REVOLUTIONIZING COLLEGE EDUCATION:
AI AWARENESS AND UTILIZATION IN CLASSROOM TEACHING

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ABSTRACT

The study aims to investigate AI awareness and its utilization in classroom teaching among college teachers in North Bengal, focusing on variations by level, gender, age, and type of college. Using the stratified random sampling technique, 333 college teachers were selected for the sample of the study. Data were collected using the AI Awareness and Utilization Scale (AIAUS) developed by Singh (2024) for college teachers. The data were analysed with the help of z-score range, t-test, and 2x2x2 Factorial Design ANOVA. Results revealed that only 10% of teachers exhibited high levels of AI awareness and its utilization, while 50 % had average levels and 40% had low levels. Further, male teachers demonstrated higher AI awareness and utilisation than female teachers. Additionally, teachers from private colleges showed better AI awareness and utilization than teachers from government colleges. The study further found that gender, age and types of colleges significantly influence AIawareness and its utilization. However, there was no significant interaction effect between these variables on AI awareness and utilization among college teachers in North Bengal.

Keywords: *Revolutionizing, College Education, AI awareness, Utilization, Classroom Teaching.*

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Introduction

In recent years, integrating Artificial Intelligence (AI)into various facets of society has sparked transformative changes, and integrating AI for classroom teaching at the tertiary level is no exception. Undoubtedly, AI is ushering in a revolution in education by fundamentally reshaping traditional teaching methods through its unique capabilities and practical applications. AI technologies offer extraordinary opportunities to enhance learning experiences, improve educational outcomes, and streamline administrative processes in colleges and universities worldwide (Anderson & Rainie, 2020; Picciano, 2021).AI enables the creation of immersive learning environments through virtual reality (VR) and augmented reality (AR), offering experiential learning opportunities that were previously inaccessible within traditional classroom settings (Picciano, 2021). This shift not only optimizes instructional efficiency but also expands access to high-quality education by overcoming geographical barriers through online learning platforms and virtual classrooms (Anderson & Rainie, 2020).

Integrating AI into college classroom teaching is essential to address the diverse learning needs and enhance the overall educational experience. AI's ability to personalize, provide data-driven insights, and automate administrative tasks can transform traditional teaching methods. According to Holmes et al. (2019), AI-driven adaptive learning platforms can tailor educational content to individual student's needs,

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ensuring a more personalized and effective learning experience. Furthermore, AI enhances engagement and accessibility, making learning more inclusive for students with disabilities (Zawacki-Richter et al., 2019). Intelligent tutoring systems provide real-time feedback, allowing students to learn from their mistakes more quickly (Lu et al.,2018). Further, predictive analytics powered by AI can identify students at risk of falling behind, enabling timely interventions for their progress in learning(Nawaz& Gomes, 2019). Overall, the integration of AI in higher education optimizes global learning opportunities, preparing students for a rapidly evolving world, where learning is more inclusive, interactive and effective (Tuomi, 2018).

Concept of Artificial Intelligence

The concept of Artificial Intelligence (AI) emerged in the mid-20th century, heralding a transformative era in technology and cognitive science. The term "Artificial Intelligence" was coined by John McCarthy in 1956(McCarthy, 1956). McCarthy was an American scientist and one of the pioneers in the field of AI. He used the term to describe the ability of a machine to simulate human intelligence. AI refers to the development of computer systems capable of performing tasks that typically require human intelligence, such as problem-solving, decision-making, and language understanding (McCarthy, 1956). AI encompasses various subfields, including machine learning, natural language processing, and computer versions, each aiming to replicate and enhance specific aspects of human cognition through computation algorithms and data-driven methodologies (Russell & Norvig, 2022).

AI and Education

Artificial intelligence has become increasingly intertwined with education, offering transformative possibilities across various facets of learning and teaching. AI's ability to analyze large datasets and recognize patterns allows for personalized learning experiences tailored to individual student needs and preferences (Picciano, 2021). Intelligent tutoring systems use AI algorithms to adapt instruction in real time based on student performance, enhancing engagement and knowledge retention (VanLehn,2011). Moreover, AI-powered educational tools facilitate automated grading and feedback, freeing educators from administrative tasks and enabling them to focus more on instructional design and student interaction (Picciano, 2021). AI also supports inclusive education by providing accessibility features for students with disabilities, such as speech recognition for dictation and test-to-speech capabilities (Baker et al.,2019). Additionally, AI-driven virtual reality and augmented reality simulations offer immersive learning environments that simulate real-world scenarios, enhancing experiential learning and skills development (Picciano, 2021). These advancements highlight AI's potential to revolutionize educational practices and make learning more personalised, accessible, and effective.

AI and Teacher

Teachers play a crucial role in integrating AI into classroom teaching by acting as facilitators, curriculum designers, and guides. They introduce AI tools, helping students use them effectively and ethically (Holmes et al., 2019). By leveraging AI's data analytics capabilities, teachers can offer personalized learning experiences tailored to individual student needs (Lu et al., 2018). Moreover, the teacher's role is to mentor students in critical thinking and ethical considerations while using AI for learning purposes (Zawacki-Richter et al., 2019). Continuous professional development is essential for teachers to stay updated with AI advancements, ensuring that they can effectively integrate new technologies into their teaching practices (Tuomi,2018). Hodges and Senger (2020) found teachers who perceive AI as a tool for personalized learning and data-driven decision-making are more likely to integrate it into their teaching practices. However, challenges such as the need for professional development and concerns about data privacy continue to influence the adoption of AI in educational settings.

AI Tools and Applications in Classroom Teaching

AI tools and applications have a profound impact on classroom teaching at the college level which enhances personalized learning, real-time feedback, and automated administrative tasks (Lickin et al., 2016). These technologies enable educators to tailor instructional strategies to meet the diverse needs of students, by improving learning outcomes and engagement (Holmes et al., 2019). Blikstein (2018); and Hodges and Senger (2020) have investigated that some educators embrace AI for its potential to enhance teaching effectiveness and student engagement, while others express concern about job displacement and the ethical implications of AI in education. Factors influencing AI adoption include Educators' technological proficiency, institutional support, and appreciation of AI's pedagogical benefits (OECD,2019).

Challenges and Benefits of AI Integration in Classroom Teaching

Tanes et al. (2020) explored that integrating AI into classroom teaching presents both challenges and benefits. On one hand, AI technologies offer the promise of personalized learning experiences, real-time feedback, and automated administrative tasks, which can enhance instructional efficiency and student engagement. On the other hand, the integration of AI in the classroom faces several challenges, which include high costs and accessibility issues, as not all colleges can afford the necessary technology and training. Teachers need continuous professional development to effectively use AI tools, which can be a significant hurdle (Smith & Brown, 2022). As teachers strive to prepare students for increasingly digital and interconnected work, understanding the current landscape of AI awareness and its utilization become an important area of research.

Significance of the Study

Therefore, this study is of great significance as it seeks to investigate AI awareness among college teachers, their perception of AI's role in education, and the integration of AI tools in teaching. By identifying knowledge gaps and utilization barriers of AI, the study aims to inform policies and practices that effectively harness AI's potential in higher education. This knowledge will certainly aid in bridging the gap between emerging AI technologies and their practical application in college education, ultimately contributing to a more innovative and effective learning environment.

Objectives of the Study

- To assess the level of AI awareness and its utilization in classroom teaching of college teachers.
- To compare mean scores of AI Awareness and Utilization in classroom teaching of college Teachers with respect to Gender, Age, and Types of Colleges.
- To study the influence of Gender, Age, Types of Colleges and their various interactions on AI Awareness and its utilisation of College Teachers of North Bengal.

Hypothesis

H_01:   There is no significant difference in the mean scores of AI Awareness and Utilization of College Teachers with respect to Gender, Age, and Types of Colleges.

H_02:   There is no significant influence of Gender, Age, Types of Colleges and their various interactions on AI Awareness and its utilisation of College Teachers of North Bengal.

Methodology

- **Research Method:** The study used a Descriptive Survey Method.
- **Population, Sampling Technique and Sample:** All the college teachers from North Bengal formed the population of the study. Using a stratified Random sampling technique, 333 college teachers were considered the sample of the study.
- **Variables:** AI awareness and utilization of college Teachers isa continuous variable, while gender, age and types of colleges are discrete variables.
- **Tools used for data collection:** The data were collected with the help of the AI Awareness and Utilization Scale (AIAUS) developed by Magdeline Singh (2024). The scale consists of a total of 16 items spread over four dimensions: i) awareness of AI in Education, ii) Utilization of AI in classroom teaching, iii) Use of educational AI Applications, and iv) Perception and challenges of AI in Classroom teaching.

Data Analysis and Interpretation

- **Level of AI-Awareness and its utilization in education among college teachers**

To study objective 1 and to find out the different levels of AI awareness and its utilization in classroom teaching among college teachers, the investigator converted all the raw scores to a z-score range from high, to average and low. The result of which is shown in Table 1 and Figure 1.

Table 1: Levels of AI-Awareness and its utilization in classroom teaching among college teachers

Levels	z-score range	Obtained scores	N	Percentage
High	+0.51 and above	66-81	33	10%
Average	-0.50 to +0.50	50-65	167	50%
Low	-0.51 and below	34-49	133	40%
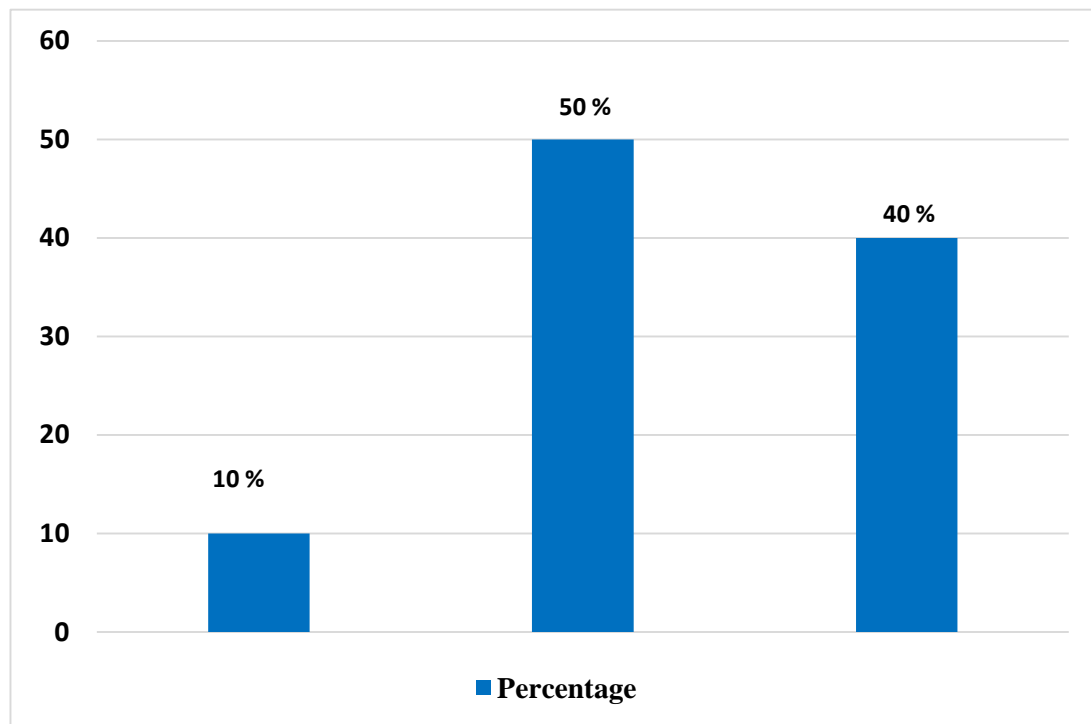
Figure 1: Levels of AI-Awareness and its utilization of college teachers

Interpretation

From Table 1 and Figure 1, it can be seen that 10 % of college teachers have a high level of AI awareness and its utilization in classroom teaching, whose z-score is positive and ranges from +0.51 and above, and the obtained scores range from 66 to 81. It indicates that this group of college teachers have data points above the mean of the sample group, where the Mean is 58.55, with an SD of 12.39. This group of college teachers have a high level of AI awareness. They are aware of the concept of AI and are knowledgeable about the latest developments and research in AI for classroom teaching. These college teachers have the potential to integrate AI-driven personalized learning tools and apps for classroom teaching. They also use AI tools for grading and tracking student's progress and encourage students to use AI for their learning and assignments. These teachers attend workshops or training sessions on the use of AI in education. They were found to be confident in their ability to effectively integrate the applications of AI in their teaching.

Further, Table 1 and figure 1 show, that 50 % of the college teachers, which comprised the majority of the sample group were found to have an average level of AI awareness and its utilization in classroom teaching, whose z-score ranges from -0.50 to +0.50, and the obtained scores range from 50 to 65. It indicates that these college teachers have data points in and around the mean of the sample group, where the Mean is 58.55, with an SD of 12.39. This group of teachers have moderate AI awareness and its utilization in classroom teaching. However, they lack extensive practical applications and utilization of AI tools and apps for daily classroom teaching.

Further Table 1, shows that 40 % of college teachers have low levels of AI awareness and its utilization in classroom teaching, whose z-score is negative and ranges from -0.51 and below, and the obtained raw scores range from 34 to 49. It indicates that these college teachers have data points less than the mean of the sample group, where the Mean is 58.55, with an SD of 12.39. These college teachers lacked the potential to integrate AI-driven personalized learning tools and apps for classroom teaching. They rarely used AI tools for grading and tracking student's progress, and they seldom encouraged students to use AI for their learning and assignments. They do not attend any workshops or training sessions on the use of AI in education. Thus, they lack the confidence to effectively integrate the applications of AI in their teaching.

The study found that only 10% of college teachers in North Bengal had a high level of AI awareness and its utilization for classroom teaching, while 50 % demonstrated an average level and 40% had a low level. This indicates a significant disparity in AI Awareness and its utilization among college teachers in the region, with the majority having low to average awareness and only a small percentage possessing high awareness. Consequently, AI awareness and its utilization remain relatively unpopular among college teachers in North Bengal.

- **Comparison of Mean Scores of AI -Awareness and Utilization of College Teachers with respect to Gender, Age, and Types of Colleges.**

        To study objective 2 and to determine the mean difference in AI awareness and utilization of college teachers with respect to gender, age and types of colleges, the investigator uses a t-test, the result of which is shown in Table 2.

Table 2: Summary of Gender, Age and College wise N, Mean, SD, 't'-value of AI Awareness and Utilization in Classroom Teaching of College teachers

Variance		N	Mean	SD	SE$_D$	df	t-value	Significance Level 0.01
Gender	Male	143	58.29	14.40	0.38	331	5.02	Significant
	Female	190	56.38	10.59				
Age	30 -45 years	223	58.10	11.79	0.41	331	11.97	Significant
	46-60 years	110	53.19	13.69				
Types of College	Government	236	57.21	12.73	0.37	331	5.16	Significant
	Private	97	59.12	9.63				

df=331, 0.05=1.97, **0.01=2.59**

Interpretation

        From Table 2, it is evident that the calculated 't'-value for gender is 5.02 which is higher than the critical 't'-value 2.59, and is significant at 0.01 level of significance with 331df. Thus, the null hypothesis that there is no significant difference in the mean scores of AI awareness and utilization of male and female college teachers is rejected. Hence, it can be stated that there is a significant difference in the mean scores of male and female college teachers of North Bengal. Further, the mean score of AI awareness and utilization of male teachers is found to be 58.29 which is higher than that of female college teachers, whose mean score is 56.38. Thus, it can be said that male college teachers were found to have better AI awareness and its utilization for classroom teaching than female teachers.

        Further, from Table 2, it is shown that the calculated 't'-value for age is 11.97 which is higher than the critical 't'-value 2.59, and is significant at 0.01 level of significance with 331 df. Thus, the null hypothesis that there is no significant difference in the mean scores of AI awareness and utilization of college teachers between the age group of 30 to 45 years and 46 to 60 years is rejected. Hence, it can be stated that there is a significant difference in the mean scores of college teachers of North Bengal based on their age. Further, the mean score of AI awareness and utilization of teachers between the age group of 30 to 45 years is found to be 58.10 which is higher than that of college teachers between the age group of 46 to 60 years, whose mean score is 53.19. Thus, it can be said that college teachers between the age group of 30 to 46 years were found to have better AI awareness and its utilization for classroom teaching than teachers between the age group of 46 to 60 years.

        Further, from Table 2, it is evident that the calculated 't'-value for types of college is 5.16 which is higher than the critical 't'-value 2.59, and is significant at 0.01 significance level with 331df. Thus, the null hypothesis that there is no significant difference in the mean scores of AI awareness and utilization of government and private college teachers is rejected. Hence, it can be stated that there is a significant difference in the mean scores of government and private college teachers of North Bengal. Further, the mean score of AI awareness and utilization of government college is 57.21, which is less than that of private college teachers, whose mean score is 59.12. Thus, it can be said that private college teachers were found to have better AI awareness and utilization for classroom teaching than government college teachers.

- **Influence of Gender, Age, Types of Colleges and their various interactions on AI Awareness and its utilisation of College Teachers of North Bengal.**

        To study objective 3 and to determine the influence of gender, age, types of colleges and their various interactions on AI awareness and its utilisation of college teachers of North Bengal, the

investigator used 2x2x2 Factorial Design ANOVA. There are three independent variables- gender, age and types of colleges. Gender has two levels: male and female; age has two levels; 30 to 45 years and 46 to 60 years; and, types of colleges have two levels: government and private. Hence, the data were analysed with the help of 2x2x2 Factorial Design ANOVA. The researcher ensured the assumption of homogeneity of variance. The assumption of homogeneity of variance was tested by applying Leven's test of equality. The calculated p-values for gender, age, and types of colleges were found to be 0.45, 0.56, and 0.31 which are greater than 0.05. Hence, the sample is considered to be homogeneous. The summary of the results of 2x2x2 Factorial Design ANOVA is shown in Table 3.

Table 3: Summary of 2x2x2 Factorial Design ANOVA

Source of Variance	Sum of Squares	df	Mean of Squares	F-value	Significance level 0.05
Gender (A)	365.32	1	365.32	4.94	*
Age (B)	855.34	1	855.34	6.16	*
Types of Colleges (C)	542.31	1	542.31	3.91	*
AXB	246.75	1	246.75	1.77	**NS**
AXC	117.56	1	117.56	0.84	**NS**
BXC	711.03	1	711.03	5.12	*
AXBXC	105.21	1	105.21	0.75	**NS**
Error	43267.12	312	138.68		
Total	46530.64	319			

* Significant   df=312, **0.05 =3.87,** 0.01=6.72

NS – Not Significant

Interpretation

- **Influence of gender on AI awareness and its utilization of college teachers**

From Table 3, it can be seen that the F-value for gender is 4.94, which is higher than the table F-value of 3.87, and is significant at 0.05 level with 312 df. Thus, the null hypothesis that there is no significant influence of gender on AI awareness and its utilization of college teachers is rejected. Hence, it can be stated that there is a significant difference in the mean scores of AI awareness and its utilization of male and female college teachers. Further, the data were analyzed with the help of the t-test to find out which type of gender had a significant influence on awareness and its utilization. The result revealed that the mean score of AI-awareness and utilization of male teachers is found to be 58.29 which is higher than that of female college teachers, whose mean score is 56.38. Thus, it can be said that male college teachers were found to have better AI awareness and its utilization for classroom teaching than female teachers. *It may therefore be said, that Gender had a significant influence on AI awareness and utilization among college teachers in North Bengal.*

- **Influence of age on AI awareness and its utilization of college teachers**

Further, Table 3 shows, it can be seen that the F-value for age is 6.16, which is higher than the table F-value of 3.87, and is significant at 0.05 level with 312 df. Thus, the null hypothesis that there is no significant influence of age on AI- awareness and its utilization of college teachers between the age group of 30 to 45 years and 46 to 60 years is rejected. Hence, it indicates that there is a significant difference in the mean scores of AI awareness and utilization of college teachers between the age group of 30 to 45 years and 46 to 60 years. Further, the data were analyzed with the help of the t-test to find out which age group of teachers had a significant influence on awareness and its utilization. The result revealed that the mean score of AI awareness and utilization of teachers between the age group of 30 to 45 years is found to be 58.10 which is higher than that of college teachers between the age group of 46 to 60 years, whose mean score is 53.19. Thus, it can be said that college teachers between the age group of 30 to 46 years were found to have better AI- awareness and its utilization than teachers between the age group of 46 to 60 years. *It may therefore be said that Age had a significant influence on AI awareness and utilization among college teachers in North Bengal.*

- **Influence of types of colleges on ai awareness and its utilization of college teachers**

Further, from Table 3, it can be seen that the F-value for types of colleges is 3.91, which is higher than the table F-value 3.87, and is significant at 0.05 level with 312 df. Thus, the null hypothesis that there is no significant influence of types of colleges on AI Awareness and its utilization of college teachers is rejected. Hence, it indicates that there is a significant difference in the mean scores of AI awareness and its utilization of government and private college teachers. Further, the data were

analyzed with the help of the t-test to find out which types of colleges had a significant influence on AI awareness and its utilization. The result revealed that the mean score of AI awareness and utilization of government colleges is 57.21, which is less than that of private college teachers, whose mean score is 59.12. Thus, it can be said that private college teachers were found to have a better awareness of AI and its utilization for classroom teaching than government college teachers. *It may therefore be said that the types of colleges had a significant influence on AI awareness and utilization among college teachers in North Bengal.*

- **Influence of interaction between gender(A) and age (B)on AI awareness and its utilization of college teachers**

     Further, Table 3 shows, that the F-value for the influence of interaction between gender and age of college teachers is 1.77, which is less than the critical F-value 3.87, and is not significant at 0.05 level with 312 df. Thus, the null hypothesis, that there is no significant influence of the interaction between gender and age on AI awareness and utilization of college teachers is retained. Thus, it indicates that there is no significant influence of the interaction of gender and age on AI awareness and utilization of college teachers. *It may therefore be said that AI awareness and utilization of college teachers remained independent of the influence of interaction between gender and age.*

- **Influence of interaction between gender(A) and types of colleges (C) on AIawareness and its utilization of college teachers**

     Further, Table 3 shows, that the F-value for the influence of interaction between gender and age of college teachers is 0.84, which is less than the critical F-value 3.87, and is not significant at 0.05 level with 312 df. Thus, the null hypothesis, that there is no significant influence of interaction between gender and types of colleges on AI awareness and utilization of college teachers is retained. Thus, it indicates that there was no significant influence of interaction between gender and types of colleges on AI awareness and utilization of college teachers. *It may therefore be said that AI awareness and utilization of college teachers remained independent of the influence of interaction between gender and types of colleges in North Bengal.*

- **Influence of interaction between age (B) and types of colleges (C) on AI awareness and their interaction on AI awareness and its utilization of college teachers**

     Further, Table 3 shows, that the F-value for the influence of interaction between age and types of colleges is 5.12, which is higher than the table F-value 3.87, and is significant at 0.05 level with 312 df. Thus, the null hypothesis, that there is no significant influence of interaction between age and types of colleges on AI awareness and its utilization is rejected. Thus, it indicates that there was a significant influence of interaction between the age and types of colleges on AI awareness and utilization of college teachers. The study further reported that college teachers between the age group of 30 to 45 years working in private colleges had better AI awareness and its utilization than the teachers of the same age group working in government colleges. *It may therefore be said that AI awareness and utilization of college teachers in North Bengal significantly influenced by the interaction of age and types of colleges.*

- **Influence of interaction among gender(A), age (B), and types of colleges (C)and their interactions on AI awareness and utilization of college teachers (A$\times$B$\times$C)**

     Further, Table 3 shows, that the F-value for the influence of interaction among gender, age, and types of colleges is 0.75, which is less than the critical F-value 3.87, and is not significant at 0.05 level with 312 df. Thus, the null hypothesis, that there is no significant influence of interaction among gender, age, and types of colleges on AI awareness and utilization of college teachers is retained. Hence, it can be stated that there was no significant influence of interaction among gender, age, and types of schools on AI awareness and utilization of college teachers. *It may therefore be said that AI-awareness and utilization of college teachers remained independent of the influence of interaction among gender, age and types of schools in North Bengal.*

Findings and Discussion

     The study found that only 10% of college teachers in North Bengal had a high level of AI awareness and its utilization for classroom teaching. In contrast, 50 % demonstrated an average level, and 40% had a low level of awareness and usage. This indicates a significant disparity in AI awareness and its utilization among college teachers in the region, with the majority having low to average awareness and only a small percentage possessing high awareness. Thus, AI awareness and its utilization remain relatively unpopular among college teachers of North Bengal. According to Venkatesh

and Davis (2000), the perceived ease of use and perceived usefulness are critical determinants of technology adoption, suggesting that many teachers may not yet recognize the benefits or feel confident in using AI in the classrooms. Furthermore, the low level of AI utilization among a significant portion of teachers aligns with the findings of Zhao and Frank (2003), who noted that teachers often face barriers such as lack of training, resources, and support, which can hinder the effective integration of new technologies in education.

The study further reported that male college teachers had better AI awareness and its utilization for classroom teaching compared to female teachers. The difference in AI awareness and utilization between male and female teachers suggests a potential gender gap in access to or engagement with AI technologies. Previous research has shown that gender differences in technology adoption can be influenced by various factors, including societal norms, access to resources, and confidence levels. Venkatesh and Morris (2000) found that men are generally more likely to adopt new technologies due to higher self-efficiency and perceived usefulness. Additionally, Stoat and Geary (2020), highlighted that women often face barriers in STEM fields, which can extend to the adoption of AI technologies in education.

The study further found that college teachers aged between 30 to 45 years showed better AI awareness and its utilization for classroom teaching than those aged 46 to 60 years. The higher AI awareness and utilization among younger college teachers (30 to 45 years) compared to their older counterparts (46 to 60 years) indicates a generation shift in technology adoption. Younger teachers might be more familiar with or open to integrating more technologies into their teaching practices. According to Czaja and Sharit (2012), young adults are typically more comfortable with technology due to their familiarity and frequent use, while older adults may face challenges due to limited exposure and potential anxiety about using new technologies. This trend is supported by Morris and Venkatesh (2000), who found that younger individuals are more likely to adopt new technologies due to their perceived ease of use and usefulness.

Private college teachers demonstrated better AI awareness and its utilization for classroom teaching than government college teachers. The differences reflect institutional priorities and administrative support to incorporate of AI-support system in classroom teaching. Private institutions may have the flexibility to invest in AI technologies and training. Enhancing AI adoption in government colleges might require policy intervention, increased funding, and a focus on creating supportive environments for technology integration. As per Tierney and Hentschke (2007), private institutions often have flexible financial resources and autonomy to invest in cutting-edge technologies and training programs. Conversely, government colleges may face budget constraints and bureaucratic hurdles that limit their ability to adopt new technologies (Altbach et.al., 2009).

The study found that gender, age, and types of colleges significantly influenced AI awareness and its utilization. Specifically, male teachers, teachers aged group between 30 to 45 years, and those working in private colleges demonstrated higher AI awareness and its utilization. However, the influence of gender and its interaction with age or types of college was not significant. Similarly, the combined influences of gender, age and types of colleges were also not significant. The findings are in line with the findings of Morris and Venkatesh (2000), who found that younger individuals are more likely to adopt new technologies. Additionally, private colleges often have the flexibility to invest in technological advances, which could explain the higher AI awareness and utilization among teachers in these institutions (Tierney and Hentschke, 2007). However, there was no significant influence of the interaction of gender, age and types of colleges. This may suggest that gender, institutional and generational factors are more critical determinants in this context.

Conclusion

This study highlights a significant disparity in AI awareness and its utilization among college teachers in North Bengal, with only 10 % of teachers demonstrating high levels of AI integration in classroom teaching. The majority exhibited low to average awareness, pointing to a need for enhanced AI-related training and resources. Male teachers, younger teachers (aged 30 to 45), and private college teachers showed higher AI awareness and usage, suggesting that these groups have better access to engagement with AI technologies. These findings underscore the need for targeted interventions, such as professional development programs and increased funding, particularly in government institutions, to bridge the AI awareness gap. Addressing these disparities is crucial for enhancing the effective integration of AI technologies in education, which can benefit both teachers and students both in the present and future.

References

1. Altbach, P. G., Reisberg, L., & Rumbley, L. E. (2009). *Trends in global higher education: Tracking an academic revolution*. UNESCO.

2. Anderson, J., & Rainie, L. (2020). The future of artificial intelligence and learning. *Pew Research Centre*. Retrieved from https://www.pewresearch.org

3. Baker, R. S. J. d., & Inventado, P. S. (2014). Educational data mining and learning analytics. In *Learning Analytics: Foundations, applications, and challenges* (pp. 61-75). Springer.

4. Baker, R. S., Rodrigo, M. M. T., Xolocotzin, U., Rossi, L. M., Ocumpaugh, J., & Gowda, S. M. (2019). Designing online learning tools for nontraditional students and nontraditional learning environments. In A. Peña-Ayala (Ed.), Intelligent Systems for Science and Information: Extended and Selected Results from the Science and Information Conference 2013 (pp. 187-205). Springer.

5. Blikstein, P. (2018). Artificial intelligence and the future of education. *International Journal of Artificial Intelligence in Education*, 28(1), 1-8.

6. Czaja, S. J., & Sharit, J. (2012). *Designing training and instructional programs for older adults*. CRC Press.

7. Hodges, C., & Senger, J. (2020). Teachers' attitudes toward artificial intelligence: Evidence from a U.S. nationwide survey. *Journal of Research on Technology in Education*, 52(4), 495-511.

8. Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Centre for Curriculum Redesign.

9. Kay, R. H., Knaack, L., & Petrarca, D. (2009). Exploring gender differences in computer-related behaviour: Past, present, and future. *Computers & Education*, 54(2), 372-378.

10. Lee, M. J. W., & Wong, G. K. W. (2021). Exploring the roles of teacher beliefs in the use of AI in education: A case of classroom AI. *Computers & Education*, 162, Article 104070.

11. Lu, X., Huang, X., & Azimi, S. (2018). The potential of intelligent tutoring systems in higher education: A comprehensive review. *Journal of Educational Technology & Society*, 21(4),

12. McCarthy, J. (1956). Proposal for the Dartmouth Summer Research Project on Artificial Intelligence. Retrieved from https://jmc.stanford.edu

13. Morris, M. G., & Venkatesh, V. (2000). Age differences in technology adoption decisions: Implications for a changing work force. *Personnel Psychology*, 53(2), 375-403.

14. Nawaz, M., & Gomes, A. (2019). Predictive analytics in higher education: A systematic literature review. *Journal of Educational Data Mining*, 11(1), 18-47.

15. Nawaz, M., & Gomes, A. (2019). Predictive analytics in higher education: A systematic literature review. *Journal of Educational Data Mining*, 11(1), 18-47.

16. OECD. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. OECD Publishing.

17. Picciano, A. G. (2021). The role of artificial intelligence in teaching and learning in higher education: A literature review. Journal of Educational Technology Systems, 49(4), 500-518. https://doi.org/10.1177/00472395211017057

18. Russell, S., & Norvig, P. (2022). Artificial Intelligence: A Modern Approach (5th ed.). Pearson Education.

19. Stoet, G., & Geary, D. C. (2020). The gender-equality paradox in STEM education. *Psychological Science*, 29(4), 581-593.

20. Tanes, Z., Arnold, K. E., & King, A. (2020). AI in higher education: The importance of institutional culture and context. *EDUCAUSE Review*. Retrieved from https://er.educause.edu/articles/2020/6/ai-in-higher-education-the-importance-of-institutional-culture-and-context

21. Tierney, W. G., & Hentschke, G. C. (2007). *New players, different game: Understanding the rise of for-profit colleges and universities*. Johns Hopkins University Press.

22. Tuomi, I. (2018). The impact of artificial intelligence on learning, teaching, and education: Policies for the future. *JRC Science for Policy Report*.

23.   VanLehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. Educational Psychologist, 46(4), 197-221. https://doi.org/10.1080/00461520.2011.611369

24.   Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204. https://doi.org/10.1287/mnsc.46.2.186.11926

25.   Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behaviour. *MIS Quarterly*, 24(1), 115-139.

26.   Voogt, J., Roblin, N. P., van Braak, J., &Tondeur, J. (2019). Technological pedagogical content knowledge – a review of empirical research published in 2005–2014. *Educational Research Review*, 27, 135-152.

27.   Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – Where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 39. https://doi.org/10.1186/s41239-019-0177-0

28.   Zhao, Y., & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Research Journal*, 40(4), 807-840. https://doi.org/10.3102/00028312040004807.

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