Starting to Think Digitally: Evaluation of Web Browser-Based Presentation of Images at a Rad Path Conference in a Traditional Film-Based Environment

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Images have traditionally been projected from film to a large-screen television at the weekly Rad Path conference at University of Medicine and Dentistry of New Jersey–New Jersey Medical School. An alternative system was developed to digitally transfer computed tomography (CT) scans and magnetic resonance images (MRI) into a standard PC format, and present them at the conference in a hypertext markup language (HTML) document via a laptop computer and liquid crystal display (LCD) projector. Resident and attending physicians were given a questionnaire about the differences between the two modes of presentation. Their responses are presented here.

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RAD PATH IS A WEEKLY conference held at many medical institutions wherein the clinical history and initial imaging studies of a case are presented. A senior resident is asked to evaluate the findings, and provide a differential diagnosis. Afterward, the pathologist describes what was found at surgery or biopsy, and a junior resident gives a synopsis of the final diagnosis. The usual manner of image presentation at the University of Medicine and Dentistry of New Jersey–New Jersey Medical School is projection of the films, regardless of modality, using an analog video film projector connected to a large-screen television. As an alternative, a computer application was developed to encapsulate computed tomography (CT) scans and magnetic resonance (MR) images from a proprietary General Electric (Milwaukee, WI) database on a UNIX-based workstation (Sun Microsystems, Palo Alto, CA) into a hypertext markup language (HTML)-based teaching file for presentation at the conference using a laptop personal computer, a web browser, and a liquid crystal display (LCD) projector. While the development of an HTML teaching

file in an environment without a picture archiving and communication system (PACS) has been described,¹ here we explore its use in a formal conference where a resident must interpret the findings before a large audience.

METHODS

The images were originally obtained from magneto-optical disk archives using a proprietary GE network protocol. The application was written in Interactive Data Language (IDL, Research Systems Inc, Boulder, CO), and allows the user to select an image series, adjust the window width and level settings, crop the images, and then publish them as a collage in an HTML document. The images themselves are written in either Joint Photographic Expert Group (JPEG) format or graphic interchange format (GIF). Image size can be automatically adjusted based on the width of the screen intended to be used for presentation, usually 1,024 pixels wide, and the number of images desired per row, usually 3 or 4. Image height is not of concern because web browsers allow vertical scrolling. Furthermore, an option is provided to have each image in the collage linked to a full size copy for finer detail.

The final set of HTML files included the pertinent clinical history, an index to the multiple series of images generated by the application, and often links to scanned articles from the literature. The portion of HTML not generated by the application was minimal and written manually via a simple text editor. Conventional radiographs and ultrasound images were presented in the traditional manner.

RESULTS

The 12 questions posed are listed in Table 1. Responses were selected from 1 to 5, with 1 meaning "agree" and 5 "disagree," except as otherwise indicated. "Don't know" was also given as a choice. Seven residents and five attending physicians responded. Results are the mean $\pm$ SD.

DISCUSSION

There was a mild degree of concurrence among residents and attending physicians that the digital format made the conference easier to follow and permitted better navigation through large image sets. Likewise, they felt that it allowed more images to be shown, and were comfortable with this new format. The attending physicians strongly indicated that they did not believe the digital format made the conference more confusing, and appreciated the integration with scanned articles from the

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Table 1. Questionnaire Responses

Question	Residents	Attendings	All
1. It made the conference easier to follow.	2.4 ± 1.4	2.2 ± 1.3	2.3 ± 1.3
2. It made navigation through large image sets easier and faster.	2.3 ± 1.3	2.0 ± 1.4	2.2 ± 1.3
3. It made the conference go faster.	2.9 ± 1.8	2.5 ± 1.3	2.7 ± 1.6
4. It allowed more images to be presented.	2.0 ± 1.4	2.3 ± 1.5	2.1 ± 1.4
5. Rate the image quality compared to the usual form of presentation. (1 = better, 5 = worse)	3.3 ± 1.0	2.3 ± 1.5	2.9 ± 1.3
6. Rate how comfortable you were with this form of presentation. (1 = comfortable, 5 = uncomfortable)	2.2 ± 1.0	1.6 ± 1.3	1.9 ± 1.1
7. It made the conference more confusing.	3.2 ± 1.6	4.8 ± 0.4	3.9 ± 1.4
8. The integration with scanned articles from the literature was better than photocopies of articles.	3.0 ± 1.8	2.0 ± 1.4	2.5 ± 1.6
9. I preferred electronic presentation over TV projection of films (except for radiographs, which were never presented electronically).	2.7 ± 1.9	1.4 ± 0.9	2.1 ± 1.6
10. Did it make interpretation by the senior resident easier or harder? (1 = easier, 5 = harder)	3.3 ± 0.6	2.8 ± 0.5	3.0 ± 0.6
11. Do you think films are inherently better for conference interpretation?	3.3 ± 1.6	3.6 ± 1.1	3.5 ± 1.4
12. Do you think it matters more what one is used to?	3.5 ± 1.7	2.7 ± 1.5	3.1 ± 1.6

literature. While the resident physicians had diverse opinions about these latter issues, the attending physicians demonstrated a clear preference for web browser-based presentation.

Part of planning for a digital department involves assessing the pre-existing attitudes among the staff.

How receptive they are toward a new technology can be just as important to its successful implementation as its technical quality. This presentation provides some examples of the types of questions that need to be asked, and a glimpse at some of the answers.

REFERENCES

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