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Enhancing student engagement and learning outcomes through education technologies in medical education

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Abstract

Medical education is hastily evolving as motivated by shifting medical and health care settings with a diverse role of physician/instructor, changing medical science in varied pedagogical backgrounds. Educational technologies have been gradually introduced in medical education to facilitate effective learning with student engagement and improved learning outcomes. It has become an indispensable measure of communication, data storage and transformation, audio-visual media usage, production and sharing of medical knowledge. The role of educational technologies has evolved from a mere study tool to an integrated learning approach. The shift in medical care from habitual clinical scenarios to ambulatory settings has obliged the skill to afford care in a short while and necessitates modification in patient documents with added materials on well-being particulars and medical records being modernized. Educational technologies portray a foremost part in student engagement and without which the learning outcomes cannot be expected. A meaningful student engagement involves engaging students in every facet of the educational technology and knowledge acquisition for the purpose of strengthening their commitment to their self-education and community. The right choice of the educational technology for specific educational purposes of interactive learning is challenging and requires studies and reviews. Computer based learning, flipped classroom, mobile devices, smart phones, digital games, simulations, virtual reality, wearable technologies, social media, podcasts, YouTube etc. are of the techniques detailed in this review with regard to the engagement and learning outcomes of students, that addresses the encounters of the fluctuating educational settings in medical profession.

Keywords: Medical education; Technology; Student; Engagement

1. Introduction

Medical education is a teaching strategy designed with the intention to serve humanity. It is the outcome through evaluation of societal requirements and its ability to influence patient care (Scheele 2012). The basic sculpture of medical education is swift in ideas and practices to outfit the current health systems (Rourke 2010). An effective change management is essential to endow the future health care. The discipline of education affords numerous important discernments to shape up medical education (Berliner 2002). A quality educational strategy is the target to achieve mastery in medical education. Education in the medical field is a multi-faceted process and excellence in its quality is a great challenge (Cradler, 2003). It is the groundwork above which distinct educational system is to be fabricated. It is generally an essential specialty that focus students to **be** equipped **as** noble physicians with better careers (Anwar and Patty, 2007). Medical education targets the shaping up of any individual to be budded from a student to a well-designed physician in every aspect of the medical profession in under-graduation, focusing specific fields in post-graduation. It equips the students to gain theoretical and practical knowledge in a swiftest mode with the aid of e-learning systems, other than classroom teaching settings. Apart from being a physician, medical education gives a stable foundation in the ideologies and practices of medical teaching, devising an individual to an outstanding instructor to design and deliver

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courses, assessments with quality assurance and certainly on educational research (Sarwar et al., 2014). The pivotal components of the program include organizational performance, outstanding curricula that ease knowledge acceptance, acquiring practical skills with the aid of educational tools, e-learning systems, self-assessments, feedbacks and portfolio to ascertain and debate specialized development (Harden and Crosby, 2000).

2. Medical Education

Educational technology plays an imperative role and abridges the learning process, being one of the most effective tools for the upliftment of the education system (Haleem et al. 2022). To have an operative and protracted learning effect, the systematic tactical strategies should be well implemented and assessed with innovative methodologies, communication sciences, human and non-human resources. An effective educational system includes actual improvement in the learning process which cannot be achieved without competent tutors as faculty members (Pinnila et al., 2013). Being potent in delivering medical knowledge to students, the faculty not only should have academic qualifications, but also should be accustomed to the modern technologies and teaching approaches, provided they are skilled in educational and professional skills (Cook et al., 2010).

Advances in medical education such as simulations, e-learning, virtual consultation has developed as a pedagogical strategy to expedite an energetic teaching approach centered by learners. Educational advancement necessitates learning and teaching technologies that excel in practice with precise devices. Medical education involves continual innovative efforts between educators in all aspects of medicine, and student trainees to fully explore technology's potential (Chhetri et al., 2017). According to research, the new generations equipped with innovative technologies are less functional in traditional classrooms. Most technologies are not equally proficient or comfortable for medical trainers as well as trainees. Hence filtering and selecting appropriate technologies for curricula is an important task in the ground of medical education (Chhetri 2017).

A great evolution in medical education is taking place these days as a large number of students are opting for medical education with a high level of technological skills and high expectation in innovative learning methods. These technologies may be adaptive platforms, educational games, gamification, simulated virtual consultations, mobile applications etc. (Woollard 2006). These technologies have achieved the enlightening aims in medical arena such as self-regulating learning, learning virtually from far, concerted and collaborative learning delivering instantaneous feedbacks and learning assessments as possible. Educational technologies have been increasingly used to promote medical education among young physicians by innovative classroom strategies. However, the scientific community still lacks a comprehensive understanding on the use of the technologies to endorse medical education. Despite the existence of a wide variety of technologies, the strategies in the medical education benefitting the younger generation is still under question.

3. Technologies in Medical Education

Technologies in the arena of medical education are developing by years. The style of medical technologies was established in retort to the encounters in medical education (Wartman and Combs 2011). The shifting health care environment from traditional settings to sophisticated instrumental settings has necessitated the ability to provide medical care with swift decisions (Patrik et al. 2019). The improved medical environment requires documentation of health knowledge and medical records electronically and digitally (Greenhalgh, 2001). Societal expectations are more focused on patient safety in a shorter period of time in all areas of the medical field, necessitating practical knowledge with live patients in interactive learning (Spooner et al. 2011). The medical curriculum is also shifting in both under and post-graduation from knowledge acquisition to demonstrating practical exposure, enriching competencies in the learners (Badwan et al. 2018). The medical education is no longer with the scenario of acquiring technologies in mind and execute to provide quality medical care. The physicians in the profession necessitate to be life-long learners, which is an imperious notion these days (Gerard, et al. 2018). The new generation of learners were born in a digital word, who are well acquainted with digital technologies, which necessitates the present medical education to reflect improved digital technologies (Wang 2011). The younger physicians in medical education prefer technology-enhanced learning environments. In short, medical education is witnessing a rapid technology swift in delivering care (Jack, 2019).

The informative targets in expending expertise in medical academics comprise knowledge attainment in basic medicine, augmentation of perceptual inequality, refining skill synchronization, improving decision making for medical issues, practicing to handle critical moments, educating team works, enhancing psychomotor abilities etc (Zapata-Lamana et al. 2020). There are several technologies presently being used in medical education (Brain et al. 1999). Though they are individual approaches, application wise they overlap in relation to technological components and instructional

possibilities. The chore of the therapeutic practitioners is to utilize the new technologies to renovate medical knowledge acquirement in further concerted, practical education authorizing medical experience for the learners to become efficient practitioners (Mo 2011). Technology continues to change healthcare education in new and innovative ways. A few years ago, the removal of a gall bladder stone is done by a team of practitioners while a robot does it now (Hasselbring, and Glaser, 2000). Especially after Covid pandemic digital education has streamlined with virtual and augmented reality, which was once with students performing their clinical in person, surrounded by instructors and students (Chhetri, 2017). With the slide to online education, technology has become a link between students, instructors, physicians and universities (John, 2011). In addition to virtual lectures and digital exams, patient simulations, augmented and virtual reality and other digital training mechanisms prepare students to enter more into heavy tech-oriented careers upon their graduation (Schindler, et al. 2017). Although, keen observation of patient matters, tech skills and experience overlay them in medical education at present. The future of health care is technology whether a beginner in under graduation or a seasoned professional practitioner.

4. Student engagement and learning outcomes in medical education

Student engagement is an intricate multifaceted paradigm in medical education that has attained great attention (Kassab et al. 2023). Student engagement plays an operative role in quality assurance in medical education. Student engagement is hypothesized into psychological, behavioral, and socioeconomic magnitudes (Kassab et al. 2022; Kahu, 2013). The psychological perception cogitates the internal psychological state of students. Student engagement is a psychosomatic state of motion making to feel triggered, employ exertion in learning activities, which connects their state with medical education (Wong and Liem, 2021). The behavioral perspective elucidates both student behaviour and the medical organized features that drives activation of students. It accounts for the time and efforts, students dedicate to educational activities and the student **activities** employed by the universities for student motivation in education (Kuh, 2009). The sociocultural outlook discourses the communal, ethnic and other radical aspects in student engagement. It is demarcated as the skill of students in intensifying standpoints and enduring alertness and obligation from assorted social and cultural backgrounds (GQ, 2022). Student engagement in medical curricula is related to strong educational programs that ensure quality assurance. The exploration schedule on student involvement in the medical profession is on the prodigious upsurge during the previous epochs (Francis, 2017). The chief urge for this upsurge is implication of a student engagement as a forecaster of theoretical achievement, safety, fulfillment, augmented detainment, dwindled exhaustion, and heightened self-learning. Additionally, student engagement and involvement enhances mentor's stimulus (Frenzel et al. 2009). Therefore, the quality of any medical agendas and the degree of brilliance of any medical educational institution is indicated by its student involvement (WFME 2020; Harden and Roberts, 2015).

Commitment and engagement of students involve self-learning or learning with partners. Consequently, student engagement is defined as academic involvements of learners in the learning-teaching process, and research investigations at behavioral, emotional, intellectual, perceptive heights by self-learning and through interaction with peers, physicians, mentors and faculty in the university environment (Groccia, 2018). As the utility of technology is enhanced in medical education which involves online and digital gadgets offers **equal** chances and trials for medical student engagements (Beeland 2002). The atmosphere offers flexibility and self-sufficiency for learners to adapt their learning experiences bestowing to the utmost appropriate phase, process and habitation (Agarwal et al., 2020). However, technology literacy is mandatory for the students to steer online platforms, cope with multimedia assets and digital gadgets. In addition, learners entail adaption to diverse means of communication and socializing abilities in online learning activities for committed engagement (Hadie et al., 2021). Student engagement in medical education is positively allied with the outcomes of the learnings with utmost consequence on practical engagements than professionalism (Xiaoming et al. 2022; **Bond and Bedenlier, 2019**). However, a lack of clear evidence exists on the affiliation between learner involvement and learning outcome in medical education sceneries as the concept of student engagement varies in diverse contexts of medical education (Gunuc, 2014; Akyol &Garrison, 2011).

5. Learning outcomes

A learning outcome is a concise description of what the student will learn and how the learning will be **assessed** to view the outputs. Outcomes in learnings are metaphors of precise knowledge attainment, skill procurement, and expertise in the specific education achieved by a learning due to the learning activity (Thomas 2016). Learning outcomes also play a crucial role in investigations on knowledge attainment due to a learning activity (Chatterjee et al. 2017). A professional consequence of learning experience is determined by the ability of the learner to apply the attained knowledge in real clinical settings, which is widely applicable to health education. The medical knowledge should be enforced in the real-life patients, where the learning outcomes will be assessed (Skrbic and Burrows, 2014).

6. Learning outcomes through educational technologies in medical education

6.1. Computer Assisted Learning (CAL)

CAL as a health informatics application is a beneficial tool for medical students in the era of expansive knowledge bases and the growing need for interactive systems. Medical education with CAL has demonstrated successful results in attainment of learning outcomes (Schifferdecker et al. 2012). The application of interactive educational software programs allows self-paced learning skill with the swiftest pace of advancement in medical education (Baby et al. 2008). A wide array of multimedia resources is available (Hughes 2002), offering a personalized learning experience designed to placate self-learning process offering essential feedback. CAL modules can be effectively utilized to visual, audio and kinesthetic learners that gives good outcomes. CAL offers students to learn in their own time and convenience as opposed to classroom learning in time limits (Brain et al., 1999). Self-learning in their own pace using CAL modules have proved with excellent learning outcomes (Haq and Dacre, 2003). Jaffe and Lynch (1995) stated that students with varied abilities produced excellent outcomes through CAL by following individual instruction routes. CAL programs offer a flexible and convenient way to present a vast amount of information at the student's pace (Coiera 1995). A teaching-learning session is successful when students have successfully met the learning objectives and were able to easily comprehend what is been taught, which is widely met by CAL by supporting students to meet the learning objectives (John, 2013).

6.2. Flipped Classrooms

The use of flipped classroom has become increasingly popular in health profession education (Street et al. 2015). CAL plays a major role in flipped classrooms techniques, where the learners use resources and learn the educational material through online and digital modules and allow for more interaction in future classroom sessions (Abeysekera et al. 2015). CAL allows learning prior to classroom session, thereby enhancing learning (Wittich et al. 2018). Flipped learning is an educational approach in which core teaching is delivered online for prior learning before face to face class room learning (Gillispie 2016). A study among third year undergraduate medical students in flipped classroom with core teaching module comprising 32 hour lectures showed a significant enhancement in fulfilment with flipped learning compared to standard lectures with improvement in assessment scores. (Chowdhury et al., 2018). A meta-analysis of 28 eligible comparative studies showed an overall significant effect in favor of flipped classrooms over traditional classrooms in medical profession, with the approach being more productive when the instructor starts the classroom session with quizzes. (Hew et al. 2018).

6.3. Smart Phones

Mobile learning (mLearning) with devices such as smartphones, tablets etc. are increasingly used in clinical environment (Chasse et al. 2018). Smartphone usage is fecund in daily life learning, teaching and patient management in medical education (Anique et al., 2021). Smartphones have untapped potential in medical education and research and widely used by medical students to facilitate peer interactions, communication and collaboration (Dorsey et al. 2017). Smartphones and their software applications have successfully breached the medical education environment with vast majority of medical students and doctors own smartphones (Raiman et al., 2017; Patel et al. 2015; Browne et al. 2015). Smart phones are used daily in patient care for decision making in medical education (Maudsley et al. 2019). Smart phones have advancements in medical research applications (Anique et al. 2021). The utility of smartphones in medical education and research quantitatively reduces data collection costs, improve data management and maintain participant interest (Mosa et al. 2012). As smartphones improves connectivity in medical research and education, its ethical boundaries should be widened between personal and professional use (Sheikhtaheri and Kermani, 2018).

6.4. Digital Games

A digital educational game for medical education is an electronic game encompassing interface of medical practitioners, students or trainees with a user interface in an offline/or online reference mode. Digital games exert education promoting function by providing the possibility of combining learning activities such as feedback, testing and spaced repetition with active participation and autonomy as well as positive experiences for students (Kandamaran et al. 2022). Amalgamation of digital educational games into prevailing medical education framework is a contest. Some studies have highlighted the constructive effect of games over traditional teaching methodologies (Noble et al., 2018). It is increasingly recognized that the application of game elements in education will provide an engaging and enthusiastic manner of learning and contribute valuable improvements in the outcomes (Bigdeli and Kaufman, 2017). In a study, research papers related to games were filtered and limited to full text peer reviewed published in English, but the concepts used in the literature are varied and distinct and the literature is not conclusive on the definition of educational games for medical education (**Bisell 2012**; Bigdeli and Kaufman, 2017). An efficient treatment outcome involves

effective communication and positive relation between patient and physician (Stewart 1995). Therefore, physician-patient/ student-patient relation and communication is considered a core element for medical education (von Fragstein et al., 2008).

6.5. Serious games

Serious games are an interactive computer application that has a challenging goal and incorporates some scoring mechanism and provides the users with practical knowledge, skills or attitudes of real life (Min et al., 2022). Serious game design in educational technology is a knowledge modelling activity for learners of different ages. It engages the learners in a decision-making process of a complex system that comprises the narrative, the character representation, their behaviors and the mechanics allowing the user to reach game objectives (Byusa et al., 2022). The remunerations of serious games on learners include enhancing their collaborative awareness via multiplayer settings, providing them with opportunities for active learning to solve medical issues and improving their clinical reasoning's, decision making skills, clinical performance (Tsoy et al. 2019). Thus, serious games have the ability as potential alternatives for traditional educational strategies and contribute better academic performances of medical students (Gorbanev et al. 2018).

6.6. Simulation

The aim of simulation is to duplicate real patients with illness, anatomic regions or clinical tasks. It is a mirror of real-life illness in which medical services are rendered. Simulations employ numerous educational tools such as provision of effective feedback, repetitive practices, dealing diverse range of illnesses, multiple dealing ill ness, multiple learning strategies, capture clinical variation, controlled learning environment individualized learning/mastery and team training, defined outcomes and benchmarks, effective method of team training, simulator validity etc. Issenberg et al. (2005) made a qualitative systematic review and found that high-fidelity simulations facilitate learning under the right conditions. The characteristics of simulation learning includes repetitive practice, individual learning, multiple strategies of learning, capture of clinical variations, ability to define outcomes or benchmarks. Simulation based education complements patient care settings, though it needs further rigor and quality (Issenberg et al. 2005). Several researchers have investigated on publications about simulation education (Bradley 2006). Simulation education spans a spectrum of complexity, from a simple reciprocation of body parts to complex body interactions portrayed by simulated patients or high-fidelity human patient simulators replicating whole body appearance and variable physiological parameters. The traditional medical mannequin, 'Rescusi Ann'e was developed in 1970's, after the development of artificial respiration (Resusci, 1971). Harvey, a simulator for cardiac examinations is developed and used successfully all around the world (Gordon et al. 1980). The medical teaching or evaluating the psychomotor skills such as plastic arms for veni puncture or suturing is studied and evaluated in a 3D representative of body parts with functional anatomy called part-task trainer.

6.7. VR Reality Simulations

VR simulation has the unique power rather than any technology to make the user experience a different environment, that allows them to learn from experience as they were in real life. VR has the ability to deliver experience on demand. Several VR programs are used in medical field. MIST VR (Minimally Invasive Surgery Trainer- Virtual Reality) has been specifically designed to provide trainees with a 264 PHYLLIS A GUZE realistic and assessable environment for developing skills, especially in the area of laproscopy (Wilson et al. 1997; McCloy and Stone 2001).

6.8. Artificial Intelligence

Artificial Intelligence (AI) is a rapidly evolving technology, transforming the medical healthcare sector by amalgamation into routine tasks. AI in medical education has the potential to facilitate complicated tasks and improve efficiency (Tolsgaard et al., 2023). AI is a powerful and disruptive area of computer science with the potential to fundamentally transform the practice of medicine and the delivery of healthcare (Bajwa et al. 2021). AI refers to the development of computer systems that can perform tasks that typically require human intelligence such as perception, reasoning and decision making (Association, 2018). AI is used to analyses large amount of patient data such as medical records, imaging studies and laboratory results to support clinical decision making and improve patient outcomes. Machine learning (ML) is a sunset of AI that involves the development of algothrims and models that can learn from data without being explicitly programmed (Sapci and Sapci., 2020). MI algothrims can be trained on large datasets to identify patterns, predict outcomes and make diagnoses, that helps doctors to make informed decisions and improve the accuracy of their diagnoses (Mori et al. 2021). AI has been increasingly integrated in medical and dental education offering numerous benefits to students and instructors. AI aid in virtual simulation and training allowing students to practice complex procedures on virtual patients without risking harm to real patients, which is customizable, enabling students to work at their own pace and repeat procedures until they have mastered them (Sit. et al. 2021) AI has the

potential to bring constructive changes in healthcare to empower patients to have control over their health. AI aids to improve delivery of healthcare in a variety of ways from providing personalized health information to enable virtual consultations and remote monitoring (Lee. et al. 2021) AI integrated with medical radiology plays a crucial role in diagnosis and treatment of various medical conditions to bring significant improvement in patient outcomes and accuracy of diagnoses.

6.9. VR

A study revealed that anatomy simulation models with 3D computer models has enhanced anatomy learning by medical students (Nicholson et al. 2006). An online virtual world, called 'Second Life 'developed by Lindan Lab, a company in San Fransico, has approximately 1 million regular users. In this online program within any second life environment, users exist as avatars and can interact with any users online from any apart of the world. The areas of learning can be established where avatars can visit, interact with other avatars and also interact with information's provided by institutions such as Pub Med and other medical schools (Spooner et al. 2014). The Second Life features diverse number of medical and health projects (Boulos et al., 2007; Beard et al., 2009). Several researches are in progress to evaluate the value of Second Life in different aspects of medical education (Wiecha et al 2010; Melu´s-Palazo´ et al., 2010). VR offers extreme benefits to learners and educators, delivering cost effective, repeatable standardized clinical training on demand (Haerling 2018). VR is a powerful tool in medical education for defined learning objectives and the implementation is growing worldwide.

6.10. Cloud computing

Cloud computing is a network of remote servers hosted on the internet used to store, access, process and manage patient data, which provides physicians with secured and remote access to patient information for better patient care (Dave and Patel, 2023). Cloud computing is of great help in drug recovery as it requires a large number of computing resources for discovering different compounds from billions of chemical structures. Infrastructure as a Service (IaaS) is beneficial in abridging this practice (Chen et al. 2012). The medical industry uses cloud-based management information systems to provide improved patient care, manage human resources, better querying services, billing and finance. Cloud computing is used to test and deploy these systems (Peter and Timothy, 2011). It aids in fast collaborative development; better integration od system with other medical systems and cross platform compatibility. It also aids in managing personal health records (PHR) and Electronic Health Records (HER). The users can easily access and manage the PHR database and share data. Some programs utilize SOAp procedures to be used in mobile and desktop applications (Wang 2010). The Cloud technology allows medical professionals to collaborate and give their input on complex medical cases such as tele surgery, teleradiology etc. CDSS is an advanced system that uses the knowledge and behavior of a medical professional to provide advice on patient record analysis. The system is used for diagnosing conditions and prescribing medication. Cloud computing can be used to create such systems that provide better patient care (Maslin and Aila, 2015).

6.11. Wearable Technologies

Wearable technologies can measure long-term data in the naturalistic environment of study participants allowing for ecologic momentary assessments (Shiffman et al. 2019). Wearables are valuable developments particularly for generating data for health research in large study populations such as global health or epidemiological studies or in low income contexts (Dunn et al. 2015; Berrut 2020). A large study: Datenspende" by Robert Koch Institutr, the German Research Institute for disease control and prevention aims to tackle Covid pandemic with anonymous data donations acquired through wearables (Robert Koch Institute, 2020). Based on the study, the clinical researchers used data from wearable devices to estimate probability of Covid pandemic outbreaks incorporating data on pulse, physical activity and sleep for the preceding 4 days in a sample size of half million participants (Radin et al. 2020). A scoping review to understand the use of affordable, consumer grade wearables for health research from a population health perspective using PRISMA (Preferred Reporting Items for Systematic Reviews and Meta Analyses Extension for Scoping Reviews) framework, which revealed that the most frequent strengths of affordable wearables were validation, accuracy and clinical certification (Huhn et al. 2022).

6.12. Social Media

Medical students have extensively used social media as a communication tool throughout their personal, professional and educational career. Social media enhances medical education as the students explicit their own knowledge creation by facilitating engagement, self-reflection and active learning (Latif, et al. 2019). Due to its prevalence, social media represents a potentially valuable tool for medical educators. Medical trainees may use Facebook, Google Plus, Twitter etc. on online group collaborations, sharing resources and get virtual moral support from student peers (Gray et al. 2010). Medical instructors may launch medical videos in important topics in Youtube to enhance concept delivery with

animations or video demonstrations and students may streamline to understand difficult concepts outside class room hours (Topps et al. 2013). Students may tweet questions for clarity during lecture hours or conferences, seminars, symposiums etc. or using hashtags to link related Twitter conversations (Junco et al. 2010). Students may blog their clinical experiences and may collaborate in creation of Wikis related to medical topics, synthesizing information, sharing knowledge, podcasts, photosharing through Flickr etc. Medical files can be collaborated through Google drives or Drop boxes. In addition, the online milieu can motivate peer and faculty review of posted social media content on a global platform to ensure accuracy of information and facilitates rapid feedback to learners from within and outside of formal learning circles (Cheston et al. 2013). Medical students who blogged, have exhibited improved knowledge, empathy, exam scores and reflective writing skills (Pinilla et al., 2013). Social media sites can function as a platform for students to exchange advice and medical information throughout their healthcare training (Hollinderbäumer et al. 2013). Majority of social media described positive overall reactions to social media and blogging interventions (Mosa et al. 2012; Goh et al. 2016).

7. Conclusion

Technology endeavors a streamline in the medical field for an instructor to offer credible, accessible information, that becomes progressively essential for medical practice. Medical education is rapidly evolving inclined by several aspects comprising swift in health care settings, the varying role of physician, assorted educational techniques and hastily fluctuating medical science to meet the societal expectations. A student and learner being prepared for a future physician involve great challenges that emphasize integration of medical knowledge with clinical experience that reflects in competed learning outcomes. Technologies favor patient centered care, cost-conscious health care, understanding and organization of health service in medical curricula which are prevalently popular in under and post graduate medical education. Medical technologies are innovative in this era facilitating enhanced knowledge acquisition in a swifter mode, clear and confident decision makings, improved skill coordination and perpetual variation that affords an entertaining educational atmosphere that engrosses learner instructor interaction in as an easier task, that eventually benefits the patients. The changes in the area of the medical profession have been chiefly to switch prevailing tactics for the endowment of medical education in the traditional classroom scenario, obsessed by the perseverance to appliance, an achievable and practical solution to the predicaments, by using modern online and digital technologies. Medical students favor educational strategies that propose educational material that is collaborative, reliable, modest, realistic along with pertinent response. Modernized medical technologies such as simulations, virtual reality etc. meritoriously upsurges acquaintance of medical skills, performing medical skills through replicated models and interactive learning through team communication (Wartman, Combs, 2019). Medical instructors exploit innovative technologies to stimulate student learning process and its brilliant reflection to address difficult clinical case.

Compliance with Ethical Standards

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