



Review Article

Knowledge based quality medical education by utilizing the means of technology application

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ARTICLE INFO

Article history:

Received 30-08-2023

Accepted 15-09-2023

Available online 22-09-2023

Keywords:

Computer aided learning

Health education

Medical education

Smart cellular and mobile phones

Learning

ABSTRACT

Background: In the 21st century's hi-tech world, imparting the scientific medical health educational instruction is changing fast, which is inclined through several indeed many factors which includes altering health care milieu, role-of Doctor of Medicine, transformed societal prospects, swiftly varying remedial-medicinal, medical and therapeutic-science, plus range of didactic (pedagogical) methods, techniques, and prototype models.

Materials and Methods: Changes and transformations in 'societal-expectations' set 'patient-safety' in front of, also raise 'ethical-issues' of learning connections plus measures over live subjects, through venerable teaching is any more suitable. Aims of education through technology in medicine comprise, providing 'knowledge-acquisition', civilizing resulting, development of perceptual disparity, enhancing quality-skills harmonization, working for unusual or grave measures, knowledge side imparting guidance, plus humanizing psycho motor skills – perceptual abilities and motor controls. Thus, various technologies could address the above objectives.

Results: Newer technologies like podcast s, videos through flipped class-work-learning's cellular-mobiles yapps, videogames, computer-simulations model-prototypes, amateur trainers, incorporated model-simulators, virtual-reality, plus smart-wearable devices-Google glass, are few techniques accessible to tackle the varying educational-instructive milieu.

Conclusion: This study addresses the application of technology which yields the infrastructural network plus basis for understanding several confronts given that 'medical education' pro (in support of the) prospect.

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1. Introduction

The application of the mind, what we call the 'technology' utilization in medicine (medical education) has been developing over many, and many years. The drift and the movement for utilizing the technology has first and foremost urbanized in retort(response) to the confronts façade education in medicine. Some of these confrontations within the medicine are many, and they are frequent (Table 1).

The rapid changes in the healthcare sectors, medical-environments, through the movement-of-medical healthcare as of the conventional, customary, and long-established hospital-settings to the ambulatory medicine, has demanded the capabilities to provide and endow with care in a greatly short interlude of duration plus needs transformations in medical records documentations, case reports, etc. through all the and thorough information, together with knowledge of medical health, medicine, medical archival records, fetching online-digital. With the introduction of the internet and through the smart cellular mobile phones with the internet facilities and also social digital medias astonishing

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the medical environment. Through these modalities a quick and thorough prescription or medication is done.

Table 1: Challenges of scientific health instruction

1	Modifying health care settings
2	Transforming social (societal) expectancies and 'patient-safety' and efficacy
3	Integrity Integrities Consciences ethical-issues and morals grasp one, perform and/or do and solve one, and impart training or teaching teach one.
4	Transforming curriculum importance – curricular-issues, abilities and competencies as well as landmarks or milestones and signposts
5	Progression (or explosion) of scientific knowledge, like medicine, engineering, biology, computing, and cognition, etc.
6	Necessity in favor of learning forever
7	Newer-generation of apprentices
8	Quickly transforming technology-application

The importance over the cost and price repression plus evidence-based use-of-resources is nationally significant and also nationwide very important. Some transformations there and some changes are in public (societal), shared and collective expectations such that the focus is more on patient-safety by means of medical educational training at every level. Which has alarmed the issues in health and medical sectors in connection with the teaching-learning one to one interaction as well as procedures on patients (live), through venerable and old imparting-teaching methods are may not be required or accepted any more.

Plus the changes in curriculum, at under-graduation and in post-graduation trainings and guidance too as of easy and straightforward 'knowledge-acquisition', knowledge elicitation, knowledge representation, knowledge extraction and then extrapolating the features towards need to exhibit competencies within the learners.¹ The flare-up of the knowledge of the medicine not any more permits doctors-physicians and physiologists to stay within their minds every expertise knowledge-intelligence which is indispensable for offering and endowing with excellence, superiority and providing value diseased (patient)care.

It was predicted that the >6,00,000 research papers were published within the biomedical engineering and sciences and informatics literature during last year and will continue exponentially every year and maybe more. Fat all a scholar, a research-student, a PG-student tried to keep up through the literature-survey by going through two to three papers in a day. Within the one year, this careful (conscientious) and thorough a person can be >800 years at the back.²

Though, and even though, the professional-work has extended and held long that the doctors, physicians, physiologists required to be lifelong learning persons, that this idea is at the moment very important. As well as the present generation-of-beginners and learners,

artificial intelligence virtual reality digital-natives, digital medias, etc.³ Who are young born in to world-of-digital so called the 'digital-world' who can fluently and effectively converse speak the language of technology eloquently. They anticipate, and expect and imagine their learning, edification and even culture to imitate their capability know-how proficiency in diverse levels- of 'technology-integration' as well as they are accustomed, familiarized, and their efficiency as well as proficiency towards technology-advanced progressive and progression wisdom environments.

Lastly, the medical education is experiencing a quickly transforming application of technology into the distribution of healthcare. The objectives of imparting training by applying the technology in medical sciences for especially medical education comprise providing the essential and fundamental knowledge-acquisition, enhancing administrative, progression of perceptual abilities and motor control disparity, enhancing the intelligent-skills harmonization and synchronization, working in support of are and/or significant-events, imparting teaching-learning by the panel, plus enhancing the psycho motor intelligent skill-set, and diverse technologies should tackle these aims and objectives.

Therefore, in medicine – medical sciences Academy, the medical educators must utilize and apply these newer technologies and techniques efficiently for transforming the teaching-learning in to further and new mutual-collaboration jointly, custom-made personalized and tailored, and also make powerful knowledge. A study by Bonk⁴ acquires the core of this new age technology tools and utilities for instruction and it is possible to state that anybody, any person from anywhere can learn something or everything or whatever and whichever is feasible as of anybody and at any moment.

2. The Application of Technology in Medicine Medical Sciences

Numerous technologies are available today and also abundant and applied largely in the medical school's medical sciences university's for effective medical-education. This section discusses specific considerations and methods, the relevance intersects in positions of high-tech elements or components or machinery as well as possible instructions.

2.1. Computer aided learning

With the introduction of computers, teaching and learning has become easier and more transformational. The UG educational instruction can be improved by using the computer aided teaching-learning. For instance, the application of flicked or flipped reversed-class rooms with which the learner's revision and the online talk prior

to the teaching-learning-session (in class-room learning), for interacting with the teacher, i.e., teacher student interaction. At this hour the teacher can spent on additional investigating complicated problems or examining also cracking queries and problems in a new differentiated direction plus dealings with learning-student, rather than teaching and the discovery in these fields not at was widespread. Even though randomized hearings within the education sector agonize because of exertion and strain through the adjustment, adulteration among two armaments, in capability and powerless to unreasoning the contestants, plus exertion measurement results, a limited randomized hearing have been showed requesting results-oriented queries approximately flicked or flipped or tossed lesson places through approximately some achievement.^{5,6} Such studies demonstrated the confirmed results within the region's and fields of apprentice, beginner, and learner participation, compensation, contentment and also knowledge presentation, acquisition and elicitation.

2.2. Smart mobiles and internet based cellular devices.

In 1990 Newton company developed Personal digital assistants so called PDAs were developed during the post internet era by the Newton. However, they were very much criticized, and so later Newton group redesigned and launched and were successful. Prior to the Newton's, personal communicators were developed, however, their usage was not up to the mark but are normally employed by the learning-students for the questions for their studies in medicine-medical sciences Academics, diseased-patient administration, also clarity and certainty on the treatments.

The scientific (medical) apps for i-Phones plus Android device applications were abundant. Even though several sources focus on the anatomical-structures as well as physiological side, a number of doctors address scientific(medical) issues and problem-solving's, diagnostics-diagnosis, prognosis, prognostics plus dealings. The website⁷ i-Medical-Apps.com gives suggestions intended for best-apps for the beginners learners and scholars plus intern residents plus connections to the online apps and app-storages and for buying. In the United States of America (USA), in Stanford University, they have a student App webpage also Stanford-apps which can be acquired as of the Apple store. Indeed, these days numerous medical-apps flooded in USA and obtain able to be employed over the laptop's tablets and also smart cellular-mobile-phones that has advanced internet facilities.

2.3. Software hardware (digital) prototype games and sports

The purpose of digital games for imparting-training scientific medical professionals is now on peak. The so called serious games give preparation tools and software

utilities which gives challenging inspiring surroundings, also they are frequently employed for imparting-training for the potential future generations.⁸⁻¹⁰

Application of games, for operational-surgical trainings enhances the eye hand coordination plus reflex-times.¹⁰ In USA, large number of universities, at Florida, California, Ohio, Harvard, Massachusetts, and in so many universities, the learning-students in aged geriatric old clerk-ships and have fun and play engage in recreation senior expedition, apposition in performance game in which the players engage-in-work to place the 'Gray-Sage', a significant wizard inside unfortunate physical condition that every entertainer performer must and should nurture support-to health. One available (printed journal publications) estimation and evaluation of this utility-tool was applied to impart training and teach geriatric-aged elderly old-aged home calls to students those who are pursuing the medicine.

And the researchers established that the modus operandi offered the students-of-medicine through the entertainment a well as pre-arranged and planned knowledge and skill that had the result not just over their wisdom only, yet on their considerable thoughtful of the meticulous requirements of the old, aged inhabitants i.e., populace.^{1,2}

2.4. The technique of simulation and modeling

The technique of simulation has long been used as an experimental arm of researchers. Its prime objective is to emulate physical i.e., real-subjects who are the patients, anatomical areas, and regions and also subregions, as well as clinical-diagnostic, diagnosis and prognosis and also prognostic issues, and/or mirror the realistic true conditions with which services are performed in all medical fields.

Virtual reality, i.e., computer simulations can succeed in numerous objectives of education (Table 2). A methodical, as well as qualitative study by¹¹ learned that the importance of effective and accessible show implies that hi-fi scientific computational simulations provide the studying(learning knowledge) within the true circumstances. The knowledge features recognized encompassed delivering the response, monotonous exercise or repetition, prospectus additions, variety of exertion echelons, manifold and numerous knowledge approaches, acquisition of difference in diagnosis clinical side, distinct knowledge, as well as capability to state result or bench-mark and bench-mark formalisms. A study¹¹ showed that even though investigation in this area requires progression in terms-of rigor and quality, high-reliable computational simulations in medicine and medical sciences are didactically efficient also model-based (simulation oriented and through the computer simulation) teaching matches and counterparts the medicine within patient-care surroundings/settings.¹¹⁻¹³ There was a work published over the history of the model-simulation.^{12,13} The objectives of the study-education emulator

Table 2: The objectives of the study education designed for meant for emulator

1	Gives successful response.
2	Recurring exercise
3	Scale of struggles
4	Several knowledge approaches.
5	Acquires clinical/and or diagnostic- deviation.
6	Under control education and understanding natural environment
7	Personalized erudition/command control plus group teaching
8	Definite results as well as bench-mark levels.
9	Efficient strategy designed for group coaching.
10	Emulator legitimacy

The application of computational-simulation and statistical modeling's extents a range of complexity, as of the modest imitation of remote vertebra-body portions thru to multifaceted humanoid connections depicted through the computer-simulated subjects (patients) and/or orhifanthropoid subject (patient) emulators reproducing the entire vertebra-body presence plus variable physiological limitations.^{14–18}

Combined computer designed simulators unify a mannequin (dummy, model manikin generally the entire vertebra, body) with urbane and classy computer-controls which can be operated to pro-vide various physiological limitations results that can be bodily (for instance, pulse-rate and/or cardiac-respiratory activities) or electrical-pulses generated through the simulators which are implanted pulse generators or over the chest-skins.

The artificial intelligence virtual-reality so called the VR-model-simulation indicates the regeneration of world's environments or surroundings or circumstances or the objects as a composite, computer-generated-image.

Within AI based simulations, i.e., virtual-reality simulations, the computer-machine monitor models the real-world plus the end-user connections or exchanges are through the computing-machine within that modelled, i.e., virtual-world. A myriad of virtual programmes are available now which are applied in medical sciences.^{19,20} For instance, noninvasive electroencephalograph (EEG) and minimally invasive deep brain stimulations (DBS) uses the virtual reality programs^{21,22} followed by the magnetic resonance imaging methods.

3. Wearable Technological-Devices

The “Google-Glass GG” is was tested as a green unfound layer-of-technologies which makes the teaching further accurate, convincing, natural plus hypothetically further successful. At the California university, San Francisco (CUSF) School-of-Medicine, cardio thoracic surgeons has had employed the “Glass” in >20 operations. They use it to plan ‘radiologic-imaging’s, such as, PETs, MRIs, f-MRI,

Dat Scans, MR-Angio, etc., into the “field-of-vision” as he drives to assistance in the cases of where they might apply extra diagnosis-clinical/prognostic data to assist drive movement.

The responsibility of GG as well as several extra goods, tools, and gadgets will become usual point throughout the healthiness maintenance range and field offer the indispensable and vital quantifiable scientific-tool, as of usage and custom through para medical over the site to progressive maintenance as well as discussions.²³

It can be said that the California university (CU)’s, School-of-Medicine (Irvine) might be the earliest to incorporate “Google-Glass” in to the program of study.²⁴ Instructors trust that scholars will get advantage as of “Glass’s” sole and unique-ability to show info-evidence within the smart cellular-mobile-phones, for instance, hands free set-up, are able to connect through the wireless, internet, via, “speech voice- commands” as well as capable to steadily “broad-cast” and also acquiring and recording the diseased-patient health-care overhaul maintenance plus scholar preparation events by means of exclusive ‘software’ acquiescent through 1996 centralized/federal Health Insurance Portability and Accountability (HIPAP) Act-accordingly.

4. Results and Discussion

Medical education is rapidly changing, influenced by many factors including the changing healthcare environment, the changing role of the physician, altered societal expectations, rapidly changing medical science, and the diversity of pedagogical techniques. Societal influences and the changing healthcare environment are influenced by the internet, globalization, cost containment, aging of society, increasing public accountability, a medically informed public, demands of personalized care, population diversity, expansion of healthcare delivery by non-physicians, and changing boundaries between health and health-care. Physician snow work in teams, are salaried, part of a complex organization, and must be highly accountable. Challenges of preparing the future doctor involve emphasis and standardization of competencies and learning outcomes, integration of formal knowledge and clinical experience, patient-centered care, population health, cost-conscious—high value care, and understanding the organization of health services.

Use of technologies for undergraduate, postgraduate, and continuing medical education has become increasingly prevalent. There are a number of educational advantages that are listed in Table 3.

These modalities facilitate knowledge acquisition, improve decision-making, enhance perceptual variation, improve skill coordination, and provide an educational environment that engages the learner and allows learning that does not endanger the patient. Use of computer

Table 3: Learning benefits of the application of technology

1	Reliable, regulated settings which exclude hazard to the diseased-patients.
2	Improved, practical imagining.
3	Authenticated perspectives for studying plus evaluation
4	Records of apprentice conduct as well as outcome-results
5	Teaching designed to individualistic or grouping requirements
6	Apprentice handling of learning practice
7	Reiteration as well as intentional repetition
8	Improve perceptual-difference/or disparity plus advanced skill/ability expertise.
9	Consistency of lessons and teaching and evaluation and/or judgement.

technologies has the additional benefit of being able to assess competencies and milestones, and provide the student, at any level, with the tools to continue to access the medical knowledge necessary to deliver quality care and be a life-long learner.

5. Conclusions

The application of technology (human mind) in medical sciences and medical educational institutions must be towards caring for the learning-process and learning procedures. There is a myth saying technology will not take away the jobs of teachers but technology in the hands of great teachers is transformational. Thus, it must not be an alternative for direct studying the education. Therefore, yet the educators aim is to continuously hub on the principles-of teaching-learning, it's not just on the individual and precise-technologies. Technology is a utility tool within the didactic, instructive, enlightening, scholastic, edifying, and informative learning toolboxes. The undertaking assignments of health instructors can be applying the novel techniques and innovative engineering methods and the application of technologies successfully for transforming learning-procedures into a more concerted, collaborative, collective, two-way mutual and personalized, as well as vesting knowledge interest and involvement. In teaching learning, it is a well-known fact that if a teacher tells the student he may forget, if he shows the student, he may remember but if the teacher involve the student then everything is comprehensive.²⁵ Therefore, involvement is a must in any kind of field. Doggedness, perseverance, hard work with smartness and determination are the weapons for success.

6. Source of Funding

None.

7. Conflict of Interest

None.

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Cite this article: Raju VR. Knowledge based quality medical education by utilizing the means of technology application. *J Educ Technol Health Sci* 2023;10(2):23-28.