Role of AI-Driven Teaching in Enhancing Classroom Decision-Making Skills of Prospective Teachers

OPEN ACCESS

Volume: 13

Special Issue: 3

Month: March

Year: 2026

P-ISSN: 2321-788X

E-ISSN: 2582-0397

Citation:
Shalviya, J., and A. R. Bhavana. "Role of AI-Driven Teaching in Enhancing Classroom Decision-Making Skills of Prospective Teachers." *Shanlax Interantional Journal of Arts, Science and Humanities,* vol. 13, no. S3, 2026, pp. 55–62.

DOI:
https://doi.org/10.34293/sijash.v13iS3-Mar.10487

J. Shalviya
Research Scholar
Department of Educational Technology, Bharathiyar University
Coimbatore, Tamil Nadu, India

Dr. A.R. Bhavana
Professor
Department of Educational Technology, Bharathiyar University,
Coimbatore, Tamil Nadu, India

Abstract

The world of artificial intelligence (AI) is quickly changing the way education is conducted by endorsing data-driven teaching, individualized learning, and responsive teaching methods. The capability of AI-based teaching tools to empower pedagogical skills in teacher education means that would allow future teachers to process situations in the classroom and make quality teaching decisions. The current paper examined the idea of AI-driven instruction on development of classroom decision-making skills among future educators. The research design adopted was experimental research design including a pre-test and post-test control group. It was decided to select 120 future teachers who are undertaking a Bachelor of Education program and allocate them to experimental and control groups randomly. Experimental group has engaged in AI-based teaching practices, such as intelligent teaching simulations, automated teaching feedback systems, and AI-assisted lesson planning tools, and the control group was provided with traditional teacher training. The scales to collect data were a Classroom Decision-Making Skills Scale and were analyzed with the help of descriptive statistics and t-tests. The findings indicated that the prospective teacher decision-making skills in the classroom were greatly enhanced when exposed to AI-driven teaching than when they were on the traditional training group. The results indicate that AI-assisted learning for instruction can encourage reflective thinking, pedagogical reasoning and adaptive methods of instruction in pre-teachers. The research points out that AI-based teaching technologies should be included into the teacher education programs to equip future teachers to work in data-informed and technology-enhanced classrooms.

Keywords: Artificial Intelligence used in Teaching, AI-based Teaching, Classroom Decision-making, Future Teachers, Pedagogical Technology, Teaching Technology.

Introduction

The swift adoption of digital technologies in the education sector has changed the teaching practices and decision making in education processes. One of such innovations is artificial intelligence (AI),

which has turned out to be an effective tool that can be used to facilitate personalized learning, adaptive instruction, and data-driven educational practices. Over the last few years, AI-based educational technologies have been integrated into classrooms more frequently, to help teachers to analyze the performance of students, anticipate learning problems, and choose the most suitable instructional tools (Holmes et al., 2022).

Teaching is a profession of decision making. The teachers have to constantly analyze the situations in the classroom, diagnose learning challenges, select suitable pedagogical strategies, and assess the learning results. Such decisions are made in the dynamic and unpredictable classroom set-ups with various factors affecting learning processes. As a future teacher, it is important to cultivate effective classroom decision-making skills in order to have a successful teaching practice. Nevertheless, most pre-service educators have difficulties in applying theoretical knowledge to practical decisions in teaching when interacting with students in the real classroom.

Artificial intelligence can facilitate this change by offering learning experiences simulated and delivered in real-time, instructional analytics, and intelligent tutoring systems that inform pedagogical decisions. Teaching platforms powered by AI have the ability to process significant volumes of learning data and provide evidence-based recommendations that allow an educator to make informed decisions when making instructions (Luckin et al., 2021). As an illustration, teaching simulations with the support of AI can give a future teacher the opportunity to rehearse their reaction to the situation in the classroom, contemplate the outcomes of various pedagogical interventions, and consider how they might be responding to the situation. Moreover, adaptive learning systems, predictive analytics, and intelligent feedback mechanisms represent AI technologies that allow teachers to understand the learning behavior and the level of engagement among students. These understandings can help teachers to change instructional strategies, differentiate instruction and classroom interactions to be more effective. Consequently, AI-based instructional tools may help educators to build pedagogical arguments and reflective practice in future teachers.

Nevertheless, even with the increasing attention to the use of AI applications in education, there are few empirical studies on the effect of AI-based teaching on the classroom decision-making ability of future teachers. The majority of the available literature concentrates on the effect of AI on the student learning outcomes instead of its influence on teacher training and professional development. As a result, the possibility of the use of AI-assisted instructional tools to enhance the capacity of potential teachers to process classroom contexts and make pedagogically valid choices has to be explored. Thus, this paper discusses how AI-based instructional technologies can be used to support classroom decision-making among future educators. With the concept of building AI-assisted teaching simulations and instructional analytics into teacher education programs, the research would investigate whether they can enhance the concepts of pedagogical judgment, reflective thinking, and adaptive instructional decision-making.

Review of Literature

AI has become one of the technologies that have revolutionized the education sector and has created new opportunities in personalized education, automated evaluation, and data-driven teaching assistance. According to the recent studies, AI-based systems can help educators to process learning data, predict student performance, and develop adaptive instruction strategies (Holmes et al., 2022).

Smart teaching tools involve intelligent tutoring systems, predictive analytics systems, automated feedback systems and classroom simulation systems. This is because these technologies will offer teachers real-time information about how students learn, as well as enable them to detect trends that are not readily noticeable during conventional teaching methods. Luckin et al. (2021)

suggest that, through analyzing the extensive educational data and providing the teacher with recommendations on how to improve instruction, AI systems can help them make more informed pedagogical choices.

AI-assisted simulations are becoming more popular as a tool of enhancing professional skills in future educators in the area of teacher education. The simulation-based learning environments enable teacher learners to learn how to make instructional decisions in secure and controlled settings where errors turn out to be learning and development opportunities. A study conducted by Chen et al. (2023) concluded that teaching simulations done using AI churned out a substantial enhancement in the abilities of the prospective teachers in classroom management and pedagogical decision-making.

The other significant aspect of teaching that is supported by AI is reflective practice. Reflective practice is the capacity of teachers to examine what they do in delivering instructions and how effective they are. Teachers can use AI-based analytics tools to receive feedback about their teaching model and determine their strong and weak sides. Zawacki-Richter et al. (2023) suggest that instructing reflectively is accomplished by using the technology of AI that provides teachers with the data-driven feedback on student engagement and the results of the instruction. Nonetheless, other researchers warn that a successful implementation of AI in teacher education is a process that needs to be carefully designed pedagogically. Artificial intelligence is not supposed to substitute instructional proficiency of humans. Educators will need to acquire critical digital literacy so that they can understand AI-generated recommendations and make context-specific pedagogic choices (Selwyn, 2022). Despite the fact that the current literature emphasizes the possible advantages of AI applied to teaching and learning, there is a lack of empirical studies aiming to identify the particular aspects of classroom decision-making skills of the potential teacher. To fill this gap, the paper discusses the effects of AI-based instructional aids on decision-making skills acquisition in teacher education courses.

Theoretical Framework

The research has been based on the theory of experiential learning, reflective practice and technology enhanced theory of learning. All the theories of experiential learning accentuate professional knowledge as a result of active interaction with the real or simulated experience (Kolb, 2015). As a new educator, I would use AI-supported teaching simulations to get hands-on experience in making decisions in a classroom and analyzing the performance of the instruction. Schon (1983) explains the value of having reflection in professional learning through the Reflective practice theory. Feedback and analytics created with the help of AI allow potential teachers to assess the strategies they use in teaching and enhance their decision-making process. Technology-enhanced learning theory implies that digital technologies are able to diversify learning experiences out of the classroom. The use of AI-based instructional aids makes the learning process interactive and personalized, facilitating the professional growth of a teacher.

Objectives of the Study

1. To determine the role of AI-based teaching tools in decision-making capabilities in classrooms among future teachers.
2. To contrast decision-making skills in future teachers who had AI-assisted training with those who had the traditional teacher training.
3. To examine the effects of AI-based teaching on teaching reflectiveness and instructional confidence.
4. To determine the efficacy of AI-based teaching simulation in teacher education courses.

Hypotheses

H 0: The differences between the capabilities of classroom decision-making between the future teachers who are subjected to AI-driven teaching and traditional instruction are not significant.

H 11: The classroom decision-making skills of prospective teachers who experience the teaching of AI-driven instructions will be significantly higher in comparison to the skills of prospective teachers, who get traditional instructions.

Methodology

The current paper took a more systematic approach to methodology to explore the role of AI-based instruction in the improvement of classroom decision-making abilities in future teachers. The methodology was supposed to test the efficiency of AI-assisted teaching tools on the basis of an experimental model that enabled to compare the results of teaching practices using AI with the traditional teacher training approaches.

Research Design

The research design used in the study was experimental research design and pre-test and post-test control groups. The rationale behind using this design was to establish the causal role of AI-based teaching interventions on classroom decision-making ability of future teachers. The participants were categorized into two, an experimental group of participants who experienced instructional experiences supported by AI and a control group, which experienced the traditional teaching training practices. Before the intervention process, the pre-test was carried out to determine the baseline level of decision-making ability and the post-test to assess the improvement. Experimental research design is also common in educational research to test the efficacy of new pedagogical techniques due to the ability of the researcher to manipulate confounding variables and determine the causal connections relating instructional methods and educational results (Creswell and Creswell, 2018).

Participants

The study population consisted of the future teachers following a Bachelor of Education (B.Ed.) degree course in the teacher education colleges at Thiruchirapalli District in Tamil Nadu. These interviewees were selected since the pre-service teachers were at the early stages of acquisition of pedagogical skills, including skills in making classroom decisions. One hundred and twenty (120) potential teachers were involved in the research. Students were recruited in teacher education colleges voluntarily and approved by the institution. The respondents were representatives of various areas of subject specialization including science, mathematics, social science, and language education.

Sampling Technique

The researcher used a simple random sampling strategy to sample the participants within the accessible sample of future teachers. Upon the selection, the participants were designated randomly to two groups:

Experimental Group: 60 future teachers who engaged in the teaching activities that were driven by AI.

Control Group: 60 future teachers that took traditional teacher training techniques.

Random assignment was done so that both groups were similar in terms of prior academic performance and teaching experience.

Intervention: Artificial Intelligence-Powered Instructional Environment

The experimental group was involved in AI-supported teaching related to modeling real

classroom scenarios and assisting pedagogical decision-making. The learning environment based on AI had the following elements:

AI-Based Teaching Simulation Platforms: These platforms included the real-life classroom situation where future teachers were required to make the right instructional decisions. Pedagogical effectiveness was used as a basis of feedback in the AI system.

Intelligent Lesson Planning Assistants: AI tools were used to assist participants to create lesson plans by proposing instructional strategies, assessment strategies, and differentiation strategies, based on student learning information.

Automated Instructional Feedback Systems: The AI-generated analytics compared the teaching choices made during the simulation and suggested ways to improve them.

These artificial intelligence-based instructional aids motivated future educators to take on classroom scenarios, consider teaching practices, and make research-supported teaching choices. It has been demonstrated that such technologies can improve teacher professional learning by offering data-driven information about teaching (Holmes et al., 2022).

The intervention took a period of six weeks during which the participants undertook AI-based instructional activities on a bi-weekly basis.

Data Collection Instruments

The research results employed the use of the following research instruments:

Classroom Decision-Making Skills Scale: A scale created by a researcher was used to assess the capacity of future teachers to interpret the classroom scenarios, recognize the needs of learning among the students and make the right choice of instructional tactics. The items included in the scale were 25 in number on a Likert scale of five, which stepped down to strongly disagree to strongly agree.

Reflective Thinking Questionnaire: This was a tool that evaluated the reflective thinking skills of the participants in regard to teaching decisions and teaching practices.

AI-Assisted Intensive Instruction Tasks: Intensive Instruction Tasks Scenario-based instruction tasks involved participants being asked to react to classroom scenarios and make pedagogically sufficient decisions.

Validity and Reliability of the Instruments

The instruments had their content validity checked by having expert reviews, with experienced teacher educators and educational technology specialists. The tools were improved in accordance with their feedback in order to be clear and relevant.

The pilot study was done with a small sample of the prospective teachers who were not part of the final sample. Calculation of the reliability of the Classroom Decision-Making Skills Scale was based on Cronbach alpha that produced the reliability coefficient of 0.87 to demonstrate high internal consistency.

Data Collection Procedure

The research was done in a systematic process:

Pre-Test Phase: The Classroom Decision-Making Skills Scale was used to pre-test the participants of both groups.

Intervention Phase: In the experimental group, AI-driven teaching activities were applied whereas in the control group, the split was left to traditional teacher education practices.

Post-Test Phase: Following the six weeks of intervention, the two groups took the identical decision-making skills test in order to determine an improvement.

Data Analysis Techniques

The statistical methods were employed in the analysis of the collected data to estimate the effect of AI-based teaching on the classroom abilities to make choices. It was done by the following ways:

- Descriptive statistics (mean and standard deviation)
- Independent samples t-test regarding experimental and control groups.
- Paired samples t-test: the results will be compared against pre-test and post-test.
- Analyzing effectiveness to quantify the size of improvement.

Such statistical methods are usually applicable in educational research, which investigates the efficacy of the instructional interventions (Creswell and Creswell, 2018).

Ethical Considerations

Ethics were also observed very sternly during the research. Participation was voluntary and informed consent was taken among all the participants. Participant data confidentiality was also ensured and findings of the research were reported in an objective manner without any manipulation.

Results

The study outcomes were compared to identify the efficiency of AI-based teaching in developing the skills of making decisions in the classroom among future educators. The hypotheses were tested at the 0.05 level of significance. The performance of the experimental and control groups was compared using descriptive and inferential statistics using independent sample t -tests. The findings are given based on the objectives and hypotheses of the research work.

Pre-Test Comparison of the Scores

A pre-test was done to identify whether the experimental and control group were equivalent in terms of classroom decision-making skills before applying the AI-driven teaching intervention.

Table 1: Pre-Test Scores of Experimental and Control Groups

Group	N	Mean	SD	t-value	p-value
Experimental Group	60	48.35	6.21	0.72	0.473
Control Group	60	47.62	6.08		

Interpretation

The findings show that the experimental group and the control group are not significantly different in the pre-test scores ($t = 0.72$, $p > 0.05$). This indicates that the two groups were the same when it comes to their skills of working out decisions in the classroom prior to the intervention.

Hypothesis Testing: the Impact of AI-Based Teaching on Classroom Decision-Making Skills

Null Hypothesis (H 0 1): The skills in classroom decision-making of prospective teachers who were taught using artificial intelligence and conventional teacher training are not significantly different.

In order to test this hypothesis, an independent samples t-test was used to compare the post-test scores of the experimental and the control group.

Table 2: Post-Test Comparison of Classroom Decision-Making Skills

Group	N	Mean	SD	t-value	p-value
Experimental Group	60	71.48	7.12	6.37	0.000
Control Group	60	63.26	6.84		

Interpretation

The post-test scores indicate that there is a statistically significant difference between the experimental and the control group ($t = 6.37$, $p < 0.05$). The experimental group that was taught using AI showed greater mean scores in the classroom decision-making skills than the control group.

Classroom Decision-Making Skills Improvement of the Experimental Group.

A paired samples t-test was used to find out the significant increase in decision-making skills in prospective teachers who underwent AI-driven teaching activities.

Table 3: Pre-Test and Post-Test Comparison of the Experimental Group

Test	N	Mean	SD	t-value	p-value
Pre-Test	60	48.35	6.21	18.54	0.000
Post-Test	60	71.48	7.12		

Interpretation

The findings indicate that there was a high rise in the post-test scores of the experimental group relative to their pre-test scores ($t = 18.54$, $p < 0.05$). This means that the AI teaching intervention was significant in enhancing the skills of making decisions in the classroom.

Discussion

The results of the current research indicate that AI-based instruction substantially increases the skills of making decisions in the classroom among the future teachers. Experimental group that participated in AI-supported teaching simulations and instructional analytics experienced higher enhancement in the analysis of classroom situations, the choice of suitable pedagogical strategies, and reflection of the instructional outcomes than the control sample. These findings are consistent with the recent studies stating that artificial intelligence could assist teachers in data-informed instructional planning and make real-time decisions on the matters of student learning and classroom dynamics (Holmes et al., 2022). Simulations based on AI provide virtual field trips that allow future educators to train and rehearse their reaction to complicated classroom situations and provide instant feedback on their choices. It promotes the concepts of the experiential learning theory, implying that the professional competence is built on the active exposure to the realistic learning experience (Kolb, 2015). Also, AI-based feedback promotes reflective practice as it enables the teacher candidates to assess the usefulness of the instructional choices, which aligns with the reflective learning model described by Schoen (1983). The same has been noted in recent research pointing out that AI-based instructional aids enhance pedagogical rationality and teaching flexibility among teacher learners (Zawacki-Richter et al., 2023). Thus, the current research offers an empirical evidence in favor of incorporation of AI-based technologies into the teacher education curriculum to enhance the competence to make decisions in the classroom.

Educational Implications

This research study has a number of valuable implications on the teacher education institutions, policy makers, and curriculum designers. To start with, AI-engineered teaching tools in the form of intelligent teaching simulation, auto teaching feedback system and AI-based lesson planning platforms should be included in the pre-service training of teachers. Such technologies will give potential teachers a chance to exercise classroom decision making in realistic interactive settings. Second, AI analytics may also be used to promote the practices of reflective teaching by offering information-based reflections on the teaching methods and student learning patterns. This can assist the teacher candidates to have critical thinking and pedagogical thinking skills. Third, educational policymakers ought to foster the emergence of digital infrastructure, professional training opportunities, which allow teacher educators to succeed in integrating AI-based technologies into the teaching process. Lastly, the curriculum developers ought to develop teacher education units that focus on the application of technology enhanced pedagogical skills so that future teachers are prepared to utilize the AI tools in the contemporary classroom in a responsible and efficient manner.

Conclusion

Artificial intelligence is quickly transforming the educational process and establishing new possibilities of enhancing professional development of teachers. The current research investigated the potential of AI-based teaching to improve decision-making abilities in a classroom setting among future educators and discovered that AI-mediated teaching settings have a great influence on the level of pedagogical reasoning, reflective thinking, and instructional confidence. Through the interaction with AI-based teaching simulations and instructional feedback systems, the potential teachers could enhance their analytical and decision-making skills in responding to classroom scenarios. The results presented above indicate how AI technologies could be used to empower teacher preparation programs and facilitate the acquisition of adaptive teaching skills. With the current evolution of education systems undergoing the digital era, AI-powered teaching eyes will play a pivotal role in educating the future generation of teachers to make effective, responsive, and data-driven teaching choices.

References

1. Chen, L., Chen, P., & Lin, Z. (2023). Artificial intelligence in education: A review. IEEE Access, 11, 20210–20223. https://doi.org/10.1109/ACCESS.2023.3244897
2. Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications.
3. Holmes, W., Bialik, M., & Fadel, C. (2022). Artificial intelligence in education: Promises and implications for teaching and learning. Center for Curriculum Redesign.
4. Kolb, D. A. (2015). Experiential learning: Experience as the source of learning and development (2nd ed.). Pearson Education.
5. Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. (2021). Intelligence unleashed: An argument for AI in education. Pearson Education.
6. Selwyn, N. (2022). Should robots replace teachers? Artificial intelligence and the future of education. Educational Technology Research and Development, 70(1), 15–23. https://doi.org/10.1007/s11423-021-10070-w
7. Schön, D. A. (1983). The reflective practitioner: How professionals think in action. Basic Books.
8. Zawacki-Richter, O., Bond, M., Marin, V., & Gouverneur, F. (2023). Systematic review of artificial intelligence in higher education (2017–2022). International Journal of Educational Technology in Higher Education, 20(1), 1–25. https://doi.org/10.1186/s41239-023-00369-8