

Complicacies in Web Engineering and need for enhanced Web Development Tools

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Abstract:

In our research paper, we will be putting forward a record of the complications faced by the Web Developers in the field of Web Application Development. We will be surveying growing as well as experienced professional web developers, and thus enquiring them of the challenges they have to face for the development of Web Applications. Our paper will summarize the major problems in Web Development, the professionals have to face, and at the end, we will conclude what enhancements in Web Development Tools and Technology, the Web Developers aspire. Our survey will comprise of 25 Growing Professionals (Students) in our college and 5 faculty members having experience in abundance in the field of Web Development.

Keywords: Web Application Development, Web Development Tools, Web Engineering.

1. Introduction

Web was designed by Tim Berners-Lee as a collaborative tool. The early motive of its development were document sharing and connecting the parts of the world to each other. But, as time has passed, the web has become more interactive and emergent. As a result, that amount of infrastructure for web development becomes insufficient for this era. Nowadays, if one is a Web developer, only the knowledge of any traditional programming language such as Java won't be enough. Rather, tools that are more problem specific and assist the developer to deal with complex and tedious tasks are the requirement of today. Therefore, in order to build

better and enhanced tools for Web Development, we need to understand the needs and habits of the users. This is what our paper is all about. We have surveyed 25 growing professionals in the field of Web development i.e. Students (From our college itself) and 5 experienced Web Developers i.e. Teachers (From our college itself).

2. Related Work

A survey conducted by Vora [10] is an exception. Vora queried web developers about the methods and tools they use, and the problems they typically encounter. Some of the key problems that developers reported included ensuring web-browser interoperability, and usability and standard-compliance of WYSIWIG editors.

Fraternali's work [2] is also related to our interests in that it proposes a taxonomy for web development tools that suggests some of the major dimensions of web development tasks.

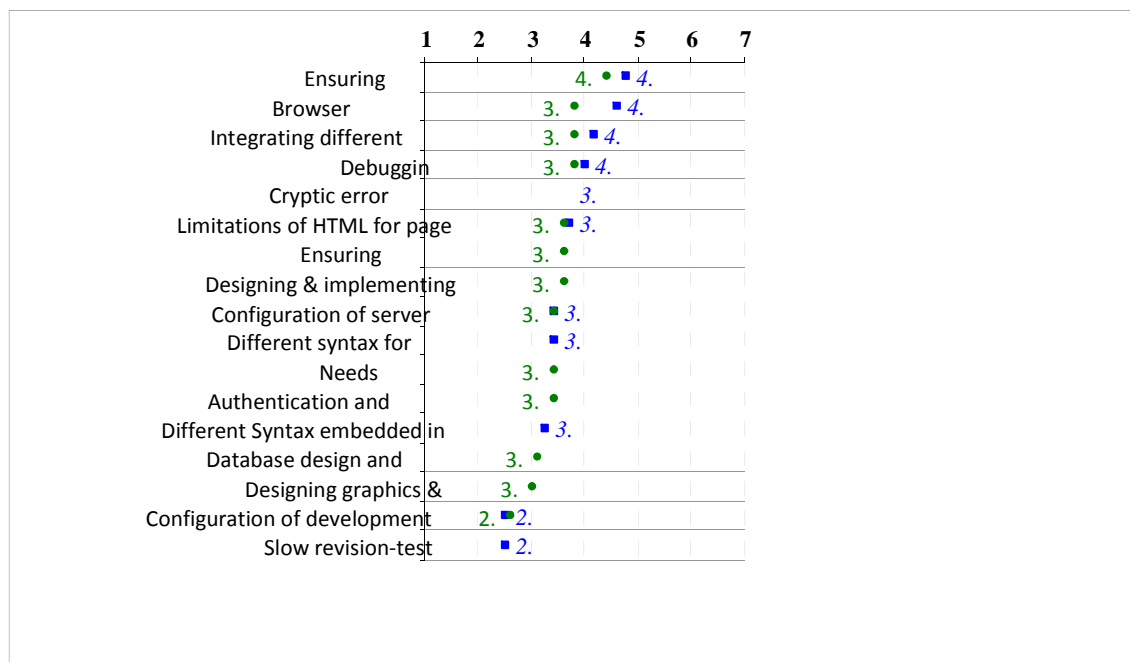
Newman and Landay [3] investigated the process of web site development by interviewing 11 web development professionals. They found that these experts' design activities involve many informal stages and artifacts; designers employ multiple site representations to highlight different aspects of their designs; and they use many different tools to accomplish their work. They concluded that there is a need for "informal tools" that help in the early stages of design and integrate well with the tools designers already use.

3. Our Survey

Our Survey comprised of 30 people. There were 25 students and 5 faculty members from our

college. The purpose of our survey was to find out the needs of the end users. One more reason behind our survey was to find out whether most of the developers find it easy to develop web pages or websites with the help of existing tools for development, or not. The answers to our

questions regarding the same, given by these people were of different kinds. But we have categorized those answers in various categories. And, with the help of this categorization, we have concluded many things. We summarize our conclusions with the help of following Table.



4. The Interviews

We conducted interviews with the same target audience for two reasons. First, we wanted to better understand the details of the web development process and have the opportunity to ask further questions. Second, we wanted to increase the total number of reported experiences which is why we interviewed developers that did not participate in the survey (with one exception). Many of the questions were equal or similar to the ones asked in the survey.

We made every participant fill in an online questionnaire which was targeted at collecting quantitative information and helped us to prepare

for the in-person interviews, prior to each interview. This questionnaire also contained all the main questions asked during the interview (so that participants could be mentally prepared) but participants were asked to *not* answer them online. The questionnaire was similar to, but much more detailed than the survey.

We asked our participants which components they reused most frequently. They responded as follows:

- HTML templates, snippets, header, footer
- Various JavaScript functions
- Database code
- Authentication code

- Validation code
- Code for encoding/decoding data

Our Participants also cited the following concepts:

- Database connectivity and operation
- Difference between client-side and server-side scripts; when to use one or the other
- Page transition, receiving input data
- Practical examples
- Maintaining state
- One-to-many relationships
- Integration of different languages
- User-centered design
- Validation

When asked what they enjoyed about web application development our participants mentioned the following factors:

- Enjoy the challenge; like building things (“It’s like playing”)
- Quick feedback; ease of checking work
- Quick results
- Diverse work; always something to learn
- Providing useful services to the user
- Quick use of results
- Ease of sharing
- Richness of the medium

6. Discussions & Conclusions

We can conclude upon the following basic topics, in which Complicacies are faced during the Web Application Development by the Developers and in which there is a requirement of enhancement.

The following points are much considerable:

6.1 Ensuring more Security

Today it is very difficult to build even a “reasonable” secure application or just to assess when an application is secure. Web developers are not confident about the security of their applications and therefore very concerned. Therefore there is a lot of need to build such

Applications, which can be used to make more secure Web Applications.

6.2 Cross Browser Compatibility

The inconsistencies between different browsers, versions and platforms are not only a major time-sink for web developers but also seem to be the reason why most developers avoid enriching the user experience with advanced features that are only possible with JavaScript, CSS2, or Flash.

6.3 Integrating Different Technologies

While classical desktop applications are typically based on the syntax of only one programming language (perhaps two when considering database interactions), most web applications combine five or more (HTML, JavaScript, CSS, server-side language, SQL, and perhaps Flash, Curl, Java applets, Active X). The resulting complexity leads to code that is hard to develop and maintain. It also raises the bar for users who want to transition from static page design to more advanced web development.

6.4 Debugging

Most software developers have to deal with bugs. Web developers however face an extra challenge due to the number of technologies involved (see above) and the fact that a web application consists of a part that runs on the server and another on the client.

7. Suggestions for the Industry

We based on our Survey, come to the conclusion that we can suggest following things to the Web Tool Industry. They should develop:

- Tools that assist developers in producing secure applications
- Tools that are more robust and *faster*, facilitate iterative development and better support debugging

- Tools that provide a large library of ready-to-go components while still giving the developer great control over the created code
- Tools that speed up and automate tedious tasks like HTML validation, cross-platform testing, accessibility checks (which may solve the problem of the general lack of testing)
- Tools that work and act very similar to standard productivity applications like Microsoft Word or PowerPoint, integrate well with those and readily exchange data
- Tools that account for and support the informal tendencies of web developers to learn and work from examples, copy & paste from the web and scavenge prior projects Addressing the complexity caused by the plethora of web technologies and working towards better standard-compliance and cross-browser compatibility are challenges for the web engineering community as a whole.

8. References

- [1] Berners-Lee, T. (1996). WWW: past, present, and future. *IEEE Computer*, v.29 n.10, 69-77.
- [2] Fraternali, P. (1999). "Tools and Approaches for Developing Data-Intensive Web Applications: A Survey." *ACM Computing Surveys* 31(3): 227-263.
- [3] Newman, M., Landay, J. (2000). "Sitemaps, storyboards, and specifications: a sketch of Web site design practice." *Proceedings of the conference on Designing interactive systems: processes, practices, methods, and techniques*, 263274, August 17-19, 2000, New York City, New York, United States
- [4] Rode, J. (2002a). Survey: "Interactive Websites", Input Form. July 12, 2002. <http://filebox.vt.edu/users/jrode/publish/2002-05survey/form/>
- [5] Rode, J. (2002b). Survey: "Interactive Websites", Results.
- [6] July 12, 2002. <http://filebox.vt.edu/users/jrode/publish/2002-05survey/results/>
- [7] Rode, J. (2003). Pre-Interview questionnaire: "Web Application Development", Input Form. May 2003 <http://filebox.vt.edu/users/jrode/publish/2003-05interviews/>
- [8] Rode, J., Rosson, M.B. (2003). "Programming at runtime: Requirements and paradigms for nonprogrammer web application development." In *Proceedings of HCC'03*, Auckland, New Zealand, IEEE.
- [9] Rode, J. M.B. Rosson, M. A. Pérez-Quinones (2004). End users' Mental Models of Concepts Critical to Web Application Development. *IEEE HCC 2004*. Rome, Italy. Oct. 26-29.
- [10] Rosson, M. B. and J. M. Carroll (1993). Active programming strategies for reuse. *Proceedings of ECOOP'93: ObjectOriented Programming*, 7th European Conference, Kaiserslautern, Germany, 26-30 July, Springer-Verlag.
- [11] Vora, P. R. (1998). "Designing for the Web: A Survey." *ACM interactions* (May/June): 13-30.
- [12] The Challenges of Web Engineering and Requirements for Better Tool Support, Jochen Rode & Manuel A. Perez-Quinones, Virginia Polytechnic Institute and State University, Cenetr for Human Interaction, 3160 Torgersen Hall, Blacksburg, VA 24061, USA, jrode@vt.edu, perez@cs.vt.edu & Mary Beth Rosson, Pennsylvania State University, School of Information Sciences & Technology, 330D IST Building, University Park, PA 16802, mrosson@ist.psu.edu