

# *Survey and Analysis of Primary School Teachers' Use of Generative Artificial Intelligence*

Lihua Liu<sup>1,a,\*</sup>

<sup>1</sup>Beijing E-town Experimental Primary School, Beijing, 100176, China  
a. 14121599@bjtu.edu.cn

\*corresponding author

**Abstract:** In the wave of generative artificial intelligence (GenAI) applications in education, the current status and attitude of primary school teachers towards the use of GenAI have not yet been fully studied. This study surveyed 78 primary school teachers through an online questionnaire to reveal their understanding level of GneAI, the usage of GenAI, their views on GenAI applied in education, and expectations for future applications of GenAI. The results show that most teachers have some understanding of AI, but less knowledge of GenAI. Despite this, almost all teachers agree that GenAI plays a positive role in assisting teacher teaching and promoting student learning, and they hold an optimistic attitude towards its application prospects. There are differences in the degree of use of GenAI by teachers of different ages and young teachers are more inclined to use AI. Teachers of different identities have different preferences for the content of GenAI-assisted work. Liberal arts and science teachers prefer intelligent search and intelligent homework correction, while art and physical education teachers and middle and senior teachers prefer personalized teaching and personalized assessment. Finally, the author recommends relevant departments strengthen the use of AI in primary education, develop practical teaching and assessment systems, and paying attention to the resource management and protection.

**Keywords:** Generative artificial intelligence, primary education, primary school teachers, AI empowerment.

## 1. Introduction

The emergence and rise of generative artificial intelligence (AI) have brought transformative changes to various industries, with rapid development and profound impacts on global society. Particularly since the introduction of ChatGPT in 2022, a new wave of interest in "AI + education" has surged, leading to an increase in related research [1,2]. Over the past decade (2013–2023), studies on AI in education have primarily focused on four aspects: the rationality of AI applications in education, empowering educational applications through AI, concerns regarding AI's application in education, and the future prospects of AI in this field [3,4]. AI empowers education mainly in two ways: assisting students and aiding teachers. From the students' perspective, AI is applied in learner analysis, performance prediction, assessment, evaluation, personalized and adaptive learning, enhancing individualized learning, evaluation, guidance, and cognitive development. For teachers, AI applications help them better understand students, implement personalized education, improve teaching efficiency, and overcome the limitations of traditional classrooms [5-8].

Despite the considerable research on AI's empowerment of education, current studies and applications mainly concentrate on higher and secondary education, with relatively little research on its application in primary education. A search on CNKI using the keywords "AI" and "Education" for literature from 2023 to 2024 revealed that as of August 26, 2024, there are 71 Chinese articles on AI in higher education, 37 in secondary education, and only 9 in primary education. In foreign literature, there are 251 articles on AI in higher education, 20 in secondary education, and only 6 in primary education. A review of relevant literature highlights factors influencing teachers' use of AI in teaching, such as educational contexts, professional experiences, personal backgrounds, and initiative, though these studies largely focus on higher education, lacking research on the current state of AI's empowering role in primary education [9,10]. Additionally, research by Zhong Zhurong et al. in 2020 showcased the use of AI tools among primary and secondary school teachers [11]. Given the rise of ChatGPT in recent years, investigating the evolving situation of primary school teachers using AI in their teaching is timely.

This article aims to address this research gap by investigating the current status of AI use among primary school teachers through a carefully designed survey. Utilizing an online questionnaire, this study seeks to reveal differences in AI usage among primary teachers from diverse backgrounds, their perceptions of AI's educational empowerment, the contexts in which they use AI, and their expectations for future applications. By interpreting data and analyzing observed trends, this research aims to provide valuable insights into the integration of AI in primary education curricula. Furthermore, the article will propose targeted strategies and recommendations to facilitate the application of AI in primary education.

## 2. Method

To comprehensively assess primary teachers' attitudes and usage of AI-assisted teaching, the researcher employed an online survey designed with Wenjuanxing. The questionnaire consists of 20 questions covering basic information about teachers and their teaching, their understanding and usage of AI in education, expectations for future AI-assisted teaching, and potential challenges they may face. The survey primarily consists of multiple-choice questions, including single and multiple selections, along with a few open-ended questions for subjective responses. A total of 78 valid responses were collected from primary school teachers.

## 3. Result & Discussion

### 3.1. Analysis of Survey Subjects

As shown in Table 1, the survey included a total of 78 participants, among which 71 were female teachers, accounting for approximately 91%, while only 7 were male teachers. In terms of age distribution, the majority (56 individuals, or 71.8%) were aged between 31 and 40 years, followed by 17 teachers under 30 years, and 5 teachers over 40 years. The professional backgrounds of the participants were predominantly in science and engineering (28 teachers, 35.9%) and humanities (38 teachers, 48.7%), with 12 teachers from arts and other fields. Similarly, regarding subject distribution, the majority were Chinese language teachers (25 teachers, approximately 32%) and mathematics teachers (32 teachers, approximately 41%), with other subjects including English, information technology, fine arts, and music. In terms of grade distribution, teachers in lower grades (1st and 2nd) and middle grades (3rd and 4th) comprised 30 and 32 individuals, respectively, totaling about 79.5%, while those in higher grades (5th and 6th) accounted for 16 individuals, or about 20.5%. Among the surveyed teachers, 84.6% held graduate degrees or higher, while the rest held bachelor's degrees.

Table 1: Basic characteristics of the survey subjects

		Number of people	Percentage%
Gender	Male	7	9.0
	Female	71	91.0
Work Area	Beijing	69	88.5
	Non-Beijing	9	11.5
Age	Under 30 years old	17	21.8
	31-40 years old	56	71.8
	41-50 years old	2	2.6
	Over 50 years old	3	3.8
Professional Background	Liberal arts	38	48.7
	Science and Engineering	28	35.9
	Art	9	11.5
	Other	3	3.8
Subject Classification	Language	25	32.1
	Math	32	41.0
	English	7	9.0
	Information	3	3.8
	Art	4	5.1
	Other	7	9.0
The period of study	Grades 1-2	30	38.5
	Grades 3-4	32	41.0
	Grades 5-6	16	20.5
Education	Undergraduate	12	15.4
	Graduate students and above	66	84.6
Manage identities	School middle and senior management staff	4	5.1
	None	74	94.9

## 3.2. Analysis of Survey Results

### 3.2.1. Teachers' Understanding and Use of AI

In the investigation of primary school teachers' understanding and usage of generative AI (GenAI) (Table 2), the researcher found that approximately 53.8% of teachers had some knowledge of artificial intelligence (AI), followed by those with a fair understanding (24.4%) and those very knowledgeable (15.4%). However, only a small percentage (about 6.4%) reported being somewhat unaware or having never heard of it. The survey results indicated that primary school teachers had significantly weaker knowledge of generative AI, with 35.9% having only a little understanding, and those very knowledgeable or somewhat knowledgeable combined accounted for 27%. Meanwhile, 37.2% fell into the categories of not very knowledgeable or completely unaware, which is also a considerable group. In terms of usage frequency, the largest group consisted of active users, while a significant portion (32.1%) reported using it infrequently or expressing a desire to use it but being unsure how to do so, indicating substantial potential for expanding the application of generative AI among primary school teachers.

Table 2: Teachers' understanding and use of GenAI

		Frequency	Percentage%
Level of understanding of artificial intelligence (AI)	Never heard of it	1	1.3
	Not sure	4	5.1
	Learn a little bit	42	53.8
	Have some understanding	19	24.4
	Very understanding	12	15.4
What is your understanding of Generative Artificial Intelligence (GenAI)?	Never heard of it	6	7.7
	Not sure	twenty-three	29.5
	Learn a little bit	28	35.9
	Have some understanding	9	11.5
	Very understanding	12	15.4
Frequency of using GenAI-related tools	Actively use and recommend to peers	26	33.3
	Neutral, occasionally used	2	34.6
	Not often used	18	23.1
	I want to use it but I don't know how to use it	7	9.0
	Against use	0	0

### 3.2.2. Teachers' Evaluation and Expectations of AI

Most teachers believe that generative AI is beneficial for both student learning and teacher instruction, with an overwhelming 93.6% acknowledging its helpfulness to teaching and 96.1% affirming its benefit to students. The remaining teachers may not have used it yet, hence their uncertainty regarding its benefits. This demonstrates that nearly all teachers recognize the significant assistance that generative AI can provide in teaching. Additionally, all teachers expressed interest in further exploring generative AI, with 94.8% optimistic about its application prospects, while 5.1% remained cautiously optimistic (Table 3).

Table 3: Primary school teachers' evaluation and expectations of GenAI

		Frequency	Percentage%
The degree of help to students' learning	Very helpful	twenty-four	30.8
	With some help	49	62.8
	Not much help	0	0.0
	Not sure	5	6.4
The degree of help to teachers	Very helpful	32	41.0
	With some help	43	55.1
	Not much help	0	0.0
	Not sure	3	3.8
Interested in learning more about GenAI?	Very interested	40	51.3
	Interested	25	32.1
	General Interest	13	16.7

Table 3: (continued).

Attitudes toward the prospects of GenAI applications	Not too interested	0	0.0
	Be opposed to	0	0.0
	Very optimistic, promising prospects	37	47.4
	Optimistic, but the effect needs to be tested	37	47.4
	Not good, just a gimmick	0	0.0
	Wait and see	4	5.1
	Other	0	0.0

### 3.2.3. Primary School Teachers' Future Needs and Challenges for Generative AI

Table 4: Survey on primary school teachers' future needs for generative artificial intelligence

		Frequency	Percentage%
The future of learning GenAI	Conduct training and lectures	32	41.0
	Provide free access	64	82.1
	Develop usage guides and provide technical support	50	64.1
	Create a practical teaching and evaluation system	53	67.9
	Formulate relevant usage specifications and clarify scientific usage methods	30	38.5
	Others: Award-winning learning	1	1.3
Demand for GenAI in education	Assist teachers in lesson preparation	twenty-three	29.5
	Assist teachers in teaching & differentiated teaching	twenty one	26.9
	Personalized Assessment	17	21.8
	Assist students in personalized learning	7	9.0
	Accurate data collection	5	6.4
	Efficient work (management, home-school communication)	4	5.1
	Expanding teachers' thinking	3	3.8
	GenAI tools can be more convenient to use	2	2.6

Although the understanding of GenAI varies among different groups of primary school teachers, the majority expressed a desire to better learn how to utilize GenAI for teaching and articulated specific needs related to their teaching practices (see Table 4). For instance, 82.1% hoped that relevant departments would provide free access to GenAI, and nearly 70% wanted schools or other relevant organizations to develop teaching and assessment systems, along with usage guidelines and technical support. The majority of teachers' application needs centered around assisting with lesson preparation, supporting differentiated instruction, and providing personalized assessments.

According to the survey, 62 teachers (79.5%) believed that the emergence of GenAI poses challenges to their teaching work. About 5.1% of teachers, due to limited knowledge about GenAI, were unsure whether it would present challenges, while 12 teachers (15.4%) felt it did not pose any challenges. The primary concerns regarding GenAI's impact on future teaching include: first, worries about how GenAI will integrate with traditional classrooms to create more authentic and student-centered curricula and to maintain a harmonious classroom atmosphere between GenAI and teachers; second, concerns regarding the potential decrease in creativity and autonomy among teachers and students due to over-reliance on GenAI, which might replace teachers due to its superior storage and response capabilities; third, apprehensions regarding the reliability of resources provided by GenAI and issues related to resource protection, along with various unknown uncontrollable factors. It is evident that many teachers perceive challenges related to GenAI's integration into classrooms from technological, operational, and resource protection perspectives.

### 3.3. Difference and Correlation Analysis

#### 3.3.1. Comparison of the Use of Generative AI by Teachers of Different Ages

Assigning scores from 1 to 5 based on levels of engagement with generative AI, ranging from "actively using and recommending to peers" to "opposed to use," variance analysis results (see Table 5) revealed significant differences in the level of generative AI usage among different age groups ( $P = 0.015 < 0.05$ ). Data indicated that the usage of AI among primary school teachers decreased with age across the groups (under 30, 31-40, 41-50, and over 50 years). Furthermore, correlation analysis showed a positive correlation between age and the level of generative AI usage, indicating that older teachers tend to use generative AI less frequently (Table 6).

Table 5: The extent of use of generative AI by teachers of different age groups

		Extent of use of generative artificial intelligence (GenAI)		
		M	SD	P
Age	Under 30 years old	1.59	0.712	0.015
	31-40 years old	2.14	0.923	
	41-50 years old	2.5	2.121	
	Over 50 years old	3.33	1.155	

Table 6: Correlation analysis between teachers of different ages and the degree of use of generative artificial intelligence

		Extent of use of generative artificial intelligence (GenAI)	Age
Extent of use of generative artificial intelligence (GenAI)	Pearson correlation	1	
Age	Pearson correlation	.361 **	1
	Significance (two-tailed)	.001	

### 3.3.2. Comparison of the Use of Generative AI by Different Teacher Groups

Overall, the researcher found that primary school teachers primarily utilized generative AI for intelligent searching (50%) and lesson preparation support (23.1%) (Table 7), while having limited knowledge of other applications, such as intelligent assignment grading, personalized assessments, and supporting personalized instruction. This indicates that primary school teachers still have a relatively low level of professional and systematic understanding and application of GenAI.

Table 7: Work content of primary school teachers using GenAI

		Frequency	Percentage%
Work that uses GenAI	Smart Search	39	50.0
	Intelligent homework grading	1	1.3
	Providing lesson planning resources and support	18	23.1
	Provide personalized assessment question bank and copywriting	8	10.3
	Using artificial intelligence teaching system to help personalized teaching	7	9.0
	Other	5	6.4

Further analysis assigned scores from 1 to 5 for the various tasks associated with generative AI-assisted teaching, including “intelligent searching,” “intelligent assignment grading,” “providing lesson preparation resources and support,” “providing a personalized assessment question bank and content,” and “using AI systems to assist personalized instruction.” Variance analysis results (see Table 8) showed significant differences in the tasks performed with generative AI among teachers from different professional backgrounds ( $P = 0.019$  and  $0.033$ , both  $< 0.05$ ). The researcher found that teachers with backgrounds in humanities and science and engineering had mean scores of 2.13 and 2.64, respectively, indicating their greater use of GenAI for intelligent searching and grading assignments, while teachers from arts backgrounds (mean score of 3.78) preferred using GenAI for personalized assessments and teaching. Similarly, mid-level management staff (mean score of 4) were more inclined to utilize GenAI for personalized assessments and instruction, whereas non-management teachers primarily used GenAI for intelligent searching and grading. This analysis reflects the practical circumstances of frontline teachers, as primary language and mathematics



teachers often bear significant homework grading burdens, while arts and physical education teachers have less need in this area, validating the above findings.

Table 8: Comparison of the work content assisted by GenAI among primary school teachers with different professional backgrounds and management identities

		What to do with GenAI		
		M	SD	P
Professional Background	Liberal arts	2.13	1.528	0.019
	Science and Engineering	2.64	1.789	
	Art	3.78	1.394	
	Other	1.00	0.000	
Manage identities	Middle-level school managers	4.00	1.155	0.033
	None	2.38	1.661	

### 3.3.3. Comparison of Primary School Teachers' Evaluation and Interest in Generative AI

As Table 9 shows, teachers' perceptions of the assistance that generative AI can provide to both teachers and students differ significantly from their outlook on the application prospects of generative AI. Specifically, teachers who have used generative AI and recognized its benefits—such as aiding in the intelligent search of teaching materials, assignment grading, personalized teaching, and assessments—are more optimistic about the future application of GenAI.

Table 9: Analysis of differences in evaluation of generative artificial intelligence among primary school teachers

		Are you optimistic about the application prospects of GenAI?		
		M	SD	P
Is GenAI helpful for teachers?	Very helpful	1.22	0.420	0.00
	With some help	1.91	0.718	
	Not much help	0.00	0.00	
	Not sure	2.00	1.732	
Is GenAI helpful for students?	Very helpful	1.21	0.415	0.002
	With some help	1.84	0.717	
	Not much help	0.00	0.00	
	Not sure	1.60	1.342	

Moreover, there is a positive correlation between teachers' recognition of generative AI's benefits to teachers and students and their level of interest in generative AI, with correlation coefficients of 0.382 and 0.239, respectively (see Table 10). The significance levels of P are both less than 0.01, indicating extreme significance. This further suggests that teachers who perceive generative AI as helpful for teaching are more likely to express interest in its application.



Table 10: Correlation between primary school teachers' evaluation and interest in generative artificial intelligence

		Level of interest in GenAI applications in education	GenAI's helpfulness to teachers	GenAI helps students learn
Level of interest in GenAI applications in education	Pearson correlation	1		
GenAI's helpfulness to teachers	Pearson correlation	.382 **	1	
	Significance (two-tailed)	.001		
GenAI helps students learn	Pearson correlation	.239 *	.714 **	1
	Significance (two-tailed)	.035	.000	

## 4. Conclusion

### 4.1. Summary of the Study

In summary, while most teachers have some understanding of artificial intelligence, their knowledge of generative AI is less comprehensive, with a notable portion indicating they are unaware or have limited knowledge. A substantial majority believe that generative AI can aid both teaching and student learning, expressing optimism regarding its future applications in education and a keen interest in its development and usage. Differences exist among primary school teachers of varying ages regarding their level of engagement with generative AI; younger teachers tend to be more inclined to use it for teaching assistance, while older teachers utilize it less frequently. Furthermore, variations are observed in the application of generative AI for teaching based on professional backgrounds and management roles, with non-management teachers in the humanities and sciences leaning towards intelligent searching and grading functionalities, whereas managerial and arts teachers favor personalized assessment and teaching functionalities.

### 4.2. Research Prospects

Based on the findings of this study, the researcher proposes the following recommendations:

1. Schools should strengthen the popularization and training of generative artificial intelligence (GenAI) among primary school teachers. This could involve collaboration with relevant research and development departments to provide free access to GenAI resources for primary school teachers, develop user guides, and offer necessary technical support. This approach aims to ensure that teachers have the means to understand and utilize GenAI effectively.

2. Educational authorities should create practical teaching and assessment systems and develop corresponding generative AI curricula. This would assist teachers in smoothly transitioning from traditional classrooms to innovative settings that integrate teachers and GenAI. Moreover, it would help schools establish a more personalized teaching environment from both theoretical and practical perspectives.

3. In promoting generative AI among primary school teachers, it is crucial to emphasize resource management and protection. Relevant usage regulations should be established, and scientific usage methods should be clarified to guide both students and teachers in the appropriate use of generative AI, thereby safeguarding the creativity and innovation of both teachers and students.

### 4.3. Study Limitations

The limitations of this study primarily include two points: first, a total of 78 valid questionnaires were collected, resulting in a relatively small sample size, with a particularly low number of male teachers and teachers in management positions. This may lead to some conclusions having a degree of error. Second, the sample population was narrow, primarily focused on primary school teachers from a specific school in Beijing, with only a small number from other provinces and cities. This limited scope may also render some conclusions less representative. Future research should aim to expand the study's scope to enhance the accuracy of the findings.

### References

- [1] Zhou, R. (2024). *The integration and challenges of artificial intelligence in education*. *Educational Research*, (2), 45-52.
- [2] Helen Crompton. (2023). *The Impact of AI on Education: A Global Perspective*. *International Journal of Education Technology*, 15(3), 123-140.
- [3] Li, P., & Qiu, X. (2024). *The current status and future trends of artificial intelligence in education*. *Modern Educational Technology*, (4), 78-85.
- [4] Chiu, T. K. F., Xia, Q., Zhou, X., Chai, C. S., & Cheng, M. (2023). *Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education*. *Computers and Education: Artificial Intelligence*, 4(2023), 100118.
- [5] Pei, L., & Wen, X. (2024). *AI in Education: A Review of Current Applications and Future Possibilities*. *Educational Technology Research*, 20(2), 201-220.
- [6] Min Peng. (2023). *The Role of AI in Enhancing Teaching and Learning in Higher Education*. *Journal of Educational Innovation*, 19(1), 45-58.
- [7] Ke Zhang. (2021). *Personalized Learning with AI: A Review of the State of the Art*. *Educational Technology & Society*, 24(1), 54-65.
- [8] Dai, Y., Liu, A., Qin, J., Guo, Y., Jong, M. S.-Y., Chai, C.-S., & Lin, Z. (2023). *Collaborative construction of artificial intelligence curriculum in primary schools*. *Journal of Engineering Education*, 112(1), 23-42.
- [9] Rebecca J. Collie. (2024). *Factors Influencing Teachers' Use of AI in Education*. *Educational Technology & Society*, 27(3), 97-109.
- [10] Hu, X. (2024). *Motivations and challenges for teachers in using artificial intelligence: A qualitative study*. *Educational Technology Research*, (3), 67-74.
- [11] Zhong, Z., Gao, S., & Yu, X. (2020). *A survey on the current status of primary and secondary school teachers' use of artificial intelligence tools*. *Educational Technology Communications*, (6), 33-39.