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Generative AI Integration in Indian Classroom: A Study on Teacher's Perception

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ABSTRACT

This study was conducted to understand the perception of school-teachers towards integration of Generative Artificial Intelligence (GAI) in education. Data was collected from 240 teachers in urban and rural Bengaluru. The survey was open to all boards (State, CBSE, ICSE, IGCSE, and IB), across teaching levels ranging from elementary- school to secondary- school, and for teachers of varying years of experience. Convenient sampling was used to collect the data and a mixed approach was employed to analyze it. An open-ended question was asked to determine the common barriers to GAI integration in Indian classrooms. Their responses were analyzed using a qualitative approach. Among participants who use GAI, a survey was conducted to find their perceptions. The major barriers discovered are unfamiliarity, lack of interest, inadequate training and resources, and the belief that GAI does not help in education. It was also found that board of school or years of experience do not have an impact on the perception of teachers. But there is a difference in their perception across levels of teaching.

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Introduction

The onset of Generative Artificial Intelligence (GAI) has sparked a revolution in the field of technology as well as education, bringing in a new age of innovation (Koh & Doroudi, 2023).

Researchers interested in AI have worked continuously to create generative models that can generate text, music, speech, and other media. The advancements in recent years have made GAI more accessible to the general public. This marked a steep rise in the use of GAI as it allows users to create content at a speed and accuracy that was not possible before (Łodzikowski et al., 2024).

GAI refers to a type of AI technology that is capable of creating new content, such as text, images, music, or videos, based on patterns and data it has been trained on. GAI models, like large language models such as GPT-3 and ChatGPT, have the ability to generate human-like responses and content. These models have varied applications, some of which include language translation, content creation, chatbots, and personalized learning experiences.

The field of education also has experienced significant transformations brought about by advancements in Artificial Intelligence (aaaa et al., 2024). GAI has revolutionized teaching and learning in education by offering personalized learning experiences, automating assessments for instant feedback, providing enhanced teaching tools like chatbots and virtual assistants, improving accessibility for diverse learners, enabling predictive analytics for student success interventions, and creating innovative learning experiences through Virtual Reality (VR) and simulations. These advancements have transformed traditional teaching methods, making education more engaging, efficient, and tailored to individual student needs, ultimately enhancing the overall learning experience for both students and educators (Zawacki-Richter et al., 2019).

The rapid advancements in AI tools like ChatGPT and others, along with their frequent media coverage, have resulted in more educators utilizing and integrating them. They are quickly adopting artificial intelligence (AI) in various forms for teaching or as a pedagogical tool(Chen et al., 2020). A positive attitude towards using AI among the teachers was observed by Chiu(2023).

Even though GAI has gained popularity within academia, several educators have expressed concerns regarding AI. Teachers have voiced worries about things like the potential for online exam cheating, and the chances of hindering pupils' ability to acquire critical thinking abilities by the frequent use of tools like ChatGPT (Mosaiyebzadeh et al., 2023). While some educators are more open to their pupils using the app to do homework, others are less amenable and may even modify their evaluations (Chiu, 2023).

The integration and adoption of technology in classrooms largely depend on the teachers' perception. This is also true for GAI. The educators who use GAI more regularly develop a positive

attitude toward it (Kaplan-Rakowski et al., 2023). So, it is crucial to study their attitudes and perspectives towards integrating GAI into the teaching and learning process.

Understanding of the potential uses and applications of GAI in educational contexts is still in its infancy (Chiu, 2023). While many studies have looked into how different stakeholders, including students and teachers, view the application of GAI in education, most studies and discussions have focused on higher education (Chiu, 2023).

Most studies about integrating AI education and digital skills in the classroom have traditionally focused on the student perspective or school and government policies (Druga et al., 2019; Lee et al., 2021). Only recently have works started investigating teachers' perspectives on K-12 AI education, exploring how to support them in implementing AI teaching (Polak et al., 2022).

Teachers play a pivotal role in shaping the educational experiences of students and are key stakeholders in the integration of GAI technologies in the classroom (Kaplan-Rakowski et al., 2023). Therefore, understanding teachers' perspectives on Generative AI is crucial for identifying opportunities for professional development, addressing concerns related to AI adoption, and enhancing the effectiveness of AI-driven teaching practices. By exploring how educators perceive and engage with GAI tools like ChatGPT and others, we can gain valuable insights into the challenges and opportunities associated with AI integration in an educational context.

From the available research, it was found that there was no study conducted to understand the perception of teachers in Indian Schools on the use of GAI.

Research Questions

1. Have teachers used GAI?
2. What are the reasons for teachers not using GAI?
3. What are the teachers' perceptions of GAI integration in education concerning their level of teaching?

Review of Literature

The phrase 'artificial intelligence' was first used in John McCarthy's research paper "A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence" in 1955 (Cope et al., 2021). Artificial intelligence may be summed up as ''developing computers to operate in ways which can be considered smart similar to humans'' (McCarthy et al., 1955). It benefits industries by automating

operations, simplifying processes, and improving effectiveness, leading to cost savings and higher production in the field of healthcare, media, and entertainment through personalized suggestions and services. It also influences banking and financial services, urbanization and planning for cities, environmental surveillance, and climate modeling (Kabudi et al., 2021).

In response to sophisticated inputs, GAI uses machine learning algorithms to produce human-like material (Michel-Villarreal et al., 2023; Harry, 2023;;Cope et al., 2021) . This is an important catalyst for educational transformation in general, and therefore, prevents a scenario in which GAI turns into a "*Ragnarök*" that spells doom for the future education (Lim et al., 2023). Based on existing educational data and enhanced communication via chatbots and conversational agents, personalized learning experiences are provided to each student corresponding to their needs. This is one of the most important components of GAI in education (Prather et al., 2023).

The GAI tools, like Grammarly, Microsoft Copilot, and others, produce images and videos to help explain concepts more clearly. It simplifies automated processes, such as assigning grades and giving students immediate feedback, saving teachers' time. It encouraged the use of cutting-edge teaching strategies like virtual tutors to raise student engagement. It improved learning outcomes, prepared teachers for their future careers, and increased task authenticity by simulating real-world situations. (Moorhouse et al., 2023).

Lesson planning and delivery is one of the major areas where GAI can be of assistance to educators. AI is already being used by educators to create content, identify key topics to discuss, and provide ideas for presentations. AI may also assist in creating lesson plans, including adding information to slides and proposing activities that would increase student participation. (Barros et al., 2023).

ChatGPT can also be helpful for novice teachers who have little pedagogical expertise. It can provide suggestions for thought-provoking exercises, talks, and materials to improve the course material. With its extensive data sources, ChatGPT can offer tailored learning and individual learning settings. Educators can use ChatGPT to get guidance and help based on their unique learning needs (Mosaiyebzadeh et al., 2023; Chen et al., 2020).

When it comes to the assessment process, teachers are now choosing modified tests that promote critical thinking and anticipate the deployment of AI (Smolansky et al., 2023). With GAI tools like ChatGPT, it is feasible to automate the process of creating assessment items in order to grade student

work and offer feedback. It can also be utilized to assess written assignments, offer helpful criticism, and make recommendations for how to make them better (Mosaiyebzadeh et al., 2023; Chen et al., 2020). AI has the potential to enhance the efficacy of assessment techniques and provide valuable insights into students' engagement and comprehension of the material (Barros et al., 2023). The professional development of teachers also can be aided by ChatGPT. It assists by offering fresh teaching concepts, such as self-regulated learning tasks and activities, and learning design methodologies (Chiu, 2023).

Overall, GAI is beneficial for both teachers and students in increasing the educational experience in learning, problem-solving, decision-making, and natural language processing (Mørch & Andersen, n.d.). GAI has resided in its capacity to fundamentally alter how teaching and learning take place in educational environments. It creates new opportunities for enhancing educational experiences for students of all ages and provides creative answers to persistent problems in education. GAI opened the door to a more effective, inclusive, and engaging learning environment by offering individualised instruction, improved feedback, and customised learning experiences. The various uses of GAI, such as intelligent tutoring systems, personalised learning support, and assessment. Recent research sheds light on the current state of the GAI in the education toolkit, that ChatGPT is emerging as the most popular GAI tool (Bahroun et al., 2023). By offering substitute resources for a range of learning styles, GAI improves accessibility in online learning and increases academic productivity with the rapid growth of ChatGPT and other tools (Prather et al.,2023). All things considered, generative AI in education promotes individualized and effective learning environments, stimulating creativity and meeting a range of student needs in classrooms (Prather et al.,2023).

Chiu (2023) suggests teacher learning as an outcome of integrating AI. The three categories under teacher learning considered by the researcher include attitude toward AI, working efficiency, and teaching competency. It was found that, about working efficiently, the result relates to activities like auto-grading, course enrolment, online classroom management, and student attendance that can lessen the workload of teachers. Enhancing teaching competency involves providing educators with fresh ideas and perspectives and promoting introspection, both of which are facilitated. Additionally, a positive attitude towards AI among the teachers was observed. The majority of teachers enjoyed and found teaching with these new AI tools:like ChatGPT to be engaging. They're interested in finding out more about pedagogies and technology.

As mentioned above effective integration of GAI starts with the attitude with which it is approached. An individual's attitude is greatly influenced by their perspective of something. When it comes to technology integration, it is noticed that the more the usage of GAI is, the more the teachers' perspectives become optimistic. Now, quite a few teachers think that GAI could be a useful tool for students, and for their professional development (Kaplan-Rakowski et al., 2023). The teachers also felt that by using AI, they could actually capture the student's attention and interest to learn new content in a simplified manner. Teachers use AI in particular to help promote academic integrity through the use of plagiarism detectors, proctoring, and online monitoring of students' actions (Chen et al., 2020).

Going beyond educational institutions, AI has also been used by researchers. An AI tool may skillfully and efficiently do duties like language editing which was formerly a significant part of the work involved in preparing a journal manuscript submission. Also, it can help writers communicate their thoughts more clearly in a language that may not be their native language. But the concern here is, since anyone may now use a tool to prepare (major) portions of their publications, generative AI will serve to accelerate the growth of irrelevant and/or poor research as well as the submission of irrelevant and/or inadequate manuscripts (Barros et al., 2023).

The world is now heading towards Digital Transformation of Education (DTE) due to its advantages like efficiency, convenience of all stakeholders, and easily reproducible services. Petricini et al. (2022) additionally highlights the advantages of AI in education, specifically ChatGPT. ChatGPT offers individualised coaching based on each student's unique learning needs, formative assessment tasks with continuous feedback, and personalised and interactive learning experiences. Its adaptability may be applied to language translation, interactive learning, adaptive learning, and automated essay grading, all of which improve teaching strategies and student outcomes.

The importance of GAI cannot be ignored when moving toward DTE. The majority of scholars from China also support integrating GAI in education as it can be a tool to personalize the educational experience, therefore making it an excellent learning tool (Liu et al., 2023). In the paper, they emphasized that GIA should be used with caution as sometimes the contents would not be accurate or reliable. It must be emphasised that tools, such as ChatGPT and GPT-4, have the potential to completely change the way education is viewed and can lead to discoveries of new forms of educational delivery (Chung et al., 2023).

In teacher education institutions also teacher educators are investigating the ways through which they could incorporate GAI tools to transform assignments, evaluation, and subject matter expertise. It is necessary to work towards improving educators' comprehension of GAI functions and encouraging the use of cutting-edge assessment techniques (Nyaaba & Zhai, 2024). GAI technologies like resources for individualised education, AI-driven tutoring programmes, applications of augmented and virtual reality in education, tools for natural language processing in language acquisition, platforms for adaptive learning, predictive modeling, and data analytics for assessing student performance helped to increase the general efficiency of educational processes by automating administrative tasks and conducting insights-gathering analyses on large datasets (Chung et al., 2023).

The main scope of GAI is the advancement of ChatGPT as it offers a scope for improvement in all aspects of curricular as well as extra-curricular activities in students as well as in the growth of teachers to create individualized learning methodologies and techniques for all the learners. It offers personalized learning assistance according to individual student needs and learning styles. It also recommends many customized resources for learners of all types to improve their comprehension and retention. The concept of "AI Collaboration" is very popular in today's generation as it emphasizes effective cooperation between AI systems and humans, aiming to shift towards "meaningful learning" by enabling teachers to play a unique role in education through mutual goal understanding and shared progress tracking. It also highlights the importance of teachers enhancing and improving their skills to nurture high-quality students, adapt to technological advancements, and utilise AI benefits by becoming knowledgeable experts in information technology and creativity. ChatGPT serves as a learning assistant for the whole education system, providing personalized guidance to students through machine learning capabilities like robots, enabling autonomous learning, content selection based on interests, and additional support beyond traditional teaching methods. The integration of generative AI technologies like ChatGPT presents a significant and important opportunity for educational reform by supporting student learning, helping educators adapt teaching practices, and fostering a more engaging and effective learning environment (Liu et al., 2023). In conclusion, the scope of generative AI in education, encompasses personalized learning support, teacher-AI collaboration, enhanced teacher skills, student-AI collaboration, and the potential for educational transformation through the integration of GAI technologies like ChatGPT.

Fear and Barrier about the Generative Artificial Usage

Despite the wide popularity of Generative Artificial Intelligence (GAI) in various fields, there are rising concerns on privacy, ethical data collection, and data protection (Wang & Cheng, 2021). It was found that ChatGPT lacks proper information quality control which could lead to irrelevant or even offensive responses (Ziemba, 2023). It is also observed that AI has the potential to disrupt industries that rely on less creativity and critical thinking, causing economic instability and job fluctuations (Chen, 2023).

The educational sector has also raised concerns such as GAI widening the digital divide, exacerbating educational inequalities(Wang & Cheng, 2021), and the subversion of conventional standards of authenticity and creativity in writing (Farrelly, T., & Baker, N., 2023). Other limitations on the lines of quality of training data, output ability, and authenticity, may hinder its effective integration into education (Wang & Cheng, 2021). The effectiveness of AI models is heavily reliant on the data used during its development and the techniques employed to refine it, both of which may harbor human biases.

The impact of artificial intelligence tools on academics is often misunderstood and has sparked apprehension, scepticism, and predictions. These concerns make the academic sector vulnerable to the claims of businesses promoting AI solutions as quick fixes, which often fail to deliver on their promises (Farrelly, T., & Baker, N., 2023).

Despite AI's wide range of applications in teaching and learning, teachers raised concerns about losing their jobs due to the increased role of AI in education. Some of them fear that the AI programs may eventually take over human educators, a scenario that can lead to job insecurity (Tao et al., 2019). Similar findings are also given by Cardoso, A. M. L. (2023). Teachers expressed fears and concerns about their jobs being taken up by robots or machines and thus felt anxious about becoming unemployed. Also, teachers fear diminished human interaction which could have adverse effects on students' social and emotional development more specifically. They feel that students still need the personal touch with teachers and that AI cannot completely substitute for the emotional bond created by human teachers (Tyson, M., 2020). Some educators are also concerned about how the learning opportunities created by AI can influence interactions between students and teachers and affect the students' growth of social skills. These fears and concerns echo previous studies showing ignorance

about AI leading to passive or aggressive attitudes towards artificial intelligence (Cardoso, A. M. L., 2022).

Since late 2022, AI tools such as ChatGPT, Google's Bard, and others have been rapidly gaining popularity. Several teachers experimented with these tools to modify their methods of instruction and create new avenues for student engagement (Barros et al., 2023). There is another population of teachers who have not tried GAI tools in the teaching and learning process. Kaplan-Rakowski et al. (2023) found that the obstacle for educators who have not used ChatGPT is their ignorance of how simple and quick it is to become proficient with GAI which the researchers suggest can be resolved through professional development initiatives.

Understanding the potential applications and uses of GAI in educational settings is still in its infancy. The majority of research and conversations have taken place in the realm of higher education. However, school pupils are younger teenagers than university students, and schools foster their cognitive and emotional intelligence. Their classroom learning is frequently supervised by teachers, and their capacity for self-regulated learning is less developed. This suggests that educators are essential in helping students learn and teach with technology in the classroom (Chiu, 2023).

Teachers are typically just involved as accessories during the implementation of AI educational research, with only a small amount of teacher cooperation occurring at this time. Rather, a larger role in the creation and application of AI educational research should go to educators and other stakeholders in education. In order to make products like ChatGPT, Bard, etc which are very useful in education, researchers and developers should incorporate varied perspectives (parents, students, administrators, and education researchers). This will also encourage the development of technologies along socially acceptable pathways (Schiff, 2021).

There has been a lot of work done on educational technology design that offers frameworks and techniques for effectively involving teachers and other stakeholders in the process. However, there are only a few researches that study the perspectives of teachers in integrating AI into education. Such a study in the Indian context is lacking in the literature.

Method

The sample size for this study consists of 250 participants. The participants were in-service teachers from schools in Bengaluru (Urban/ Rural). The study was open to all teachers from State, CBSE, ICSE,

IGCSE, and IB boards across all grade levels. Convenient sampling technique was used for the study. This technique was employed to get a general idea of how teachers perceive GAI in Bengaluru and find out what the common barriers are. The primary criterion for every participant was to be an in-service teacher in Bengaluru. A survey was conducted among teachers who have used GAI. Teachers who have not used GAI in education even once were asked to give their reasoning for not doing so.

The participation was on a voluntary basis. Data collected is kept confidential and was only used for the purpose of this study. The participants also had the right to withdraw at any phase of the study. An informed consent was also taken from all participants.

The objectives of this study are:

1. To know whether teachers have used GAI.
2. To understand the reasons why teachers have chosen to use or not use GAI.
3. To study teachers' perceptions of GAI integration with respect to their level of teaching.

H_{01}: There is no significant difference in the perception of teachers towards GAI among elementary, primary, middle, and secondary levels.

H_{a1}: There is a significant difference in the perception of teachers towards GAI among elementary, primary, middle, and secondary levels.

In this research, a study is done to understand how the variables- teaching level, years of experience, and board of school impact teachers' perception of GAI in education.

The use of educational technologies by teachers largely depends on their perception of them. The perception depends on factors like usefulness, ease of use, intention to use, anxiety, self-efficacy, confidence, personal flexibility, digital literacy, etc (Kaplan-Rakowski et al., 2023). The lack of facilities, confidence, or preparation can all contribute to a negative outlook toward technology among some teachers. This can prevent them from completely embracing and integrating ICT into their teaching practices as a result of this poor perception (Aminullah et al., 2019).

Educators at all levels are likely to see GAI as a tool to foster creativity and engage young learners while ensuring ethical behavior. Middle school teachers are finding AI useful for improving

thinking and problem-solving. They also use it to prepare their students for their future careers. Concerns about the impact of intelligence on student motivation and engagement continue to exist at all levels necessary for development and collaboration (Uygun, 2024). Therefore, teaching levels or grade levels become an important factor. The level also influences instructional strategies, curriculum design, and classroom management.

Teachers are grouped according to their years of experience to understand how their knowledge and experience influence their use of GAI. Experience impacts the teacher's knowledge, learning activities, student participation, classroom management, professional development, job satisfaction, stress, etc. It also affects many aspects of effective teaching, such as teachers' views on the benefits, limitations, and ethics of GAI. One's teaching is influenced by their experiences, differences in retention and understanding of the work they do (Uygun, 2024). Experience can also affect teachers' perceptions of their jobs and their confidence in managing different classrooms.

Different boards of schools have different governing bodies and this can influence the perception of the use of GAI in schools (Kaplan-Rakowski, R., 2023). Thus, the school board controls methods, policies, and curricula that affect the learning environment, allocation of funds, teacher-student relationships, and school culture impacts teacher behavior, instructions, and evaluation.

This study employs a mixed-method approach where both quantitative and qualitative methods are used to analyze the data. The data collected includes demographic data such as gender, region of school (urban/rural), school board (State/CBSE/ICSE/IGCSE/IB), current teaching level, years of experience, and whether they have used GAI in education or not.

If the participants have used GAI, they proceed to fill out a survey on "Teachers' Perceptions of GAI in Education", which consists of 15 items. Otherwise, they are asked to give a description of why they have not used GAI in the teaching-learning or assessment process.

Qualitative analysis of the description of barriers was done by identifying common themes. Quantitative analysis of the demographic data and survey items was done using Statistical Package for the Social Sciences (SPSS) version 27.

The survey tool used is based on a survey tool by Kaplan-Rakowski et al. (2023) namely 'Teachers' Perceptions of GAI in Education' from the research paper 'Generative AI and Teachers'

Perspectives on Its Implementation in Education'. The tool contains fifteen Likert-scale items consisting 5-point scale to express the participant's level of agreement or disagreement with statements from 1 (Strongly disagree) to 5 (Strongly agree). Some questions are also reverse-coded.

For the analysis purpose, SPSS was used. The data was tested for normality, based on which parametric or non- parametric tests were conducted.

The Shapiro-Wilk test is used to determine whether a given sample of data is representative of a population that is normally distributed (Uba et al., 2021). The Shapiro-Wilk test is important because it gives a quantitative evaluation of the data's normality, especially when used in the statistical model's outstanding analysis (DEMİR, 2022). Based on the presumption of normality in the data, we use the Shapiro-Wilk test to make well-informed decisions about the suitability of the statistical models and the validity of the conclusions (Monter-Pozos & González-Estrada, 2024). We cannot reject the null hypothesis if the test's p-value is greater than 0.05, indicating that there is no significant deviation from normality. If the p-value is less than 0.05, we reject the null hypothesis, suggesting that the data is not normally distributed (Noel, 2021).

If the data is normal, parametric test is conducted. For this test we need a continuous dependent variable and an independent categorical variable. If the independent variable has two categories, T- Test (paired or unpaired) is conducted. While analysis of Variance or ANOVA test is used to compare the means of three or more independent groups. (Delacre et al., 2020). ANOVA evaluates if the group means differ in a way that is statistically significant. The alternative hypothesis (H_{a1}) of an ANOVA is that at least one group mean differs from the others, whereas the null hypothesis (H_{01}) is that there are no significant differences between the group means (Sawyer, 2009). We can reject the null hypothesis and conclude if there are significant differences between the group means if the p-value is less than 0.05. We fail to reject the null hypothesis if the p-value exceeds 0.05 (Krishnamoorthy et al., 2007).

If the distribution of data is not normal, non- parametric test is conducted. The Kruskal-Wallis test is commonly employed in quantitative research to perform a non-parametric version of the Analysis of Variance or ANOVA. The Kruskal-Wallis test is used when the assumptions of ANOVA are broken, such as when the data are not normally distributed or when the variance between groups is not equal (Sedgwick, 2015). ANOVA is typically used when there is continuous data normally distributed. In the event that the test statistic surpasses the critical value, or if the p-value falls below 0.05, the null

hypothesis is rejected, indicating the presence of a significant difference between a minimum of two groups. (Pappas & DePuy, 2004). When parametric assumptions are broken or dealing with data types that parametric tests are inappropriate for, non-parametric tests offer useful alternatives in quantitative research. They guarantee solid and trustworthy statistical analysis, even in difficult situations. (Publications, 2016).

Findings

Descriptive

The study involved 240 participants, who were teachers from elementary, primary, middle, and secondary schools. The gender distribution of the participants reveals that 94.19% (226 out of 240) of the participants are female teachers, with only 5.81% (14 out of 240) being male teachers.

In terms of board affiliation, 41.91% (100 out of 240) are from CBSE, 36.51% (88 out of 240) from ICSE, and 21.58% (52 out of 240) from State boards. 93.77% (226 out of 240) of participants came from urban areas, while only 6.23% (14 out of 240) hail from rural areas. The whole study shows that there are 20% (48 out of 240) teachers from elementary, 26.25% (63 out of 240) from primary, 25.41% (61 out of 240) from middle, and 28.33% (68 out of 240) from secondary school levels.

Table 1

Teachers' Perceptions of GAI in Education

	Statement: The use of GAI in education	**M**	**SD**
.	Increases academic achievement (e.g., grades).	4.03	.746
2.	*Results in students neglecting important traditional learning resources (e.g., library books).*	2.07	.921
3.	Is effective because I believe I can implement it successfully.	3.79	.707

4.	Promotes student collaboration.	3.62	.924
5.	Promotes the development of communication skills (e.g., writing skills, presentation skills).	3.77	.933
6.	Is a valuable instructional tool.	3.91	.788
7.	Makes teachers feel more competent as educators.	3.99	.738
8.	Is an effective tool for students of all abilities?	3.57	.901
9.	Enhances my professional development.	4.02	.684
10.	Eases the pressure on me as a teacher.	3.69	1.039
11.	Motivates students to get more involved in learning activities.	3.68	.935
12.	*Should reduce the number of teachers employed in the future.*	3.68	.978
13.	*Will increase the amount of stress and anxiety students' experience.*	2.95	1.011
14.	*Requires extra time to plan learning activities.*	2.64	1.001
15.	Improves student learning of critical concepts and ideas.	3.77	.738
	Average Total Score:	53.17	6.489
	Average	70.8955	8.65165

Percentage:

Note: Italicized items are to be reverse- coded.

The items which have the highest means are 1, 7 and 9. This means that these items contributed to positive perspectives the most. 76.43% participants agreed that GAI helps increase the academic achievement of students. 77.7% participants feel more competent as educators when using GAI. 83.44% participants believe that GAI can help in their professional development.

Data Analysis

Research Objective 1: To know whether teachers have used GAI.

From the data collected, it was found that 65.15% of participants had used GAI in education in the teaching- learning process whereas 34.85% of the participants had not used it before. Among the participants who have used GAI, a significant majority of 94.27% were female teachers. When considering board distribution, 43.95% of affirmative responses are from CBSE board, 33.12% from ICSE, and 22.93% from State boards. Similarly, at different teaching levels, the distribution of "Yes" responses varies as 17.20% in elementary, 26.11% in primary, 30.57% in middle, and 26.11% in secondary school levels.

Among the 34.85% of participants who answered "No", again the majority being female 94.05%. Among them, 38.10% are from CBSE, 42.86% from ICSE, and 19.04% from State boards. The distribution across school levels for "No" responses is 25.30% from elementary, 26.51% from primary, 15.66% from middle, and 32.53% from secondary school levels.

Qualitative Analysis:

Research Objective 2: To understand the reasons why teachers have chosen to use or not use GAI.

In this study, we investigate teachers' perspectives on generative AI, focusing on their utilization of GAI tools. A qualitative research design was employed specifically to address two primary research questions: 1) Have teachers used GAI? and 2) What are the reasons for teachers not using GAI? To explore these questions, we conducted a survey among a sample of educators, inviting them to provide open-ended responses detailing their reasons for not using GAI.

Through the analysis of the survey responses, there are 5 main themes identified that shed light on the factors influencing teachers' decisions regarding the adoption of GAI. These themes include unconscious familiarity with AI, training needs for teachers to improve their integration of AI in teaching, lack of interest among primary teachers, teacher beliefs, and limited resources. These themes are not only evident in the responses provided by the participants but also resonate with findings from the existing research literature (Kohnke et al., 2023), (Zhai & Nyaaba, 2023)

Quantitative Analysis

Research Objective 3: To study teachers' perceptions of GAI integration with respect to their level of teaching.

H_{01}: There is no significant difference in the perception of teachers towards GAI among elementary, primary, middle, and secondary levels.

H_{a1}: There is a significant difference in the perception of teachers towards GAI among elementary, primary, middle, and secondary levels.

Normality Test

The normality of the data in the perception of teachers towards GAI and their teaching level is checked according to the Shapiro-Wilk test is done. According to this test, if the significance value (p-value) is greater than 0.05 (or 95%), the data is normal.

Table 2

Test for Normality for Perception of Teachers and Teaching Level

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Current teaching level	Statistic	df	Sig.	Statistic	df	Sig.
Percentage	Elementary School (KG)	.144	27	.159	.945	27	.159
	Primary School (1 - 5)	.073	41	.200*	.967	41	.278
	Middle School (6 - 8)	.120	48	.079	.966	48	.180
	Secondary School (9 - 12)	.083	41	.200*	.983	41	.776

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Here, the significance value in the Shapiro- Wilk test is greater than 0.05. Therefore, the data is normal.

Parametric Test

Since the data is normal, a parametric test is conducted. The current teaching level has four categories. Therefore, a One- way ANOVA test is conducted. If the significance value is lesser than 0.05, the null hypothesis is rejected.

Table 3

One-Way ANOVA

Percentage

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1378.028	3	459.343	6.824	.000
Within Groups	10298.736	153	67.312		
Total	11676.764	156			

Here, the significance value is less than 0.05. Therefore, the null hypothesis (H_{01}) is rejected. The accepted hypothesis is, 'There is a significant difference in the perception of teachers towards GAI among elementary, primary, middle, and secondary levels'.

To study the multiple comparisons, Tukey's Post Hoc test is conducted. There is a significant difference in the means if the p-value is less than 0.05.

Table 4

Multiple Comparisons- Tukey's Post Hoc

Dependent Variable: Percentage

Tukey HSD

(I) Current teaching level	(J) Current teaching level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Elementary	Primary School	-5.01077	2.03342	.070	-10.2926	.2710

School (KG)	(1 - 5)					
	Middle School (6 - 8)	-8.21255*	1.97367	.000	-13.3391	-3.0860
	Secondary School (9 - 12)	-7.80833*	2.03342	.001	-13.0901	-2.5265
Primary School (1 - 5)	Elementary School (KG)	5.01077	2.03342	.070	-.2710	10.2926
	Middle School (6 - 8)	-3.20178	1.74473	.261	-7.7337	1.3301
	Secondary School (9 - 12)	-2.79756	1.81205	.414	-7.5043	1.9092
Middle School (6 - 8)	Elementary School (KG)	8.21255*	1.97367	.000	3.0860	13.3391
	Primary School (1 - 5)	3.20178	1.74473	.261	-1.3301	7.7337
	Secondary School (9 - 12)	.40422	1.74473	.996	-4.1277	4.9361
Secondary School (9 - 12)	Elementary School (KG)	7.80833*	2.03342	.001	2.5265	13.0901
	Primary School (1 - 5)	2.79756	1.81205	.414	-1.9092	7.5043

	Middle School (6 - 8)	-.40422	1.74473	.996	-4.9361	4.1277

*. The mean difference is significant at the 0.05 level.

There is a significant difference in teachers' perception towards GAI between elementary-middle school level (p= 0.000), and elementary- secondary school level (p= 0.001).

Discussion/ Summary

- Concerning the findings and relating them to the Literature Review Chapter
  - Theoretical and Practical Implications
  - Limitations of the Study
  - Suggestions for Further Research
  - Conclusion

Research on the possible applications and uses of GAI in educational settings is currently in its early stages (Chiu, 2023). The majority of research and discussions have concentrated on higher education, even though numerous studies have examined how various stakeholders, including as students and teachers, evaluate the application of GAI in education (Chiu, 2023).

The majority of research on incorporating digital skills and AI education into the classroom has historically been on school and government policy or the viewpoint of the student (Druga et al., 2019; Lee et al., 2021). The study of teachers' perspectives on K–12 AI education and how to assist them in implementing AI instruction has only recently begun (Polak, 2022).

Teachers are important stakeholders in the incorporation of GAI technologies in the classroom and have a significant influence on how students perceive their educational experiences (Kaplan-Rakowski et al., 2023). In order to solve adoption-related problems, find professional development opportunities, and improve the efficacy of AI-driven teaching techniques, it is imperative to comprehend teachers' perspectives on generative AI. We can learn a lot about the opportunities and problems related to

integrating AI in the classroom by investigating how teachers view and use ChatGPT and other GAI applications. Wang et al. (2021) recommended professional development to improve educators' attitudes towards use and consequently their intention to use AI technologies.

The purpose of the study is to understand whether the teachers have used GAI or not, and if they have not used what the reasons are. The study also examined the attitude of teachers towards level of teaching: (elementary, primary, middle and secondary),years of experience and school board.

A qualitative study was done to understand the reason behind the teachers not using the Generative AI in the teaching and learning process. The results showed that 65.15% used generative in the teaching and learning process and 34.85% did not use GAI. The teachers who have not used the GAI have raised concerns regarding not using GAI . 45 percent of the teachers were not familiar with the Generative AI and their usage. The teachers when surveyed mentioned that they are not aware about the AI tools and how they can be implemented in the teaching learning process, which is in congruence with the study done by Zhai & Nyaaba (2023)which states that GAI tools are in their early stage of implementation thus, the teachers lack the understanding about the GAI tools that can be used in the classroom. Another reason that was given by the teachers for not using GAI was that they were not given proper training to improve their teaching skills in GAI. The school doesn't give an exposure to teachers about the AI tools and the methodologies through which the teachers could make the class more interactive. The teachers were not given sessions regarding the positive and negative impacts on GAI (Kohnke et al., 2022).The majority of participants felt that their university has not provided enough opportunities for debate, and has only depended on sending out vague directions via email to keep up with the rapidly developing field of generative AI technologies. The language teachers recommended that a practical session would be better, offering opportunities to investigate and utilize AI tools in a safe setting.

Furthermore, in the current study 15% of the participants claimed that lack of essential resources such as smart boards, internet access, and lack of computers were the reasons for not adopting GAI in the teaching and learning process. The similar reason was also evident in the study done by (Kaplan-Rakowski et al., 2023; Sharma et al., 2022) which stated many school settings, lack of infrastructure, funding and support that hinders the widespread adoption of AI. Fourth reason states that the lack of interest among primary teachers is due to their perception regarding that elementary education should be taught in the old school method. Insufficient assistance and direction may cause elementary school instructors to be reluctant to investigate the potential of generative AI, instead opting to depend on more

well-known pedagogical approaches and materials. This study supports the research by Kozak (2006) that AI concepts can be difficult for primary and secondary students, as well as non-computer science students to grasp because of knowledge disconnects between the AI concepts and their daily experiences.

Lastly, 10% of educators expressed concern about the usage of generative AI tools in the classroom and how it might affect students' social skill development by taking away from them the strong bond of human connection. Many educators expressed a preference for conventional teaching methods, especially when it comes to teaching mathematics, and cited a lack of expertise with generative AI as a reason for their worries about time wastage and loss of control. This beliefs of the teachers are contradictory to the study done by Seo et al(2021) and (Healy & Blade(2020) which claims that using AI teachers can not only improve their efficacy but also foster self-regulation among their students and facilitate meaningful communication and interaction. The teachers also felt that by using AI, they could actually capture the student's attention and interest to learn new content in a simplified manner (Chen et al., 2020).

The quantitative study reveals several key findings regarding the perceptions of teachers towards the integration of GAI into education. Firstly, it investigates teachers' perceptions concerning GAI integration relative to their level of teaching. Secondly, it explores how teachers' years of experience influence their perceptions of GAI integration. Finally, the study delves into the perspectives of teachers regarding GAI integration about different school boards. These findings provide valuable insights into the varied perceptions and attitudes of educators towards the incorporation of GAI in educational settings.

Conclusion

The current study aimed to explore the teachers' perceptions concerning GAI integration relative to their level of teaching, years of experience and how different school boards influence their perceptions of GAI integration. The study also consists of qualitative research which

includes understanding the reasons that led to the teachers not use GAI, there are 5 main themes identified that shed light on the factors influencing teachers' decisions regarding the adoption of GAI. The themes are unconscious familiarity with AI, training needs for teachers to improve their integration of AI in teaching, lack of interest among primary teachers, teacher beliefs, and limited resources. This

study emphasizes how important it is for teachers to receive individualized coaching, self-paced learning, and practical workshops to build their AI teaching competencies. The findings could be helpful for policy planners, and important stakeholders such as teachers. administrators and principles to introduce new steps to improve the successful implementation of GAI.

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