Editorial

Can we use technology to make engineering education more inclusive? This is a question I always pondered upon. We know that the pursuit of inclusivity in education has been a cornerstone of progressive pedagogy for a long time. In engineering education, where diversity is critical for fostering innovation, creating an inclusive classroom environment is more important than ever. Technology, with its transformative potential, offers myriad opportunities to dismantle barriers and cultivate an environment where every student thrives regardless of their background, abilities, or identities. Some broader societal barriers that engineering learning environments reflect include continued gender imbalance and low minority representation, as well as obstacles brought about by disability and socio-economic disadvantage. Both of these latter categories of disadvantage inhibit individual capacities while also impeding the richness of thought needed to succeed in engineering progress. Because our world is an increasingly globalised and complex space, our solutions in engineering need to be addressed and considered for all sections of diverse people. It not only represents an ethical imperative but also a pragmatic necessity to create a learning climate that is accessible and inclusive for the development of a future workforce capable of addressing global challenges. Technology, if used appropriately, has the potential to address such challenges in diverse avenues. Most importantly, it improves access for disabled students who face serious impediments in ordinary classroom environments. Assistive technologies, such as screen readers, speech-to-text applications, and real-time captioning services, make engineering materials more accessible. For example, software programs like JAWS or NVDA allow students with visual impairments to access digital content effectively, while platforms like Otter.ai provide live transcription of lectures for students with hearing impairments. Moreover, tactile learning tools, such as 3D printing, which is used to create physical models, help students with visual disabilities understand complex spatial concepts. The technology also facilitates personal learning experiences that overcome the difficulty of one-size-fits-all teaching. Artificial intelligence can drive adaptive learning platforms that can adapt content to suit individual needs. Such a personalization will help students with different academic backgrounds keep pace with their peers. Technology can also facilitate gender and cultural inclusivity as it challenges stereotypes and encourages underrepresented groups to pursue engineering. There are online forums and peer mentoring systems where members from disadvantaged backgrounds can interact, share personal tales, and seek assistance, too. Technological innovations really remove the barriers in terms of space and finances. Technologies for remote education have made quality

education accessible to many. Even those coming from rural or economically deprived backgrounds can participate in elite engineering programs. However, the implementation of these initiatives is full of challenges. It involves the shared responsibility of educators, technologists, policymakers, and students. Educators should be well-trained in using accessible technologies effectively and to incorporate them into their pedagogy. Institutions need to make a priority of investment in accessible infrastructure and support services. Policymakers need to take remedial measures regarding the digital divide by providing equitable access to technology for all the students, and students themselves have a crucial role. The possibility of building learning environments embracing diversity and where every learner gets a chance to succeed can be attained through accessible resources, adaptive frameworks, and collaborative technologies.

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