

Work in Progress - Evaluation and Feedback for Web Programming Curriculum

Ronald J. Glotzbach, Laura A. Kocur
Purdue University, rjglotzbach@purdue.edu, lkocur@purdue.edu

Abstract - Leading any curriculum development is always difficult and challenging. A survey of former students and industry professionals is being performed that will help guide the changes necessary to keep our students gainfully employed. Too often, improvements to courses come not through industry experts, but instead through what faculty feel is the best approach, which may or may not be correct. This paper looks at evaluation of curriculum contents, down to project assignments and tools used, and the implementation of new content and objectives. In addition to gathering some demographic information such as job title and location, the 72 questions in the survey ranged from "How frequently do you or others in your company/organization commonly use the following web technologies/languages?" to "How important is teaching Search Engine Optimization (SEO) so that students understand how to obtain better page listings?" to "With the purpose of HTML5 being to reduce the amount of reliance on RIAs and browser plug-ins like Flash, how important do you see Flash development being in the future?" The feedback garnered thus far has been useful in guiding changes in the web programming curriculum and has shown that industry professionals are generally interested in helping guide student learning.

Index Terms – E-learning, Curriculum, Course Improvement

INTRODUCTION

A survey of former web programming students was performed to gather information about the improvement of the web curriculum. The survey was designed to guide the person taking it through a series of five courses, asking questions about best practices and course objectives throughout. The courses evaluated were (a) Internet Foundations, Technologies and Development, (b) Human Computer Interface Theory and Design, (c) Web Programming, Development, and Data Integration, (d) Principles of Interactive and Dynamic Media, and (d) Advanced Web Programming, Development, and Data Integration.

The research study is aimed to improve the outcomes of the web programming courses so that courses correctly build upon one another and use the appropriate technologies as are being used in industry. Furthermore, the intention of the study is to reduce the amount of overlap within classes

and eliminate older web technologies that are no longer as relevant in industry. Additionally, web programming used to focus mostly on Internet Explorer, but has shifted to encompass several browsers, including Firefox, Google Chrome, Safari, and Opera [1]. This shift is crucial to development because popular devices like the iPad and iPhone use Safari as their browser and Android devices have Firefox as a popular option. Failing to plan for various web browsers can be a company's downfall.

METHODOLOGY

Qualtrics[2] survey software was used to implement a 72 question survey. The software is available through Purdue University and allows the easy creation of survey questions as well as distribution of the survey and collection and storage of results.

Likert-type surveys were the primary instrument utilized to collect data about the system; however, there were several open-ended qualitative questions provided to the participants as well.

The participants were either former web programming students that are now in industry or industry professionals in the web field that had not taken the courses. The former web students are contacts that the author has maintained through eight years of teaching web courses.

Solicitation was done through the social network, LinkedIn[3]. The author has connected with over 500 former students and industry professionals and used that as an avenue to request participation in the survey.

The survey was open for several months as there was not a need for a time restraint.

Questions asking the participants company, job title, location, and whether they were a graduate of the program were asked to help validate the responses as coming from reliable sources.

Several questions about the type of software used and the platform used to develop were asked, including "What web browsers do you or others in your company/organization commonly design for?" with the top five browsers in terms of market share listed; "How frequently do you or others in your company/organization commonly use the following Integrated Development Environments (IDEs)?" with seven IDEs listed and an optional write in; "How frequently do you or others in your company/organization commonly use the following web technologies/languages?" with 19

technologies and/or languages listed and an optional write in.

The remaining questions were divided under the headings of each of the courses. Here are a few of the questions that were asked, all Likert scale-type questions: "Given that Firefox, IE8, Safari, and Chrome (Opera is lagging behind) currently have some implementation of HTML5 (implementations vary by browser though), How long do you think it will be before your company/organization is creating HTML5 compliant web pages/applications?," "Currently, this class has students validate each page in order to prove that they have written the code correctly. How important is it that these beginning web students validate each page/website against a strict DTD?," and "How important is it for a graduating student seeking a web programming job with your company to have experience using/interfacing with an API (perhaps something like Facebook API or Twitter API, but could be another API)?"

Although there were many other questions on the survey, there are far too many to list here. The questions listed give you a good flavor of the purpose the survey was intended to serve.

PRELIMINARY DATA ANALYSIS

Some of the preliminary responses to questions reaffirmed what the authors felt the results would be; however, some of the responses to questions enlightened the authors to trends that may be happening in industry.

As expected, most job titles were listed as web developers or web programmers or something within the field that is closely related.

The results for the question relating to which browser a company designed for also came back as expected, with Firefox and Internet Explorer being the top two and Chrome, Safari, and Opera coming in behind them.

In terms of IDEs used, the results also came back with Dreamweaver being the most frequently chosen, followed by Visual Studio, Flash, then Eclipse, with a couple others trailing behind.

The technologies and languages used were ranked by the participants with JavaScript being the most frequently chosen, followed closely by PHP, jQuery, and Ajax, with ASP.NET C# and Flash coming in not far behind those. Several other technologies and languages were selected, but not nearly as frequently as those mentioned above.

The question "Given that Firefox, IE8, Safari, and Chrome (Opera is lagging behind) currently have some implementation of HTML5 (implementations vary by browser though), How long do you think it will be before your company/organization is creating HTML5 compliant web pages/applications?" had mixed results, being pretty evenly distributed across the choices. The preliminary results have 25% already doing it, 15% implementing within 6 months, 26% within 6 months to 1 year, 25% within 1 to 2 years, and 10% more than 2 years out.

Validation has been of key importance through the web curriculum and as such, the authors wanted to ensure that it was just as important in industry. The question "Currently, this class has students validate each page in order to prove that they have written the code correctly. How important is it that these beginning web students validate each page/website against a strict DTD?" had results similar to what the authors expected. Using a 7-point Likert scale ranging from Extremely Important to Not at all Important with an 8th option for Unsure or Unable to Answer, the preliminary results came back with 52% of the participants choosing a 1 or 2 out of 7 (extremely important or very important) and 88% of the participants choosing 1, 2, or 3 out of 7 (extremely important to somewhat important).

The question "How important is it for a graduating student seeking a web programming job with your company to have experience using/interfacing with an API (perhaps something like Facebook API or Twitter API, but could be another API)?" was asked using a 7-point Likert scale ranging from Extremely Important to Not at all Important, with an 8th option of Unsure or Unable to Answer. The preliminary results came back as 51% saying it was either extremely important or very important (a 1 or 2 out of 7) and 86% saying it was a 1, 2, or 3 out of 7 (extremely important to somewhat important).

IMPLEMENTATION AND CONCLUSIONS

The content of the courses being surveyed were already using PHP, ASP.NET, Flash, and JavaScript with some implementation of jQuery and Ajax. In the most recent semester, much more jQuery and Ajax have been implemented into the courses.

Validation was already a part of the courses as it teaches proper coding techniques to students. The survey validated our belief of its importance and it is continuing to be used within the courses.

HTML5 is designed for both web browsers as well as mobile devices [4], therefore is growing quickly and is being implemented throughout all the courses. While the results came back as mixed, it will undoubtedly be the most common development technology within 2 years.

REFERENCES

- [1] Browser statistics: web statistics and trends, W3Schools.com, http://www.w3schools.com/browsers/browsers_stats.asp
- [2] Qualtrics Survey Software. <https://www.itap.purdue.edu/itl/qualtrics/>
- [3] LinkedIn. <http://www.linkedin.com/>
- [4] T. Wright, "HTML5 and the future of the web," *Smashing Magazine*, 2009.

AUTHOR INFORMATION

Ronald J. Glotzbach, Associate Professor, Computer Graphics Technology, rjglotzbach@purdue.edu

Laura A. Kocur, Graduate Student, Computer Graphics Technology, Purdue University, lkocur@purdue.edu