*Research Article*

# Assessing the Influence of ChatGPT-Supported Self-Regulated Learning on Problem-Solving Skills of Novice Teachers

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## Abstract

*The National Education Policy (NEP) 2020 emphasised the need to equip beginning teachers with essential 21st-century skills so they can meet the expected standards of professional competence. The influence of ChatGPT facilitated-self-regulated learning on the problem-solving skills of novice teachers of 2-year B.Ed. programme in relation to gender and management type was investigated by employing an ex-post-facto research design. Using simple random sampling, a sample consisting of 300 novice teachers was drawn from four universities located in West Bengal. The researcher gathered data by administering a self-developed test designed to assess problem-solving skills, which demonstrated acceptable consistency with a reliability coefficient of 0.78. The data were analysed using Student's t-test. Findings revealed that the problem-solving skills of male and female novice teachers were found to be similar. Further, the findings revealed that novice teachers from state universities demonstrated significantly stronger problem-solving skills than their counterparts from private universities. The findings of the study might be implemented to improve the competency level of novice teachers in different contexts.*

**Keywords:** Problem-solving skills, ChatGPT, Novice teachers, Gender, Management type

## Introduction

Problem-solving skills are the vital skills of the 21st century, which are playing a pivotal role in preparing competent teachers for society (Ajani, 2024). Teachers handle various challenges in classrooms that require critical thinking and decision-making skills (Beetham and Sharpe, 2019). Many novice teachers entered into the profession with limited skills; as a consequence, they do not manage classrooms effectively during their teaching-learning practices (Boettcher and Conrad, 2016; Lunenberg et al., 2007). These aspiring teachers require tailored resources for critical thinking, efficient problem-solving abilities, and in-depth analysis to bridge theory and practice effectively (Aristanto et al., 2023). Therefore, novice teachers must be well-equipped with the necessary knowledge and skills to address different academic issues (Mncube et al., 2021).

The advent of artificial intelligence (AI) technologies, such as ChatGPT, has shifted the landscape of teacher training and professional development (Barbhuiya, 2023; Zhang et.al, 2020). In the digital world, ChatGPT has gained significant attention in engaging students in personalised learning for improving their academic achievement (Kasneci et al., 2023; Kohnke et al., 2023; Hsu et al., 2023). Further, it is very important for novice teachers to equip them with knowledge of AI tools, how they work, and their advantages

and disadvantages (Ng, Leung, et al., 2023; Chiu et al., 2021). As a versatile language model, ChatGPT delivers interactive, on-demand support that aligns seamlessly with the individualised needs of novice teachers who engage in specialised training emphasising pedagogical innovation, classroom management, and reflective practices. Furthermore, ChatGPT empowers novice teachers to improve their competency at their own pace. By offering diverse content formats—such as concise summaries, detailed breakdowns, or structured teaching outlines—ChatGPT accommodates varied learning preferences within the dynamic context of pre-service training, fostering adaptability in diverse classroom settings (Albdrani and Al-Shargabi, 2023). In teacher education, where cultural diversity and varied learning preferences abound, ChatGPT can amplify these benefits through innovative teaching strategies, real-time feedback, self-paced guidance, and stage-specific support (Zhang and Aslan, 2021; Floridi and Chiriatti, 2020). By providing real-time, tailored responses, ChatGPT boosts academic engagement, supports learning design, and generates new ideas, thereby enhancing critical thinking and problem-solving skills (Ekarina & Engliana, 2025). According to Dayagbil et al. (2025), novice teachers experienced moral dissonance when using ChatGPT, as they navigate the tension between convenience and academic conscience under workload. Chiu et al. (2023) reported that ChatGPT can help novice teachers in addressing misconceptions about sustainability through interactive, real-time dialogue that supports individualised understanding.

On the other hand, Heine and König (2025) reported that frequent use of AI tools can weaken critical evaluation and problem-solving skills among novice teachers, leading to superficial engagement with the technology. This over-reliance appears in various ways, including accepting AI-generated responses without proper verification or critical analysis. Pacheco et al. (2025) noted that novice teachers often struggle to balance AI assistance with independent thinking, especially in lesson planning and curriculum development. The difficulty is compounded because many candidates do not possess the digital literacy required to properly evaluate and use content created by AI. Previous studies have highlighted some issues like factual errors, outdated outputs, and the risk of misinformation in ChatGPT responses (Adnan and Anwar, 2022). Despite these challenges, ChatGPT offers substantial opportunities to enhance personalized learning for novice teachers. Learning tasks depend not only on content knowledge but also on problem-solving skills, reasoning, and self-regulated learning (SRL) abilities (Ng et al., 2024; Molenaar et al., 2022; Azevedo et al., 2010). To improve their SRL, some opportunities like autonomy, planning, a feedback system, continuous support, and an appropriate learning environment must be provided (Liang et al., 2023; Xia et al., 2023; Chiu et al., 2022; Schunk and DiBenedetto, 2020). Using SRL, novice teachers apply their mental abilities to enhance problem-solving skills (Zimmerman, 2002).

ChatGPT can be used as a virtual teacher with SRL, providing direct instructions to novice teachers to develop their critical thinking skills (Devolder et al., 2012). Asy'ari and Sharov (2024) suggested that using ChatGPT as a teachable agent can improve students' SRL, indicating similar benefits for teacher education simulations and practice teaching skills. This scaffolding feature enables novice teachers to receive immediate feedback and support. ChatGPT has been immensely accepted due to its multi-purpose working ability. It

provides human-like conversation and accelerates personalised learning.

**Review of Related Literature**

The use of ChatGPT in educational contexts has attracted considerable interest because of its potential to transform teaching and learning and make education more learner-centered. Recent studies have shed light on the pros and cons of utilising it within the field of teacher education. David and Maroma (2025) found that ChatGPT serves as a valuable supplementary tool for empowering novice teachers in terms of lesson planning and creativity, provided educators receive adequate training and institutional support. Nevertheless, the study also pinpointed challenges that could impede effective integration, including unfamiliarity with AI, worries over the reliability and trustworthiness of AI-generated content, and the potential for excessive dependence on the technology. Gurl et al. (2025) noted that ChatGPT's suggested lessons often lack student-centered approaches and exhibit repetitive patterns, with inaccuracies in assessing mathematical outputs, frequently misinterpreting incorrect solutions as alternative approaches. These findings underscore the need for careful implementation to ensure alignment with pedagogical goals.

Naznin et al. (2025) emphasised ChatGPT's potential to support personalised learning, academic writing, and coding tasks in higher education, though ethical concerns, such as ensuring responsible use, remain significant. Jere et al. (2024) demonstrated that ChatGPT can enhance lesson planning, preparation, presentation, and formative assessment, indicating its versatility in specific subject areas. Dhananjaya et al. (2024) highlighted ChatGPT's transformative potential in delivering personalised learning experiences and supporting educators in diverse educational contexts. Nerem et al. (2024) noted that while teachers face challenges with time and resources in personalising education, they perceive AI as a valuable tool for tailoring learning experiences. Lee and Zhai (2024) and Abas et al. (2023) revealed that novice teachers viewed ChatGPT as a tool to facilitate high-quality questioning, self-directed learning, individualised support, formative assessment, and fostering interactive and engaging learning environments. According to Ponte et al. (2023), the demonstrative feature of ChatGPT engages students to facilitate learning in a more intuitive, convenient, and proactive way. Furthermore, the amalgamation of ChatGPT is beneficial in educating novice teachers as it leads to the development of information processing and critical thinking skills, which are necessary for problem-solving skills for future professional competencies (Kreinsen and Schulz, 2023).

ChatGPT can significantly enhance the problem-solving skills of the learners, but overuse of ChatGPT can lead learners to be solely dependent on technology Kizilcec and Lee, 2022). It possesses the capability to develop customized learning plans and educational materials. This allows it to recognise and support educational competencies for the purpose of producing literacy assignments, user feedback, and assessments. Gill et al. (2024) described that the traditional pedagogy is not sufficient to confront the difficulties in the modern era with the advent of ChatGPT, which encompasses the shift from the conventional method of knowledge-centered to a competency-based pedagogical approach. Rather than focusing on rote learning and memorisation or simply acquisition of knowledge, this era demands the application of the knowledge for

innovation in such a way that builds a bridge between knowledge and skills, where the base knowledge serves as the foundation for skill development (Garvey, 2019). For reconciliation with the new technology advent era, the teachers must acquire digital competency, which includes basic understanding and operating, creating new content, communicating, and collaborating on digital platforms for navigating the contemporary digitalised educational landscape (Howard, 2019).

Despite these insights, a critical research gap exists regarding the influence of ChatGPT on personalized learning among novice teachers, particularly when considering variables such as gender and management type. Findings of a research study showed significant gender differences in AI adoption, where females reported higher AI anxieties and a lower positive attitude towards AI (Russo et al., 2025). Earlier research demonstrated that public institution students exhibited lower levels of readiness as compared to those of private institution students (Phung et al., 2024).

On synthesising the existing literature, which has focused on the common upsides and drawbacks of ChatGPT's application in specific disciplines, without exploring how demographic factors might shape its effectiveness in teacher preparation programmes. Researchers of this study noted that only a small number of studies have examined the impact of ChatGPT. specifically on tailored learning for novice teachers. However, no studies have been carried out on improving the problem-solving skills of novice teachers through ChatGPT-integrated self-regulated learning. This gap motivated the researchers of this study to undertake it as a problem by keeping in mind the urgent need for novice teachers in the Indian context. This research seeks to determine the problem-solving skills of novice teachers through ChatGPT-integrated self-regulated learning in relation to gender and management type. The following objectives and hypotheses have been formulated for this study.

## Research Objectives

i. To compare the mean scores of problem-solving skills of novice teachers with respect to gender

ii. To compare the mean scores of problem-solving skills of novice teachers with respect to management type of institutions

## Hypotheses

**$H_{01}$:** There exists no significant difference in the mean scores of problem-solving skills of novice teachers with respect to gender.

**$H_{02}$:** There exists no significant difference in the mean scores of problem-solving skills of novice teachers with respect to management type of institutions.

## Research Method

**Design:** This study employed a causal comparative research design.

**Population:** All novice teachers of the 2-year B.Ed. programme studying in private and state universities of West Bengal were considered as the population for this study.

**Sample:** 300 novice teachers of a 2-year B.Ed. programme from 4 universities (2 state and 2 private universities) were taken through a simple random sampling. The characteristics of the participants, specifically their gender distribution and the management type of their institutions, are displayed in Table 1.

**Table 1: Sample characteristics based on gender and management type**

| Gender | | Management Type | | Total |
|---|---|---|---|---|
| Male | Female | Public | Private | |
| 203 | 97 | 30 | 270 | 300 |

**Tool used for the data collection:** Classroom management in B.Ed. represents taking care of the classroom's physical setup, students' behavior, teaching methods, emotional needs, social interaction, daily organisation and time management. When all these aspects are managed well, the classroom becomes a positive place for learning and helps students grow academically and personally. A problem-solving skills test on classroom management covering its various aspects was constructed by the researcher which was comprised of 40-items of multiple-choice. After item analysis, 30 items were retained. Each correct response was awarded one mark, while each incorrect response received zero marks. The test's reliability coefficient was calculated using Cronbach's alpha and the split-half method though SPSS and was found to be 0.78. Further, the test was validated by incorporating suggestions collected from five different experts.

Procedure of data collection: Permission was taken from the Head of Department of each university. For assessing the problem-solving skills, a test comprising 30 multiple choice items was administered among novice teachers of the third semester of a 2-year B.Ed. programme studying at four different universities during July to December 2024. The duration of the test was 45 minutes. The marks obtained by the students in the problem-solving skills test were recorded.

ChatGPT helps students improve their problem-solving skills by supporting self-regulated learning. It guides learners through planning, monitoring their work, and evaluating what they have learned. During planning, ChatGPT helps students understand the problem, set clear goals, and choose suitable ways to solve it. While monitoring, it gives quick feedback, asks thinking questions, and helps students check their progress and thinking. After completing a task, ChatGPT helps learners review their answers, find mistakes, and improve their methods. With this continuous support, ChatGPT helps students think about their own learning, work more independently, and become better problem solvers.

**The technique used for the data analysis:** An independent samples t-test was applied to analyse the data through IBM SPSS version 25, and interpretation was stated accordingly

## Results

### Verifying the assumptions of normality

Before applying statistical techniques, the data underlying the normality assumptions were examined through SPSS, and the results are presented in Table 2.

**Table 2: Mean, Standard Deviation, skewness, kurtosis, $Z_{Sk}$ and $Z_{Ku}$**

| Mean (M) | Standard Deviation (SD) | Skewness ( Sk) (a) | Std. Error (b) | Kurtosis (Ku) (c) | Std. Error (d) | ZSk = (a) / (b) | ZKu = (c) / (d) |
|---|---|---|---|---|---|---|---|
| 16.4 | 7.63 | 0.26 | 0.14 | -0.48 | 0.28 | 1.86 | -1.71 |

In Table 2, the value of M (=16.4) is less than half of the SD value (=7.63). Further, the values of skewness and kurtosis are 0.26 and -0.48, respectively, which lie between -2 and 2. Furthermore, the values of $Z_{Sk}$ and $Z_{Ku}$ are 1.86 and -1.71, which lie between -1.96 and 1.96. This indicates that the data related to problem-solving skills are normal.

Since the sample size for this study is 300, which is significantly larger than 50. The results of the Kolmogorov–Smirnov test for normality were taken into consideration and are presented in Table 3.

**Table 3: Kolmogorov–Smirnov normality test's results**

| Variable | Statistic | df | Significant |
|---|---|---|---|
| Problem-solving skills | 0.059 | 300 | 0.073 |

From Table 3, the value of the statistic is 0.059, which is not significant. This indicates that problem-solving skills data are normal.

For verifying the homogeneity of variances, Levene's Test was applied, and the corresponding results are given in Table 4.

**Table 4: Result of Levene's Test for equality of variances**

| Variance | F | Significant |
|---|---|---|
| Assuming equal variances | 0.009 | 0.924 |

In Table 4, the value of F is 0.009, which is not significant. This indicates that the data are normal.

Histogram, Q-Q plot, and whisker plot for the data related to problem-solving skills are shown in Fig 1.

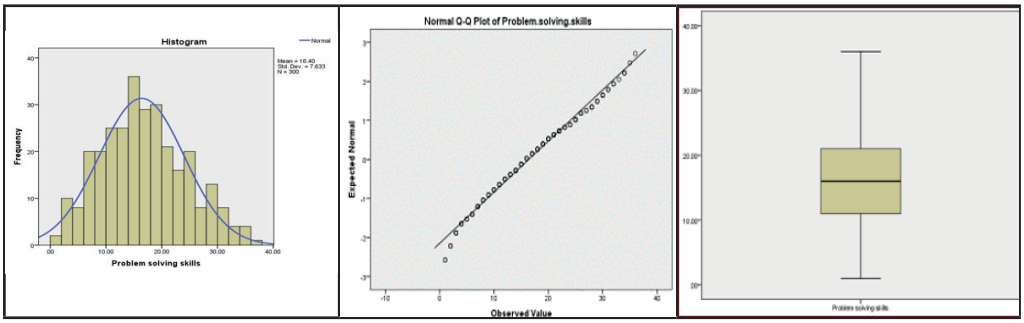


*Fig. 1: (a) Histogram, (b) Q-Q plot and (c) Box plot*

Fig. 1 (a) shows a bell-shaped curve well fitted with the peaks of the histogram, which implies that the data are normally distributed. Fig. 1(b) shows a Q-Q plot wherein most of the points lie either on the intercept line or near the intercept line. Fig. 1(c) shows a whisker or box plot, which demonstrates that there is no outlier.

Hence, based on the above results, it can be said that all assumptions of normality are met satisfactorily. Thus, parametric statistics were applied to analyse the data.

### Testing of first hypothesis (H01)

Gender had two levels: male and female. The data were analysed using an independent sample t-test, with the results presented in Table 5.

**Table 5: t-value of problem-solving skills of novice teachers with respect to gender**

| Gender | Mean | N | SD | df | t-value | Remarks |
|---|---|---|---|---|---|---|
| Male | 16.11 | 203 | 7.71 | 298 | 0.93 | Not Significant |
| Female | 16.99 | 97 | 7.47 | | | |

From Table 5, the t-value of problem-solving skills of novice teachers is 0.93, which is statistically not significant. Hence, the null hypothesis ($H_{01}$) is not rejected. Therefore, it is concluded that problem-solving skills of male and female novice teachers are identical.

### Testing of second hypothesis ($H_{02}$)

The management type of institution had two levels: state universities funded by the state government and private or self-financing universities. An independent sample t-test was employed to analyse the corresponding data, and the resulting findings are presented in Table 6.

**Table 6: t-value of problem-solving skills of novice teacher with respect to management type**

| Management type | Mean | N | SD | df | t-value |
|---|---|---|---|---|---|
| Private Universities | 15.49 | 270 | 7.13 | 298 | 6.61** |
| State Universities | 24.57 | 30 | 7.29 | | |

**** Significant at 0.01 level**

Table 6 shows that the t-value for the problem-solving skills of novice teachers is 6.61, which is significant at the 0.01 level with df = 298. This indicates a significant difference in the mean problem-solving skills scores between novice teachers from state and private universities. The null hypothesis ($H_{02}$) is therefore rejected. Furthermore, the mean scores of problem-solving skills of novice teacher with respect to the management type of institution have been shown graphically in Fig. 2.

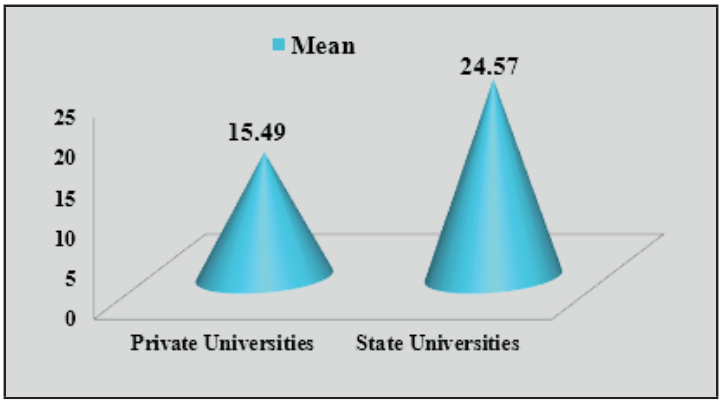


*Fig. 2: Mean scores of problem-solving skills of novice teacher with respect to management type*

Fig. 2 illustrates that the mean score of problem-solving skill for novice teachers at private universities (15.49) is significantly lower than the

score for those at state universities (24.57). Therefore, it is concluded that novice teachers at state universities demonstrated higher problem-solving skills than those at private universities.

## Discussion

Both objectives were acquired using an independent sample t-test. The findings for the first objective indicated that male and female novice teachers possessed comparable problem-solving skills. This is consistent with the findings of the previous studies (Sarkar, 2020; Khan, 2017). The outcomes of the second objective showed that the problem-solving skills of novice teachers of state universities were found to be higher than those of private universities, which is consistent with the earlier studies (Devi and Rajeswari, 2013; Daniel et al., 2010). This is because of the fact that the novice teachers pursuing a 2-year B.Ed programme from state universities had higher professional skills and competencies in terms of knowledge and practice.

Integrating ChatGPT with SRL is a powerful approach for improving students' problem-solving skills, as it offers personalised and flexible support. It reduces mental effort and helps learners perceive AI tools as more useful. This well-structured support leads to better academic performance. By promoting key self-regulation skills such as planning and reflection, generative AI tools prepare students for long-term academic success. This study significantly advances AI education by demonstrating that integrating generative AI, such as ChatGPT, with \ SRL effectively boosts students' critical thinking. By adapting the plan–act–reflect SRL cycle using ChatGPT, the research successfully empowered students to become more self-directed learners. Moreover, the study provides practical insights by examining the advantages and limitations of using ChatGPT in educational contexts. Teachers, however, must balance this potential by understanding the constraints of various AI technologies, recognising that SRL is a sophisticated, multi-layered learning process.

## Educational Implications

The findings revealed that ChatGPT improved the problem-solving skills of novice teachers. Integrating an AI tool such as ChatGPT presents a promising avenue for helping novice teachers more effectively manage and guide their self-regulated learning. To guarantee that the use of these technologies yields accurate and relevant results, it is imperative that both educators and novice teachers acknowledge the limitations of AI. Furthermore, equipping both groups with the necessary AI competencies (skills and knowledge) is essential, enabling them to leverage these tools effectively. Hence, the outcomes of the present study might be helpful for students, teachers, teacher educators, administrators, principals, and policy makers as well.

## Conclusion

Problem-solving skills of novice teachers of 2-year B.Ed. programme in terms of gender and management type of universities located in Kolkata city of West Bengal has been studied through a causal comparative research design. The findings revealed that using ChatGPT integrated self-regulated learning, the problem-solving skills were found to be identical for male and female novice teachers. Further, ChatGPT integrated self-regulated learning, enhancing the problem-solving skills of novice teachers of state universities more than those of private universities. Artificial intelligence supports student self-regulated learning (SRL) across all subjects. For novice teachers, problem-solving is a

key developmental area that can be cultivated using ChatGPT-integrated SRL support. This integration has the potential to boost their problem-solving proficiency through personalised guidance and feedback. The study's findings can be applied to refine teacher training programs by promoting the development of innovative skills. For expanded understanding, subsequent studies should investigate the role of other demographic and sociological factors in shaping novice teachers' problem-solving skills within diverse settings. Metacognitive support can be integrated into teaching when AI tools are used. Teacher training can be designed to help educators develop self-regulated learning strategies in technology-rich classrooms. Policymakers can promote the responsible and efficient use of AI tools in education.

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