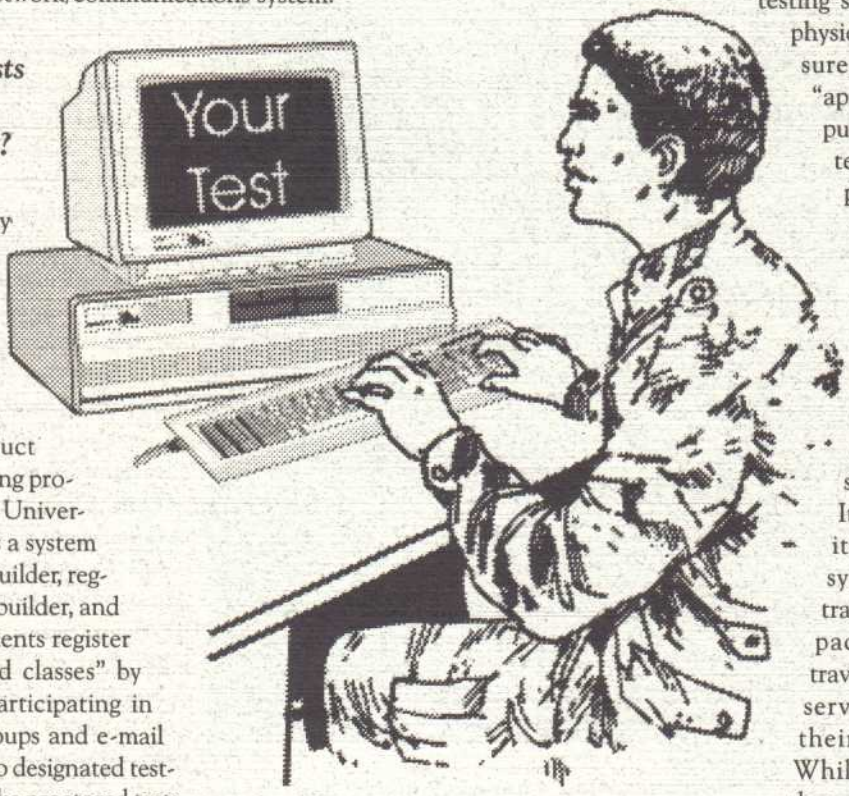
Web-Enhanced Testing

By Richard C. Gershon, Ph.D.

Q: ***What is "Web-enhanced testing?"***

A: The term "Web-enhanced testing" encompasses any aspect of testing-building, registration, delivery, administration, and scoring that is facilitated by use of the Internet, a public HTML standards-based network/communications system.

Q: ***What types of tests are appropriate for Web delivery?***



A: Technologically, any test, such as certification, performance, skill assessment, or self-evaluation, can be delivered via the Web. The University of Washington and the University of Wyoming conduct their entire distance-learning programs over the Web. "Web University," as it's called, contains a system builder, an administration builder, registration builder, a syllabus builder, and a courseware builder. Students register over the Web and "attend classes" by downloading notes and participating in listservs and discussion groups and e-mail homework. They must go to designated testing centers on campus to take proctored tests, however.

Today only non-proctored tests are appropriate for administration through the Web. At this time, identity verification is difficult through the Internet, though WebCams and retinal scanners may make this less of an issue in the future. Until then a human proctor is necessary to ensure the integrity of high-stakes tests.

Internet traffic, i.e., the volume and time differential of Web use, also impacts the type of test mounted. Low stakes or practice examinations are less likely to be overly faulted than more complex tests when the Web is running slowly. Though inconvenienced, examinees will not be severely affected.

Q: ***What about Web security?***

A: Tests delivered through the Web can have more protection than tests passed out by hand and guarded by the human eye. Paper tests must be shipped and stored in advance of a testing session and ultimately physically destroyed to ensure that copies are not "appropriated" for illicit purposes. Web-delivered tests, however, can be produced in multiple formats at the moment of distribution.

The Internet was initially designed by the military as a reasonably secure communications channel that could survive nuclear attack. Its security comes from its "packet-switching" system. The Internet transmits information in packets of bytes that travel through a number of servers before reaching their final destination. While Packet A may go through computers in Sydney, Tokyo, Moscow, and Tel Aviv before reaching its destination in Madrid, Packet B will take an entirely different route to get to the same place. Once the packet reaches its destination, the route can be traced. But the routes of subsequent packets — even from the same transmission — cannot be designated or predicted beforehand.

The security of the CATGlobal(tm) Testing Network, CAT, Inc.'s international channel of test centers, is based on this packet-switching system. To further enhance security, packets transmitted through this network are encrypted to such a degree that only the National Security Administration can

break the code.

New test types make content theft impossible. For example, the item bank of a properly designed computerized adaptive test may contain several thousand items, of which individual examinees are exposed only to a small fraction during each test. Similarly, a live-application test requires an examinee to perform an actual task — a process which is fairly immune to most security concerns. If you can do it, you pass. If you can't do it, you don't!

Q: *How does Web-enhanced testing work?*

A: The host computer (which holds the test items) sends the test to the destination computer (which administers the test) at the testing center and intermediary computers (which transmit the information along the way) communicate with each other through a browser, such as Netscape Navigator or Microsoft Internet Explorer. Browsers interpret universal HTML standards, and so the type of host, destination, and intermediary computer clients, whether Macintosh or PC, are irrelevant. Likewise, operating systems—Windows, MacOS, Unix, OS2/Warp, etc.—are equally unimportant. As a result, any person with an Internet connection can access a test site on the Web.

In traditional Web-enhanced testing, test questions are delivered in real time, subject to the limitations of the Internet's low bandwidth, i.e., the narrowness of the tube that data can flow through. This method of delivery currently can result in delays between items and the slow appearance of graphics.

In this regard the CATGlobal(tm) Testing Network takes a different approach to using the Web for test delivery. In this case complete tests are sent electronically to a proctored test center (or anywhere a test is needed). The test is taken locally and does not require continuous Web access. Therefore it is not subject to the unpredictability of the Internet.

Q: *Where can it take us?*

A: With Web-enhanced testing, examinees have the freedom to register for tests online, at any time of the day by logging into a particular Web site. Registration takes minutes, not hours or days. Paperwork will not get lost in the mail and test candidates do not need to register in person at the testing center. Because the Web delivers tests in seconds, tests can be offered daily, registration can be immediate, and recipients and sponsors can receive score reports in real time.

The use of the computer as a mechanism for test delivery allows the testing of virtually any skill through myriad modalities, including live-application and simulation-type tests, and computerized adaptive testing (CAT).

The greatest advantage of any type of Web-enhanced testing scenario is the ability to deliver the latest tests and return the results in the least amount of time at minimal cost. Should a test developer change a test in the morning, it can be updated for the very next test taker. And when the test is complete, results are returned to the sponsor immediately.

Richard C. Gershon is President and CEO of Computer Adaptive Technologies, Inc., a leading provider of computer-based solutions to testing and survey organizations worldwide.

Special thanks to Laini Wolman, Technical Editor at CAT, Inc., who contributed to this article.

Richard C. Gershon, Ph.D.

President, CEO, and founder of CAT, Inc.

Dr. Gershon has been a leader in testing and testing automation for over 16 years. He has published articles and presented papers nationally and internationally on a wide range of testing issues.

He has served as a program chair and discussant for conferences across the globe. Dr. Gershon holds numerous copyrights for software algorithms used in the testing automation process. He is the former Director of the Northwestern University Testing Center and continues to serve as an adjunct faculty member.

"What the human sciences require for more dramatic progress [is] not simply more data (of the same kind), as so many empiricists have stated, but new instrumentation for obtaining data, or reasonable theoretical restrictions of data domain so that more exhaustive explanatory possibilities can be tried." Ackermann, John R. Data, instruments, and theory: a dialectical approach to understanding science. Princeton, New Jersey: Princeton University Press, 1985, p. 169.