtle: investors seek returns and leverage but a considerable number of them focus on capital protection on behalf of Gen Z investors. Behavioral drivers. The influence of social media, The FOMO responses to a loss and impulsivity. Influence majorly trading decisions among Gen Z analysts.

The paper has analysed the trading behaviour and perception of risk among Gen Z stock market investor in the Indian equity market based on primary data collected on 102 respondents. Results denote the presence in the market, with the tendency of short-term trading as far as speculative trading is concerned. There is a combination of to-high risk tolerance with concern about capital protection exhibited among respondents. A practical rather paradoxical attitude of Gen Z investors. The media, Fear of Missing Out, and emotional reactions to losses are behavioural factors that dominate to facilitate speculative trades by Gen Z investors. Although a number of Gen Z investors have knowledge of the risk-management tools they are not always using them. Capital-preserving investors are less intensive in speculation and those more confident about the risks in the market trade on a more frequent basis. The research points to the necessity of giving financial literacy a more prominent role and focus on disciplined risk management and the specific programs aimed at encouraging young market members to become informed investors. Reforms that might be used to make retail participation in the Indian equity markets more sustainable.

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AI and the Future of Classroom Pedagogy: Transforming Teaching, Learning, and Educational Design

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Abstract

Artificial Intelligence (AI) is rapidly transforming the learning landscape, shifting the classroom practice, the structure of teaching and learning, testing, and the patterns of student interaction. The current research article explains the future of classroom pedagogy in the light of AI technologies that enable one to test individual learning and instruction, adaptive instruction, intelligent assessment, and decision-making based on data. It takes into consideration this shift of teacher to learner-centered spaces with the help of AI-regulated systems, such as intelligent tutoring systems, automated feedback systems, predictive analytics, and generative AI assistants. Among the proposed ideas about pedagogies in the paper, including differentiated instruction, real-time feedback and accessibility support, and student motivation, along with the problematic aspects that are addressed by the paper, including ethical issues, bias, data privacy, redefinition of teacher roles, overuse of automation and digital inequality. The analysis is based on a pedagogical approach to explain how AI will support constructivist, collaborative, and inquiry-based learning processes and not simply automate the traditional teaching process. It also creates an idea of a hybridization of human educators and AI that would collaborate to create responsive and inclusive classrooms. The research concludes that AI will not replace teachers but will change their functions as facilitators, creators, mentors and ethical guides. The future of classroom pedagogy, which acknowledges human discretion, creativity and empathy and employs technological intelligence to maximize learning outcomes, is the use of balanced AI implementation.

Keywords: *Artificial Intelligence, Classroom Pedagogy, Personalized Learning, Intelligent Tutoring Systems, Educational Technology, Adaptive Learning, Teacher Roles, AI Ethics in Education, Digital Classrooms, Future of Learning.*

1. Introduction

One of the most significant social institutions, which form individuals and society in general, is education. Education has over the years been able to keep up with social

demands, cultural realities, and technological evolution. Artificial Intelligence (AI) has become an important force in this change process in recent years. In a social aspect, the process of using AI in the classroom is indicative of an overall move toward digital systems that will be used to enhance efficiency, accessibility, and learning results. Classroom pedagogy has traditionally been structured and homogeneous, concerning the teaching process. Content is presented by the teacher, information is passed on to the students and evaluation is provided at predetermined intervals. Although this has contributed somewhat to the development of the basic knowledge base, it in most cases ignores the multiple abilities, interests and rates of learning existing in any classroom. The society now understands that education should address diversity and needs of individuals instead of using a blanket kind of approach.

The introduction of new opportunities in classroom pedagogy with the help of AI-based tools has resulted in making it more flexible and responsive to learning. The tools help to structure the learning content, monitor the learning process, and provide feedback. In a broader sense, AI is not perceived as something that will substitute the teachers but rather as an assistant that will support human teaching. Its role in education is also increasing as it is in other sectors of the society like communication, administration and information management. But education is not just about content delivery or efficiency enhancement. It is also the matter of value development, social skills, creativity, as well as ethical awareness. Thus, the advent of AI in the classroom creates significant questions about the balance, responsibility, and human interaction. There is a need to consider how technology can support education without undermining the human and social basis of the society.

The present paper examines the use of AI in changing the classroom pedagogy through a general societal perspective. It investigates the value of AI in facilitating learning and inclusion and the obstacles associated with the ethics, access, and technology overdependence. It is stressed in the discussion that it is the considerate and judicious application of AI that determines the future of education in which technological advances are consistent with social values and the educational agenda.

2. Artificial Intelligence in Education: A General Overview

Artificial Intelligence in education is the application of the digital systems which help in the teaching and learning processes by organizing the data, recognizing the patterns, and responding on the feedback. Socially, AI in education is a symptom of a bigger trend in adopting technology to enhance services and decision making. These

systems instead of eliminating human intervention in education are being built to enhance it. AI-based pedagogy is consistent with the current educational concepts of appreciating knowledge over memorizing, and engaging with learning instead of passively learning. Applied in the right way, AI can contribute to transforming classrooms into more interactive and student-centered ones. Meanwhile, overreliance on the use of digital tools can lead to a danger of turning education into a mere set of headless mechanical operations. Thus, according to the social perspective, AI must be regarded as a learning tool, but not a source of authority. Its application should be informed by human judgment, culture and ethics. Society should play the task of making sure that AI is an enabling factor in the educational setting and one that will not compromise the human essence of learning.

3. Personalized Learning and Educational Flexibility

The support of the personalised learning is one of the most popular advantages of AI in classroom pedagogy. In terms of societal outlook, personalized learning can solve the fact that people are different in terms of their abilities, interests and learning pace. Conventional educational systems are not very accommodating to these differences because of set curriculums and time limit. The tools supported by AI can assist in making learning more adaptable as the content and practice may be changed based on the progress of each person. Students will be allowed to be helped when they are struggling with concepts and progress when they are prepared. Such a flexible approach is an indicator of the change in the perception of the contemporary society regarding education: it is not fixed teaching but the flexible learning settings.

One-on-one learning is also a source of increased engagement. Once the process of learning is meaningful and approachable, the people will tend to be more active. The society benefits by this interaction as it creates a curious, responsible, and lifelong learning behavior. Education is no longer about being competitive, but about personal development. Nonetheless, personalization should be done with caution. Socially, there is a danger that overemphasis on individual education can diminish the collective education experiences serving as an encouragement of socialization and group comprehension. Education is very important towards creating the communal values and collaboration. Thus, individual learning must be moderate to shared learning objectives and cooperative learning. The balance can be provided by AI which will allow providing individual guidance and keeping the educational goals common. Personalized learning can be used to enhance personal growth and social cohesion when applied in a considered way.

4. Assessment and Feedback in AI-Supported Classrooms

In classroom pedagogy, assessment plays a key role, judging the progress of learning and guiding the instructional choices. The assessment tools that are supported by AI have transformed the way evaluation is implemented through faster and more frequent feedback. In the social context, this change can be seen as the need to gain efficiency and transparency in education systems. Automated assessments enable the learners to have instant feedback, which enables them to know their errors and do better. This helps in the unceasing education and not concentrating on the ultimate outcomes. Such methods of formative are becoming more popular in society since they focus on improvement and comprehension rather than memorization.

In this way, AI-based evaluation must improve objectivity and feedback and retain human assessment where needed. This kind of balance makes the process of assessment more of a learning tool than a control tool.

5. Supporting Inclusive Education

One of the social objectives is inclusive education, which seeks to deliver equal opportunities to all learners. AI can help in this objective through the handling of various learning requirements. In the opinion of society, inclusion enhances social cohesion and curbs inequality. Learning assistance by AI-powered tools may take various shapes, like visual, audio, or simplified information. The features assist in accommodating diverse abilities and learning challenges. Learning problems can be detected early on and therefore it can support individuals and the society.

The access is however crucial to inclusion. Disparities in the access to digital tools can widen the educational disparities. This digital divide is a grave issue to the society. AI can only be useful to some groups without proper infrastructure and policy support. Thus, shared responsibility is needed when using AI inclusively. Governments, institutions and communities should make sure that there are equal access and digital literacy. With the help of inclusive policies, AI can help in creating a more fair system of education.

6. Encouraging Active and Collaborative Learning

Collaborative and active learning has taken an important part of the present classroom pedagogy, because it transforms students into a passive receiver of information to an active participant in the learning process. By facilitating interaction, engagement, and knowledge building, the introduction of Artificial Intelligence in education can

contribute to these learning methods greatly and make them more robust.

The educational systems powered by AI will provide students with an active learning experience by allowing them to engage with material as opposed to passively listening to lectures. Smart tutor systems, adaptive learning systems, interactive simulation enable students to read concepts at their own pace, experiment and provide instant feedback. This constant engagement encourages students to be responsible in their learning process and adopt critical thinking and problem resolving abilities. In a social context, those learner-centered strategies are manifested by the increasing need of having education systems that equip individuals to be able to think independently and to adjust to the dynamically evolving social and professional context. AI may be used to promote active and collaborative learning successfully when applied in classroom pedagogy intelligently. AI facilitates interaction, collaboration and learner autonomy, thereby making the learning process more engaging and socially relevant. However, effectiveness of such strategies will be established by the ability to balance between technological sophistication and human counseling so that learning should be interactive and profoundly human in its essence.

7. Changing Educational Roles and Responsibilities

Incorporation of Artificial Intelligence in the education sector has seen some observable transformation of conventional roles and responsibilities of education. According to a bigger picture of society, these developments represent a changing concept of the manner in which learning occurs and the people involved in the learning process. Education has stopped being treated as a unidirectional flow of knowledge since it is now a collective and interactive process facilitated by human resources and technological resources. Conventionally, teachers have been regarded as the main source of information and they are the individuals that give out content, control the classes and assess the students. Using the tools that are supported by AI, some of the everyday activities like learning resources organization, progress monitoring, and simple feedback can be performed in a more efficient way. This change enables the educators to concentrate more on the substantial elements of instruction including the facilitation of discussions, promotion of critical thinking and facilitation of emotional and social growth.

The roles and responsibilities of an educator are undergoing constant changes, which can be seen as the equalization of technological assistance and human presence. AI will help in process management, but human educators will continue to play a

significant role in creating meaningful learning experience. Socially, this balance is needed to make sure that education goes on evolving the individuals in terms of their intellect, social and morality as well as keeping abreast with the changing times.

8. Ethical Concerns and Social Challenges

There have been significant ethical issues and social problems with the growing application of Artificial Intelligence in education, which should be considered. In terms of social life, education is not merely based on academic success, but also on trust, justice and safeguarding of individual rights. Implementation of AI in the classroom thus needs critical reflection on the effects they have on learners, instructors as well as the society generally.

Data privacy is one of the critical ethical issues. Analytical educational applications frequently utilize personal and educational data to be effective. This also brings up the question of the storage of data, access, and usage. In terms of social perspective, it is necessary to guard personal information because it is the point of keeping trust in academic institutions. The absence of clear policies and transparency means that there is a chance that student data can be used or secured insufficiently. Equality is another issue of concern. AI systems require data and in case this data is based on social or cultural disparities it might cause biased results. This prejudice may work against some groups of people and entail the strengthening of the existing inequities in the educational system. In the social perspective, this is quite alarming since education is intended to enhance equal opportunity. There should be constant monitoring to determine that AI is ethically used in order to treat all learners alike.

Another socially problematic issue is digital inequality. The access to digital tools, to the reliable and functioning Internet connection, to the technical support is not equally available to all people or communities. Due to this, not all people may experience the advantages of AI in education. This digital divide has the potential to enlarge educational inequalities among various social and economic classes and thereby potentially provide the social mobility with long term effects. People are also worried about the excessive reliance on technology. Overuse of AI can decrease human interaction and deprive education of its emotional and social areas. The learning process is communication, empathy, and moral development, which cannot be completely facilitated by technology.

To sum up, the ethical issues and social problems related to AI in education reveal

the need to use it in a responsible and balanced manner. The society should make sure that AI does not harm human values in favor of educative purposes. There must be clear rules, moral consciousness, and non-discriminant policies to make sure that technology is used in education in a reasonable and purposeful manner.

9. Toward Balanced AI Integration in Education

The increasing emergence of Artificial Intelligence in the educational field shows that there is a necessity to approach the integration of AI in the classroom pedagogy in a balanced way. Socially, there has to be the aspect of balance whereby technology does not overrule the human and social aspects that support education. Education is not a mechanism of information delivery but a process of value, skills, and social perception formation of people. Balanced AI integration implies the application of technology as an assistant tool and not as the controlling force. AI can be used to help arrange learning contents, give feedback, and detect where the help is necessary. The choices that involve the teaching methods, assessment, and development of the students, however, should be based on the human judgment. Society needs to understand that learning is related to emotional attachment, moral thought, and socialization, which cannot be entirely substituted with the digital system.

The other element of balance is constant assessment. The influence of AI on learning is also to be revised periodically to determine the question of whether it can enhance educational experiences or introduce new challenges. Teacher, student, and community feedback can be used to improve the use of AI and avoid unintended outcomes. To sum up, the integration of AI in education needs to be approached with a strong aim of considering both the advantages of technology and social obligations. AI must aid the teaching and learning process without compromising the human values which provision of education entails. As an instrument that is implemented with responsibility, AI can help to build flexible, inclusive, and meaningful learning spaces that can not only benefit personal growth but also benefit society.

Conclusion

The growing application of Artificial Intelligence in classroom pedagogy is a major change in the conception and implementation of education in the modern society. In a more general social sense, AI will provide useful resources to enhance teaching and learning, such as personalized, effective learning, and inclusive learning. Concurrently, its adoption poses a significant inquiry on the matters of ethics, equality, and maintenance of human values in education. In the current discussion,

AI has not been perceived as an alternative to human teachers but as an auxiliary device which can be used in the management of educational processes. In the wise use, AI can be used to develop adaptable learning settings, which can address the needs of different individuals and learning styles. This flexibility is one manifestation of the increased acceptance of the society that education can no longer be confined to the narrow and standardized models in order to suit the individual and community.

Another critical need in AI integration that is discussed is balance. Education is a people-centered process which depends on the ability to interact, empathize, be creative and make ethical judgments. Although AI can contribute to efficiency and order, the latter qualities of a human being cannot be substituted. Thus, AI is not supposed to be the force that dominates education but is an aid to improve education practices. Finally, the classroom pedagogy will rely on the responsible and balanced usage of Artificial Intelligence. Technological advancement should be made, with regard to education and social aspirations, acceptable by the society. Guidelines, moral consciousness, and non-discriminatory policies are paramount to inform the use of AI in education. Used wisely, AI can enhance education by enhancing meaningful learning and still maintaining the human touch at the core of education.

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Artificial Intelligence as Pedagogical Interface: Visualising Reader Response in the Study of Poetry

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Abstract

Recent developments in artificial intelligence have renewed pedagogical interest in multimodal approaches to literary studies, yet their application to poetry pedagogy remains under-theorised. This paper examines the use of AI-generated visualisation as a pedagogical strategy for teaching poetry, foregrounding the role of reader imagination in the construction of poetic meaning. Departing from content-driven or tool-centric models of educational technology, the study conceptualises AI image generation as a mediating interface through which students externalise and critically reflect upon their subjective acts of interpretation.

Grounded in reader-response theory, cognitive poetics, and digital humanities pedagogy, the paper argues that poetic meaning is not merely decoded but imaginatively produced through sensory and affective engagement with language. The proposed classroom intervention invites students to generate AI prompts based on their close reading of poetic texts, translating their internal visualisations into machine-generated images. These images are not treated as interpretive authorities or aesthetic endpoints, but as artefacts of the reading process that make individual and collective patterns of imagination visible within the classroom.

Drawing on qualitative data from student prompts, generated images, reflective writing, and classroom discussions, the study demonstrates how AI-mediated visualisation facilitates interpretive plurality, enhances metacognitive awareness, and shifts pedagogical focus from interpretive correctness to interpretive process. By comparing divergent visual responses to the same poetic text, students develop a heightened awareness of ambiguity, figurative language, and the cognitive mechanisms through which poetry generates meaning.

The paper contributes to ongoing debates in digital humanities and literary pedagogy by reframing AI not as a substitute for human interpretation but as a critical tool for examining it. It ultimately proposes AI-assisted visualisation as a scalable, reflective, and ethically grounded method for teaching poetry in contemporary literature classrooms.

Keywords: *AI-assisted pedagogy, Poetry teaching, Reader-response theory, Multimodal learning, Cognitive poetics, Digital humanities, Interpretive visualisation*

1. Introduction: Teaching Poetry in the Age of Visual Culture

The pedagogy of poetry has historically resided at a precarious intersection of linguistic density and interpretive resistance. While poetry serves as one of the most semantically condensed and imaginative modalities of language, it is frequently encountered by students as an impenetrable or "obscure" medium. Traditional pedagogical frameworks have sought to demystify these complexities through close-reading strategies that prioritise thematic extraction and formalist decoding. However, such content-driven models often risk marginalising the experiential, sensory, and affective dimensions of poetic engagement, reducing the act of reading to a search for "interpretive correctness" rather than a dynamic construction of meaning.

In the contemporary educational landscape, this tension is exacerbated by the hegemony of multimodal and visual cultures. The cognitive habits of current students are increasingly calibrated toward interactive, image-centric ecosystems. Consequently, the literature classroom faces an urgent imperative: to synthesise these evolving modes of visual engagement with the rigorous textual attentiveness central to the humanities. The integration of digital methodologies offers a robust pathway for this synthesis, provided that these tools serve to extend, rather than replace, the complexity of the poetic text.

The emergence of generative Artificial Intelligence (AI) presents a transformative opportunity for multimodal literary pedagogy. Unlike previous iterations of educational technology, AI-mediated visualisation functions as a "pedagogical interface" that translates internal, subjective mental imagery into tangible visual artefacts. By converting poetic language into generative prompts, students are compelled to externalise their cognitive processes, rendering the "private act of reading" visible and susceptible to critical reflection.

This study investigates a targeted classroom intervention conducted across SY (Second Year) and TYBA (Third Year Bachelor of Arts) cohorts. The intervention required students to engage in a recursive cycle of close reading, prompt engineering, and collective analysis of AI-generated outputs. These generated images were not positioned as definitive

interpretations but as "artefacts of the reading process" that facilitate "interpretive plurality".

The primary objective of this research is to evaluate how AI-assisted visualisation reconfigures the student's engagement with poetic ambiguity and figurative language. Specifically, this paper argues that the use of AI as a mediating interface shifts the pedagogical focus from the product of interpretation to the interpretive process itself, thereby fostering metacognitive awareness and transforming the classroom into a space for collaborative, pluralistic inquiry.

2. Theoretical Framework

This study situates AI-assisted visualisation at the intersection of reader-response theory, cognitive poetics, and multimodal digital pedagogy, using these frameworks to examine how interpretation operates within poetry classrooms. Reader-response theory establishes that literary meaning emerges through the interaction between the reader and the text. Rosenblatt's transactional model emphasises that interpretation is shaped by individual imagination and experiential engagement with language (Rosenblatt 12). By requiring students to convert interpretive responses into AI prompts, the activity positions readers as active meaning-makers, with visual outputs serving as material representations of reader-text interaction.

Cognitive poetics expands this perspective by explaining the mental processes involved in literary interpretation. Stockwell argues that reading involves cognitive simulation through which readers generate sensory and emotional representations of language (Stockwell 2). Within this framework, AI-generated imagery functions as cognitive externalisation, translating internal mental images into visible artefacts that allow analysis of imaginative and affective engagement with poetry.

Multimodal digital pedagogy provides the methodological foundation for integrating AI into literary instruction. Hayles highlights how digital environments encourage interpretive practices across multiple sensory modes (Hayles 2), while Drucker emphasises that visualisations remain interpretive and culturally mediated (Drucker 11). Together, these perspectives position AI-generated imagery as a collaborative tool that reveals interpretive diversity and fosters reflective, multimodal engagement with poetic meaning.

2.1 Challenges in Poetry Pedagogy

Poetry occupies a distinctive yet difficult space in literary education. Many students resist engagement with verse because its compact language and rich figurative texture defy simple paraphrase or thematic summarisation. Empirical research on undergraduate reading shows that learners often struggle with poetic texts, reporting difficulty in interpreting figurative language and a sense that meaning is obscure or inaccessible.

Studies of poetry instruction highlight that learners frequently find it challenging to navigate the aesthetic density of imagery, metaphor, and symbolic language, which inhibits comprehension and enjoyment (Showalter 111).

Teachers acknowledge that traditional, text-centric pedagogy can inadvertently reinforce this resistance. Instruction that privileges paraphrase or the extraction of a singular theme may fail to engage students' imaginative faculties, leading to classroom practices that centre on what the poem "means" rather than how the poem works in the reader's mind. Elaine Showalter argues that literature teaching must move beyond reductive interpretive strategies and cultivate experiential engagement with literary texts (Showalter 112). Such pedagogical limitations become particularly visible in the teaching of imagery and figurative language. Imagery, the sensory language that evokes mental impressions, lies at the core of much poetic meaning. Without strategies for engaging with visual or affective dimensions of poetry, students may resort to analytical methods that overlook the experiential and embodied aspects of reading.

2.2 Reader-Response Theory and Interpretive Plurality

The development of reader-response theory in the twentieth century marked a significant shift from author-centric and text-centric models toward an understanding of literature as a transactional experience between reader and text. Louise Rosenblatt's transactional theory asserts that "a poem is what the reader lives through under the guidance of the text and experiences as relevant to the text" (Rosenblatt 12). Meaning, therefore, is not a fixed property contained within the text but emerges through the lived interaction between reader and language.

Reader-response theorists emphasise that reading is an active and participatory process. Wolfgang Iser argues that literary texts contain "gaps" and indeterminate spaces that readers must fill through imaginative participation, thereby shaping interpretation through individual cognitive and experiential frameworks (Iser 34). Interpretation, within this framework, is inherently plural rather than singular. Different readers may construct divergent yet equally meaningful interpretations based on their imaginative engagement with textual cues.

Despite this theoretical recognition of interpretive plurality, classroom pedagogy often struggles to accommodate such multiplicity, particularly within assessment-driven academic systems that favour standardised interpretation. Pedagogical strategies that externalise subjective reading experiences can therefore provide valuable opportunities to operationalise reader-response theory within classroom practice. By encouraging students to articulate their imaginative responses through descriptive prompts and visual representations, interpretive plurality becomes materially visible, allowing reader engagement to function as a legitimate object of scholarly and pedagogical analysis.

2.3 Cognitive Poetics and Mental Imagery

Cognitive poetics extends reader-response theory by examining the mental processes that underpin literary interpretation. Drawing upon cognitive linguistics and psychology, cognitive poetics investigates how readers process figurative language, narrative structure, and poetic imagery through mental simulation. Reuven Tsur argues that poetic language activates perceptual and emotional processes that encourage readers to construct sensory representations of textual descriptions (Tsur 28).

Mental imagery occupies a central role within cognitive poetics, particularly in the reading of poetry. Research in cognitive science suggests that readers frequently generate mental images that resemble perceptual experiences, allowing linguistic structures to evoke sensory responses. Peter Stockwell explains that cognitive poetics focuses on "the cognitive structures and processes that shape literary reading," highlighting how figurative language stimulates experiential engagement rather than abstract conceptualisation (Stockwell 2).

From a pedagogical perspective, mental imagery remains difficult to access because it occurs internally within the reader's cognitive environment. Traditional classroom discussion relies heavily on verbal articulation, which may not fully capture the sensory and affective dimensions of poetic engagement. Externalisation of mental imagery through visualisation activities offers a means of revealing the cognitive processes associated with reading. When students translate their imaginative responses into visual prompts for AI-generated imagery, they engage in a reflective interpretive process that reveals how they cognitively process poetic language.

2.4 Digital Humanities and AI in Literary Pedagogy

The emergence of digital humanities has significantly reshaped literary scholarship and pedagogy by introducing computational tools for textual analysis, visualisation, and interactive learning. N. Katherine Hayles argues that contemporary reading practices increasingly operate within digital environments that require scholars and educators to engage with multimodal forms of textuality (Hayles 2). Within educational contexts, digital technologies facilitate multimodal literacy practices that combine textual, visual, and interactive interpretation.

Artificial intelligence represents one of the most recent developments within digital humanities pedagogy. Scholars increasingly conceptualise AI not as a replacement for human interpretation but as a mediating interface that reflects and transforms human input. Johanna Drucker emphasises that digital visualisation tools should be understood as interpretive constructs shaped by human design and interpretive frameworks rather than objective representations of data or meaning (Drucker 11).

Within literature classrooms, AI-generated imagery can function as an interpretive mirror that reveals patterns of reader engagement rather than providing authoritative interpretations. This pedagogical use of AI aligns with broader discussions of multimodal literacy, which emphasise the capacity to interpret and produce meaning across multiple media forms. By encouraging students to translate textual imagery into visual representation, AI-assisted pedagogy expands interpretive practice while maintaining close engagement with textual language.

Despite growing scholarly interest in AI-assisted learning, empirical classroom studies examining its application in poetry pedagogy remain limited. Existing research frequently focuses on automated text generation or computational stylistics rather than visualisation as an interpretive pedagogical strategy. This study addresses this gap by examining AI-mediated visualisation as a method for teaching poetic imagery and reader interpretation.

3. Research Methodology

3.1 Research Design

This study adopts a qualitative classroom-based pedagogical intervention to examine the role of AI-assisted visualisation in poetry instruction. The research design is interpretive and exploratory in nature, aiming to investigate how students engage with poetic imagery through multimodal interpretive practices. Qualitative methodology was selected because the study focuses on examining interpretive processes, cognitive engagement, and student reflections rather than measuring quantifiable learning outcomes. The intervention was structured as an experiential learning activity that integrates close reading, creative interpretation, and collaborative discussion to explore how students translate textual imagery into visual representation through AI tools.

3.2 Participants and Context

The study was conducted within undergraduate literature classrooms (SYBA, TYBA English Major Students, A.Y. 2025-26) in a higher education institution (Symbiosis College of Arts and Commerce, Pune). The activity was integrated into regular classroom instruction as part of a module focusing on poetic imagery and interpretive reading. Participation occurred as a structured classroom exercise designed to enhance engagement with poetry and to explore innovative pedagogical strategies in literature teaching.

3.3 Pedagogical Procedure

The classroom intervention was conducted in multiple stages to facilitate progressive interpretive engagement. The activity began with a guided reading of the selected poem - Kubla Khan, Or, A Vision in a Dream: A Fragment by Samuel Taylor Coleridge, followed by an open thematic discussion that encouraged students to identify initial interpretive responses and key visual elements within the text. Students were then introduced to

prompt design strategies, including guidance on translating textual imagery into descriptive visual prompts suitable for AI image-generation tools.

Following this training, students independently reread the poem and documented visual elements, spatial arrangements, colour schemes, and atmospheric details that reflected their interpretive understanding. Students subsequently created AI prompts without explicitly referencing the poem's title or author, ensuring that the prompts reflected personal interpretation rather than reproducing existing visual representations. Students used AI image-generation platforms of their choice to produce visual outputs and were encouraged to refine these images through iterative prompt modification until the output aligned with their imagined interpretation.

The final stage involved classroom presentations during which students displayed their generated images and explained their interpretive choices. These presentations were followed by collaborative discussions examining similarities, differences, and interpretive patterns across student visualisations. Students also provided reflective feedback regarding their learning experience and interpretive insights gained through the activity.

3.4 Data Collection

Data for the study were collected through multiple qualitative sources to capture diverse dimensions of interpretive engagement. These included student-generated AI prompts, the visual images produced through AI platforms, written or verbal student reflections, student feedback and observational notes documenting classroom discussions and interpretive interactions. This multimodal dataset allowed for a comprehensive examination of both cognitive and collaborative aspects of poetry interpretation.

3.5 Data Analysis Method

Data analysis was conducted using thematic qualitative analysis to identify recurring interpretive patterns across student prompts, visual outputs, and reflective responses. Comparative interpretive analysis was employed to examine how different students translated textual imagery into visual form and how these visualisations influenced classroom discussion. Student reflections were analysed to identify evidence of metacognitive awareness, interpretive reasoning, and engagement with poetic imagery. Together, these analytical approaches enabled a systematic examination of AI-assisted visualisation as a pedagogical strategy for teaching poetry.

4. Findings and Analysis

The classroom intervention generated a rich corpus of interpretive data, including student prompts, AI-generated visual outputs, reflective feedback, and collaborative classroom dialogue. The findings demonstrate that AI-assisted visualisation facilitated interpretive

diversity, strengthened students' awareness of their interpretive processes, and fostered collaborative meaning-making. The analysis is organised into four thematic areas.

4.1 Visualising Interpretive Diversity

One of the most significant findings of the activity was the emergence of extensive interpretive plurality. Although all students engaged with the same poetic text; Kubla Khan, Or, A Vision in a Dream: A Fragment by Samuel Taylor Coleridge, the visual outputs generated through AI revealed a remarkable range of imaginative landscapes, aesthetic styles, and symbolic emphases. Students visualised architectural structures, natural landscapes, and symbolic figures in widely divergent ways, demonstrating that poetic imagery operates as an interpretive stimulus rather than a fixed visual blueprint.

Some students emphasised architectural grandeur by depicting monumental domes and palatial structures illuminated by warm, golden light, suggesting an interpretation of the poem's imagery as majestic and harmonious. Others foregrounded darker, more turbulent visual elements, such as erupting chasms, fragmented terrain, and contrasting lighting schemes, indicating an interpretation focused on tension and instability within the poetic landscape. A third group of students interpreted the poem through symbolic or mythic frameworks, incorporating supernatural figures, dreamlike spatial arrangements, or hybrid visual compositions that merged human and natural elements.

These variations highlight how identical textual imagery can generate divergent imaginative worlds depending on the reader's interpretive focus. The visual outputs functioned as material evidence of reader-response theory by demonstrating how students actively constructed meaning through imaginative participation.

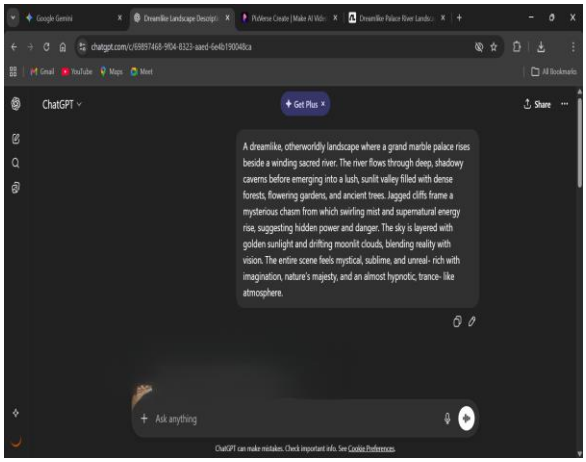
The comparison of these images enabled students to recognise that poetic imagery operates through suggestion and ambiguity, allowing multiple valid interpretive realisations.

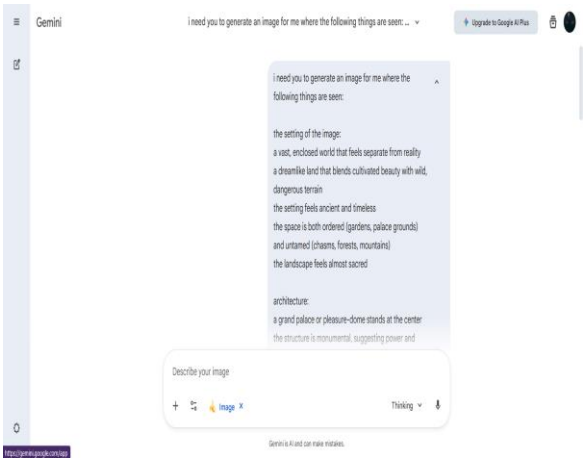
4.2 Prompt-Writing as Interpretive Practice

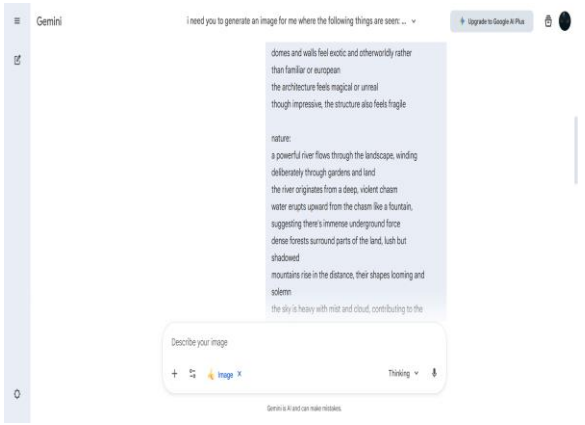
The process of prompt construction emerged as a crucial interpretive activity rather than a merely technical step in AI image generation. Students were required to translate poetic language into descriptive visual instructions, compelling them to identify specific textual details and interpret how these details might manifest visually.

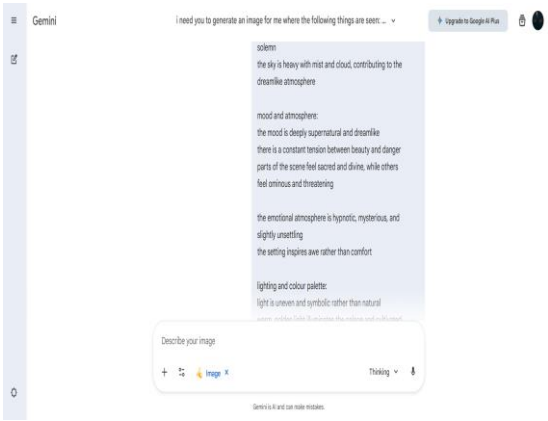
Analysis of student prompts revealed that students selectively prioritised certain poetic elements while omitting or transforming others. For instance, some prompts foregrounded colour symbolism, specifying atmospheric lighting conditions such as "golden sunset illumination" or "ethereal moonlit shadows," suggesting interpretive engagement with the poem's tonal qualities. Other prompts focused on spatial arrangement and movement, describing flowing rivers, cascading waterfalls, or dynamic geological formations, reflecting attention to the poem's kinetic imagery.

Prompt-writing also encouraged students to interpret the emotional atmosphere. Many prompts included descriptors such as "mysterious," "sacred," "dreamlike," or "foreboding," demonstrating that students engaged with the affective dimension of poetic imagery. This process required students to articulate interpretive decisions explicitly, thereby transforming subjective imagination into structured descriptive language.









Through this process, prompt-writing functioned as a bridge between textual interpretation and visual representation, reinforcing the role of descriptive language as an interpretive tool.

4.3 AI Visualisation and Metacognitive Awareness

Student reflections indicated that the activity significantly enhanced metacognitive awareness of interpretive processes. Many students reported that translating their mental imagery into AI prompts required them to reconsider how they visualised poetic language and to examine the assumptions underlying their interpretations.

Students frequently reflected on the rationale behind their aesthetic choices, including colour selection, spatial design, and symbolic emphasis. Some students explained that they initially imagined particular visual elements subconsciously but became consciously aware of these interpretive tendencies during the prompt-construction and image-refinement stages. Others noted that AI outputs occasionally differed from their intended visualisation, prompting further reflection and iterative modification of prompts.

This iterative engagement with AI-generated imagery encouraged students to recognise interpretation as an evolving process rather than a fixed conclusion. The refinement of visual outputs allowed students to experiment with alternative interpretive possibilities and evaluate how subtle descriptive changes influenced visual representation.

The findings suggest that AI-assisted visualisation functions as a cognitive externalisation tool, enabling students to observe and analyse their imaginative engagement with poetic language.

4.4 Collaborative Interpretation and Classroom Dialogue

The collective presentation and discussion of AI-generated images significantly enriched classroom interpretation by transforming individual reading experiences into collaborative analytical dialogue. The display of diverse visual outputs prompted students to compare interpretive choices, question their assumptions, and recognise the legitimacy of multiple readings.

Classroom discussions frequently focused on how specific textual phrases influenced visual interpretation. Students examined why certain visual motifs appeared consistently across multiple images, while other elements varied dramatically. These discussions encouraged students to return to the poem and reconsider how language constructs meaning through ambiguity, symbolism, and sensory suggestion.

The collaborative environment also reduced interpretive anxiety by shifting classroom emphasis from interpretive correctness to interpretive exploration. Students demonstrated increased confidence in articulating their imaginative responses and expressed greater willingness to engage with complex poetic imagery.

Observational notes from classroom discussions indicate that students often referenced both textual evidence and visual elements while explaining their interpretations, suggesting that AI visualisation encouraged integrated multimodal analysis.

Overall, collaborative image comparison transformed the classroom into a shared interpretive space where students collectively negotiated poetic meaning through visual and textual analysis.

5. Pedagogical Implications

The findings of this inquiry suggest that AI-assisted visualisation yields substantial pedagogical value when operationalised as a mediating interface rather than an authoritative interpretive endpoint. When AI-generated imagery is framed as a reflective medium responsive to student-authored prompts, it functions as an "interpretive mirror," externalising the cognitive mechanisms through which readers construct imaginative responses to poetic language. This approach effectively shifts the pedagogical locus from the attainment of a singular "correct" interpretation toward a critical examination of the interpretive process itself. By highlighting how visual outputs coalesce from student-driven decisions regarding imagery, symbolism, and atmospheric nuance, the intervention reinforces the premise that poetic meaning is a collaborative construct emerging from the reader's transaction with textual cues.

Furthermore, AI visualisation facilitates a robust multimodal poetry pedagogy. Given that contemporary learners navigate knowledge through convergent visual, textual, and digital modalities, the integration of visual interpretive activities aligns literary instruction with contemporary literacy habits. The translation of poetic imagery into visual composition necessitates a dual engagement: maintaining rigorous textual attentiveness while simultaneously transposing figurative language into spatial, chromatic, and symbolic visual structures. This process enhances metacognitive awareness, as students must consciously articulate and refine their subjective mental simulations into shareable, analytical artefacts.

6. Limitations and Ethical Considerations

Despite the pedagogical affordances identified, the deployment of generative AI necessitates a critical appraisal of its inherent limitations and ethical tensions. A primary concern involves the ontological dependency of AI systems on pre-existing training datasets, which frequently encode aesthetic biases and Eurocentric cultural assumptions. Such algorithmic constraints may inadvertently standardise student imagination, steering visual outputs toward stereotypical representations rather than idiosyncratic interpretations.

Moreover, the methodological variability inherent in diverse AI platforms, each governed by distinct parameters and algorithmic architectures, presents challenges for standardised comparative analysis. While this variability mirrors the heterogeneous nature of digital ecosystems, it requires educators to implement a "critical framing" to prevent technological determinism. AI tools must be positioned as interpretive aids that reflect human input rather than as objective or authoritative representations of literary truth. Finally, while the qualitative data from the SY and TYBA cohorts offer rich insights, the sample size necessitates further longitudinal research across diverse institutional contexts to validate the scalability of these multimodal interventions.

7. Conclusion: Reimagining the Poetic Interface

This study demonstrates that AI-assisted visualisation serves as a potent pedagogical catalyst, rendering the ephemeral "private act of reading" visible and analytically accessible. By transmuting textual imagery into visual artefacts, the intervention foregrounds interpretive plurality and empowers students to navigate the inherent ambiguities of poetic language. This synthesis of technology and hermeneutics transforms poetry pedagogy from a passive reception of meaning into a collaborative, reflective, and multimodal practice. As digital architectures continue to reshape cognitive habits, the integration of AI-mediated visualisation offers a scalable and ethically grounded model for contemporary humanities education. By fostering student agency and encouraging interpretive experimentation, this approach ensures that the study of poetry remains resonant within an increasingly visual and digitally mediated global culture.

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Integrating Artificial Intelligence for Effective Teaching

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Abstract

The modern world is dominated by artificial intelligence and the use of English. Technological developments have changed the face of society. The term AI is complex in nature as it refers to different systems. The entire world is utilising AI tools for future advancements. Educational progress and the expansion of education play an important role in national development. Education shapes human life, and therefore teaching and learning have certain value. To enhance our understanding of the English language, AI plays a crucial role. Effective Teaching strategies increase learners' understanding. AI provides various tools and strategies for effective teaching of English. These new, innovative, interesting strategies and tools of AI make learning and teaching English more enjoyable and effective. The integration of artificial intelligence for teaching English is necessary for enhancing our understanding of different domains. The new educational policies are promoting extensive use of ICT to maximize learning resources. Smarter data-driven tools of AI boost human capabilities. These AI tools support teachers in making the learning process more effective, useful and systematic.

Keywords: *Artificial intelligence, teaching strategies, domains, learning resources, ICT, AI tools*

1. Introduction

This paper is an attempt to explore the importance of AI tools, which are very useful, and the integration of these tools will enhance the understanding of the learners, at the same time make the teaching interesting and useful. This paper tries to highlight the use of AI tools in the teaching of English. Therefore, having the prime focus on the English language, the attempt is made to shed light on some important AI tools, which are very useful for the teachers of English to make their teaching easy, impactful and entertaining. AI is used in almost every domain, as it gives immediate and demanding results. It has provided countless possibilities, and therefore, using AI wisely is necessary. Moreover, the majority of the AI-driven apps, websites and search engines are in English, and therefore there is a rising demand of English.

The present scenario shows how advanced tools and technologies are utilised for better

and quicker results to meet the demands. The digital platforms provide easy access for internet users. It has localised the world. Social media and e-content sharing have given easy access to everyone across the globe to know and share information. The advancements and dominance of AI have provided new advanced platforms for performing in a better way. The learning of any domain or language is no longer difficult because AI provides whatever we want. Therefore, the traditional teacher-centred lecture method is replaced, and importance is given to the student-centric learning methods. At present, blended learning has been given more weightage in education from KG to UG, and various digital platforms are utilised. This integration of AI is enhancing the understanding of the learners by providing them with experiential learning. Practising these AI tools has become a necessity. Even the government is promoting the use of the internet for easy access to AI-driven tools. The reputed universities, institutions, college and schools are promoting the online digital platform for strengthening the educational institutions. The role of the teacher plays a crucial role in the holistic development of the students. Effective teaching strategies and facilities yield positive outcomes. Therefore, to meet the demands of the students is a very challenging task for the teacher. Today's teacher needs to be techno-savvy to create awareness among the students for the access of ICT enabled devices. English is an international language and provides opportunities. As a result, understanding and mastering English has always been given the topmost priority.

English helps to access and understand technology as it is used globally and used for documentation and programming. Learning English becomes essential for mastering technology. It has accorded a special status to the English language. Learning and mastering English is now possible with the help of AI-driven tools. These tools help the teachers of English to adapt technology for effective teaching and better results. AI tools help teachers from admission to result.AI helps to conduct various activities in the class. These AI-driven apps give a helping hand to teachers to provide access and conduct various activities for the students.

2. AI tools for Learning English

Many institutions, universities and colleges are using AI tools to make learning English easy and interesting. The following are some of the important AI tools to learn, understand and master English:

- **Intelligent Computer-Assisted Language Lab (ICALL)**: These labs are available in many institutions and colleges, which provide access for the evaluation of the written work. Speech recognition and pronunciation practices are also provided with the help of chatbots. Such labs prove to be useful for practice. Constant practice of the intelligent computer-assisted language lab assists the students improve their performance.

- **Useful Websites:** BBC Learning English, British Council, and Cambridge English are the standard and very useful websites that use AI engines to provide ample practice of activities and for assignments and results. These websites are used worldwide as the standard sources for learning comprehensive English. These websites prove to be very useful for learners of English, as the learners can have access to them whenever they desire. Even the learners come to know about their mistakes and get the chance to know and correct them. These websites are like complete packages that provide all types of support to know and correct their mistakes.
- **AI Tools for Vocabulary Building:** Vocabulary plays a vital role in understanding, mastering and using English appropriately. To increase the vocabulary, AI tools play an important role. Quizlet, Smalltalk2me, Twee, wordUp, wordtune, vocabulary.com, Duolingo, and Memrise help to master vocabulary. Even these platforms provide word alternatives, exercises and quizzes for practice. Therefore, these sources are used by the majority of English learners worldwide. Many online dictionaries use AI for explaining and defining words along with usage. Mobile phones can help learners learn English as play store provides countless apps for mastering English. The teacher can provide internet access in the classroom and customise these sources and online dictionaries for the vocabulary growth of learners. These tools help the students to know the most appropriate words and their usage.
- **AI Tools for Conversational Practice and Pronunciation:** Linga, Smalltalk2me, ELSA AI, Loora, Fluently, Speakometer, Bold Voice, Fervo etc. are some of the important AI tools for conversational practice and for improving pronunciation and accent. Some tools allow the recording and provide support to know and correct our pronunciation and style by comparing it with specialised available sources. These tools help to know the difference between the American and British English accents and pronunciation. These apps help with conversational practice and for improving tone, accent and pronunciation.
- **AI Paraphrasing and Editing Tools:** One can modify written text into a formal and more polished way by using AI paraphrasing and editing tools. Grammarly and Quillblot are widely used tools that are available free of cost and charge a fee for more premium services. These tools are widely used as standard sources to make written material more formal, standard, and impressive. These tools are used worldwide for academic writing. These tools help to find out spelling mistakes and grammar mistakes, and help to make our writing appropriate, acceptable and faultless. These tools are extremely useful for proofreading and avoiding mistakes. Even these tools suggest changes in words and construction by suggesting more appropriate ways.

- **AI Tools for Listening Practice:** Glisgish and Lingua are well-known platforms for listening practice. Learners get conversational text along with audio, which provides listening practice. Talkpal AI, Loora, ELSA Speak, Smalltalk2Me and Microsoft Copilot are the other important available platforms for listening practice. There are so many other mobile apps, such as Speak, Praktika, Hablo, Speak and Learn English, which are very useful for listening practice.
- **Personalised Tailored Content:** AI provides personalised, tailored content for English learners. Teachers can identify the problem or limitations of the students in understanding English and can suggest appropriate personalised content for practice. After identifying the mistakes in English, the teacher can guide the students to make improvements in the field or domain in which the student is weak. This tailored content helps the students to overcome their problems and boost their confidence to learn and master English.
- **Commonly Used AI Tools for Classes:** Magicschool, Almanack, Eduaide, Diffit, Khan Academy SchoolAI are some of the tools that are extremely useful for understanding and mastering English. Teachers can make use of these platforms to make the teaching of English more effective and useful. There are some apps like Drops and Duolingo that provide gaming elements to make the classes engaging. Teachers can make use of AI tools like Canva Magic, Ideogram, Gemini and Adobe Firefly using pictures and images for language learning. These platforms help to create images. The Use of ICT enhances the understanding of the learners. Therefore, knowledge about the AI tools, useful websites and apps always promotes and helps the learners for better understanding of English. Computational linguistics, which is a subfield of linguistics and computer science help to analyse the text and spoken discourse. Information retrieval is also possible. Machine translation helps to enhance the understanding of language. AI tools help in translation, spellcheck, speech recognition and synthesis. Teachers can use social networking sites such as MySpace, Bebo,Twiter, Friendster, Hi5, Friends Reunited, you tube to enhance the learning experience of students.AL tools help to get the experience of virtual reality through games and activities. It makes the learning process enjoyable.
- **Most Leading AI Tools**: AI tools are extremely useful in teaching. It assists teachers in many ways by providing the most advanced and useful sources. Chat GPT and Gemini are the leading tools that provide AI assistance for getting anything the learner wants. AI tools like Deep Research NotebookLM are very useful for research as they consider our intention and assist us accordingly. Search engines like Google AI, Perplexity and Chat GPT are the leading and most used search engines worldwide. There are various search engines, such as Attio, AdCreative, Reclaim, Guru, CanvaManusGPT4o,

Synthesia, which are used for different purposes to get a special type of guidance and solution.

3. Conclusion

Teaching the English language and literature, integrating AI is a necessity in the present times. It enhances understanding and makes the teaching interesting and participative. Experiential learning is possible using AI tools, which makes the learning enjoyable and entertaining. Search engines, blogs, websites, podcasts, and text material prove to be useful for understanding, leaning and teaching of English. Many AI tools provide personal feedback and provide teaching sources as per the demands. These tailored mode of learning have become popular as it meets the needs of the learners and teachers. Teachers can make use of these AI tools for different purposes, such as attendance, assessment, training, role-playing, exercises, practice, translation, analysis, and communication. Data can be stored and retrieved. It makes the teaching process easy and effective.

These emerging technologies have provided opportunities, but there are some challenges and risks that need to be considered. The existing research and guidelines need to be addressed and reconsidered regarding the use of AI in the education field. Teachers should develop their awareness and literacy in the domain of AI to guide their students. The advantages, opportunities, ethical issues, and limitations of AI need to be reconsidered before finalizing teaching strategies.

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Navigating the Ethical Implications of AI in Library and Information Centres

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Abstract

Library and information centres are known as a storehouse of Information and knowledge where users across different domains and professions gather to enhance their learning. Library and information centres have always adopted the new technologies to pace up with its user's ever-changing needs and to provide enhanced library services. AI is one of such recent technology that have transformed all fields of human activity, including Libraries and information centres. The AI integration in Libraries and information centres have transformed traditional library services, automated processes and provide customised user experiences. This AI integration have made library operations efficient and a vibrant centre of information discovery for the 21st Century. However, AI also brings ethical implications that challenges the basic principles of the library. This conceptual paper examines the key ethical implications of AI in Libraries and information centres, focusing on user personal data security, biases, accountability and governance, user consent and control, equitable access etc. It argues that Library and information centres must proactively develop an ethical framework for AI. The article concludes with recommendations for policy guidelines, training, user education modules etc. to guarantee that AI technologies are aligned with its principles of equality, accessibility and same opportunities for all.

Keywords: *Artificial Intelligence, Library and information centres, Ethics, Algorithmic Bias, AI transparency, Data security*

1. Introduction

The technology of artificial intelligence to organize a vast amount of data and make smart decisions based on that data has made Library and information centres to integrate it in its operations and services. The AI integration has made the libraries and information centres possible to improve user experiences, personalise services and ensure equitable access to information for all. (Chang, M., & Wu. Y. (2024). This integration has led the library to emerge as vibrant centres of information discovery in the twenty-first century. (Jyoti & Kumar,2024).AI is helping librarians to manage information load and improve the

efficiency of cataloguing, classifying and organizing resources. Librarians are also using AI to streamline their workflows by automating their routine operations and channelling that time on offering personalized user experiences and community engagement initiatives. (Wusu, 2025). However, this integration also raises ethical concerns related to privacy, data security, algorithm bias, etc. Library and information centres have a responsibility to ensure that AI is implemented ethically and responsibly. This research paper or conceptual paper aims to explore the ethical implications of AI on Library and information centres, develop an ethical framework and strategies to mitigate the ethical implications of AI on Library and information centres.

2. Objectives

The main objective of this study is to:

a. To identify the key ethical challenges of AI in libraries and information centres.
b. To find out the ethical framework and guidelines for AI implementation in Libraries and information centres
c. To recommend strategies for the ethical AI implementation in Libraries and information centres.

3. The Ethical Impact of AI on Library Services

The use of AI in Libraries and information centres raises serious ethical challenges and issues including:

3.1 **Privacy and Data security**: The most important and sensitive issue in the application and use of AI in library management systems is user privacy. AI systems are trained to collect user data for working memory for personalized and future recommendations. Libraries and information centres need to be very responsible and cautious while acquiring and handling user's personal data by AI systems. A proper system and mechanism should in place in the libraries and information centres to foresee that the user's personal data is not misused or revealed for any other motive.

3.2 **Discrimination and Algorithmic Bias**: AI algorithms can reinforce or worsen existing social biases, leading to discrimination against non-privileged groups like minority community, disabled, women etc. while favouring more privileged groups. The issue is often caused by bias in the data that AI systems learn from, and it can lead to biased decision-making. This can reinforce existing inequalities in society and pose challenges to the very mission of library of providing seamless access to knowledge and information. This poses a fundamental threat to the library's mission

and Libraries and information centres must be alert to the dangers of such bias in order to provide equitable service.

3.2.1 **Lack of transparency and accountability:** This is another major ethical issue libraries and information centres handle. The "black box" nature of many algorithms in AI makes it tough for libraries and information centres and patrons to evaluate and understand the underlying decision-making processes, and the potential for bias in results may require difficult efforts to detect and correct for bias. Additionally, there are concerns that, if AI systems lack explainable functionality, people may not trust library and information centres as neutral sources of information. Library and information centres should focus on transparency in their systems to help build user trust and accountability with respect to AI behaviour. This would involve devising a system by which AI decisions and processes are explained to users and stakeholders thereby establishing a mechanism for accountability for the responsible use of AI in libraries and information centres.

3.2.2 **Unemployment due to Automation:** Replacing routine library functions like classification, cataloguing and metadata management by artificial intelligence may lead to unemployment and job displacement of library professionals who have been doing this work for years. Hence timely support through training and upskilling of these affected staff should be addressed by the libraries and information centres.

3.2.3 **Lack of Human involvement**: There is a growing concern over automation of reference service with chatbots and virtual assistants could lead to a reduction in the personalized and empathetic assistance provided by human librarians. The challenge lies in balancing the importance of human connection and knowledge with the opportunities offered by Artificial intelligence. Library and information centres must carefully consider whether integrating AI will enhance rather than detract from the human elements of their services.

4. Ethical Frameworks and Principles

When implementing AI, library and information centres must set and adhere to ethical standards and principles to avoid technological exploitation and inequitable practices. The creation of these recommendations requires collaboration among library professionals, the participation of AI ethics experts, and consideration of the opinions of numerous stakeholders. While maintaining the basic library values of access, privacy, and intellectual freedom, libraries and information centres must ensure that these frameworks are flexible enough to the rapidly evolving field of AI technology.

Mishra (2023) created a modified ethical framework for Library and information centres because of a lack of knowledge about ethical frameworks and regulations for AI applications. It includes the following:

a. **Fairness:** Library and information centres can ensure that their AI systems be developed to assist users equally, without bias or discrimination. For example, they may train their systems with different sets of data according to their library user demographics and test for discrimination and prejudice.

b. **Transparency**: Library and information centres can build trust with their users and other stakeholders by keeping transparency in how AI systems work,the data sets they use, the decisions they make; this will also help identify potential problems or biases.

c. **Accountability:** Library and information centres can stay accountable by taking responsibility for the decisions and actions of their AI systems by establishing clear cut policies and procedures. This includes regular monitoring, evaluation of AI systems, training of staff and other stakeholders.

d. **User Autonomy**: Library and Information centres can ensure that their AI systems practice user autonomy by providing user full control over their personal information, to take informed decisions over how their personal data is used, clear privacy policies and the option to opt-out over the usage of their personal data.

e. **Personal data security:** Libraries and information centres may protect user personal data by collecting and utilizing personal data only for legitimate purposes by implementing strong security measures to protect this data from unauthorized access or use.

f. **Human oversight:** Libraries and information centres can ensure their systems of AI are subject to human oversight and intervention for confirmation that decisions taken and actions executed are harmonious with the values and goals of the library and information centre. This includes development of clear procedures about when human intervention will be called upon, training, and support provided for staff that are assigned to oversee these systems.

g. **Benefit:** Libraries and information centres can ensure their Artificial Intelligence technologies are designed and implemented to promote the well-being of individuals and communities. This can be done by considering the needs, interests, and values of users, together with the values and mission of the library and information centre.

By using these ethical frameworks and principles, the library and information centres can ensure that the AI technologies are used in a responsible and ethical manner by considering the interests and needs of the community and information users at large.

5. Strategies and the best practices for mitigating risks of AI

I. **Training and continuous education**: A major strategy to resolve the ethical challenges when it comes to integration of AI is to ensure that library staff are trained on the technology and the ethical part of it. Libraries are expected to provide extensive training program to their staff on the ethical issues of AI and machine learning, including issues such as prejudice and discrimination, privacy, and job loss (Misra, 2023; Bradley, 2022; IFLA, 2020). This program must include the need for long-term education to stay updated on ever evolving AI technologies. Moreover, libraries are expected to endorse the importance of continuous education, particularly for the unemployed library staff to help them in adapting AI driven job market.

II. **Engagement with Ethical frameworks:** The libraries must take an active part in developing and executing various standards related to the utilisation of AI. This calls for development and implementation of various norms related to the use of AI, as laid out in various international frameworks like the IFLA Code of Ethics for Librarians. The libraries also have to comply with various international and individual country norms and frameworks, like those of Australia and Canada, which follow international guidelines related to AI, as laid out by OECD norms and EU guidelines like Trustworthy AI. Moreover, there is also a need for dialogue with other parties related to intellectual freedoms, privacy, and various other facets of AI technology applied in libraries (Bradley, 2022; IFLA, 2020).

III. **Transparent policies and Guidelines**: Libraries and information centres should establish transparent policies and guidelines for the use of AI systems, including guidelines for data collection, storage, and use, as well as guidelines for the successful implementation of AI algorithms.

IV. **Literacy related to Algorithms:** Algorithm literacy will better position library users to critically assess the AI-driven environment. It is desired that libraries create instructional programs around AI algorithms literacy to help users understand the impact of algorithms on their information access. Such may include seminars and other resources that explain the operations of AI systems, potential biases, and repercussions of AI in daily usage. Libraries are mandated to develop a training program to include topics on personal data loss and other dilemmas due to AI technology.

V. **Audit and Test Algorithms:** Libraries and information centres need to audits and evaluate AI algorithms to ascertain that they function correctly and do not lead to any bias or discrimination. This includes assessing AI systems for any errors and undertaking corrective actions as necessary. The information used in AI systems has

to be accurate and biasfree, and libraries play a significant role in making AI systems bias free.

VI. **Mechanisms or medium for User Feedback*:*** Periodic feedback and reviews must be obtained from the library users with regard to their experience with AI system. Their feedbacks should be thoroughly reviewed and integrated for better experience with the AI systems.

Through adopting such strategies and best practices, libraries and information centres would be able to ensure the use of AI systems would become a more responsible, ethical, and positive for all stakeholders in libraries and information Centres.

6. Conclusion

This paper has explored the ethical challenges of integrating AI in library services and has made recommendations to mitigate such challenges.

According to the study, AI has a huge potential to revolutionize library services, making it more efficient in its operations. However, there are several ethical problems with AI integration that are very complex and need human oversight and supervision.

Additionally, the paper has delved into major ethical dilemmas, including privacy and data security, the risk of bias and discriminatory behaviour by AI algorithms, the need for transparency and accountability in AI systems, the threat of employment displacement, the lack of human interaction in library services, the lack of comprehensive ethical frameworks and guidelines. These issues highlight how challenging it is for a library and information centres to integrate AI technology in its operations.

Several solutions are also being provided to overcome these challenges which included training and continuous education, engagement with ethical framework, clear policies and guidelines, algorithmic literacy, routine auditing and checking of AI algorithms and the creation of efficient channels for user feedback.

Finally, in conclusion, while libraries continue to integrate AI technology, it is important that they be vigilant of the ethical challenges. This can be attained by employing a strategy which is proactive, informed, and collaborative, such that libraries are able to leverage the potential of AI technology in a manner that does not compromise their core principles of accessibility, privacy, and intellectual freedom.

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Artificial Intelligence in Library Services

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Abstract

To the improvement of the user experience, accessibility, and efficiency, artificial intelligence has been changing the nature of library service delivery. The rise in digital content has led to the incorporation of artificial intelligence tools to support the consumer, conserve resources, and facilitate wise decisions. This study focuses on the role that artificial intelligence plays in the activities that librarians engage in, such as categorization, sorting, and interaction with users. The study has focused on the key artificial intelligence tools that are changing the nature of library service delivery, such as machine learning, chatbots, and data analysis. The challenges associated with artificial intelligence, such as issues with data privacy, training, and the need to emphasize moral behavior, are key issues that the study has highlighted to ensure the improvement of library service delivery and its continued relevance.

Keywords - *Artificial Intelligence, Library Services, Smart Libraries, Machine Learning, Chatbots, Digital Libraries*

1. Introduction

Library plays very vital role in sharing and handling knowledge. The world is moving ahead in technology hence library also moved from traditional print system to digital platform. AI is immensely helpful to manage library and operate it smoothly. There are so many uses of Artificial Intelligent in library for example- AI can be helpful in automate processes, personalized services, improved information searches as well as support decision making process. The use of AI can make library more smarter and user friendly.

Libraries are the most trusted source for research and instructions in academic institutions. They are user friendly and behaves ad vital hubs for archiving and storing data. To cope with the current scenario, libraries are adopting newer technologies because traditional role of libraries is under danger due to insufficient money and rapid progress and modifications in technologies. To solve this problem, libraries are using AI enabled technologies. AI tools are useful for using data analytics, machine learning. Other tools of AI help to enhance cataloging and organization that allow librarian to dedicate more time for other task. The use of Ai tools also modified views of readers and their interactions

with libraries. It had done by offering simple suggestions, cleaver search engines and virtual assistants. It improved user pleasure with the involvement with library.

2. Definition and Key Concepts of Artificial Intelligence

If we look at definition of Artificial Intelligence then it is an adoption human behaviour such as learning, reasoning, problem solving and decision making. AI is based on the use of algorithms, machine learning models, and data analytics to perform task. Typically to perform these tasks required human intelligent.

AI system actually works on gathering, analyzing and applying data to arrive at the objectives without any instruction from others. There are two important concepts- natural language communication can be possible by NLP i.e. National Language Processing, and capacity to acquire data with little human interaction made possible by Machine Learning (ML). AI tools are useful for data analytics, predictive modeling, decision making algorithms and other technologies.

3. Need for Artificial Intelligence in Libraries

There are several problems in library. There is need of round-the-clock service, growing user expectations, insufficient resources, and information overload. By implementing AI tools libraries can get rid the above problems as per below:

- Managing enormous volumes of electronic information properly
- Increasing the accuracy and speed of data retrieval
- Providing tailored and interactive user services
- Reducing the quantity of repeated physical work

With the assistance from machine learning tools, large libraries automatically group and classify their extensive resources and papers to get help with well-organized operation. Whereas, natural language processing (NLP) aids to develop search relevance and user interface. As a consequence, expanding their accessibility through use of voice interfaces and chatbots.

All the above-mentioned tools like virtual assistants and chatbots, helps readers to consumers in real time by giving answers to the questions and guide them towards resources which improve readers' experiences.

4. Uses for Artificial Intelligence in Library Operations

4.1 AI for Reference Services: AI driven chatbots and virtual assistants supply reference services around-the-clock. These tools answer questions, brings readers towards resources and assist users with database searches.

4.2 **Classifying and Cataloguing:** By taking help of AI generated tools for automated cataloguing, creation of metadata, indexing and subject categorization makes reduction I human work and errors.

4.3 **Finding of Information:** This tool is helpful to understand user intention. AI as natural language processing improves search accuracy and can be modified as per the relevant results.

4.4 **User suggestion systems:** These tools are the most helpful for recommendations for books, journals and digital recourses. All these are dependent on user preferences and search history.

4. 5 **Management of Digital Libraries:** AI tools support and help libraries with content management, piracy detection as well as copyright enforcement and library digitization.

4.6 **Library Watch and Surveillance:** This AI tool can be used as monitoring system in library premises that prevents theft and also provide control on regulation. This tool is known as facial recognition and RFID technology.

4.7 **Electronic Reference Services:** If AI implemented in libraries, virtual assistants and chatbots can be helpful to readers and library users to find out the appropriate catalog system. They can point out the inquiries and more around-the-clock user support. Users can get improved experience and opportunities if Natural Language Processing (NLP) is used because it enables equal library access for everyone.

4.8 **Personalized Information Retrieval:** The most important work of AI is observing users and their activities to recognize the most appropriate tool's availability. It is also helpful for better search by tailoring recommendations using machine learning techniques which raises relevant search. Consequently, making growth in user interaction with libraries.

4.9 **Digital Archival and Preservation:** AI tools help for digital collection of books and other sources. It ensures access to scarce resources for a long time through artificial intelligence. Tools for Data Extraction and Restoration: AI technologies facilitate quick access to large digital collections and increase resource findability.

4.10 **Linguistic and Translation Services:** Highlights the role of artificial intelligence in making library services more user-friendly and easily accessible for different categories of users. Real-time translation services enable libraries to reach a broader audience and bypass the language diversity issue.

5. Advantages of Artificial Intelligence in Libraries

- Growing productivity and efficiency
- Better user experience and participation

- Fast and dependable information services
- Cost-effective management in the long run
- Data-driven support for decisions
- Personalization improves user experience.

6. Difficulties in Integrating Artificial Intelligence in Libraries

Despite its advantages, the following challenges exist in the application of artificial intelligence:

- Pricey infrastructure and technology
- Technical inadequacy of library staff
- Data protection and ethical issues.
- Resistance against change
- Reliance on top quality data

7. Function of Librarians in the Artificial Intelligence Age

The role of AI is not to replace but to change the role of librarians. Librarians need to improve their skills, control AI, and ensure the proper use of data, as well as assist consumers in using information properly. Librarians are no longer just managers of information, but also managers and facilitators of knowledge.

8. AI's future prospects in libraries

Libraries will be designed by intelligent, smart, and clever technologies. It is expected that AI will improve multilingual access, predictive analytics, and customized education even more, as well as virtual reality-based library services.

9. Conclusion

Artificial intelligence can transform library services into more efficient, accessible, and user-centric services. Strategic planning, skill development, and ethical considerations are essential in ensuring the successful integration of AI, despite the challenges. Promoting education, research, and lifelong learning in the digital age depends on AI-driven library services.

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The Future of Wellness with Artificial Intelligence

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Abstract

Artificial Intelligence (AI) is getting integrated in our day-to-day life at a rapid pace in field of wellness and sports activity. The technology is being used to monitor everything from physical activity, step-tracking and food consumed, calories burned to the quality of sleep. The AI based algorithms are being deployed to guide healthy diets, nudges for mental calm guiding lifestyle corrections and even chronic disease management with medicinal database at backend. The personalization is achieved by wearable devices in forms of watches and rings, continuous glucose monitoring (CGM) patches with less invasive technique and the data fed to adaptive training platform which connect user through mobile based wellness and health applications. The platform provides personalized tailor-made recommendations for lifestyle alterations to improve health outcomes.

The industry reports and media advertisements portray these solutions as transformative improving lifestyle, managing chronic health conditions and even inducing behavioral changes. The recent research mostly concentrated on accuracy of algorithms and efficiency of predictive modelling as such metrics which are mostly around system level performance. However, there is dearth of quality research on effectiveness of these technologies from outcome perspective. Any adoption of technology and behavioral changes has critical element of human psychology. Any improvement in lifestyle or change in habits needs sustained adherence for significant influence of health and lifestyle outcomes. These factors impact the outcomes in more than one way and need further study and analysis.

Further various wearable devices are available with varying quality and price points. The accuracy and reliability of technology needs uniformity across brands and devices available for any comparison or trend analysis through data analytics. In view of this study seeks to examine the influence of AI-driven technology and solutions on wellness of individuals through study of research articles available on the subject.

Keywords: *Artificial Intelligence, Wellness, Wearable, Predictive Algorithm*

1. Introduction

Conceptually **Artificial Intelligence** (AI) dates back to 1950s and was first defined as 'the science and engineering for making intelligent machines.' Today AI is performing complex tasks that replicate human cognitive ability such as reasoning and decision making. Under the umbrella concept of AI, there are emerging technologies such as machine learning (ML), deep learning (DL) and natural language processing (NLP). These models feature many free parameters adapting autonomously to calibrate the model. Toay AI is being applied to repetitive tasks where human intelligence was requires such as reading scanned documents, answering text and voice queries etc. Machine Learning (ML) and Deep Learning algorithms enable systems to learn from large data sets to make decisions and work on feedback to improve over time.

What is wellness? The state of being healthy and physically fit is called wellness. Many a time it is being classified as physical wellness or mental wellness and others. The global Wellness institute defines 'the active pursuit of activities, lifestyles and choices that lead to a state of holistic health as wellness.' So, the wellness is not a final state rather the pursuit of the holistic health. The holistic health in recent times combines physical, mental and social health. Due to rapid urbanization the active lifestyle is being replaced by a sedentary lifestyle. Many individuals are trying to cope up with fast-paced life by introducing a health activity or weekly sport routine to keep fit.

Technology today using AI has provided many avenues to track daily activity and food, sleep etc. As the individual are trying to achieve work-life balance on fitness front through whatever physical activity they can squeeze in their busy schedule, tracking of steps and calories burned displayed on mobile app give them momentary feeling of achievement. This article will evaluate the use of Artificial Intelligence (AI) as a tool behind such wellness activities.

2. Need and Importance of Study

In today's world the digital gadgets have entered our day-to-day life in many forms. These technologies backed by Artificial Intelligence (AI) and Machine Learning (ML) algorithms are making strides in wellness and sports industry as well. Social media and other media are posting advertisement of individuals achieving success following these app or using certain gadgets. A study is necessitated to evaluate the role of AI behind this technology leap and its usefulness in wellness and sports activities.

3. Methodology

The researcher scanned for articles related to sports, wellness and artificial intelligence in public domain using google scholar and web of science for this study. Since this is recent

phenomenon articles published in past 10 years were only considered. Articles which mentioned use of AI in wellness or sports were shortlisted for the study. The articles elaborating on technology details or modelling were not considered for the purpose of this study.

4. Literature Review

Post-pandemic there has been lot of increased awareness on health and fitness. The rise in sedentary lifestyle forced by pandemic has continued partly and increased health risks associated with it have heightened people's interest in personal fitness. The conventional fitness including gym and coach is effective but access and cost are challenge for this model. The alternate system offered through use of technology which offers personalized recommendations and available and accessible anywhere need to be explored for its effectiveness.

Monitoring body posture and effective feedback for impactful exercise: When the pandemic forced everyone indoor, people found new ways to exercise at home. An image-based AI fitness coach developed using pose recognition of the customer, analyzing of fitness movement through AI and real-time voice or text feedback for correction has been highly effective in improvement of exercise quality at home. It's a promising tool for improving safer and more effective home exercise for people. (Horan J, et. Al, 2023). Similar article on "Posture estimation and redressing workout pose" by Kanase, et.al. mentions the system using computer vision technology, deep learning gives pose estimation to evaluate individual pose during exercise, analyzing same the system provides feedback for improvement. The Artificial Intelligence (AI) and Machine Learning (ML) is the backbone of these technological innovations where a simple device like mobile 'observes' the exercise posture and 'provides feedback' for correction like a personal trainer.

Personalized AI health coach: The authors Gupta, Gurubuxani and Madan of a research paper argue that AI supported virtual wellness coach can achieve much more on physical fitness front than a human coach. The technology to capture real-time video of routine and suggest improvements basis machine learning (ML) is very powerful concept for fitness. The real-time personalized guidance can help user improve form and performance reducing risk of injury. The interactive nature of AI fitness trainer can help improve engagement and hence motivation. Through progress tracking and gamification, the AI fitness trainer can help user stay committed to their fitness goals and achieve long term improvement on their health and fitness. (Gupta L, et.al., 2024). This will completely alter the way we think about health and fitness. The AI wellness coach will help people visualize their future state of health and recognize zone of advancement thereby alter their schedule

appropriately. The fitness regime supporting application using AI cover wide range of topic from nutrition-based food planning, personalized fitness planning to virtual trainer or coach. Further access to social community for fitness and competing within community provides motivation for achieving the fitness goals. (Taware et.al). We are already witnessing many younger generation executives subscribing for such plans with various health-tech providers who are delivering services through phygital or completely digital mode.

Continuous monitoring: The technology has enabled continuous monitoring of BP and conditions possible in Home or Office environment. A review of Generative AI (GenAI) applications across domains of early detection of physical health risk, mental health risk and personalized wellness showed that GenAI systems using multimodal agents and LLM (Large Language Models) are being increasingly used for supporting mental and physical health monitoring, fitness routines and recommending interventions in real-time. The research conclude that GenAI has a potential to deliver personalized wellness support which can be easily scaled up, although it also faces challenges on account of user adherence and over-intervention risks. Also, ethical considerations due to data-privacy remains unresolved issue. (Chenzhe Xu, Keyi Qiu, 2026). The presence of adaptive, sensitive and responsive environment to the presence of people is called **ambient artificial intelligence**. The ambient AI integrates with systems and devices, human-centric computer interfaces and technologies that do sensing and reasoning followed by acting on the inputs. For a person recovering from health condition or for a senior citizen in home environment such ambient AI helps in providing a continuous monitoring environment at home or office for patients or individuals under observation. (Cook, D J, et al. 2009).

Medical Support and assistance: A virtual nurse assistant backed by conversational AI technology platform provides patients with personalized care management and health coaching. The conversation between the virtual nurse 'Molly' and patient happens through a mobile platform, the system processes natural language of patient to understand the query and provide personized advice. Ambient sensing and connected intelligence networks using sensors and IoT is very powerful technology for virtual health care in era of 5G. (Nahar J K, Kachnowski S, 2023). AI in healthcare is like a smart machine that learns and solves problems fast like humans. As it diagnose problems early and suggest treatments it is like a super brain assisting doctors by looking at tons of medical information and from complicated scans and images much faster than any human being. It's a game-changer in prevention and managing healthcare. (Deepa R, et.al., 2023).

AI in preventive care: The preventive medication and care forms part of wellness which is directed towards early detection of health episodes. The early detection of any non-

communicable disease (NCD) can help in reducing the impact and sometimes even stopping the onset or spread. The revolutionary transformation through integration of AI in detection of early-stage cancer is ensuring diagnostic accuracy and superior outcomes than traditional methods. It helps in detection of lung, breast and skin cancer early, which are life-threatening and most common cancers which can be controlled if detected early. When the disease is detected early the treatments are cost-effective, easier and better. Research indicate AI is very powerful in detection of cancer in X-rays and also indicating heart problems before they become unmanageable. (Deepa R, et.al., 2023).

Assistance to physicians: The digital interventions in healthcare are needed more than ever. Augmentation of technologies for clinical medicine and healthcare delivery can help reduce stress on doctors and para-medical staff. US is witnessing high burnout amongst medical and para-medical staff and this is followed by resignation creating more stress on healthcare system. The digital interventions are helping in monitoring patients remotely there by reducing stress on healthcare system. (Nahar J K, Kachnowski S, 2023). Further the wearable technology is playing a significant role by providing virtual environment which helps in reducing burden on clinical services and hospitals. (Ahsan Md., Siddique Zahed, 2022).

Wearables: Today wearable devices are available in many forms and are designed to monitor different parameters of human health and wellbeing. Most of these devices gather data which is processed using AI for effective monitoring and recommendations. This is about to bring in transformation in wellness and medical care. Wearables are used to personal health and activity tracking by many. Personal medical systems utilizing advancement in wearable technology have been developed which enables non-invasive and continuous monitoring and analyzing of biochemical responses and vital signs. Biomedical clothing with intelligence and body area networks (BAN) are used which provide better monitoring than traditional watches and rings. (Teng X F, et.al., 2008). However, a 2020 study noticed variability amongst the accuracy of wrist-worn wearables. The devices measuring Heart rate, step count and calories burned showed different readings across 9 different brands tested by the team of researchers. Some of the brands were found accurate only 50% of time. (Fuller D, Colwell E et.al., 2020).

As the technology progresses and models mature with algorithms more reliable data and reading will be available through the wearable technology.

5. Discussion

Artificial intelligence is being leveraged for wellness and healthcare through multiple means and AI is creating future roadmap for wellness. As the technology stabilizes and the models mature with data algorithms, AI in wellness and healthcare will play a very

crucial role. The shortage of trained manpower can be augmented by AI supported technology gadgets for effective assistance. The capability has been proven in field of healthcare and wellness and needs to be scaled up for overall wellbeing of larger populace. In our society where due to rapid urbanization joint family system is giving way to nuclear family system, care and wellbeing is becoming a personal responsibility. In such system a personalized gadget backed by almost humanized AI algorithms keeping track of health and wellness is very effective solution. Data preservation and privacy remain the issues though to be resolved.

6. Conclusion

Usage of artificial intelligence as a technological backbone has improved effectiveness of many gadgets and systems. This has gained lot of momentum in personal health, wellness and healthcare industry. The ease and availability have made AI as integral part of most of new age gadgets and wearables. In its current form it may not replace the trained manpower but rather assist the specialists who can utilize their time and efforts more effectively and efficiently. Its application in clinical care and practicing medicines need to be explored further for benefit of mankind.

The technology generates huge amount of data and processing the same effectively without programmer bias is a challenge. Further lot of personal data is available which can be misused and hence data privacy and protection related issues need to be addressed appropriately.

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