

Radiology Online: Information, Education, and Networking— A Summary of the 2012 Intersociety Committee Summer Conference

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The “new online” (Web 2.0) world is evolving rapidly, and the digital information, education, and networking resources available to radiologists have exploded over the past 2 decades. The 2012 Intersociety Committee Summer Conference attendees explored the online resources that have been produced by societies, universities, and commercial entities. Specific attention was given to identifying the best products and packaging them in tablet computers for use by residents and practicing radiologists. The key functions of social networking websites and the possible roles they can play in radiology were explored as well. It was the consensus of the attendees that radiologic digital resources and portable electronic devices have matured to the point that they should become an integral part of our educational programs and clinical practice.

Key Words: Intersociety Committee, Intersociety Committee Summer Conference, ACR, online, education, networking

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Established by the ACR in 1979, the Intersociety Committee (ISC) is intended to promote collegiality within radiology, foster and encourage communication among national radiology organizations, and make recommendations on areas of concern. The ISC holds an annual Summer Conference, with the topic selected by an executive committee. The 50-plus professional radiology organizations that are members of the ISC include diagnostic and interventional radiology, radiation oncology, and radiologic physics organizations.

The 34th ISC Summer Conference was held August 3 to 5, 2012, in Telluride, Colorado. The focus of the conference was to explore the spectrum of online radiologic education, information, and networking resources and how these resources might be incorporated into digital platforms such as tablet computers to improve our educational and clinical programs. As in previous years, the conference consisted of a series of plenary presentations and work group sessions. Seventy-six members

and executive directors from 37 organizations participated in the conference.

THE NEW ONLINE

The first computer-to-computer connections were established in 1969, thus creating the first incarnation of the Internet [1]. In 2000, approximately 361 million people used the Internet; today, there are more than 2.3 billion users, or approximately 33% of the world's population [2]. Radiology was one of the first specialties in medicine to embrace digital resources and computer interconnectivity. Specifically, an electronic-based workflow, including the acquisition, transmission, display, and archiving of medical images, has existed in some departments and practices for almost 2 decades. The maturation and broad dissemination of this technology have been impressive and has driven a digital transformation of our specialty. However, although radiology has been at the forefront of this transformation in medicine, we have failed to keep up with the revolution in the online world. We are currently handicapped by multiple independent electronic systems that require people to serve as the integration system. The “new online” (Web 2.0) will markedly change the current digital landscape in radiology.

The new online is an environment in which information is massively distributed and interconnected, in which there is universal discovery and consumption, in

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which the “search” is king. Content is created and driven by users, a sort of tyranny of democracy. Browsers are the universal platform for discovery, and collaboration and interaction among users are extensive and immediate (social networking, online gaming). Popular websites such as amazon.com encapsulate the new online. Typical features include a personalized experience (mash-up), adaptive algorithms that create a contextually aware environment that presents new opportunities for the user on the basis of prior use, automatic integration of separate functions (eg, product searching, payments, shipping), and centralized cloud storage of user information such that accounts can be accessed from anywhere. In medicine, this would require a “business logic” layer of software that would integrate the function of multiple disparate systems and allow for an adaptive and customizable user interface. Such a system would be able to integrate information from the medical record, pathology, and prior studies to help users protocol, interpret, and report studies. The radiology report in such an environment could be a “live” document, with links to prior studies, radiation dose exposure, related educational materials, and appropriate utilization of additional studies. Possible benefits of the new online would apply to clinical care, research, and education.

INFORMATION AND EDUCATION RESOURCES

Radiology organizations have been at the forefront of the development of digital and online information and education resources.

The RSNA’s main online gateway is the myRSNA website (<http://myrsna.rsna.org>). This site allows customizable home pages, file storage with a built-in viewer application, and the ability to provide targeted searches of vetted journal content. myRSNA also allows online discussions with colleagues through myGroups, as well as access to committee files and calendars through myCommittees. The RSNA also sponsors CMEgateway.org, a centralized site to which an individual’s continuing medical education (CME) hours are reported by organizations and can be forwarded to the ABR. The RSNA Image Share network, a project funded by the National Institute of Biomedical Imaging and Bioengineering, allows radiologists to share medical images with patients. RSNA software is also available for creating teaching files, administering clinical trials, and storing and sharing reporting templates.

The ACR’s website (<http://www.acr.org>) is customizable with links to education, training, quality and safety, informatics, and socioeconomic and political materials. The main page contains a dashboard showing personal CME hours and links to CMEgateway.org and the ACR’s My Education page. The main site also links to the online version of the *Journal of the American College of Radiology*. RadiologyInfo.org, developed jointly by the

ACR and the RSNA, is a popular site for patients and providers that contains a full list of radiology procedures explained in a readable and informative manner. The ACR sponsors a number of additional initiatives, each with an online presence, including

- the Radiology Knowledge Assessment Test, an online self-assessment product that allows users to test their skills and earn CME credit;
- Case in Point, an interactive case-of-the-day website;
- the American Institute for Radiologic Pathology syllabus, which is also available in application form for smart phones and tablet computers;
- TRIAD, an ACR-sponsored image transfer network;
- the Radiology Leadership Institute, a leadership development program and think tank; and
- the Image Wisely[®] and Image Gently[®] programs, multiorganizational collaborations to reduce radiation doses from imaging.

The ARRS’s (<http://www.arrs.org>) latest online initiative is its Sherpa software, a highly interactive and personalized online system that uses a gamification approach to self-assessment and learning. The ARRS also sponsors GoldMiner, a radiologic-image-specific search engine. The main journal of the ARRS, the *American Journal of Roentgenology*, also has an easy-to-use online version.

The ABR’s online hub (<http://www.theabr.org>) is the Personal Database website. This continually evolving site is accessed by trainees before board certification. It is also accessed by ABR diplomates enrolled in maintenance of certification (MOC) for entering their MOC data. Future MOC online capabilities will include group administrator access and management for diplomates in practices that have enrolled as a group in MOC. The ABR website also contains other materials relevant to diplomates’ relationship with the ABR, including educational materials on ethics and professionalism.

An immense amount of educational and informational resources are also made available by university-affiliated radiology departments, not-for-profit organizations, government entities, and for-profit companies. University-generated resources include teaching files, anatomy atlases, and complete online radiology courses. For better or worse, Wikipedia (<http://www.wikipedia.org>) may be the largest not-for-profit online informational resource for radiologic information. The Khan Academy (<http://www.khanacademy.org>) is an interactive online classroom that contains little radiologic information but is a great example of some of the capabilities of online education. PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>) for access to scientific medical publications and MedlinePlus (<http://www.nlm.nih.gov/medlineplus>) for public medical information are two well-known government resources. For-profit organizations have also published an impressive array of

digital resources, including digital textbooks and smart phone and tablet applications.

NETWORKING AND COMMUNICATION RESOURCES

Facebook (<http://www.facebook.com>) has almost 1 billion users worldwide, with nearly 552 million daily users [3]. LinkedIn (<http://www.linkedin.com>) is now home to almost 175 million users [4], and the popular microblogging website Twitter (<https://twitter.com>) logs almost 340 million tweets (small online posts) each day [5]. These sites are not just the domain of teenagers; corporations, politicians, the news media, and social movements have recognized the potential power of these new methods of communication and networking.

The key features defining the Facebook experience are (1) the ability to connect with “friends”; (2) the presentation of a continuous stream of information and posts (a “newsfeed”) about friends and contacts; (3) calendar functions; (4) photo archiving and sharing; (5) the ability to e-mail, chat, and make video calls; (6) the ability to develop applications that can enhance the functions of the site; (7) the ability to align with interest groups, corporations, and products; and (8) a profile that provides a snapshot of every Facebook user’s “important” information at a glance. Profiles include photos, education history, work history, interests, and even details such as relationship status. Although each of these single features can be valuable, the aggregation and integration of these features and the adaptive and customizable interface are what make Facebook so successful.

LinkedIn is a more professionally oriented social networking site. It allows users to develop detailed, résumé-like profiles that may be shared with colleagues and prospective employers. The profiling functions are probably more suitable for professional settings than those of Facebook; however, its communication, calendar, photo, and application capabilities are absent or less robust.

Although professionals are reluctant to use Facebook for business networking, the abundant features could be useful. For example, radiologists, who typically have large and complex networks of associates, colleagues, and collaborators, might benefit from a platform that facilitates connections and communication. A streaming newsfeed of information from contacts, professional societies, and employment organizations could also be valuable to busy professionals. Photo sharing, particularly in a form more akin to teaching files, could be of great utility to a community of imagers if the requisite safeguards were in place. And although most Facebook applications are games, user-written applications for a platform used by professionals could have numerous possibilities, including applications to access CME records, perform radiology-specific searches online, and access education materials.

Although the core functions of current social networking sites are intriguing, the sites are probably not suitable for everyday professional use. For example, there is limited ability to sufficiently compartmentalize personal and professional information, and the security of personal data is limited. Current sites also lack the specialized functions needed to be truly useful to professionals, particularly medical professionals such as radiologists.

An example of a highly specialized online “networking” feature that could be immensely valuable to radiologists would be an in-house radiology consultation program. With the advent of PACS, in-person consultations have declined [6], thereby degrading the personalized service for which our profession was once known. Integrating a digital consultation service into the PACS software could offer a novel replacement. With such a system, referring clinicians could digitally request a consultation when reviewing a study on a web PACS. They would be offered a list of logged-in radiologists, from whom they could select a consultant. The software would connect the referring physician and the radiologists in a video call and would synchronize the images being reviewed and the mouse pointer. Although remote, this form of communication would allow a (digital) face-to-face conversation and could help reestablish close professional relationships.

RESOURCES COMBINED WITH PORTABLE DEVICES

The utility of online information and education resources is magnified when combined with portable electronic devices such as tablets. Several radiology residencies across the country have adopted tablets as the primary medium for resident education and clinical information. For example, the Radiology Resident iPad Toolbox project developed at the University of Colorado is focused on placing all of the educational and informational resources necessary for an entire radiology residency on an iPad. Residents and faculty members culled a wide variety of iPad resources to identify a complete set of high-yield applications, links, and files that could be loaded onto an iPad. The items requiring licenses were negotiated with vendors, often with group discounts. A complete Resident iPad Toolbox image was then loaded onto multiple new iPads, which were provided to each resident to use for the duration of their residency.

The licensed (or free) resources include the following:

- Educational resources
 - Electronic textbooks accessible via electronic reader applications
 - Radiology journal content pushed to the iPads via rich site summary feeds
 - Videos of a popular resident review course
 - An anatomy atlas
 - Departmental lectures
 - Podcast-format lectures
 - Interesting case files

- Point-of-care learning and clinical tools
 - RADPrimer (<http://www.radprimer.com>), Radiology Toolbox Pro (<http://www.radiologytoolbow.com>), and StatDX (<http://www.statdx.com>)
 - Remote access to the electronic medical record and PACS
- Communication tools and information
 - An e-mail program
 - An instant messaging program
 - Virtual conferencing software
 - An audience response system
 - File-sharing programs, including Dropbox (<http://www.dropbox.com>) and Blackboard (<http://www.blackboard.com>)
 - Call and lecture schedules
 - Procedure-logging software
 - Departmental policies and key documents

It is estimated that \$3,703 worth of material was assembled at a cost of \$1,272 per fully loaded iPad, with the saving mostly resulting from group licenses. The total price was approximately half hardware, half software and was fully covered by the department.

ISC ATTENDEE PERSPECTIVE

The attendees of the ISC Summer Conference were impressed with the abundance of online information, education, and networking resources available to radiology; however, they were struck by a general lack of knowledge of the existence of many of these resources. They identified a need for a central compendium of the resources as well as a method to evaluate the quality of the products. A concept from the 2010 ISC Summer Conference of creating a new radiology website resurfaced [7]. As previously proposed, [RadiologyCentral.org](http://www.RadiologyCentral.org) would serve as a central access point to all member organizations of the ISC, with key functions including links to the websites of all ISC member organizations, a centralized calendar (listing organization meeting dates and locations, abstract submission deadlines, etc), and potentially a centralized dues payment system. The attendees at this meeting expanded the previous proposal by suggesting that the site include a central compendium of all online radiology information, education, and networking resources, and a “Yelp-like” (<http://www.yelp.com>) rating system of the resources. Yelp’s rating system is generated solely by users (tyranny of democracy), not by any specific organization or panel of experts. The compendium and rating system could focus initially on all societal CME and self-assessment modules and then be extended to include other societal, university, nonprofit, and for-profit products. An additional feature of the website, highly desired by the attendees, is a single login and password to [RadiologyCentral.org](http://www.RadiologyCentral.org) that would gain them immediate access to the “members-only” portions of the websites of all ISC member organizations to which they belong.

Beyond the website, the attendees were very impressed with the concept of maximizing the utility of electronic and online resources through the development of pre-defined “radiology toolboxes” that could be loaded on smart phones and tablet computers. The advantages of migrating resident education to a fully digital and portable environment were appreciated by all attendees. Last, although the information currently available online is extensive, there is need for additional resources. For example, the creation of a wiki to catalog education exhibits (which otherwise become unavailable after meetings) could be a great resource. Social networking sites for radiology learners could also be useful, as would massive open online courses, a format recently made famous by an artificial intelligence course offered in partnership with Stanford Engineering that enrolled more than 160,000 students from across the world [8].

TAKE-HOME POINTS

- There is a wide array of radiologic information, education, and networking resources that are highly useful for education and clinical service.
- The new internet (Web 2.0) and handheld electronic devices offer new opportunities for radiology.
- The ISC recommends the creation of [RadiologyCentral.org](http://www.RadiologyCentral.org) to serve as a central access point to all member organizations of the ISC, with key functions including links to the websites of all ISC member organizations, a common login, a centralized calendar, a centralized dues payment system, a compendium of all online CME and self-assessment modules, radiology information, education, and networking resources, with a “Yelp-like” rating system.

REFERENCES

1. Leiner BM, Cerf VG, Clark DD, et al. Brief history of the internet. Available at: <http://www.internetsociety.org/internet/internet-51/history-internet/brief-history-internet/>. Accessed August 22, 2012.
2. Miniwatts Marketing Group. Internet World Stats. Available at: <http://www.internetworldstats.com/stats.htm>. Accessed August 22, 2012.
3. Facebook. Key facts. Available at: <http://newsroom.fb.com/content/default.aspx?NewsAreaId=22>. Accessed August 22, 2012.
4. LinkedIn. About. Available at: <http://press.linkedin.com/about>. Accessed August 22, 2012.
5. Wasserman T. Twitter says it has 140 million users. Available at: <http://mashable.com/2012/03/21/twitter-has-140-million-users/>. Accessed March 21, 2012.
6. Reiner B, Siegel E, Protopapas Z, Hooper F, Ghebrekidan H, Scanlon M. Impact of filmless radiology on frequency of clinician consultations with radiologists. *AJR Am J Roentgenol* 1999;173:1169-72.
7. Dodd GD III. The radiology conglomerate: optimizing the structure and function of the 50-plus radiology organizations—a summary of the 2010 Intersociety Conference. *J Am Coll Radiol* 2011;8:539-42.
8. Thrun S, Norvig P. Introduction to artificial intelligence. Available at: <https://www.ai-class.com>. Accessed August 22, 2012.