The Use of Artificial Intelligence, 3D PDF, and Deep Learning in Anatomy and Medicine: A Cross-Sectional Study

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Introduction: The integration of Artificial Intelligence (AI), 3D Portable Document Format (3D PDF), and Deep Learning technologies into medical education offers promising enhancements to anatomy instruction and clinical skill development. However, little is known about how medical students perceive and utilize these tools. This study aimed to evaluate the awareness, usage patterns, perceived benefits, and educational needs of medical students regarding AI, 3D PDF, and Deep Learning technologies in the context of anatomical and clinical education.

Material & Methods: A descriptive cross-sectional survey was conducted among 607 medical students at Istanbul Medeniyet University. The study was approved by the university ethics committee with the protocol number 2024-GOSEK-0003 and decision number 2024/02-04.The validated online questionnaire include demographic questions, technology usage patterns, and perceptions of educational utility. Descriptive statistics, Chi-square tests, t-tests and correlation analyses were performed using IBM SPSS 25.0.

Results: Awareness of AI tools like ChatGPT was high (92.4%), yet only 4.1% of students had received formal training. AI tools were used primarily for theoretical learning (64.6%) and research (37.3%). Moderate correlations were observed between AI use and trust ($r = 0.45$, $p < 0.01$), and between 3D PDF use and improved imaging understanding ($r = 0.52$, $p < 0.001$). While 73.5% found 3D PDFs beneficial, only 25% felt competent using AI. Statistically significant associations were found between gender and AI or 3D PDF use ($p < 0.001$).

Conclusions: Despite high engagement with AI and 3D PDF technologies, formal training is lacking. Curricular integration of structured, competency-based modules is essential to enhance technological fluency, ethical awareness, and critical thinking in medical education.

Keywords: artificial intelligence, deep learning, medical education, anatomy, 3D PDF