A STUDY ON USE OF AI TOOLS: OPPORTUNITIES AND CHALLENGES IN HIGHER EDUCATION

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Abstract:

Indian higher education system is adaptive in nature. All branches of higher education in India have shown resilience to changing global scenario and has brought new knowledge into education to make Indian students competitive in global arena. With the introduction of NEP 2020 use of digital technology in education has become essential for several reasons. Incorporating artificial intelligence (AI) tools in higher education provides ample opportunities and also challenges in the context of India education system. With the rapid development of AI tools, universities & colleges in India are increasingly adopting AI-driven systems for a range of academic and administrative functions. These include personalized learning experiences, automated grading, virtual teaching assistants, and predictive analytics to enhance student performance and institutional management. AI also offers potential for transforming curriculum design, improving accessibility for differently-abled students, and addressing the diverse learning needs of India's vast student population.

However, the use of artificial intelligence in Indian higher education faces several challenges which include inadequate infrastructure, limited digital literacy among faculty and students, concerns over data secrecy and security, and the need for substantial investment in artificial intelligence technologies and training. Additionally, there is a risk of deepening educational inequalities, as institutions in urban areas may have greater access to AI tools compared to those in rural or remote regions require careful consideration.

This paper explores the opportunities/ scope and challenges in using artificial intelligence tools in higher education and also identify the purposes of using of using AI tools in higher education. Recommendations and analysis will help to make proper policy guidance for use of AI tools in higher education in India.

Keywords: Artificial Intelligence tools, higher education, Curriculum design, AI driven system

Introduction: Higher education in India plays a key role in shaping the country's manpower and driving economic growth. The landscape of higher education in India comprises public and private institutions, offering a wide range of courses in fields such as science, engineering, arts, commerce, and social sciences.

AI technologies have brought a structural change in higher education, thereby creating possibilities for personalized learning, data-driven decision-making, and innovative pedagogical approaches (Oliveira, *et al.*,

2019, Grimus, 2020). The use of Artificial Intelligence (AI) tools in higher education is rapidly changing how institutions operate and how students learn. In India, where the education system serves millions of diverse learners, AI offers exciting opportunities to improve teaching methods, personalize learning experiences, and enhance administrative efficiency. For instance, AI can help in offering education as per individual students' needs, provide instant feedback, also streamline processes like admissions and grading. Scholarly research mentioned that use of AI in universities has posed challenges in education (Konecki, *et al*., 2023). AI has put forth benefits as well as challenges like data privacy, unequal access to technology, and the need for teacher training are crucial barriers that can hinder the successful implementation of AI in education. Additionally, ethical concerns around AI use—such as bias in algorithms and the impact on student privacy—must be addressed to ensure fair and responsible practices.

Objectives:

1. To understand the opportunities in using AI tools in higher education.
2. To know challenges in using AI tools in higher education.
3. To identify the purposes of using AI tools in higher education.

Hypothesis :

H_0 There are no significant opportunities in using AI tools in higher education.

H_1 There are significant opportunities in using AI tools in higher education.

H_0 There are no significant challenges in using AI tools in higher education.

H_2 There are significant challenges in using AI tools in higher education.

H_0 There are limited purposes of using AI tools in higher education.

H_3 There are significant purposes of using AI tools in higher education.

Literature Review:

1. **Mohammed S., (2023)** stated in the research paper that AI has capacity to revolutionise the teaching learning process and making education interesting to faculty and students. It also helps in effective administration of the educational institutes. AI has confronted some challenges which need proper guidelines and ethical practices in application of AI tools in higher education.

2. **Crompton H. and Burke D., (2023)** findings of the study says that there is rapid increase in publication on use of AI in higher education in US and other countries. It says that AI is mostly used for five areas like assessment , predication , AI assistant, Intelligence tutoring system and managing student learning.

3. **Villarreal R. et al (2023)** mentioned in the article that ChatGPT has revolutionised education system and making education contents human friendly , but its application in the higher education has raised concerns like integrity, impact of on logical thinking etc. Policies , guidelines and framework need to be prepared for responsible use of ChatGPT in higher education.

Problem statement:

Higher education plays an important role in nation building, research, innovation as well as individual growth. Higher educational institutes are adapting new techniques and tools in making teaching and learning effective.

Use of AI tools in higher education has made education interesting and creative. Its application in higher education can confront several opportunities as well as challenges. Irrational use of AI tools may affect natural intelligence, thinking process and creativity. Policy framework and guidelines on AI will only ensure effective integration of AI tools in education.

AI Tools used in higher education:

1. **Intelligent Tutoring Systems**:
   - **Socratic**: Uses AI to help students solve problems and understand concepts through interactive Q&A.
   - **ALEKS**: An adaptive learning platform that personalizes math and science instruction.

2. **Personalized Learning Platforms**:
   - **Dream Box**: Provides personalized math instruction using adaptive learning technology.
   - **Knewton Alta**: Offers a fully adaptive learning platform for various subjects, tailoring content to student needs.

3. **Content Creation and Enhancement**:
   - **Canva for Education**: Incorporates AI tools for designing educational materials and presentations.
   - **Otter.ai**: Transcribes spoken content in real-time, making lectures more accessible.

4. **Learning Analytics**:
   - **IBM Watson Analytics**: Provides insights into student performance and engagement to help educators tailor instruction.
   - **Brightspace Insights**: Analyzes data to provide actionable insights on student learning patterns.

5. **Assessment and Feedback Tools**:
   - **Gradescope**: Uses AI to assist in grading exams and assignments, providing instant feedback.
   - **Turnitin**: Checks for originality and provides feedback on writing quality and plagiarism detection.

6. **Gamified Learning**:
   - **Kahoot!**: Engages students through gamified quizzes and interactive learning activities.
   - **Quizizz**: Offers gamified assessments that provide immediate feedback and analytics.

7. **Language Learning**:
   - **Duolingo**: Utilizes AI to tailor language lessons based on student progress and performance.
   - **Rosetta Stone**: Uses speech recognition and AI to help learners improve pronunciation and language skills.

8. **Virtual Labs and Simulations**:
   - **Labster**: Provides virtual laboratory simulations for science courses, allowing students to conduct experiments online.
   - **zSpace**: Offers immersive 3D learning experiences for subjects like biology and engineering.

9. **Collaborative Learning Tools**:
   - **Miro**: An online collaborative whiteboard platform that enhances group work and brainstorming.
   - **Slack**: Facilitates communication and collaboration among students and instructors.

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10. **Accessibility Tools**:

   ➢ **Read&Write**: Supports diverse learners with tools for reading, writing, and comprehension.

   ➢ **VoiceThread**: Allows students to create and share multimedia presentations, enhancing engagement.

11. **Grammarly** : It is an AI powered tool that can help students to improve their writing skills. It checks grammar, spelling, words etc. thereby improve writing skill with clarity.

12. **Quillbot** : It is a paraphrasing tool thar can help students to avoid plagiarism and suggesting different ways to improve writing skills to express their idea.
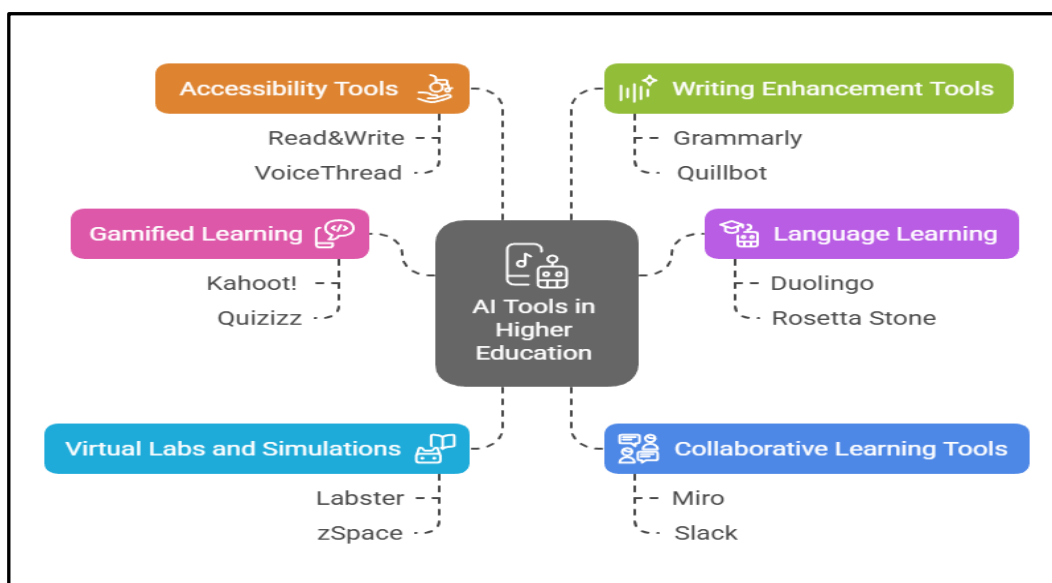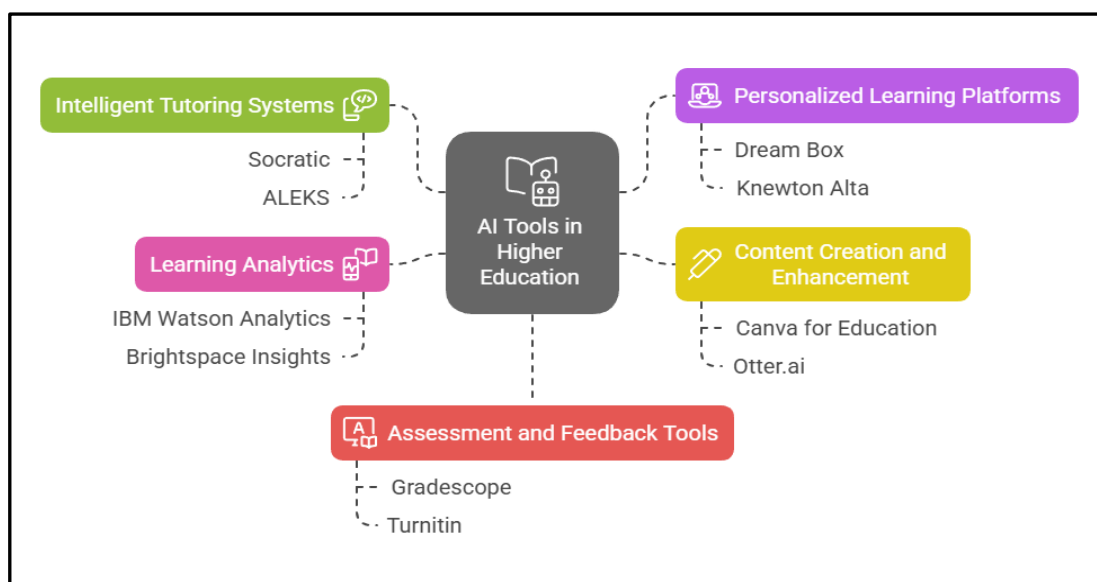
Opportunities / Benefits of use of AI tools in higher education:

1. **Personalized Learning**: AI facilitates to prepare educational contents as per individual student needs, pace and learning styles.

2. **Enhanced Engagement**: Interactive AI tools, such as gamified platforms and virtual simulations, increase student involvement and making learning more enjoyable.

3. **Efficient Assessment**: AI-driven assessment tools provide immediate feedback on assignments and exams, which enable the students to know their performance and areas for improvement.

4. **Data-Driven Insights**: Learning analytics powered by AI enable institutions to track student performance and engagement, allowing for data-informed decisions to enhance teaching strategies.

5. **Administrative Efficiency**: AI tools streamline administrative work such as admission, examination, attendance etc., This helps faculty and staff to focus more on teaching and support.

6. **Accessibility Improvements**: AI tools can enhance accessibility for students with disabilities by providing speech-to-text, text-to-speech, and other assistive technologies.

7. **Support for Faculty**: AI can assist educators in creating and curating content, grading, and managing classroom activities, helping them to be more effective and efficient in their teaching.

8. **Scalability**: AI tools can support larger class sizes without sacrificing the quality of education, making it easier to scale learning opportunities.

9. **Lifelong Learning Support**: AI tools provide continuous learning opportunities according to their own pace and refer study materials as and when needed.

10. **Career Preparedness**: AI platforms can provide insights into job market trends and help students develop skills relevant to their future careers through tailored recommendations.

11. **Enhanced Collaboration**: AI tools facilitate collaboration among students, enabling group projects and discussions to occur more seamlessly, regardless of location.

12. **Predictive Analytics**: Institutions can use AI to predict student outcomes, allowing for timely interventions to improve retention and success rates.

13. **Resource Optimization**: AI can help institutions optimize resource allocation, such as classroom space and faculty time, based on student needs and usage patterns.

14. **Language Translation**: AI-driven translation tools can assist non-native speakers, making educational content more accessible and promoting inclusivity in diverse classrooms.

15. **Improved Research Capabilities**: AI can analyse large amount of data quickly. This will help students and teachers to strengthen research capabilities.

16. **Automation of Routine Tasks**: Automation of repetitive office work, such as attendance tracking and time table , allowing faculty to spend more time on meaningful interactions with students.

17. **Support for Diverse Learning Needs**: AI technology can cater to various learning disabilities and preferences, offering personalized resources and support for all students.

18. **Increased Flexibility**: AI tools enable flexible learning environments, allowing students to learn anytime and anywhere, accommodating various lifestyles and commitments.

19. **Continuous Improvement**: AI systems can learn from interactions and outcomes, enabling ongoing refinement of educational strategies and tools based on real-time data.

20. **Global Learning Opportunities**: AI can facilitate virtual exchanges and collaborations with institutions worldwide, broadening students' perspectives and enhancing their educational experiences.

Challenges in using AI tools in Higher education:

1. **Data Privacy and Security**: Due to AI maintaining data secrecy such as faculty records, salary records, exam data, results, attendance etc. is a challenging task.

2. **Lack of Access**: all students do not have equal access to the technology required to use AI tools, which can exacerbate existing inequalities in education.

3. **Expensive:** The initial investment for AI tools and infrastructure can be significant, making it difficult for some institutions, especially smaller ones, to adopt these technologies. It also requires lot of cost for maintenance and updating the system.

4. **Resistance to Change**: Faculty and staff may be resistant to adopting new technologies, fearing that AI will replace their roles or disrupt established teaching methods.

5. **Quality of AI Tools**: Not all AI tools are created equal; some may lack the necessary accuracy or reliability, leading to incorrect insights or recommendations.

6. **Training and Support**: Educators and students may require extensive training to effectively use AI tools for support and professional development.

7. **Overreliance on Technology**: Overdependence on AI tools may potentially diminish critical thinking & personal interaction in the learning process.

8. **Ethical issues**: The use of AI may raise ethical questions regarding bias in algorithms, decision-making processes, and the potential impact on student outcomes.

9. **Integration with Existing Systems**: Synchronising AI tools with current Learning Management Systems (LMS) and other technologies can be complex and may require significant resources.

10. **Maintenance and Updates**: AI systems require regular updates and maintenance to ensure they remain effective, which can be a resource-intensive process.

11. **Lack of Standardization**: The fast development of artificial intelligence tools has led to a lack of standardization in terms of functionalities and best practices, making it challenging for institutions to choose the right tools.

12. **Impact on Pedagogy**: The introduction of AI might change teaching dynamics, and teachers may require to rethink their educational approaches to integrate these tools effectively.

13. **Monitoring and Accountability**: monitoring the outcome of AI tools is a challenging task because of lack of clear policies and oversight.

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Research Methodology:

Analysis of this research paper is done by using primary as well as secondary data. Primary data has collected from students and teachers by questionnaire method. The sampling size for the study is 120 respondents. Whereas, secondary data has been collected through books, journals, government publications, reports of research agencies, newspaper, websites etc. The research is mainly exploratory in nature and analysis is done based on percentage method and observation.

Table 1		
Gender		
Males	68	44%
Females	52	56%

Source : Primary Data

Gender / Awareness of AI tools
11% No
89% Yes

How Frequently AI tools are used

		58%
		50%
		37%
		33%
		67%
		40%
		51%
Project work	72	60%
Feedback Analysis	19	16%

Source : Primary Data
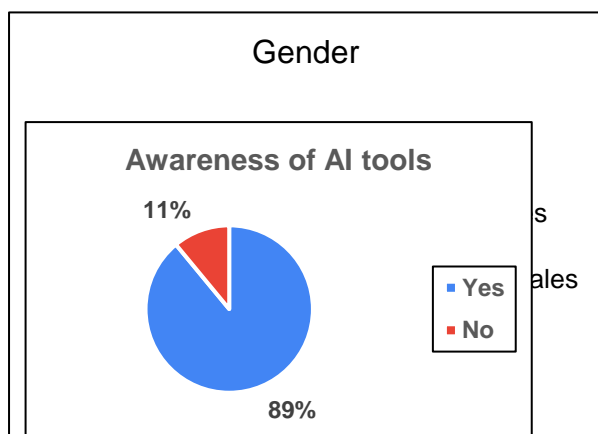
Table 2		
Awareness of AI tools		
Yes	99	89%
No	12	11%

Source : Primary Data

Table 4		
Purpose of using AI tools		
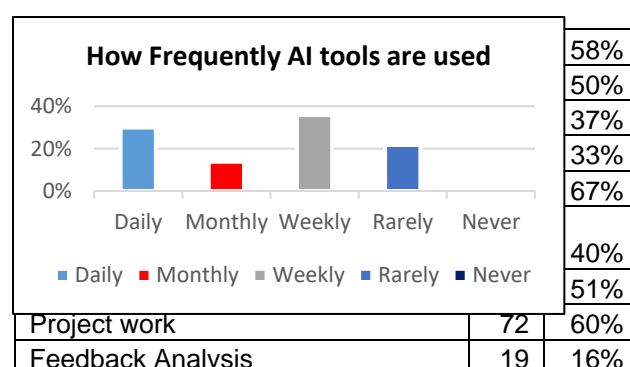
Table 3		
How frequently AI tools are used?		
Daily	36	30%
Monthly	13	13.8%
Weekly	43	35.8%
Rarely	26	21.7%
Never	02	1.7%

Source : Primary Data

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Purpoose of using AI tools
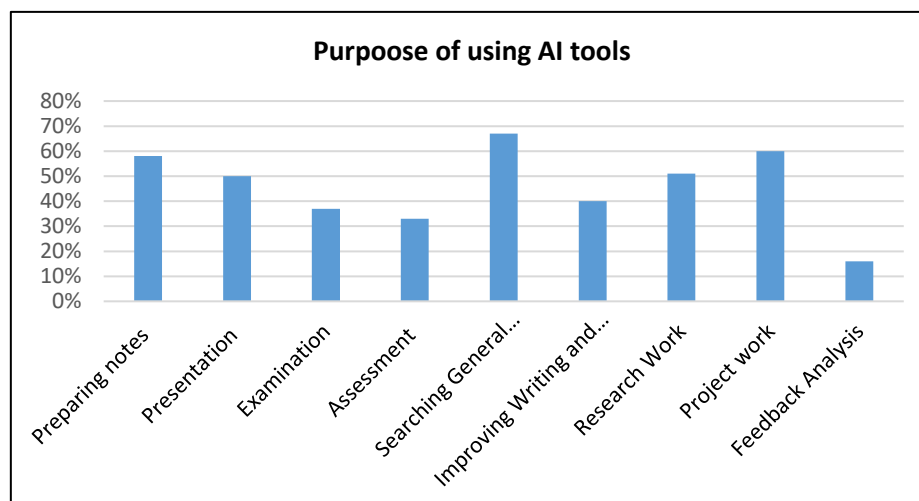
Table 5					
Opportunities/Benefits of using AI					
	SA	**A**	**N**	**DA**	**SDA**
AI increases teaching learning flexibility	35%	53%	12%	0%	0%
AI facilities global learning opportunities	33%	54%	9%	3%	1%
Useful in improving administrative capacity of the institution	24%	56%	17%	3%	1%
AI tools useful for notes preparation , presentation ,project work etc.	49%	43%	7%	1%	1%
Useful to enhance students Skills and Capabilities as per Job market requirement	30%	42%	21%	6%	2%
AI tools are useful in teaching , learning and Evaluation process	35%	43%	18%	3%	1%
AI optimizes teaching and learning resources	28%	45%	22%	5%	0%
Useful to meet the needs of disable students	26%	41%	28%	5%	0%
AI can help in achieving educational goals	27%	45%	22%	6%	1%
AI can help in bridging gap between rural and urban education	33%	37%	27%	3%	1%

Table 6					
Challenges in using AI					
	SA	**A**	**N**	**DA**	**SDA**
Do you feel AI tool improves student engagement and participation in learning activities ?	20%	43%	24%	11%	3%
AI will reduce natural intelligence of the students	28%	39%	21%	6%	6%
AI will affect personal and academic data	26%	38%	28%	6%	3%
AI tools do not consider specific needs of the students	12%	37%	27%	19%	6%
AI is limiting your creative and thinking abilities	31%	43%	17%	5%	5%
AI tools are bias in assessment and recommendations	13%	37%	38%	10%	3%
Speed and connectivity issue	8%	38%	26%	23%	5%
Availability of different AI tools and their utility	18%	41%	29%	9%	3%

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There is an issue of plagiarism	26%	36%	27%	8%	3%
All students and teachers do not have technical knowledge	23%	42%	18%	12%	6%

Opportunties of using AI

Challenges in using AI tools
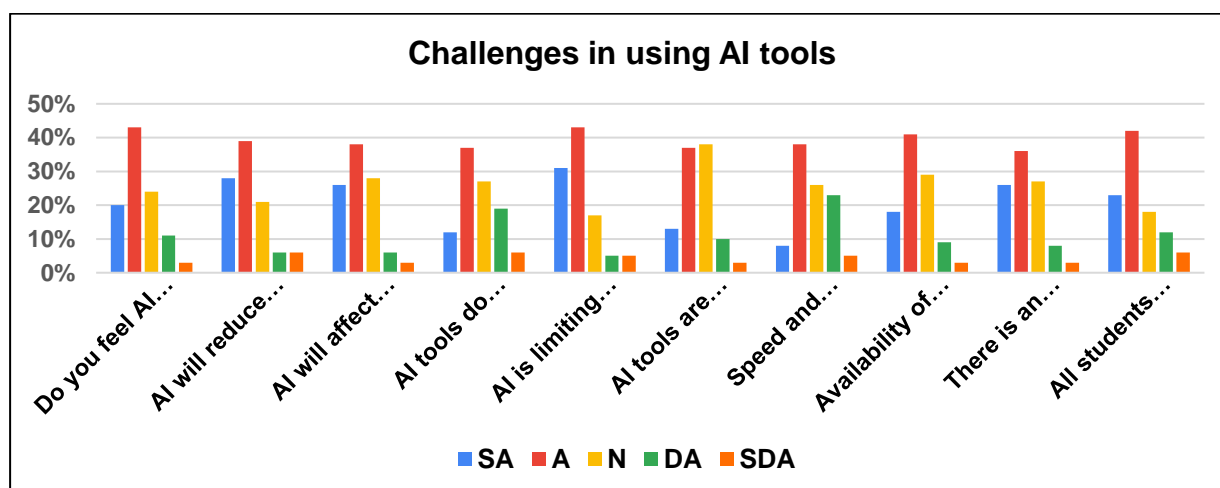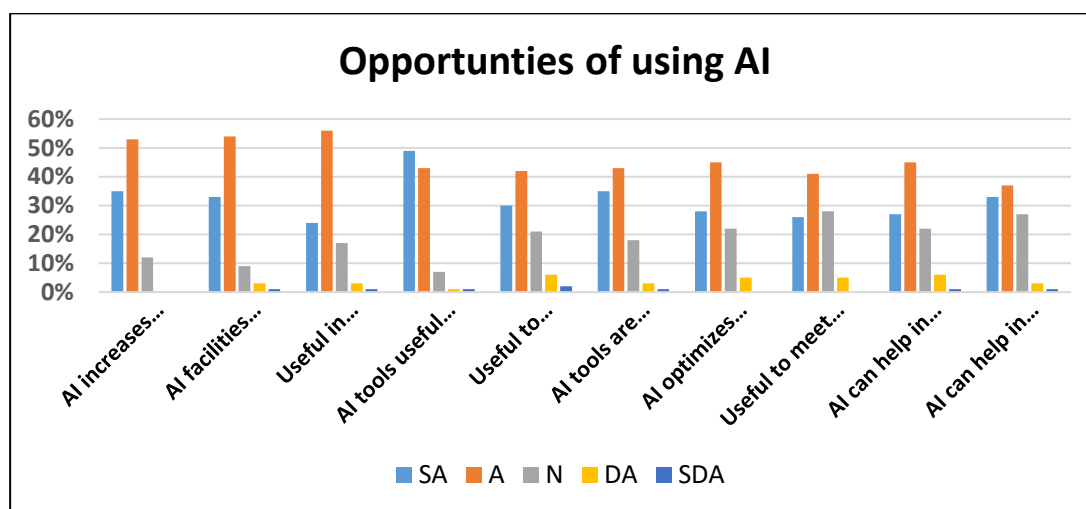
Findings:

1. 89% respondents says that they are aware about AI tools used in higher education. Most of the respondents are using ChatGPT tool.

2. 36% respondents said that they are using AI tools on weekly basis and 30% respondents are using AI tools on daily basis. Only 1.7 % people said that they never used AI tool.

3. Maximum respondents use AI tools for searching general information, whereas it is least used for feedback analysis.

4. Among the benefits of AI tools, 92% respondents mentioned that AI tools are more useful for preparing notes, presentations, project work etc.

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5. More than 88% respondents stated that there are global opportunities of learning and providing teaching and learning flexibility.

6. 80% respondents agreed that AI provides help in improving administrative efficiency of the institution in terms of data management, paperless working etc.

7. 73% of respondents have agreed that AI tools are enhancing students' skills and capabilities for job markets, optimizing teaching and learning resources and achieving educational goals

8. Only 61 % respondents mentioned that AI tools are meeting the needs of disabled students. Whereas 67% of people are of the opinion that AI tools can bridge the gap between urban and rural education.

9. 74% are of the opinion that reducing natural intelligence of the students and also diluting creative thinking and visualization of the students. Respondents also feel that AI will affect personal and academic data

10. 50% of the respondents feel that AI tools do not consider specific needs of the students and also bias in assessment and recommendation.

11. 52% of respondents expressed that people are using online data for research work there is plagiarism issue in preparing research papers, research articles etc.

12. 65% of the respondents said that teachers and students do not have technical knowledge for operating AI tools.

13. Selection of different AI tools is a big concern in front of students and teachers due to availability of different AI tools.

14. Speed and connectivity are common problems in several parts of India in using AI tools in education.

Recommendations:

1. Workshops or seminars should be conducted in educational institutes to make the students and teachers aware about the tools which are commonly used for presentation, notes and projects, evaluation etc.

2. As far as possible give creative task or activities to the students to inculcate and develop students' natural intelligence. Eg. Logo making, poster making, video advertising, best out of waste etc.

3. Educational institutes need to develop their software and networking system to avoid data piracy.

4. Take offline exams to avoid malpractices during the exam sessions.

5. To conduct training sessions for teachers for effective use of artificial intelliegence tools in teaching and evaluation process.

6. AI tools may improve students' skills require for securing job, but individual efforts are also needed by the students to raise those skills.

7. While preparing research papers, thesis and research projects manual paraphrasing can be done effectively to avoid plagiarism issue.

8. AI tools can be used effectively for completion of assessment work in time and also declaration of results.

9. AI tools can be used for assessing students' strength and weakness in different subjects.

10. Special efforts should be made for students from rural areas to get accustom with AI tools and tarin them for effective use in gaining knowledge and skill upgradation.

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11. Special efforts are needed by the teachers and educational institutes for reaching out the benefits of AI tools to the disable students.

Conclusion:

In conclusion, while AI tools can play transformative role in higher education, therefore its implementation must be done thoughtfully with careful consideration of ethical implications and a commitment to equitable access for all students. AI tools can reduce administrative work of faculty members and allowing them to give more time for teaching, mentorship and guidance. Displacement of job, shrinking of natural intelligence, data privacy and many other challenges have emerged in higher education due to unprecedent use of AI tools. Balancing innovation with these challenges will be crucial to realizing the benefits of AI in academic settings and reaching education to all the students.

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