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Abstract

This study was conducted to explore the role of Artificial Intelligence in enhancing the teachers' competencies. This was a theoretical study in nature conducted while using the secondary data collected from the available books, journals, and dissertations. The results revealed that AI has great potential to enhance teachers' competencies while helping them design relevant educational content aligned with learning objectives and providing feedback on their instructional strategies and practices. It also allowed to automate the student attendance and grading on the teacher's side. It will also assist the teachers in selecting suitable strategies and teaching aids for aiding a wide variety of students including those with special needs. Yet, it is also important to underscore that AI ought to act in support of and not replace with machine algorithms infallible virtues inherent to human education: sympathy; a creative spark; and the ability to individually adapt for each student.

Keywords: Artificial Intelligence, University Teachers, Competencies Enhancement

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Title

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Abstract

This study was conducted to explore the role of Artificial Intelligence in enhancing the teachers' competencies. This was a theoretical study in nature conducted while using the secondary data collected from the available books, journals, and dissertations. The results revealed that AI has great potential to enhance teachers' competencies while helping them design relevant educational content aligned with learning objectives and providing feedback on their instructional strategies and practices. It also allowed to automate the student attendance and grading on the teacher's side. It will also assist the teachers in selecting suitable strategies and teaching aids for aiding a wide variety of students including those with special needs. Yet, it is also important to underscore that AI ought to act in support of and not replace with machine algorithms infallible virtues inherent to human education: sympathy; a creative spark; and the ability to individually adapt for each student.

Keywords: [Artificial Intelligence](#), [University Teachers](#), [Competencies Enhancement](#)

Introduction

AI of course is not a new channel in education that can lead you to think about it for close to twenty

years using initial efforts at integrating technologies within educational contexts (Sanusi et al., [2022](#)). Experiments in computer-assisted



learning began during the 1950s and 1960s when computers were used to deliver instruction over basic lessons and test students on simple facts. Among the first was a system named "PLATO" developed at the University of Illinois, which featured educational coursework available to students through a bank of computer terminals. Intelligent Tutoring Systems (ITS) first became a topic of interest in the 1970s/80s (Aleven, [2022](#)). Instead, it used AI techniques to do what a human tutor would have done: deliver instructions and feedback tailored for the individual students. First, systems like "SHERLOCK" and Mycin were designed to teach medical reasoning & diagnosis (Fahimirad & Kotamjani, [2018](#)). Before the current wave, Expert Systems (1980s-1990s) as a type of AI (based on rules and knowledge bases to simulate human decision-making), were adopted for guidance purposes in different specialized domains by educators. These systems facilitated the learning of difficult subjects by students and helped teachers evaluate student performance (Verma, 2018; Yang, [2022](#)).

The 1990s gave birth to multimedia and educational software that relied on various AI technologies to deliver such engaging, interactive learning experiences (Arora, [2021](#)). This was followed by educational games and simulations, which increased the motivation of students to participate as well as better comprehension (Fahimirad & Kotamjani, [2018](#)). Adaptive learning systems emerged in the 2000s with increases in AI technology and data analytics. Such systems will enable them to 'dynamically adjust content and difficulty levels based on individual student performance, providing personalized learning paths. The development of Massive Online Open Courses (MOOCs) in the 2010s represents one major advancement within online education (Verma, [2018](#); Wu et al., [2022](#)).

AI-powered platforms delivered scalable, programmatic human experiences to the masses ensuring heaps of feedback and support for all learners. Integrating Natural Language Processing (NLP) and Chat-bots practically during the 2010s, these technologies were integrated into education platforms that allow for natural conversation in support of the student or language learning applications (Bulut, [2022](#); Yang, [2022](#)). Virtual Reality (VR) and Augmented Reality (AR) in

Education 2010s — AI-driven VR and AR applications have been created to introduce realistic real-world scenarios or exploratory as well, engaging students with the immersion of learning within virtual environments/simulations (Arora, [2021](#)).

AI-driven data analytics and learning analytics are being implemented more widely in the field of education. With these technologies, educators can get feedback on student performance, participation, and learning progress so that data-driven decision-making takes place (Liu et al., [2021](#)). Now, AI-powered personalized learning platforms (2010s) are more common than ever before and offer tailored content and experiences to individual students based on ability, strength, and interest (Chikobava & Romeike, [2021](#)). AI is at the forefront of a lot of researchers and developers when it comes to education, and there are many more innovations to come to enhance teaching and learning denominator sectors (Liu et al., [2021](#)). As AI technologies develop over the years, they are going to be an even bigger factor in deciding who will learn what and eventually how well (Berendt, [2020](#); Sanusi et al., [2022](#)).

Literature Review:

Artificial Intelligence in Education

The relationship between Education and 'Artificial Intelligence' (AI) is a well-established and ever-evolving dimension impacting various stakeholders of the educational landscape. AI in education allows for the enhancement of learning exercises as well as individualized guidance, gadget organization, and other administrative undertakings all help to make life less difficult both inside and outside the classroom (Bentley, [2018](#)). Using AI analysis, they provide customized learning materials and adaptive problems that are recommendable to that student. This technique fosters student participation and learning of the subject but also permits learners to learn at their own velocity (Gašević et al., [2023](#)).

Conversely, virtual instructors such as AI-driven tutoring systems may give students real-time feedback and clarifications on tasks or problems. These systems are able to detect misunderstandings and perform small-group teaching experiences (Edwards et al., [2018](#)). By dealing with our inability to handle an increasing

amount of data, AI is used in educational settings and can help educators, as well as administrative staff, gain insight into students' behavior, performance attendance, etc. (Blok et al., [2021](#)).

Early identification of at-risk students can lead to timely intervention allowing for better learning support and that is where learning analytics comes into the picture (Sawant & Vaghela, [2022](#)). From answer grading to more formal assignments, quizzes exams, etc., AI can help in automating the process of how things are graded or assessed. Teachers have to spend less time and grades can be returned faster. NLP allows AI to comprehend human language and query it (Lameras & Arnab, [2021](#)). NLP use cases for education Language learning tools Automated Essay Scoring Chatbots (Language comprehension, writing standards, and Personal tutoring) Immersive learning experiences: AI integrated VR (virtual reality) and AR (augmented reality) applications. These technologies could work as environments that can replicate real-life (or historical) environments and events, or even important principles from science to engage students (Carolus et al., [2022](#)).

With AI, administrative functions such as scheduling, resource allocation, and student management can be automated. Further, it can even assist educational institutions in making educational decisions based on facts (Ayanwale, [2022](#)). Over the coming decades, we expect to see increasingly frequent instances of AI in education as well; however, there are clear-cut ethical issues associated with this trend — ranging from data privacy and algorithmic bias all the way through to what role does/should ELISA play in shaping educational content. Educational AI systems must be created responsibly and in an environment where educators, developers, and policymakers discuss the above issues and solve them for appropriate response to deployment (Al-Zyoud, [2020](#)). Against this background the way forward for AI in education is clear, to power change but not at the cost of dehumanizing a process that relies on human faculty as well. Educators and policymakers should collaborate to use AI's potential for the betterment of students, streamlining an otherwise cumbersome system (Wu et al., [2022](#)).

Research Question

The Research question for this study was as under:

1. How artificial intelligence can enhance teachers' competencies?

Methodology

This study was conducted to explore the role of Artificial Intelligence in enhancing the teachers' competencies. This was a theoretical study in nature conducted while using the secondary data conveniently collected from the available books, journals, and dissertations.

Results

The collected data were analyzed with the help of Content analysis and the results have been discussed as under:

Assisting Teachers in Teaching

AI has the ability to help teachers create educational content efficiently, interactively, and precisely. Here are a few main ways in which AI can help teachers write the content for their teachings.

Content Recommendation

AI can recommend content that is correlated and find new content (for example, books, educational materials, and online sites with the course or learning objectives). In this manner, teachers can spare time to hunt for applicable materials.

Custom Learning Paths

AI can assess students online and provide tailored content according to their requirements. It means students will receive content based on their level of learning ability and method of learning.

Content Generation

AI can create educational content for users in the form of quizzes, practice exercises, and interactive simulations. AI-assisted materials: As Yi Wu and Yang ([2022](#)) noted, while AI-generated content may never truly replicate the creativity and domain expertise of teachers themselves it could act as a starting point or an aid to existing materials.

Adaptive Learning

Using machine learning algorithms, adaptive learning platforms are able to dynamically adjust course material based on performance data for each student individually. In other words, students who

catch on quickly can work toward more difficult content while those in need of extra assistance will receive that instruction. These articles include tools such as AI translation, which can help to standardize the content interaction across multiple languages or create open resources that are more universal for language learners from various linguistic backgrounds.

Content Enhancement

AI can be used to improve different types of educational content with media, such as multimedia videos images and also adding interactive elements. This increases the students' engagement not to mention easy grasp on difficult matters.

Plagiarism Detection

With the advanced AI-driven plagiarism detection features, Teachers can easily check if their content is also not replicating other content available online. Natural Language Processing (NLP) for Writing Assistance — AI-powered NLP algorithms can narrow down writing assistance to teachers, highlighting clarity or the lack thereof in instructional materials grammar, and style suggestions.

Curriculum Mapping

Autonomous systems can greatly assist educators in mapping theirs across certain educational standards, and verify the resources made under every of the necessary learning outcomes and competencies.

Feedback and Analytics

The area in which AI can also be harnessed for getting insights about how students are interacting with the content. This data will help teachers make their content better and understand the parameters more. When AI is utilized to eliminate the tedious, it can function much more effectively — which makes content creation an equivalent partner rather than a usurper in tandem with creativity followed by teacher-driven expertise and flexibility.

Personalized Learning

AI can really help teachers in most steps of teaching so that a more efficient and tailored way

of learning is built. What are the ways in which AI will support teachers, not just replace them? AI-driven education platforms can gather data about how students learn and understand what they know effectively (Sawant & Vaghela, [2022](#)), thereby allowing them to recommend personalized learning paths along with content that is tailored specifically to each of the student's needs.

Classroom Management

AI can help teachers focus more on teaching and communicating with the kids by helping them manage class duties like taking attendance, scheduling, resource allotment, etc. It also helps educators to follow current educational trends and improve their teaching and classroom management skills. In summary, the use of AI can offer additional guidance and assistance to teachers making them even more effective in their teaching while making them more student-centered.

Assisting In Students' Evaluation

AI could also be instrumental in assessing whether the students have learned as much and how well they know it by giving teachers better tools so that their assessments can become more streamlined, based on data and performance improving accurate thinking. How AI can assist in assessing Student Learning outcomes Including Automated Grading: although it is an objective assessment such as multiple-choice or fill-in-the-blank activities, and for both formative and summative grading. It frees teachers from having to grade traditional paper tests and lets students receive faster feedback, allowing them to identify weaknesses sooner. Open-ended questions and free-text grading: AI-natural language processing (NLP) algorithms can assist in the grading of essays or open-ended answers. While subjective assessments are unlikely to be fully supplanted by AI, the technology can provide a preliminary assessment so that human graders remain consistent and efficient. Analysis and Insights of Data — How AI can analyze the huge resources of the data with respect to how students are performing by means of their assessment scores, progress reports, etc. By analyzing these trends, strengths and weaknesses can be detected not just at the class level but also in individual students. Adaptive Assessment: According to their performance, AI-based adaptive

assessment systems can alter the duration and depth of examinations per student. This way each student will be matched to appropriate challenges, allowing for a more nuanced indication of competencies.

Learning Analytics: AI can analyze student engagement data on educational platforms to show teachers how students engage with the learning material, and identify potential issues in the learning curve. **AI for Early Intervention:** Help in identifying students who might not do well academically (due to poor attendance and lack of participation) from the available data streams. This way teachers could identify at an early stage which students need help and provide the much-needed support to not fall behind and succeed academically. **Tracking** — AI tools can track student performance over time, making it easier for teachers to monitor how individual students are improving and use that data so they can plan instruction. **Formative Assessment:** It provides feedback to students based on continuous assessment of their performance and learning progress by AI. This allows students to identify their areas of strengths and weaknesses; it also gives them the responsibility they need in order for them to start blazing through on revision exercises. **Intelligent plagiarism detection:** AI-based techniques for detecting plagiarized content help teachers in quickly analyzing student assignments to make sure that these are as per academic standards. **Personalized Feedback:** AI-powered tutoring systems can offer personalized feedback and explanations to students on the assessments they have answered. It will support personalized learning and make students realize their mistakes, and weak points better. **Performance Prediction** — AI can predict students' future performance based on historical data and learning patterns, this helps the teachers in identifying if any action is to be taken for extra support or extension activities. AI has a lot to offer in assessing student learning, but it cannot replace teachers who know what can be taken at face value and how the best results are devised. Teachers would still play an important role in interpreting outputs, giving human feedback, and adjusting instructional strategies to the idiosyncrasies of their pupils.

AI & Teachers' Competencies Enhancement

Artificial intelligence can massively enhance the

growth and development of teachers by providing them with worthwhile resources, assistance, and know-how. **AI in professional learning for teachers** · **Personalized PD:** AI can analyze teachers' data, classroom interaction, and improvement areas to offer personalized prof. Development courses or sources that would enhance teacher skills. This allows teachers to attend the training that is tailored for them accordingly (Sawant & Vaghela, [2022](#)). **Data-Driven Feedback:** Provides teachers with immediate feedback about their instruction including practices, classroom management, and engagement; This immediate feedback helps teachers in self-reflection on how they teach things and to do it better. **Virtual Coaching and Mentoring:** Algebra coaches are virtual CP, providing guidance to teachers in the form of tips & hints---teaching practices that work best with AI tutor systems[40]). It gives teachers access to coaching and advice outside of direct PD sessions. Simply put, AI can help teachers create and curate educational content like lesson plans, quizzes, or multimedia. This not only saves time for teachers but also ensures that they will find high-quality, educationally standard material (Verma, [2018](#)). **Classroom Management:** The AI tools provide an exploration of the academic system where it could be used to manage various tasks related classroom such as attendance, and scheduling; enabling teachers more focused on teaching and engaging with students (Sanusi et al., [2022](#)). **Language Translation and Inclusion:** AI-driven translation tools can be helpful in establishing the communication between over-ethnic groups of students with their teachers to understand them well. AI can also recommend inclusive teaching strategies and materials for accommodating students with alternative learning needs (Verma, [2018](#)). **Grading Automation:** One of the biggest benefits AI offers is for automating grading on objective assessments thus allowing teachers to provide faster and more consistent feedback. This saves the teachers time and hence allows them to provide more qualitative feedback on assignment types — subjective ones (Lameras & Arnab, [2021](#)). **Continuous and Customizable Learning:** AI-driven platforms can start to provide continuous learning paths for teachers that reinforce their toolkits with new discoveries in educational science, persistence practices, and tech trends. **Better Based Decisoning Through Data Analysis** – AI facilitates data

ingestion from myriad point sources including student performance, assessment scores, learning analytics, etc. It helps the teachers provide relevant choices to opt such as instructional strategies and interventions based on the identified data (Yufei & Salmiza et al., 2021). Strategies for Evaluation and Intervention: AI may offer suggestions on how to evaluate student learning, and ways to do their progress monitoring. It can locate students who may be in trouble and suggest directing their learning. Collaboration and Professional Networking: AI may link teachers with a larger professional network to collaborate, exchange ideas, and apply effective practices learned from peers or experts in the field. In sum, AI offers to almost revolutionize pedagogical best practices and have on-the-fly course adjustments for evolving student needs. It extends and enhances the knowledge, passion for learning and culture to open new ground in the educational community.

Assisting Teachers in Administrative & Managerial Tasks

AI can help teachers cope with administrative and managerial duties in schools or colleges, reinforce the system and students themselves, improving the overall scheme. AI can help teachers in the administrative as well as management work of schools or institutes of higher education: Administrative Task Automation — AI will automate all routine administration tasks such as scheduling alerting, and assignment resource allocations. Chatbots: AI chatbots can address students', parents', and staff's inquiries about school policies as well as schedules of events. These assistants can relieve some of the administrative burden, while simultaneously addressing popular queries in seconds.

AI can automate grading for objective assessments, particularly multiple-choice questions that require significantly less time for manual grading. This will allow teachers to devote much of their time to giving quality feedback to each student. Data Management and Analytics: AI can analyze thousands of terabytes of data – For instance, student performance, attendance records, or disciplinary incidents. Based on this data set, educators can identify trends and patterns that can guide decision-making and interventions. Manage Your Resources: AI can even be used to manage

educational material such as books and other digital forms of material or material equipment inventory. Teachers would thus have access to the resources they need to carry out excellent teaching.

Personalized Learning Platforms

Learning management systems powered by AI can offer students customized pathways and content to engage. These platforms are able to track the students on an individual level and assist teachers in providing them support. AI can optimize school timetables so that no two teachers may teach concurrently, also with what students study. Budgeting and Financial Management: AI can assist in budgeting, financial management, and data analysis of finance-related data to provide you with the best possible cost-saving opportunities.

Parent-Teacher Communication

Facilitate communication between teachers and parents using AI-powered parent-teacher communication platforms by getting updates on student progress, behavior patterns, and forthcoming events. It can also be used by organizations to keep track of various security technology implementations like facial recognition for access control, surveillance of high-risk areas, or proactively detecting threat vectors. · Predictive Analytics: This feature allows AI to use past data and make predictions about any issues or problems, so administrators and teachers can counter this move ahead of time while preventing it. With AI used for admin and management, teachers can be liberated to reimagine their roles — teaching the way they were trained: mentoring young people. By helping to develop a more concerted educational environment that is better equipped for the support of its students and provides an improved learning atmosphere. Yet, there must be a combination of AI-powered solutions and interactions with humans to sustain an educational experience on the ground.

Conclusion

This study was conducted to explore the role of Artificial Intelligence in enhancing the teachers' competencies. This was a theoretical study in nature conducted while using the secondary data collected from the available books, journals, and dissertations. The results revealed that AI has great

potential to enhance teachers' competencies while helping them design relevant educational content aligned with learning objectives and providing feedback on their instructional strategies and practices. It also allowed to automate the student attendance and grading on the teacher's side. It will also assist the teachers in selecting suitable strategies and teaching aids for aiding a wide variety of students including those with special

needs. In addition, it is used to monitor the actions of a student and also communicate with students as well as parents by teachers. Yet, it is also important to underscore that AI ought to act in support of — and not replace with machine algorithms infallible virtues inherent to human education: sympathy; a creative spark; and the ability to individually adapt for each student.

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