

Short communication

International distance-learning outreach: the APEC EINet experience

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Received 11 March 2002; received in revised form 11 July 2002; accepted 23 August 2002

Abstract

Background: The Emerging Infections Network is a mature electronic network that links Public Health professionals in the Asia Pacific through regular e-mail bulletins and an extensive Web site (<http://www.apec.org/infectious>). Emerging infections is a new area of study; learning materials help foster education. Our objective is to quantify the response of the network to the introduction of distance-learning materials on the Web site. *Methods:* Distance-learning materials, developed by the University of Washington School of Public Health, were field tested and launched on the site. Publicity was carried out prior to the launch of the materials. Access was tracked prospectively using server counts of page downloads. *Results:* Web access increased substantially during the month after the materials were launched, especially among Asia based computers. The effect was isolated to the distance-learning pages, and not general to the site. *Conclusions:* This Web site appears to be responsive to the advertisement and to the materials. Prospective Web-site monitoring proved useful.

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Keywords: Telecommunications; Distance-learning; Technology assessment; Public health; Emerging infections; Asia Pacific

1. Introduction

Public Health and medicine are increasingly using electronic media for education, information dissemination, communications and collaboration [1,2]. This report describes audience response to the introduction of a Web-based international infectious disease distance-learning program presented within

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the context of an ongoing Web-based networking project in the Pacific Rim [3]. Our objective was to measure the usage of, and confidence in, a Web-based public-health training tool within the cross-cultural setting of the Asia Pacific Economic Cooperative (APEC), a group of 21 economies who border the Pacific Rim. To this end, usage of a new page of instructor-led distance-learning materials was compared with usage of an existing viewer-guided library resources page of external links. We hypothesized that the multi-cultural audience would respond to the distance-learning materials with increased site usage, and that this usage could be quantified and characterized.

The context for this experiment was the Emerging Infections Network (EINet), an initiative developed by the APEC to encourage timely and effective notification and control of infectious diseases among the 21-member economies through enhancing communications [4,5]. In its fourth year of operation, EINet electronically links nearly 300 public health, science, technology, trade and foreign affairs experts from APEC economies to updated information on the emergence of infectious diseases and its impact on economic sectors.

2. APEC EINet

EINet facilitates the flow of information on issues of emerging infections in the Pacific Rim in a two-pronged approach: an e-mail newsletter and a Web site. The distance-learning tool for students and practitioners about current topics in emerging infections of international public health importance (prepared by international health experts) is available on the EINet Web site, <http://www.apec.org/infectious>. The EINet Web site also provides links to library resources,

surveillance data, prevention guidelines and other training resources. In addition, EINet disseminates information and news (summarized from ProMED and other sources) about emerging infections in the Asia-Pacific region with a semimonthly electronic bulletin. EINet's electronic approach promotes cross-cultural and multi-sector collaboration among scientists, public-health professionals, and policymakers to help prevent and control infections.

3. Methods

Teaching tools were designed (lecture and visual format) and pre-tested in an APEC member economy (Philippines). These new materials were launched on the established Web site in July of 1999 (<http://www.apec.org/infectious>). Site access was measured prospectively with counts of page downloads recorded on Internet standard server protocols [6–9]. Web logs from the host servers were used to analyze access to the site.

As reflected in our results, two methods of 'counting' were applied to the server data for the site. UNIX utilities (i.e. grep) and SAS software were used to develop detailed custom analyses. Trial copies of software by WebTrends and Webalizer were used for more general analyses.

The number of pageviews for the teaching page (<http://www.apec.org/infectious/teaching>) was compared to the number of pageviews for the library resources links page (<http://www.apec.org/infectious/library>) to provide a case-control approach to analysis. The library page was selected as the control because it is at an equal level within the site's file tree, could be expected to attract an audience similar to the teaching page audience, and had not been enhanced or advertised. As a result, the enhanced instructor-led

teaching area was contrasted with a non-enhanced viewer-guided library resources area as a means of comparison.

Usage was delineated from pageviews, which were defined as a single page of content requested by one client (i.e. <http://www.xxx.org.jp>) per day.¹ Web indexing clients (i.e. <http://www.google.com>) were identified upon requests for the file 'robots.txt', and were excluded from analysis. There are no frame-based pages on APEC-EINet, so the risk of inflating the pageview count by counting each frame as a pageview was avoided.

4. Results

As shown in [Fig. 1](#) (Pageviews to APEC infectious/teaching page), Web site access soared 2317% one month after distance-learning materials were placed online; over 50% of the resolved pageviews were identified as from an APEC member economy. Monthly usage statistics for APEC revealed a substantial increase in total pageviews from June (1014) to July (15 342); pageviews continued to rise through August (16 938). UNIX utilities also showed an increase in Web-site access during the same time period; pageviews rose from 2317 to 7686 (332%).

Page-specific analysis isolated the increase usage to the new distance-learning page and was compared to usage of the library page. As shown in [Fig. 2](#) [Pageviews to APEC Teaching and Library Pages], access to the library page also increased after distance-learning materials were placed online. The synchronicity of the surge in usage for both pages suggests a correlation.

¹ B. Winett, 2001. Tracking your visitors [online]. New York: Carnegie Mellon University, Terra Lycos Network. Available from world wide web: (<http://hotwired.lycos.com/webmonkey/e-business/tracking/tutorials/tutorial2>).

5. Discussion

Web-site monitoring is an important, although imprecise, method of measuring and improving the effectiveness of a site. Tracking visitors can gauge their numbers, the numbers of pageviews, and the hosts visitors use. This information can be used to fine-tune content (See Webmonkey footnote above). Currently, Web traffic can be analyzed through an Internet Service Provider (ISP), by installing a counter on the Web page, by purchasing Web traffic analysis software, or by employing an outside firm to audit the Web traffic.

Challenges to Web-site monitoring have broadened amid increased use and advancement of Internet technologies. The development of remote site cached Web sites and the increasing number of blocks of Internet addresses sold by ISPs have enhanced Web site access; however, these advances have also confounded efforts to identify the source of a request. For example, when a browser locates a requested page in the local ISP's cache, the request is not recorded in the server logs.

Other limitations to site analyses encompass Web terminology. If a 'hit' (each request a server answers in order to render a single Web page completely—html, gif, wav, etc.) is erroneously counted a 'pageview', (total of what a user sees in a browser window) the number of pageviews may appear inflated. While, if a 'pageview' is defined as a request by a computer per day, and the computer is shared (i.e. library use), the number of 'pageviews' may be a gross underestimate.

The limitations of Web site tracking fall equaling on the various pages within the APEC-EINet site, making it possible to deduce some valuable information from the ratio of pageviews between pages, even

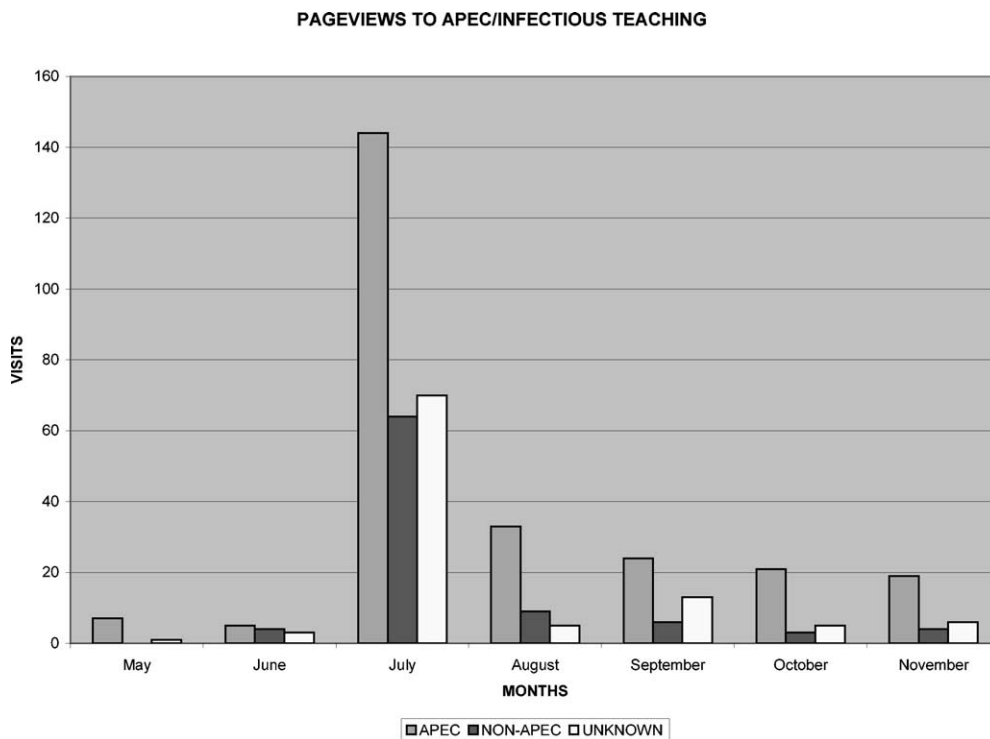


Fig. 1. Pageviews to APEC/infectious teaching.

though a definitive count of the number of visitors and pageviews remains elusive.

Increased access to the distance-learning page may be due to advertising; however, pageviews remained higher even after the first month of the new offering. More recently an online survey for first-time users of the distance-learning page was conducted that indicates continued interest, usability and utility of the distance-learning page (not published).

Offering distance-learning within an established international surveillance site provides the surveillance community with a reliable source of training and disease information. The response to the distance-learning page is indicative of a strong acceptance of APEC–EINet Web site as a viable international educational resource and responds to the

World Health Organization’s call for ‘Action Against Infection’².

6. Conclusion

International outreach with distance-learning technologies is a key strategy to address the increasing globalization of disease. Applications of electronic information systems in health have generated considerable attention amid recent developments in communications networks. Information transfer and global access have become increasingly popular means to address international disease control [10]. Distance education technology—an in-

² WHO ‘Action Against Infection’ (vol. 3 (1), Jan. February 2002).

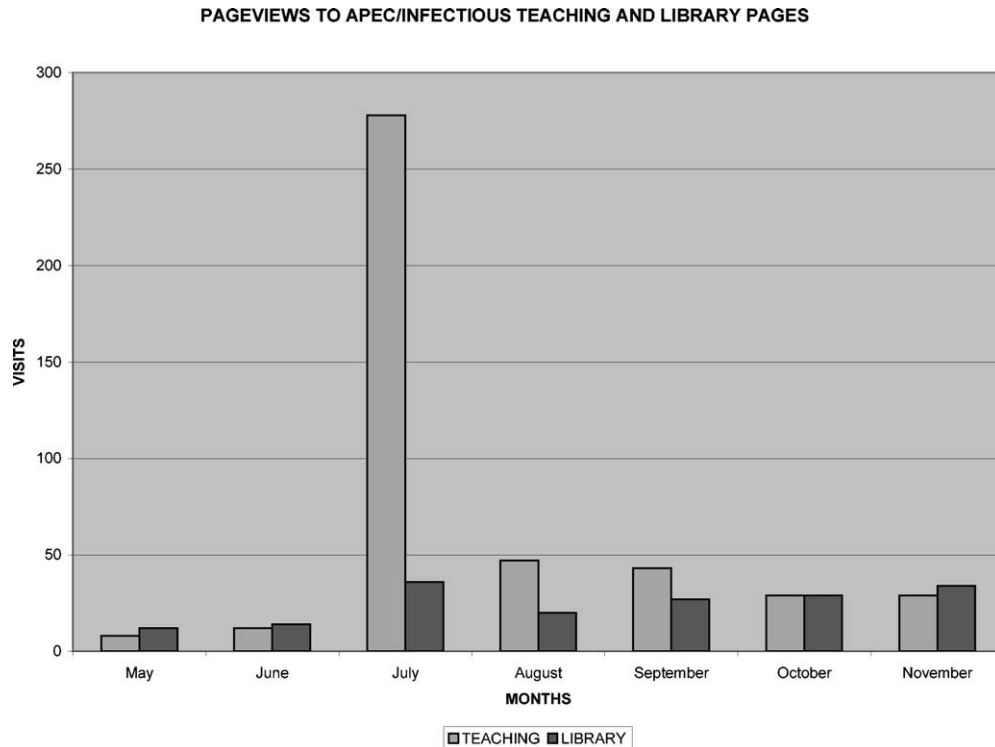


Fig. 2. Pageviews to APEC/infectious teaching and library pages.

teractive teaching and learning network environment that rivals the traditional educational system—and information exchange, are important components to global linkage.

The importance of increased access to the APEC–EINet distance-learning page shows that the site is user friendly in many different countries and gives clues to the areas of emerging infections that are of most interest to our readers. The lack of accurate information and the inability to establish real-time communications among international health agencies have encumbered international disease surveillance. By enhancing electronic networks in public health, global linkage will mature, thereby increasing the speed of interaction and flexibility necessary to respond efficiently to infectious disease. Future re-

search can help further define the usefulness of these pages in the global health community.

References

- [1] D. Krasnow, R. Rodrigues, International perspective. *Telemedicine: practicing in the information age* (text) (1998) 17–24.
- [2] M. Rigby, The management and policy challenges of the globalization effect of informatics and telemedicine, *Health Policy* 46 (1999) 97–103.
- [3] A. Kimball, C. Horwitch, P. O’Carroll, et al., The Asian Pacific economic cooperation emerging infections network, *Am. J. Prev. Med.* 17 (2) (1999) 156–158.
- [4] APEC EINet. Pacific Telecommunications Council 22nd Annual Conference; January 2000 (power point presentation) (2000).
- [5] APEC EINet. Object Description. Available from: <http://apec.org/infectious/pub/descript.htm>.

- [6] Improve Your Web Site With Log Analysis. Internet Info Scavenger. Available from: <http://www.infoscavenger.com/stats.htm>.
- [7] On Interpreting Access Statistics. Available from: <http://www.cranfield.ac.uk/docs/stats>: 1–5.
- [8] R. Wilson, Analyzing your web site traffic, *Web Marketing Today* November 4 (1996) 24.
- [9] B. Winett, Tracing Your Visitors. webmonkey/e-business/. Available from: <http://hotwired.lycos.com/webmonkey/ebusiness/tracing/index.html>.
- [10] C. Howson, H. Fineberg, B. Bloom, The pursuit of global health: the relevance of engagement for developed countries, *The Lancet* (1998) 586–589.