

Review of “An Introduction to Online Physical Oceanography”

Dean A. McManus

University of Washington • Seattle, Washington USA



his review of Dr. Matthias Tomczak's World-Wide Web site is from a pedagogical viewpoint, giving little attention to the scientific content of the site. Before beginning the review, however, I would like to thank Dr. Tomczak for presenting the historical development of the site in his adjacent paper. It records that an instructor does not have to change to Web-assisted instruction all at once; the change can evolve. Too many instructors, in my experience, are so dismayed by the thought of having to learn a new instructional technology (that has no relevance to their research) and, then, by the thought of preparing the entire course at once that they do not begin the task, even when templates are available to facilitate the task. Dr. Tomczak's story should ease some commonly shared anxieties. His story also records that forces beyond the instructor's control may dictate changes in the course presentation, whether the instructor is ready or not.

The site is easy for students to access in that it can be viewed on any platform with the appropriate Web browser for frames, even using a 28.8Kbps modem. The site is formatted with three horizontal frames: an upper title frame, a middle text frame, and a lower illustration frame. The borders between the frames can be dragged up or down to increase the vertical size of the frame of interest. The challenge for the user is to set the font size of the browser so that it is large enough for easy reading and small enough to lessen the need for continually moving the borders.

The site contains notes for 13 lectures in physical oceanography. Dr. Tomczak states clearly in the instructions that, as notes, these are not so complete a presentation of information as one finds in a textbook. Nevertheless, like most textbooks, they are statements of fact in declarative sentences. Questions to stimulate student learning are lacking. I assume that Dr. Tomczak provides these in his lectures, but I wonder whether all the instructors who use these notes, either from the Web or from the CD-ROM, will do more than recite the facts.

Each lecture is illustrated with colored figures that open in the lower frame when the hypertext link is

clicked in the middle frame. The use of color in the figures provides another tool to enhance understanding of the information being presented. The latest version of the site also uses animation and interactive exercises, Web technologies that do not merely duplicate the printed textbook. Animation is used to present time series data (as in the lecture on El Niño), a form of data that can be difficult for students to comprehend in two-dimensional overhead transparencies. Animation is also used to present images that are more readily comprehended in three dimensions than in two dimensions, as in the depiction of wave motion with and without rotational effects in the lecture on tides. Some interactive calculations are included in the lectures, and seven interactive exercises are presented at the end of the site. Given the evolutionary development of the site, one would expect some of the colored illustrations to be replaced by animations in the future, such as in the discussion of wave processes.

It is in the exercises that the site begins to become an active learning tool. Here, questions are asked the student. His or her response automatically opens a new window with either a discussion of why the answer chosen was wrong or a brief confirmation of the correct answer. This is a first step in self-learning. Most of the questioning, however, is in the form of a practice test. That is, the student is assumed to know the correct answer, and the question tests that knowledge. The sequence is “knowledge” first, then “test question.” The exciting learning opportunity provided by the interactive Web, however, reverses this sequence to: “inquiry question” first, then “knowledge.” Asking the question can stimulate curiosity and engage students' interest; it can give them a reason for wanting to know. Hence, the recommendation in *Shaping the Future* (1996, p. 65) for instructors to “Build into every course inquiry. ...” This method of teaching is not easy, but it can be very effective in enhancing student learning. As evolutionary as this site development is, one can hope to see this approach in later versions.


Dr. Tomczak is to be complimented for sharing his

material with instructors in regions of the world with slow Internet downloading, by making it available through UNESCO as a CD-ROM. The drawback, however, is that a CD-ROM limits the interaction between student and data. Having students work with large data sets or sophisticated data presentation can engage them more in the study. The El Niño data on the site is a first attempt at including such data. Having students work with quasi-real time data (time-averaged hourly to monthly) adds an immediacy to the engagement. In future versions of the site, one would hope to see links to online data sites such as those of the Australian Oceanographic Data Centre, the U. S. National Oceanographic and Atmospheric Administration, the U. S. National Aeronautics and Space Administration, and others. The students would have the data, much of it presented in sophisticated images, and, ideally, use the data to form their own questions to solve. Ownership of the question gives them ownership of the value of the

question, something they often do not accept from the instructor when the instructor poses the question.

This site is a very good educational tool. That it is, and presumably will continue to be, evolving in its pedagogical use of technology is its major strength, unlike the textbook frozen in the past and unable to respond to the student's answers or questions. As Dr. Tomczak mentions, however, it is difficult for instructors to find the means for improving such a site. Perhaps the growing value attached by universities to distance learning, which uses the same technology, will come to his assistance.

REFERENCES

Advisory Committee to the National Science Foundation, 1996: *Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology*. National Science Foundation, Virginia, 76 pp. 



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Events:

Ocean Optics XV

16-20 October 2000

Musée Océanographique, Monaco

<http://raptor.ocean.dal.ca/~optics>

2001: An Ocean Odyssey

**Joint Assemblies of the
International Association for Physical Sciences of the Ocean (IAPSO)
and the International Association of Biological Oceanography (IABO)**

21-28 October 2001

Mar del Plata, Argentina

http://www.retina.ar/2001_ocean