

Running head: INTEGRATION SKILLS NEEDED BY WEB PAGE DEVELOPERS

21ST ANNUAL RESEARCH CONFERENCE
ORGANIZATIONAL SYSTEMS RESEARCH ASSOCIATION

TOPIC AREA:
Internet and the World Wide Web
Computer Training

Integration Skills Needed by Web Page Designers and Developers for 2003

Dr. Randall McCoy
Assistant Professor of Computer Information Systems
Email: r.mccoy@morehead-st.edu

Mr. Mark Messer
Candidate: Master of Business Administration
Email: m.messer@morehead-st.edu

Information Systems Department
UPO 868
Morehead State University
Morehead, Kentucky 40351
Office: 606-783-5393

Integration Skills Needed by Web Page Designers and Developers for 2003

Introduction

In the advent of the 21st century, the relatively recent promise of e-business has become real. Both businesses and individuals are using the World Wide Web to buy products and services. Due to this innovative means of communication, consumers and producers want to employ new strategies to extend the reach of e-business to new environments. Consumers access information, and make purchases with their personal computers, cellular phones, and PDAs (personal digital assistants). Businesses are competing to provide the most ever-present and convenient service for their customers. This new economic and information exchange media has created an overwhelming demand for a new type of systems architect. To be successful, this new architect must possess both end-user and developer skills needed to design an aesthetic interface with applications that take advantage of the rich-rendering capabilities of advanced desktop browsers as well as low-level text presentation for devices which have little or no graphics capability.

The architects of this rapidly changing media need integration skills to utilize end-user interface, authoring languages, multimedia, and graphics (Britton, 2001). *Integration skills* are those in the area of content-management skills or competencies needed to assess, apply, and adapt microcomputer technology to World Wide Web page design and development.

Due to the need to teach computer applications in our educational programs and the rate at which technology advances are developing new uses for computers, it is important for our curriculum planners to have timely information pertaining to the future computer competencies needs of our students. Because computer technology changes faster than educational curriculum development, in some cases, such as with web design skills, educators should look to the future rather than the past in designing courses to teach those skills. Educators are facing tremendous challenges in identifying, developing, and designing a curriculum that will prepare undergraduates for work in the 21st century (Hunt & Perreault, 1999).

Purpose of Study

The problem was that, to date, there has been little evidence of research conducted to determine the integration skills needed by web page designers and developers for the future. The purpose of this study, therefore, was to determine objectives in the area of integration skills for the preparation of web page designers and developers for the year 2003 and beyond.

Related Literature

Traditional methods of curriculum development do not take into consideration the changes that may take place before the curriculum is in place. As a result there is a lag in the process from origination to achievement of curriculum revision. In terms of computer technology, it is obvious that the amount of time used to make curriculum revisions may encompass an enormous amount of change. Therefore, it is assumed for the purposes of this study that a consensus among future-minded professionals will be more appropriate than techniques that may simply analyze current

trends in the field of information systems. Many contemporary research studies in the area of information technology are utilizing the Internet and the World Wide Web as a media to collect consensus data (Nesbary 2000).

During this advent of the 21st century, the World Wide Web spans the globe, and geographical boundaries are becoming less of an issue in communications. Because of this innovative medium the cost of survey administration for educational research is becoming cheaper, and the amount of work required in survey distribution, collection and analysis is greatly reduced. Although studies remain to be done, the validity of web-based survey research is likely to be strongest for researchers who target specific population samples (Watt 1999).

Traditional methods of survey distribution and collection that utilize the postal system are slow and provide low rates of return. Internet technology provides a medium to drastically decrease the amount of time and provides easy follow-up using electronic mail (Turner & Turner 1999). Early methods of Internet-based data collection typically embedded the instrument directly in the body of an email message and requested the response to be replied to as an attachment or modification of the original message. However, researchers are increasingly directing participants to complete instruments that have been published as web pages (White & Dailey 2001)

Over the last decade, previous studies have been found to be relevant to the research question in content and the context of training (Retalis, et. al, 2000). Included with these is the suggestion that there is a lack of specialized training and education in the area of web engineering. There has been an adoption of instructional technology by some university faculty to meet the needs for training future professionals in the area of web page design and development (Groves & Zemel, 2000).

Research Question

Based upon the past models of competencies that are cited in the literature relating to computer competencies needed by web page designers and developers, the following question guided the research: "For the year 2003, what integration skills do web page designers and developers need to possess in order to effectively create and deploy World Wide Web pages?"

Methodology

In research, the Delphi technique is an organized research methodology for correlating views and information pertaining to an area of strategy and for allowing respondents with such views an opportunity react to and assess differing viewpoints. The technique was introduced in 1958 through "Project DELPHI" which was sponsored by the United States Air Force and directed by the Rand Corporation to obtain the most reliable consensus of a group of experts concerning predictions of alternate national defense futures (Dalkey & Helmer, 1963, p. 458).

This study is being completed in four phases, the first of which was completed on September 25, 2001. The initial phase involved identifying a national panel of experts. After identifying these experts they were petitioned for a list of statements regarding their respective answer to the

research question. The panel of experts contributing to the data includes 21 professional web page architects from the Association of Internet Professionals (AIP) and the World Organization of Webmasters (WOW). All panelists were invited to participate in multiple iterations of communication utilizing the Internet and the World Wide Web as a primary media. The identities of the panelists are being kept confidential throughout the study, and each panelist is assigned a unique identity that keeps the panelist anonymous to the other participating panelists.

The first round of communication was followed with a second round of communication using a World Wide Web page instrument. The panelists were all notified through electronic mail on the same day about the second round instrument with a unique password enabling them to input data into the instrument. The second round was completed on December 1, 2001.

To develop the second round instrument, the responses received during the first round were listed in a table. These statements were compared for similarity and collapsed into a web page survey that presented all the statements representing the collective views of the panelists. During the second round of communication, each panelist rated the importance of each competency according to a 5-point scale. A rating of 1 indicated that the panelist felt the item was not important, 2 that the item was somewhat important, 3 that the item was moderately important, 4 that the item was important, and 5 that the competency was very important. The panelists were also encouraged to make comments to explain their answers.

The third round of the procedure involved a communication of the instrument in revised format, which provided each panelist's previous response along with the median of the collective responses given by the panel. The inclusion of the group and individual responses from the previous round allowed each panelist an opportunity to re-rate each item based upon the group response.

Descriptive statistics including the Pearson product-moment correlation coefficients and the number of responses for each rating given for both the second and third rounds of communications were used. Stability is defined, in this study, as the point when any two distributions show correlation of greater than .50 in a Pearson Product-Moment test. All positive correlations (greater than .50) indicate a consensus of the panel for statements about future competencies that may be included in web design and development curriculum.

Findings

The panel of practicing web page designers used in this study identified 27 skills that should be considered when developing courses to teach web page architecture. The skills identified include technical programming/coding, front end usability, and those aesthetic skills needed to produce web documents which appeal to the end-user. All of the skills identified by the panelists were deemed as at least moderately important by the collective panel. The panel considered 12 of the skills to be important and 12 to be moderately important. Collectively the panel rated two skills dealing with Java2 scripting and Scalable Vector Graphics to be somewhat important. The one skill that the panel agreed to be essential to include in curriculum for web page development is the ability to design user interfaces with usability and interactivity. Table I presents a summary of the findings of the study ranked by composite score.

Table I, Skills Identified and Rated by Web Page Designers as Necessary in the Field of Web Page Design and Development for Year 2003.

(Rating Scale: 4.5 to 5 = Essential; 3.5 to 4.4 = Important; 2.5 to 3.4 = Moderately Important; 1.5 to 2.4 = Somewhat Important; =1.4= Not Important.)

<i>In order to effectively create and deploy World Wide Web pages for the year 2003, web page designers and developers need to possess the following integration technology skill:</i>	median	mean	Std. Dev.	Composite
Design user interface(s) with usability and interactivity	5.00	4.65	0.99632	79
Envision the end result through the user's (customer's) eyes	5.00	4.41	1.17574	75
Maintain a focus on user needs	5.00	4.41	1.17574	75
Integration of effective and quick-loading multimedia/graphics	4.00	4.12	1.11144	70
A strong understanding of the perspective target audience including good communication skills and a strong ability to sell and promote your goods or services	4.00	3.94	1.29762	67
The ability to deliver high quality applications with simple front ends and sophisticated back ends. (This includes Java, and database design and implementation skills.)	4.00	3.88	0.92752	66
Use team communication and project management skills	4.00	3.76	1.14725	64
Define, implement, and interpret usability testing	4.00	3.76	0.90342	64
Dynamic Web Page Languages	4.00	3.71	0.98518	63
Use proper language and grammar in writing and editing content	4.00	3.71	1.31171	63
Use backend database support, and data warehousing	3.00	3.65	0.93148	62
Develop information architecture	4.00	3.59	0.71229	61
Demonstrate content expertise, online community development, backend/IT management, web/IT engineering	4.00	3.59	0.93934	61
Possess knowledge of networking foundations	3.00	3.47	0.94324	59
A balanced synergy of industry best practice with specific customer segment lessons learned	4.00	3.47	0.87447	59
Utilize content management systems	4.00	3.47	0.94324	59
Use authoring languages and graphics	4.00	3.47	1.17886	59
Utilize cross-cultural communication	3.00	3.35	0.78591	57
Code with XHTML (Extensible Hypertext Markup Language)	3.00	3.18	1.0146	54
Code with JavaScript	3.00	3.18	0.88284	54
Code with ASP/PHP (Active Server Pages/Personal Home Page)	3.00	3.12	1.11144	53
Use Macromedia Dreamweaver	3.00	3.12	1.26897	53
Use Adobe Photoshop	3.00	3.12	1.31731	53
Code with JSP (Java Server Pages)	3.00	2.82	0.95101	48
Use Macromedia Flash	3.00	2.53	0.87447	43
Code with Java2	2.00	2.41	1.12132	41
Code with SVG (Scalable Vector Graphics)	3.00	2.29	1.21268	39

Contributions and Conclusions

This study contributes to the literature in information systems by empirically examining the potential content of web page design and development courses included in information systems programs. This study could provide guidance to information systems educators who teach such a

course as well as practitioners who may hire information systems graduates. In addition, textbook authors may use these data to assess the necessary coverage of specific topics for a web page design and development course. Curriculum designers may use these results to define a course sequence, which could involve multiple web page design or development offerings at the university level. Additionally, software companies may use these results to provide products to enhance the training of the specific skills cited as important by the panel of practitioners.

References

- Britton, K. (2001). Transcoding: Extending e-business to new environments. IBM Systems Journal, 40(1), 153-177.
- Dalkey, N. & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. Management Science, 9(3).
- Groves, M. & Zemel, P. (2000). Instructional technology adoption in higher education: An action research case study. International Journal of Instructional Media, 27(1).
- Hunt, C. & Perreault, H. (1999). Organizational & end-user information systems—A compendium of resources and materials. Office Systems Research Journal, 17(1), 37-49.
- Mager, R. F. (1962). Preparing instructional objectives. Palo Alto, CA: Fearon (ERIC Document Reproduction Service No. ED 267 045)
- Nesbary, Dale K. (2000). Survey research and the world wide web. Boston: Allen and Bacon.
- Retalis, S.; Psaromiligkos, Y.; & Avgeriou, P. (2000). Web engineering: New Discipline, new educational challenges. Information Services & Use, 20(2).
- Turner, J. & Turner, D. (1999). Using the Internet to perform survey research. Syllabus, 12(5), 55-56.
- White, J., Carey, L., & Dailey, K. (2001). Web-based instrumentation in educational survey research. WebNet Journal: Internet Technologies, Applications and Issues, (In Press).
- Watt, J. H. (1999, February). Internet-based surveys. Upgrade: The magazine for the software and information industry association, 20, 83-87.