

Chapter 7

Revolutionizing STEAM Education: Harnessing the Power of AI and Digital Technology to Deliver Personalized Learning Experiences

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ABSTRACT

Incorporating AI and digital technologies in the realm of STEAM education has created a paradigm shift in the higher education sector. Studies have proved that employing AI and digital technologies in STEAM education helps students develop passion and interest in research. Apart from reviewing recent scholarly literature in peer-reviewed journals, this chapter also draws on the results of two studies conducted in South Indian states to examine the advantages and challenges of implementing high-tech AI technologies in STEAM education. In the first study, data were collected from 165 STEAM students and 50 STEAM educators who teach these students. The second research was conducted among 355 students who opted STEAM subjects for higher studies. The study shows that AI and gamified teaching improve student interest, research skills, and critical thinking. However, educators face challenges like lack of expertise, data privacy, and difficulties ensuring equal access to AI powered resources.

INTRODUCTION

The digital space has conquered all spheres of human life. The unification and standardization of digital space have helped a lot in improving the knowledge component of individuals. It is considered the basic component for the upliftment and development of society. Digitalization restructures the ideological perceptions and social consciousness. It bridges the gap between the younger and the older generation. It is obvious that the electronic systems and its various applications are spreading in the day-to-day life of human beings. The multi-level introduction of novel technologies in the economic, domestic and sociopolitical spheres are linked to media space. Digital globalization acts as an inevitable factor in the daily routine of human lives. Quality education is one of the basic components of

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sustainable development proposed by United Nations. It tries to ensure equitable and inclusive quality education to everyone. Digital technologies and AI have emerged as crucial components in achieving this goal. During the time of COVID 19 pandemic, these technologies have proven its worth in the realm of education. It made drastic changes in the education sector. It can be perceived as a knowledge provider, a mentor, a co-creator of ideas and information, and an assessor. Education plays a pivotal role in the social well-being and sustainable development. Digital technologies, especially, the information technology, act as the major driving force behind the spread of shared knowledge and educational reforms. The incorporation of novel technology-assisted learning tools such as smartboards, tablets, simulations, virtual laboratories, mobile devices, MOOCs, laptops, dynamic visualizations etc. have created a drastic change in the education system followed in schools, colleges and universities.

The IoT (Internet of Things) has proved that it is one of the best cost-effective means to educate the youngsters. It is also an excellent mechanism for integrating a global-level of learning experience for everyone (Keengwe & Bhargava, 2014; Dreimane & Upenieks, 2022; Rogers, 2000). Educational technology is striving hard to facilitate education for individuals who do not have sufficient educational facilities. Social media also play a crucial role in imparting education. Many students and teachers use social media as an effective platform in the overall e-learning process. Social media sites also act as an excellent means to produce networking possibilities. It promotes possibly new jobs and establishes several social activities. Traditional classrooms are devoid of faster evaluations, immediate learning environment, infotainment and more engagement. Technology and digital learning tools fill this space. Most of the educational institutions are making efficient use of these novel technologies and its possibilities. Moreover, novel technology's non-intrusive nature and adaptability make learning more interesting and appealing to the students. Although this is the case, many traditional instructors are reluctant to use contemporary gadgets and advanced technological sources in educational institutions. Instead of considering it as an intelligent learning aid, they perceive it as a distraction (Vakaliuk et al., 2021). Usage of technology and its applications help the students.

Digital games and platforms have emerged as powerful tools in language learning and intercultural exchange, providing a dynamic and interactive space for learners to develop language skills and cultural awareness. The modern technological landscape is harnessing the global influence and versatility of the English language to its fullest potential, leveraging its widespread adoption and versatility to drive innovation, facilitate communication, and bridge cultural divides in an increasingly interconnected world (John, 2021). For instance, an online classroom calendar helps the students to plan and schedule their activities like assignments, class schedules, speaker events, field excursions, semester breaks, examinations etc. in a proper manner. Clicker devices, smart phones etc. act as an easy and fast technique for teachers to assess the learning capacity of the students. It also helps the teachers to determine and analyze whether to give more explanations or not (Biletska et al., 2021; Kim, Holmes & Mims, 2005). Digital technologies helped the education system to be in an active state during COVID 19 pandemic. Students learnt from the convenience of their own homes (Kostopoulos & Kotsiantis, 2022). Incorporating digital technologies into the academic realm help the students to experience 'virtual' reality. It ensures that the students are more interested in the academics and helps to keep the factors of distraction away. Optimal utilization of computers, projectors and other modern technical tools in the classroom makes the process of learning a fascinating experience for the students. Employing such things in the classroom make the process of learning more interesting and fruitful.

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