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Envision a learning environment where students using VR headsets can virtually explore detailed structures of the human brain, moving through neural pathways and connections. This immersive experience is fascinating and emerging technologies like virtual reality (VR) and three-dimensional (3D) visualisation are transforming education by making abstract ideas tangible. But, even with these developments, spatial literacy remains a crucial element that cannot be understated.

What is it?

Spatial literacy involves skills such as mental rotation, spatial visualisation, and understanding spatial relationships. These abilities are essential in a variety of professions, including engineering, design, architecture, data visualisation and more. With the introduction of VR and 3D visualisation, we observe an increase in spatial literacy's significance. Technologies that offer immersive learning environments may turn abstract ideas into concrete lessons and students understand difficult concepts better.

Numerous studies' and findings highlight how crucial spatial literacy is to education. A National Science Foundation survey claims that students who excel in STEM (Science, Technology, Engineering, and Mathematics) courses do better when they have great spatial skills. Additionally, a survey by the American Educational Re-

Navigating the future

Spatial literacy is a fundamental ability that students need to develop and India needs to integrate programmes into the educational curriculum

search Association found that 80% of teachers believe that incorporating 3D visualisation tools into the curriculum significantly improves students' spatial reasoning skills and understanding of the concept. Spatial literacy is a fundamental ability that enables us to interpret data and understand spatial aspects in our daily and professional lives.

Many countries such as the U.S., the U.K., Australia, Singapore and Finland already have spatial literacy pro-

grammes to ensure that every student can develop spatial skills for future success. However, some many educational institutions, especially in India, still rely predominantly on traditional teaching methods. It is becoming increasingly important to close this educational gap to guarantee that our students are suitably equipped with this knowledge.

Importance

Spatial literacy plays a crucial role in STEM careers. Engi-

neers require it to design complicated structures while scientists use it to understand geological patterns and molecular formation. Its impact in Maths can be seen in solving geometric problems and visualising data. In fields like Robotics and VR, developers use spatial knowledge to make engaging 3D environments. Robotics engineers take full advantage of spatial reasoning to design the robots in a more coordinated way. Besides this, spatial skills are required for da-

ta analysts, architects, urban planners and others.

Avoiding spatial literacy can bring significant risks, which will make it difficult for young minds to stay competitive in the digital world. These include:

Competitive Disadvantage: Students who lack spatial literacy will lag in the evolving global job market. They will struggle to get selected in a big organisation as spatial literacy helps in effective teamwork and efficient decision-making.

Impact on Cognitive Development: Lack of spatial literacy will limit problem-solving capabilities and hinder cognitive development leading to difficulties in understanding newer complex topics.

Exclusion from Digital World: If individuals want to participate in the digital world, they need to develop spatial skills. Otherwise, they cannot understand newer technologies, which further will limit their capabilities to take advantage of those innovations.

Broader Social Implications: Limited knowledge of spatial reasoning can lead to decreased innovation and economic growth, as people will face problems in coping with quick technological changes leading to reduced productivity.

There are many ways in which spatial literacy can be integrated into education to simplify understanding of critical concepts. The concept also needs to be included in teacher training programmes and professional development modules. While the National Education Policy 2020 recommends the use of tools like AR and VR to teach, implementation remains a challenge.

In the future, constant advances in technology will make spatial technologies more accessible and crucial in our daily lives. So, educators, policymakers, and stakeholders must take spatial learning seriously and ensure our students can develop these skills for a better and brighter future.

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