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Artificial Intelligence–Enabled Teacher Dashboards and Their Impact on Academic Achievement in Teacher Education

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Abstract

Artificial Intelligence (AI) is increasingly transforming higher education by enabling data-driven instruction, personalized learning, and real-time academic monitoring. Among AI-based innovations, teacher dashboards have emerged as powerful tools that support instructional decision-making through learning analytics. This study investigates the effectiveness of AI-driven teacher dashboards in enhancing the academic performance of B.Ed. (Hons) students at Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi. Using a quantitative research design, data were collected from 25 undergraduate students through a structured questionnaire assessing awareness, usage, and perceived academic impact of teacher dashboards. Descriptive statistical analysis was conducted using SPSS. The findings reveal that AI-based teacher dashboards significantly support students in monitoring academic progress, managing learning resources, improving self-regulation, and enhancing motivation. Improved teacher–student communication and timely feedback were also reported as key contributors to better learning outcomes. However, limited awareness regarding data privacy, ethical considerations, and institutional policies related to AI use was identified as a major concern. The study concludes that AI-enabled teacher dashboards positively influence teaching and learning processes and hold strong potential for integration into teacher education programs. Embedding AI literacy, ethical guidelines, and professional training within teacher education curricula is essential to ensure sustainable and responsible adoption. These findings provide valuable insights for educators, policymakers, and higher education institutions aiming to promote innovation and improve instructional quality through AI-driven educational technologies.

Keywords: Artificial Intelligence, Teacher Dashboard, Learning Analytics, Educational Technology, Pedagogical Practices, Academic Achievement

1. Introduction

Artificial intelligence (AI) has been a transformative force in education that is changing the way students are taught and they learn with data-driven adaptive technologies (Chiu *et al*., 2023). AI comprises computer systems able to accomplish tasks usually requiring human intelligence, including reasoning, learning and problem solving (Goksel & Bozkurt 2019). Institutional applications of AI as reinforcement learning decision support systems have the potential to have a positive impact on student learning (Rodríguez-Ortiz *et al*., 2025). These technologies provide individualized learning experiences by analyzing learner data and delivering immediate feedback which is an essential means of improving instructional quality (Xu *et al*., 2022).

AI in education is closely tied to learning analytics which is the process of collecting and analyzing data to make learning environments better (Ifenthaler & Yau, 2020). Teacher dashboards make this idea real by giving teachers visual useful information that helps them keep track of student achievement. Progress and change how they teach based on that (Van Leeuwen *et al*., 2023). These dashboards show how engaged, performing and participating students are and they let teachers step in and give personalized instruction right away (Lampo, 2023). Recent research suggests that dashboards not only enhance academic performance they also encourage self-regulation and motivation in students by rendering progress visible (Ahn *et al*., 2021).

However, the implementation of AI-powered dashboards has faced challenges regarding user-friendliness, pedagogy and ethics (Khurshid *et al*. Teachers frequently struggle to comprehend complex visualizations (data) or to integrate dashboards into their daily practice, signifying the necessity for professional development (van Leeuwen *et al*. In addition, concerns about data privacy, algorithmic bias and fair access have led to a demand for rules to make sure that AI is used ethically in schools (Salloum *et al*., 2023). To make AI an enabler instead of a disruptor in education-related settings, these issues need to be fixed (Safiulina *et al*., 2024).

The use of AI in education is growing around the world but it is still not widely used in developing countries like Pakistan. This is because of factors like poor infrastructure and resistance to change (Phulpoto *et al*., 2024). Local studies on the implementation of teacher dashboards in Pakistani higher education are scanty and have created a considerable vacuum (Ikram *et al*., 2025). The study therefore fills a gap by investigating the influence of AI-enabled teacher dashboard on academic performance of B.Ed. (Hons) (Hons) students, thereby augmenting the knowledge repository AI in education (Pang *et al*., 2025)

Artificial Intelligence has the power to be a game changer in education by allowing for greater personalization of learning, data-driven teaching and ultimately, higher student achievement. Yet unlocking their potential advocates the resolution of issues around usability, ethics and situational applicability. further Investigating the influence of dashboards, on B.Ed. (Hons) students this research provides significant insights for policymakers, educators, and institutions aiming to integrate technology into teacher education.

2. Materials and Methods

This study employed a quantitative research design, regarded as a methodology that facilitates precise measurement of variables and the analysis of numerical data to identify patterns and links (Weyant *et al*., 2022). The design was a suitable one to investigate the influence of AI-based teacher dashboards on academic achievement of B.Ed. (Hons) students.

Target population the target population for the current study comprised of the students studying in Department of Education, PMAS-AAUR. Twenty-five (both male and female) B.Ed. (Hons) programme were included in the study. This sample size was deemed sufficient for exploratory research in an educational context.

The convenience sampling method was employed since it permitted the inclusion of those respondents who were available and willing to be part of the study (Etikan *et al*., 2016). While restricting generalizations this approach is frequently used in small educational studies.
The information was retrieved by structured questionnaire designed by the researcher. The tool consisted of close-ended type of questions with a scale ranging from 1 as strongly agree to 5 as strongly disagree. The questionnaire was checked for clarity and content validity by two subject experts and then pilot tested on five students to improve the items.
The questionnaires were administered in class. Participants were told about the purpose of the study and that their responses would be kept confidential and anonymous. The survey was voluntary and all respondents provided informed consent.
The data were coded and analyzed by SPSS a package commonly used for statistical analysis in educational research Summary and Inferential statistics were employed in analyzing the data for interpretation and conclusions (Nie *et al*., 1970).
Students of B.Ed. (Hons) at PMAS-Arid Agriculture University, Rawalpindi were restricted to the study. Other programs/institutions were not represented which can impact the generalizability of the findings. The research process was carried out according to the ethical guidelines. The participants were told that their participation was voluntary and that their answers were to be kept confidential. There was no gathering of any identifying information and the data were not utilized other than in research.

3. Results and Discussion

The central inquiry of the given research was how teacher dashboards could be applied in helping B.Ed. (Hons) students to achieve higher academic performance. The results also show that dashboards gave students feedback on time, enhanced engagement and helped manage time better. The students said that dashboards helped them find their weak spots and use their resources better which made their grades go up. These results show that dashboards can be an an important tool for boosting self-control and motivation through making progress clear and possible
Teacher dashboards and other technologies let teachers and students check data, keep track of their academic progress and get feedback when they need it. Using artificial intelligence in education has made it possible to personalize, automate and analyze data in real time which is in line with the findings of earlier research that emphasizes the significance of dashboards, enabling educators and learners to make informed decisions through real-time analytics. Other similar research has indicated that dashboards can support formative assessment practices and promote individualized learning experiences.
Analysis of questionnaires showed that the majority of students felt that dashboards helped in managing resources keeping up to date and tracking academic progress easily. Students also said that there was better teacher-student communication that minimized misunderstandings and improved learning planning. Dashboards helped the students manage themselves and set goals which enhanced their self-management skills. These conclusions are consistent with the objectives of modern educational technology that are to empower learners and assist educators in providing effective and tailored education (Luckin and Holmes, 2016).
The SPSS results have revealed that the level of agreement was clustered around the middle to high range, indicating that people had a positive outlook towards dashboards. As an illustration, in the Agree category the most popular options were 12 and 14, with an equal number of people choosing each one. Likewise, the most common level 6 (25%) was in the disagree category. Strongly agree and strongly disagree had less frequent responses, implying moderate as opposed to extreme views. All in all, the data confirm that students think dashboards can help students

achieve higher academic performance, but their understanding of data privacy and institutional policies is low.

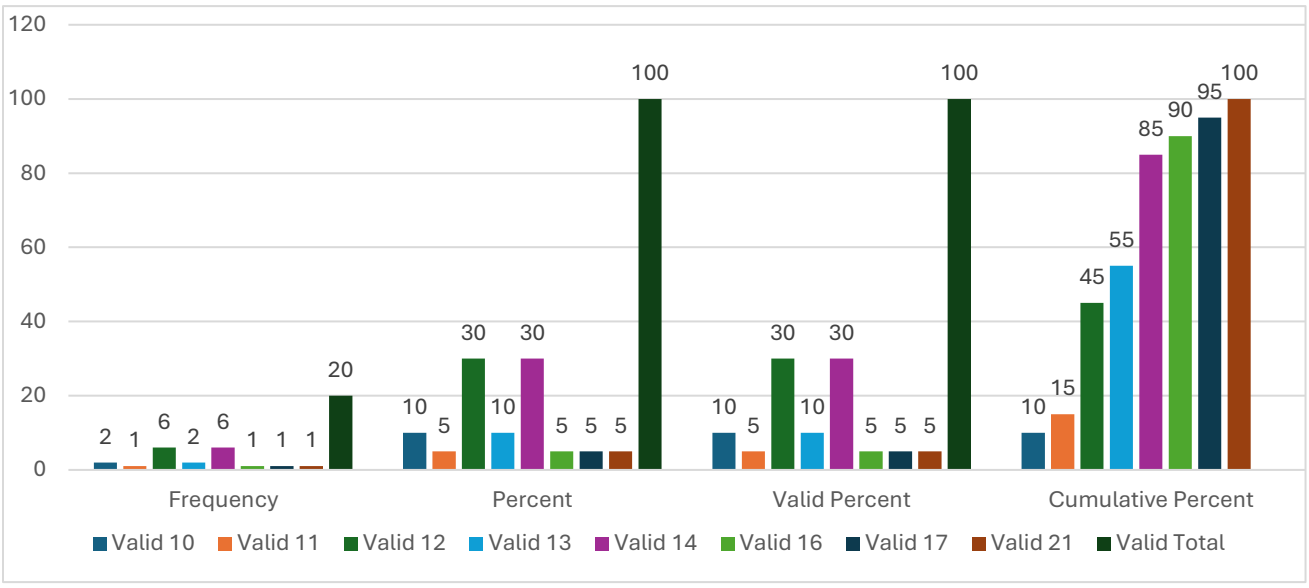

Figure.1: Frequency distribution of "Agree" responses across Likert levels.

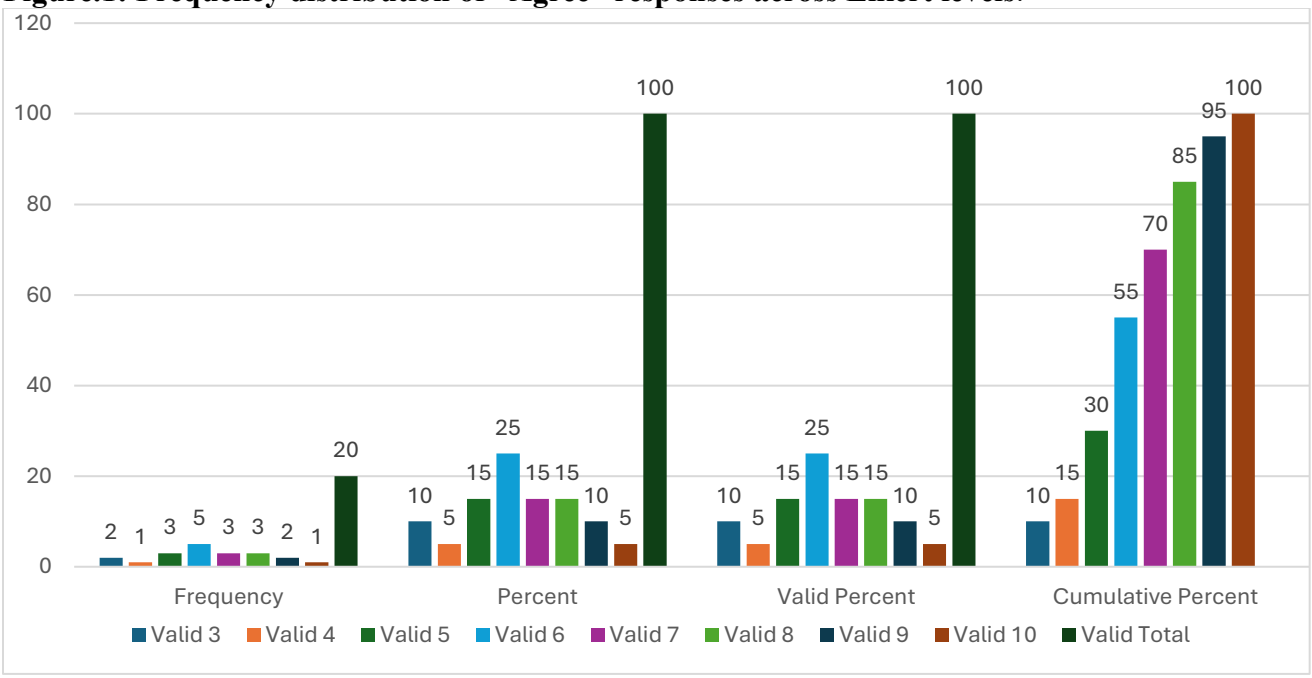

Figure. 2: Frequency distribution of "Disagree" responses across Likert levels.

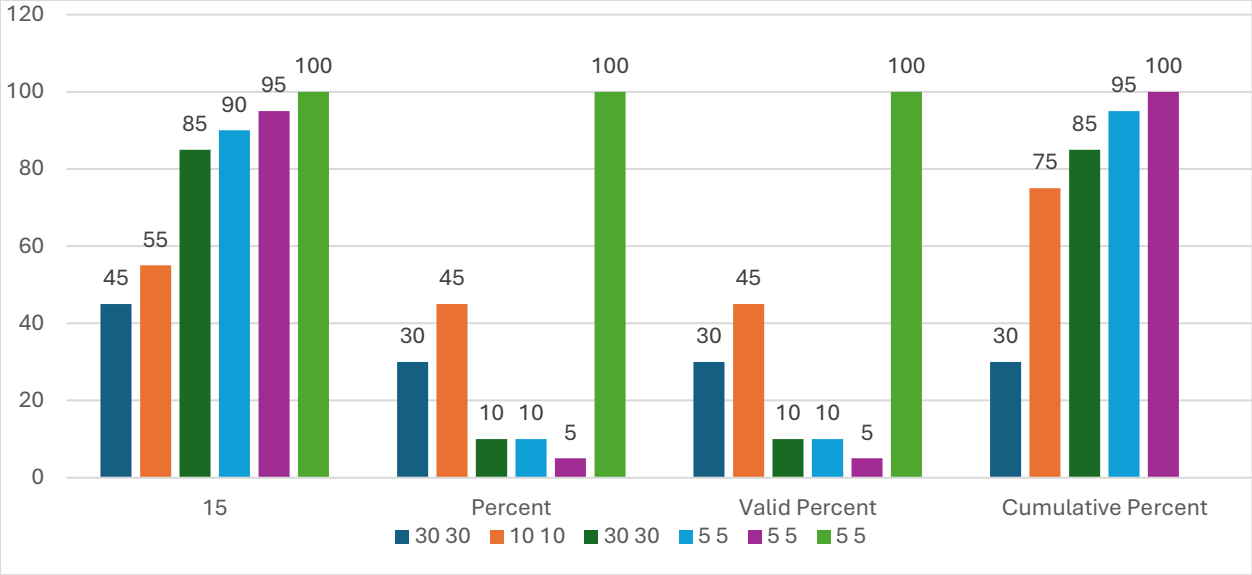

Figure. 3: Frequency distribution of "Strongly Agree" responses across Likert levels.

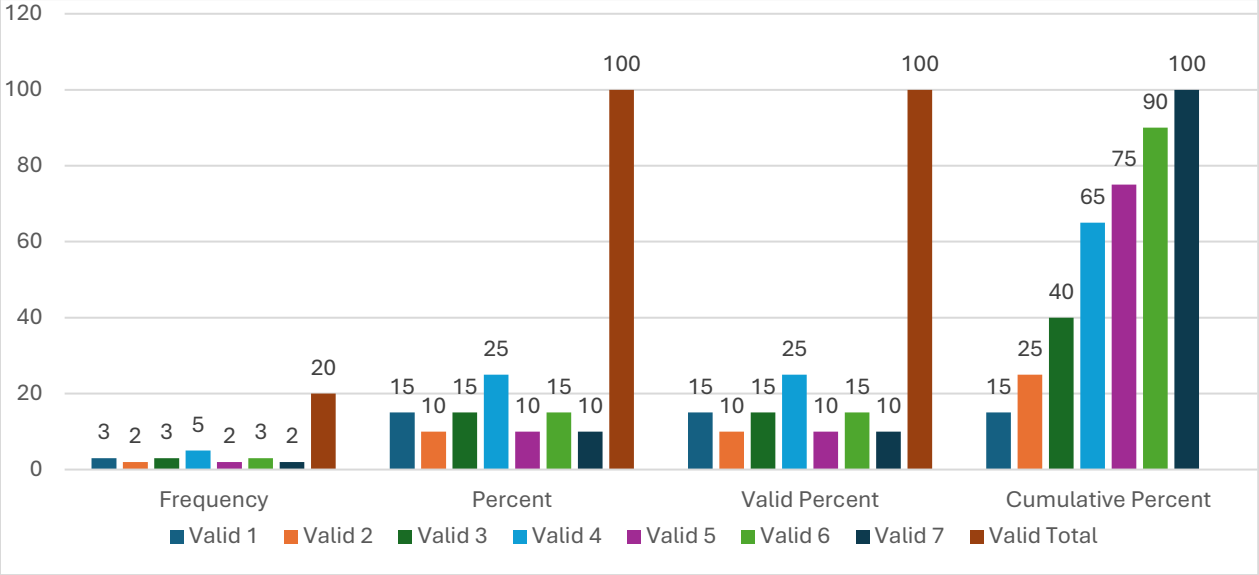

Figure. 4: Frequency distribution of "Strongly Disagree" responses across Likert levels.

The statistics obtained with four sets of surveys indicate the individual trends of respondent behavior and the levels of their agreement. As Figure 1 indicates, the most common forms of agreement were 12 and 14 each having 30% of the respondents. This means that there was a high level of consensus at these two stages. There was moderate agreement in level 10 (10%) and level 13 (10%) and level 11, 16, 17 and 21 were only chosen by 5 percent each, with a distribution that was more scattered among the other participants. Figure 2 shows that 25% of the respondents chose the most common value of 6. Values 5, 7 and 8 were close behind with values of 15% each, 3 and 9 were chosen with 10% and 4 and 10 with 5% or less. The distribution indicates that there is an overall propensity to moderate values with the proportion of those who select extremes being lower. Figure 3 emphasizes the equilateral response pattern on a 7-point scale.

The most frequent (25%) was at option 4 which may be a neutral or a halfway answer. Other responses were well distributed with 10-15% on the low and high end of the scale showing a varied

yet centered opinion trend amongst the participants. Lastly, Figure 4 can be analyzed as an agreement summary of a 7-point scale where 30 percent of the sample reported the lowest scores (0) and 45 percent reported the highest score (1), indicating a clear bias towards low agreement. The highest score (5) achieved moderate agreement with only 5% of the respondents giving the highest score, whereas the score (2) and (3) each had moderate agreement (10 percent). In general, the data indicate that the majority of the respondents were neutral or agreed with low levels of agreement, and a very small fraction of the respondents agreed strongly.

4. Conclusion

Attributed to the integration of Artificial Intelligence in education, teaching and learning processes are being transformed with the introduction of tools that make the process more personal, efficient and data driven. Teacher dashboards are among such tools and have proven to be a potent innovation offering real-time information on student performance, engagement and progress. This paper showed that dashboards can make a tremendous positive impact on academic outcomes by providing timely feedback, facilitating self-regulation and enhancing active teacher-student interaction.

In the case of B.Ed. (Hons) students, who will become future teachers, contact with AI tools is necessary to achieve digital literacy and innovative approaches to teaching. Not only do dashboards aid in the tracking of student progress it also helps cut down the amount of work the teachers need to complete by facilitating the automation of low-order teaching processes, therefore enabling teachers to be able to concentrate more on higher-order teaching processes. Nevertheless, other obstacles identified in the study include a lack of knowledge about data privacy or the institutional policies required to promote ethical AI use in education. It is paramount to tackle these issues by developing professionalism and precise governance structures to ensure its sustainable realization.

When used intelligently, teacher dashboards have immense potential to improve learning outcomes and teaching quality in students. They change the role of the teacher (delivering content) and turn it into individualized direction, making the process more inclusive and adaptive to change. To leverage all the benefits, AI training must be embedded in teacher education programs, responsible data practices must be encouraged and strategies to adopt AI based on research must be encouraged. We can make sure that technology does not neutralize but enhances the human aspects of teaching by training the educators to utilize AI to benefit from its advantages and continue promoting the values of education with innovation as the key factor.

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