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Editorial Open Access

Educational Informatics in Medicine and Imaging

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Editorial

Medicine is a constantly evolving profession that is increasingly faced with the challenge of having to adapt to major advancements in the fields of life sciences, bioengineering, molecular biology and information technology. This in turn poses a unique challenge to the conventional constructs and practices of Medical education. It is imperative that we incorporate the principles and application of these disciplines in order to ensure that we are adept at utilizing the new tools available for addressing complex issues.

Medical imaging, in its very interdisciplinary nature, has proven to be the stalwart of modern medicine. From the early days of nuclear scintigraphy in the middle of the last century to the advent of computed tomography in the 70's, to the modern day molecular probes used in optical imaging, we've come a long way in terms of how we visualize human physiology and disease processes. This has been made possible due to exciting innovations in the fields of biomedical engineering, medical physics and informatics. As these fields continue to transform medicine, the understanding and application of their principles are enabling us to innovate current trends in clinical practice and shape the future as well. Radiologists have pioneered the use of technology for the purpose of advancing the medical sciences - contrast-enhanced imaging, interventional procedures, molecular probes and fusion modalities are just a few examples.

Medical informatics can be defined as a field that involves cognitive, information processing, and communication tasks of medical practice, education, and research, including the information science and the technology to support clinical and academic proceedings in healthcare. Currently, there are various fields within medicine where informatics is actively being applied. And while great strides have been made in the fields of bioinformatics and genomics, the forerunners among the clinical disciplines where informatics has been increasingly applied are Medical Imaging and Pathology. Through the use of big data analytics, feedback loops, machine learning (Bayesian models, artificial neural networks, etc.), informatics has revolutionized the practice of laboratory medicine and imaging. Not to mention the advances made in the domains of electronic medical record systems, mobile health, PACS and patient-user communication portals, which have made it possible to digitalize all aspects of healthcare and make it more efficient, productive, accessible and manageable. Informatics has also made it possible to practice telemedicine with the advent of remote/mobile communication and consulting portals (such as ederm).

Any discipline of science or arts owes its existence, perpetuation and advancement to the educational practices therein. And medical education is a true vanguard of clinical proficiency and academic excellence. Informatics is at the cusp of transforming the way Medicine is taught and learned. With the use of digital libraries, interactive online repositories of multimedia material, e-learning modules, collaborative platforms, learning content management systems (LCM) such as Shareable Content Object Reference Model (SCORM), productivity management tools, self-assessment programs and intuitive feedback programs using analytics and various other innovative approaches, medical education is no longer confined to the conventional methods.

Recently, there has been a lot of interest in the application of virtual reality in medical education. There are companies developing human anatomy holograms and virtual procedural modules to help students get an enhanced educational experience. In the realm of medical imaging, there is a slew of educational software applications and web services that provide everything from radiology search engines (yottalook.com), online reference texts and audiovisual aids (STATDx), discussion forums and social media platforms (radrounds.com), and other other apps focusing on targeted e-learning modules (radiography, mammography support, etc.) [1-4].

Clinical decision support systems are incrementally being applied in medical imaging as well. Numerous systems currently exist in the domain of Computer-aided diagnosis (CAD) especially in Nuclear Cardiology (SDS, SSS using Bull's eye conograms), mammography, neuroradiology, etc.). In the field of Nuclear Medicine, there are quite a few image analysis software programs such as PMOD, P-Neuro, etc. There has been a lot of interest in bringing IBM's supercomputer Watson to medicine and use its computing power to interpret diagnostic studies. With most of these systems, there is an educational component embedded within, which allows for e-learning simulations that test the user/reader knowledge, competency and allows for inter-reader peer review systems as well. Such applications provide a more hands-on, focused learning experience and ensure quality control [5].

Medical education is a true vanguard of clinical proficiency and academic excellence. Application of aforementioned e-learning systems as made possible by Educational informatics, have significantly improved the learning experience of medical students, trainees and physicians alike. Moreover, with the use of analytics and feedback loops, the participation, performance and progress of the learner can be tracked to provide valuable perspective. With judicious application of the new e-learning systems, backed by evidence of improved outcomes, this field will continue to grow and impact general and specialized medical education. Some of the top medical schools are beginning to recognize this and are transforming their curriculum to reflect these trends. It is an exciting time to be in academic medicine.

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