

# End-user Participation in Design Through Collaborative, Crowdsourced Storyboards

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## INTRODUCTION

Successful open-source projects have a distributed, often passionate set of users that currently sit on the periphery of the design process, or are not engaged in the process at all. Our research focuses on enabling designers and project leads to leverage the distributed nature of their user communities, as well as the power of sheer numbers on the Web, to *generate* community-based ideas, and *evaluate* concepts and designs at earlier stages in the design process. The two primary components of this system are a ‘crowdsourced’ storyboarding tool, and a mixed qualitative/quantitative system to evaluate these ideas that allows for community voting and metrics. The fundamental hypothesis behind this work is that *by allowing (and encouraging) increased user participation in the design process — particularly during the storyboarding/scenario phase — projects can generate a wealth of ideas that capture the shared knowledge of their user community, and reflect their community’s needs more closely.*

This research abstract covers the work related to this project and a research plan.

## RELATED WORK

There are two research areas that relate closely to this subject: rapid prototyping/sketching tools, and distributed participatory design.

The role of prototyping and sketching in early stages of design has been well-documented [5]. Two primary advantages of early-stage prototyping and sketching are allowing for a *breadth* of ideas at low cost to the designer, client, or community, and allowing for quicker *validation* of generated ideas. Newman and Landay conducted a thorough study of Web design practice, including the storyboarding process [7]. Their work argues for a research focus on early design tools, since

those are the ones least served by existing tools, and would most benefit from informal interfaces. By trying ideas out rapidly, basic problems can be averted, and alternative approaches to difficult design decisions can emerge. Truong et al have conducted extensive investigations into storyboarding practice, which reveal a set of best practices that will be incorporated into our system [12]. Particularly, they recommend storyboards of about 3-5 panels, support for text annotations, and the ability to share and discuss storyboards, a practice that is made possible today by physical representations of storyboards in a common space, but which we hope to extend towards the Web in our system.

Several systems have been built to support this early-stage ‘enlightened trial-and-error’ — as termed by Eric Drexler [2]. Electronic rapid prototyping tools like DENIM [8] have allowed designers to sketch interface designs using digital tablets, and then build off those sketches into eventual interface implementations. DENIM performs basic shape recognition of interface elements and allows for simple manipulations such as scrolling a scroll bar. The Designers’ Outpost uses physical representations and direct manipulation to bridge the physical aspects of information design with the affordances of digital systems, by allowing designers to brainstorming using tangible Post-it notes and manipulate the data on these notes in a digital manner [4]. Recent work in this field has explored using standardized interface markup languages to maximize compatibility for the generated post-sketching interface representations [1], and on improving the recognition of interface sketches [3]. Our research shares some of the same basic goals as these tools, but extends the focus to include end-user who have not necessarily been exposed to sketching and storyboarding practice. Further, since our goal is to minimize the cost - in terms of time and required equipment - to end users, storyboards are created through a Web application using the mouse, rather than through a pen tablet.

A second broad research area that relates to our work is distributed participatory design (DPD). DPD builds on the idea of participatory design — which emerged in the design community as a philosophy for breaking the “cult of the specialist” [11] by increasing end-user participation in stages of the design process and designing

from a user-centered perspective — and extends it to a distributed, global scope. DPD research has sought to include end-users in several distinct stages: OpenProposal allows for collaborative participation in requirements management [10]; Gabbeh extends the DENIM sketching tool to include end-user collaboration in the early prototyping phase [6]; and, finally, Nichols et al have explored the role of end-user participation in post-deployment usability [9]. In other work, Joyce has explored using the concept of ‘crowdsourcing’ — offloading ideation or design to the ‘wisdom of the crowds’ of a larger community — to generate design ideas (using Amazon’s Mechanical Turk system). Though generation of ideas was successful in this project, when asked to generate sketches, no users responded — this lack of response is likely due to the high barrier of entry (users needed to sketch on paper, scan the sketch, email it, etc.), and is further motivation to keep our tool ‘in the browser’, without requiring additional steps on the users’ part. We are inspired by the philosophy behind these systems, and believe our work belongs in the larger conversation between DPD and CSCW.

## RESEARCH PLAN

This project is currently in the development phase. We are currently evaluating the feasibility of ‘crowdsourcing’ storyboards through a case study, and will follow this by building a system that allows end-users to easily participate in early-stage generation of scenarios and storyboards, and the corresponding community Web service to evaluate, rate, moderate, and otherwise act on generated ideas. Based on the work done by Twidale and Nichols on Open Source Usability [13], we believe this system will fit in best with open source projects, as there is a current lack of tools for community-generated ideas in the design process. Further, such a service will serve a crucial role not only in the generation of ideas, but also, through the comments and community processes, as a record of design rationale when in the review and re-design phases.

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