Education E-Village: Empowering Technology Educators in Developing Regions
Extended Abstract

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There exists a significant need for relevant, accessible and useful resources to enhance technology education in developing regions [1, 2]. Currently, access to courseware for technical subjects such as Computer Science is available several online resources [3, 4]. However, these resources are designed for developed communities, where technology is ubiquitous, technology infrastructure is robust, and educators have easy access to a variety of academic publications and other helpful guides. Therefore, the available online resources do not provide sufficient avenues for educators in developing regions to understand the courseware or discuss alternative ways of teaching it based on their specific constraints. To address this deficit, the TechBridgeWorld group at Carnegie Mellon University initiated the "Education e-Village" (E-Village) project. E-Village is an online community where educators from around the world will be able to share ideas, experiences, expertise, educational resources, and strategies to promote and enhance technology education in developing regions.

This senior thesis project enhances the search functionality and user experience of E-Village. The target users of E-Village span educators in both developed and developing regions who vary widely in terms of their exposure to technology and access to resources. Thus, the search functionality and user experience of E-Village must cater to this diverse set of expectations and constraints in order to successfully engage and retain the community of users. To select a solution for search functionality, we compiled a list of constraints and requirements of E-Village. We then analyzed existing search solutions and chose the Open Source search engine Lucene for integration as it met our needs best. It would be less useful to configure Lucene without understanding how the future E-Village community will make use of the search functionality. Therefore the configuration was informed by user studies as explained below.

To enhance the user experience, we followed both heuristic evaluation and user-testing approaches. For the heuristic approach, we prepared a set of guidelines inspired from work done by leading web usability experts [5]. We then scored E-Village's existing design based on the guidelines and came up with ways to improve the design. Heuristic studies are very good at detecting common usability problems but in order to determine the preferences and expectations of our target user group, we need to conduct usability tests. As the project is currently in its pre-pilot stage, we wanted to understand potential improvements to the user interface at a high-level. We selected areas of E-Village that would become critical in defining the user experience and establishing credibility. These included overall navigation, registration, collecting user information, login and search. We created electronic mockups of features based on structured essential use cases [6]. These included modified screenshots and mockups of the current E-Village design and commonly used websites. These mockups were created with an "unfinished" look to avoid any reluctance of the test subjects to share honest feedback due to the worry that they will be critiquing a finished product.

Finally, we conducted these usability tests with a representative sample of 25 users. We compiled a list of problem areas and user preferences, and addressed them in a design prototype. The focus of the improvements was to make the user interface (UI) as intuitive as possible, while staying consistent with user expectations. Accordingly, we created a functional specification for the UI within our scope of study, and a configuration for the search. We also documented an evaluation of our methods, and made recommendations for future work on E-Village. Hence, we improved the existing UI to E-Village, and enhanced the overall user experience in E-Village.

References

[1] Dias M. B., Brewer E. How Computer Science Serves the Developing World. Communications of the ACM Vol. 52 No. 6. June 2009.

[2] Brewer E., Demmer M., Du B., Ho M., Kam M., Nedevschi S., Pal J., Patra R., Surana S., Fall K., The Case for Technology in Developing Regions. IEEE Computer. 2005.

[3] MIT OpenCourseWare. http://ocw.mit.edu/

[4] Open.Michigan. https://open.umich.edu/

[5] Krug S., Don't Make Me Think: A Common Sense Approach to Web Usability, 2nd Edition. New Riders Press. 2005.

[6] Constantine L. L., Lockwood L. A. D., Structure and Style in Use Cases for User Interface Design. In Harmelen M. V., Object Modeling and User Interface Design. 2001.