**Supplementary Table 1.** Summary of teaching methods applied in different stages of medical education for undergraduate students

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| --- | --- | --- | --- |
| **Teaching method** | **Advantages** | **Disadvantages** | **Refs.** |
| Lecture-based learning | A quick, inexpensive, and efficient way of introducing complex educational material; brilliant speakers can give highly stimulating lectures, which can be an active mode of learning. | Received passively by students; highly dependent on educational materials and skills, experience, and availability of the lecturer; insufficient analysis, limited spatial visual conversion ability, and poor practical application. | (1-4) |
| Case-based learning | Promotes self-learning by enhancing relevance, concept understanding, and problem-solving skills; cultivates students’ rigorous logical reasoning; integrates basic biomedical knowledge and its application to concrete patient cases and clinical case management; improves student motivation, satisfaction, and engagement. | Its utility may be limited in a large lecture environment. | (1, 5, 6) |
| Team-based learning | Combines active and collaborative learning; helps students achieve course objectives and learn how to function in teams; reports high levels of student engagement and interaction in class as well as fostering individual accountability and promoting teamwork behaviors. | Requires students to study before class. | (7) |
| Problem-based learning | Enhances active learning and students’ intrinsic motivation; students solve problems through self-study, research, discussion, and cooperation within small groups. | Uses non-directive tutors. | (8, 9) |
| The flipped-classroom model | Improves academic outcomes, class attendance, student satisfaction, and instructor time management; may help students acquire suturing skills in different domains; blends strengths of Internet-driven instruction outside the classroom (e.g., digital videos, self-regulated learning, online discussions) and face-to-face instruction inside the classroom (e.g., collaborative study, applied problem-solving, instructor and peer engagement); offers advantages over direct observations of surgical skills and clinical performance in terms of objectivity, time-efficiency, and feasibility. | Requires a considerable amount of time, faculty members must prepare materials, and high costs | (10, 11) |
| Simulation-based training | Incorporates basic technical-skill task simulators and animated laboratories to teach basic operative skills and procedures; improves reflective capacity and communication skills; offers a reliable, proven, and affordable means of teaching multiple aspects of pediatric surgical clinical practice; superior learning than from textbooks. | Fidelity; financial barriers; surgical simulation studies are often inadequately powered owing to great heterogeneity; effective use of simulation requires all main factors: training resources, trained educators, and curricular institutionalization. | (12-17) |
| Augmented reality (AR) | Provides live representation of real-world environment; perspicuity and dependability; short training time and high usability and acceptance | Utility of AR applications is limited when task demands are low; suitable for specific task requirements; physical pressure for participants (weight>500 g); tissue disruption throughout the case. | (18-22) |
| “Hand as Foot” teaching | Combines changes of limb bones with orthopedic clinical teaching and advantages of metonymy and simulation in teaching; stimulates students’ interest and improves their active-thinking abilities; increases teaching/learning efficiency; enhances self-worth, identity, and medical responsibility. | - | (23, 24) |

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