



Five Things That Radiologists Can Do to Improve Their Technology Quotient

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A term that has recently become popular in corporate jargon is TQ or technology quotient. It is the ability of an individual, group, or organization to embrace, integrate, and use technology to transform the world. This is a concept that radiologists can learn and gain from. As medicine becomes increasingly digital, the need for radiologists to adopt and learn to use new technologies becomes correspondingly greater. Radiology in particular is at the forefront of digital health care. With a perpetual tsunami of images overwhelming radiologists, acquiring and developing technology skills may unlock the key to increasing reporting efficiency. Five suggested focus areas for the radiologist of today are the following:

- **Picture archival and communication system (PACS) and radiology information system (RIS):** Gone are the days of the trusty viewbox; today these technologies are ubiquitous and an understanding of their functionality is unavoidable for any radiologist. What the radiologist needs to be aware of over and above the basics is the reporting efficiencies that actually impact on radiologist productivity. For example, the utilization of efficient hanging protocols can greatly optimize the image review process. Viewer hotkeys ensure that commonly used processes such as pan, zoom, window, and scroll are delivered with a single action, which is also more ergonomic. As with any electronic gadget PACS/RIS systems come with a host of features and spending some time and becoming familiar with these at the outset can save many hours of effort further down the line.^{1,2}
- **Teleradiology:** In today's world, it is virtually mandatory for a radiologist to understand and embrace teleradiology, which in our era of radiologist shortages is now essential to ensure that radiologists extend their reach to report for a larger community than a single center. A very basic understanding of Digital Imaging and Communication in Medicine (DICOM) and Health Level Seven (HL7; and the latter's newer avatar, MIRTH) is helpful to understand the fundamental processes of teleradiology if one is keen to set up one's own teleradiology practice. Additionally, teleradiology is all about workflow and the use of filtered worklists, alerts, and messaging communication both to efficiently report and to conveniently communicate with sites as required. Setting up an efficient teleradiology workflow is a quick and easy way to both increase and enhance one's radiology practice and provide reporting for a larger catchment than a single venue practice makes possible.^{3,4}
- **Voice recognition (VR) and structured format reporting (SFR):** VR and SFR are two of the greatest productivity benefits for radiologists. Handwritten or hand-typed reports are both history today. VR allows for efficient report dictation in real time while simultaneously viewing the scans. SFR ensures checklist-driven review for greater accuracy and also ensures the use of standard terminologies and reporting protocols.^{5,6}
- **E-learning: image archival for training.** For the radiologist educator, learning to use a web-learning platform such as Zoom or Teams can greatly enhance one's reach. Platforms such as www.Radguru.net allow for interactive teaching in quiz format as well as didactic lectures. Audience polls can be conducted and feedback obtained. All of these are conducive to better learning. Even within a distributed private practice radiology group, the use of web-based learning technologies can significantly boost reporting quality and referring physician satisfaction.⁷
- **Artificial intelligence (AI):** Finally, the new frontier of AI is the future and radiologists must learn to embrace it effectively, or render themselves obsolete. Knowing what algorithm is available for one's particular clinical needs and can help make one's reporting process more efficient is key to ensuring longevity in radiology. Today AI

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in radiology can help prioritize abnormal studies on a radiologist's worklist, highlight areas of abnormality on an image, or even generate a report (with quantification of lesion size, etc.). AI is the only technology that simultaneously improves quality and productivity, and therefore it is of great importance. Also, it is integrated with all of the other technologies discussed and its presence will soon be ubiquitous and its use unavoidable. The most recent applications of AI, namely, the use of Natural Language Processing and Large Language Models allow for (1) report generation and editing, (2) error checking of reports, (3) radiologic decision support, (4) workflow optimization, and even (5) image analysis. To uncover patterns in the huge amounts of data associated with medical imaging and enable radiologists to make well-informed clinical judgments, AI is crucial. The potential of AI holds great promise for revolutionizing the practice of radiology.⁸⁻¹⁶

Given the importance of information technology in radiology today, it seems a logical assumption that the radiology curriculum in medical teaching institutions should be modified to incorporate these points, both in theoretical/didactic and practical training. The European Society of Radiology has already made efforts in this regard.¹⁷ Specialized courses in these technologies at radiology conferences such as the Informatics Course at the RSNA also help.¹⁸ Further, radiology associations including subspecialty associations/societies can help in this regard. While technology-focused conferences such as Society for Imaging Informatics in Medicine (SIIM) exist, these tend to be more focused toward industry and engineers. On the other hand, specialty radiology societies such as the Society of Emergency Radiology (SER) have made efforts in this direction. For example, an SER-validated virtual fellowship conducted by Teleradiology Solutions provides focused input to its radiologist trainees on technology-focused training on viewer, workflow, and structured reporting, all with the goal of making radiologists more efficient in the emergency setting, where time is especially of the essence.

Improving one's TQ is an important survival skill for radiologists today. A small amount of time and effort spent on understanding and learning about the five areas highlighted earlier will yield rich benefits in terms of the radiologist's professional quality as well as in quality of life in general.

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