Design principles for crowdsourcing cultural heritage

PhD findings report

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# Table of Contents

**Research overview**

**Notes for use**

**Design Principles for Crowdsourcing Cultural Heritage**

Inform users

- Provide clear, concise, and sufficient task instruction
- Show how project output is freely accessible
- Keep the website current
- Prioritize key information
- Present reasons to contribute
- Display project progress
- Convey the credibility of the project

Support users

- Minimize the effort to contribute
- Minimize user error
- Enable users to review contributions
- Clearly identify tasks
- Provide task options
- Simplify the task

Engage users

- Attractive design
- Acknowledge participation
- Encourage users to engage with the collection
- Convey a sense of fun

Nurture and sustain the user community

- Convey a sense of community
- Support community interaction
- Publicly recognize contributions
- Support content sharing

**References**
Research overview

This report presents selected findings from the study *An Information Systems Design Theory for Crowdsourcing Cultural Heritage*. The aim of the study is to establish the principles of design that influence participation and contribution quality on websites for crowdsourcing cultural heritage, and build and evaluate an Information Systems Design Theory that encompasses these principles to support website design and evaluation. To achieve this, the study answers the following research questions:

1) What are the principles of design that influence participation and contribution quality on websites for crowdsourcing cultural heritage?
2) How can an Information Systems Design Theory support the design and evaluation of websites for crowdsourcing cultural heritage?

The design principles were developed using the following research methods:

*Literature search:* Eleven studies, which were identified in the course of a systematic literature search, contributed to the first iteration of the design principles. I selected studies on interactive website design (Petrie & Power, 2012), online community design (Kraut & Resnick, 2012; Preece & Shneiderman, 2009) and crowdsourcing (Howe, 2009) for their comprehensiveness and generalizability. I selected studies on crowdsourcing cultural heritage (Hansen et al., 2013; Holley, 2009, 2010; Lascarides, 2012; McKinley, 2012, 2013; Romeo & Blaser, 2011) for their particular relevance to the research focus.

*Website inspections:* I formatively evaluated the design principles by inspecting a sample of 20 websites for crowdsourcing cultural heritage, drawn from a database of 52 websites compiled for the purpose.

*Questionnaire:* I collected data from 251 current, former and prospective website contributors, to determine the extent to which the design principles influence the decision to contribute, sustained participation, and contribution quality.

*Expert review:* Seven crowdsourcing practitioners, including project managers and website developers, provided feedback on presentation, terminology and general comprehension.
Notes for use

Crowdsourcing is an umbrella term for various approaches, and there are multiple definitions in circulation. In this study, crowdsourcing refers to:

A type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit (Estellés-Arolas and González-Ladrón-de-Guevara, 2012).

These design principles apply to websites for crowdsourcing the processing of cultural heritage assets, which are used by unpaid volunteers. Specifically, the principles apply to websites that fit the typology for crowdsourcing cultural heritage shown in Figure 1. This is a modification of the typology for crowdsourcing in the humanities developed by Dunn and Hedges (2012).

Figure 1 Typology for crowdsourcing cultural heritage (McKinley, 2015) adapted from Dunn and Hedges (2012)
To help practitioners prioritize aspects of design and thus, optimize limited time and resources, the design principles are ranked below, from the most to least influential on participation and/or contribution quality.

1. Provide clear, concise, and sufficient task instruction
2. Show how project output is freely accessible to the public
3. Keep the website current
4. Minimize the effort to contribute
5. Prioritize key information
6. Minimize user error
7. Enable users to review contributions
8. Clearly identify tasks
9. Present reasons to contribute
10. Provide task options
11. Simplify the task
12. Attractive design
13. Acknowledge participation
14. Encourage users to engage with the collection
15. Display project progress
16. Convey a sense of community
17. Convey the credibility of the project
18. Support community interaction
19. Publicly recognize contributions
20. Support content sharing
21. Convey a sense of fun

These design principles are intended to be used in conjunction with general usability heuristics, such as those developed by Petrie and Power (2012) for highly interactive websites. To support the use of the design principles for website evaluation, a website inspection report template can be downloaded from http://nonprofitcrowd.org/crowdsourcing-heuristics.
Design Principles for Crowdsourcing Cultural Heritage

The design theory developed in this study proposes that websites for crowdsourcing cultural heritage support participation and contribution quality by effectively informing, supporting and engaging users; and nurturing and sustaining the user community. Websites meet these user needs by complying with the design principles presented below.

Inform users

*Provide clear, concise, and sufficient task instruction*

Websites for crowdsourcing cultural heritage support participation and contribution quality by providing clear, concise and sufficient task instruction. Terms, abbreviations and interactive elements should be clearly explained, and jargon should be avoided. Task instruction should be concise and easy to follow so as to not overwhelm the user, but sufficiently detailed to enable users to complete the task efficiently and effectively.

New visitors should be able to start contributing within a short space of time, and contributors should be able to work independently and with confidence. A diverse group of users with varying levels of skill, knowledge, and available time should be supported by instruction delivered in various formats.

Task instruction may begin with an overview of task workflow, using video tours of the task interface, instructive graphics, step-by-step tutorials or demonstrations. Incorporating step-by-step instructions or hover/pop-up instructive text into the task interface can support new contributors. More detailed instruction in the form of written guidelines and help documentation, FAQs, screenshots and examples, knowledge bases, or forums can support contributors requiring additional guidance.
Show how project output is freely accessible

Websites for crowdsourcing cultural heritage support participation by showing how project output is or will be freely accessible to the public. Types of project output include original, transcribed, corrected and enhanced content; metadata; structured or synthesized data; digital collections; and curated content. Project output should be made accessible as soon as possible; if project output is not immediately accessible, the website should explain when it will be accessible.

Proof of free public access to project output encourages new website visitors to contribute, although this may be more influential on the decisions of users who have previously contributed to websites for crowdsourcing cultural heritage than for users who have not. Seeing the result of their contribution in the public domain gives contributors a sense of satisfaction, and may encourage them to contribute more.

Examples of compliance with this principle include the incorporation of or links to a searchable database, interactive visualizations of project output, access to application programming interfaces (APIs), and the promotion of work that uses project output. Charging users for access to project output is an example of non-compliance.

Keep the website current

Websites for crowdsourcing cultural heritage support participation by keeping content current. Time stamping should indicate that website content is up to date and that the website is active. Cultural heritage assets should be available for processing, except in the case of websites requiring contributors to record/create content, for which this may be of limited relevance.

Evidence that the site is active encourages users to contribute, and ensuring that assets are available for processing means that users can contribute at their convenience, which encourages them to return to the site.

Websites may use text or visual elements to alert users to assets recently uploaded to the site. Examples of time stamped content include integrated social media posts, project updates, webpage footers, and discussion of upcoming events. Time-stamped content that suggests inactivity is an example of non-compliance.
Prioritize key information

Websites for crowdsourcing cultural heritage support participation by prioritizing key information. Key information includes a specific and challenging project goal; an invitation to participate; the value proposition, which implies a mutually beneficial exchange between the project host and contributors; and a call to action.

Prioritizing key information enables new visitors to quickly understand the purpose of the website, and how and why they should participate. Clearly displaying a hyperlinked call to action also speeds up the process for returning visitors, who can start contributing immediately.

Key information should be conveyed in simple, concise language that is crafted for the target crowd; for example, the invitation to participate is commonly framed as helping the institution, and the call to action is presented as a direct question or imperative.

Key information should be prominently displayed on the homepage using a clear visual hierarchy, which is based on the importance of information; for example, key information is displayed in the top left-hand corner of the homepage or above the fold; project names and taglines may be used to convey the nature of user contribution; and information is presented using headers, centred text, bullet lists, graphics, images, video and slideshows. The call to action is commonly presented as a button, but can also be clearly identified using bold coloured text or navigation menu titles, and reinforced by repeating at the bottom of the homepage.

Examples of non-compliance are calls to action that are below the fold or obscured in body text, requiring users to search for and click to display key information, and prioritizing explanations of how project output is being used over the need for user contribution.
Present reasons to contribute

Websites for crowdsourcing cultural heritage support participation by presenting reasons for visitors to contribute. Reasons given should align with likely motivations to contribute, such as the significance of the project goal, the size of the challenge, the necessity for volunteer contributions, and how project output will be used. Other common motivations include interaction with interesting content, the opportunity to learn something new, joining a community, collaboration with prestigious institutions, personal recognition, forthcoming events, and the ease and enjoyment of participation. Presenting reasons to contribute helps visitors to quickly and easily determine whether the project entails mutual benefit, and reflects their motivations.

The website may use positive and emotive terms to describe the nature of the collection, emphasize the value of project output, and describe the contributor experience. Specific examples include:

- Using headers such as "Why this matters" and "How your contributions help", and describing the type of people who will benefit from project output;
- Presenting scenarios illustrating how people will be able to use project output, or linking to evidence of how project output is being used;
- Describing a forthcoming event related to the project, such as a centenary, and specifying the number of assets to be processed;
- Being explicit about connecting and collaborating with the host institution, explaining the necessity for contribution, and inviting visitors to join the community;
- Listing the kind of research questions that contributions will help to answer, and explaining how contributors are part of the research process;
- Describing the types of people who will find it interesting to contribute, promoting accessibility and enjoyment, and stating that contributors will earn recognition.
**Display project progress**

Websites for crowdsourcing cultural heritage support participation by displaying project progress. Evidence of activity and progress contributes to an expectation of project success, which encourages new visitors to contribute. Displaying project progress also contributes to a sense of achievement, and encourages users to contribute more.

Statistics and progress bars are commonly used to display evidence of user contributions in relation to the project goal. When the rate of participation is low, acknowledging each new volunteer or contribution may be a more favourable signal of progress than showing the number or percentage of assets processed.

**Convey the credibility of the project**

Websites for crowdsourcing cultural heritage support participation by conveying the credibility of the project. Credibility refers to trust in the value of the project and its sustainability, and information security. Assuring new visitors that the time and effort required to contribute will be well spent, and that any personal information they provide will be secure, encourages them to contribute. Conveying the credibility of the project may be more influential on the decision to contribute for visitors unfamiliar with these websites, than those who have visited or contributed to such websites before.

Websites may convey credibility by displaying host institution logos, a list of supporting institutions, evidence of financial support, names and photos of the project team, and the number of people who have contributed to the project. Other examples include linking to offline project events; and displaying project awards, evidence of external publicity by third parties, evidence of project support on social networks, contributor profiles, and testimonials from project output users.
**Support users**

*Minimize the effort to contribute*

Websites for crowdsourcing cultural heritage support participation by minimizing the effort to contribute. Websites should minimize the necessity for users to provide the same information more than once, and not demand excessive effort when tasks could be achieved more efficiently by the system. Enabling users to perform tasks effectively and efficiently encourages new users to continue contributing, and established users to make large and/or frequent contributions.

Examples of minimizing effort include allowing users to contribute without registering, making registration optional, or simplifying registration/login by incorporating existing user accounts for web applications such as Google, Twitter or Facebook. Other examples include prioritizing components of the task and allowing contributions to meet minimal requirements, auto-save functionality, automatic completion of data fields based on previous contributions, automatically directing users to the next step of the task, and enabling users to save and return to their work in a new session.

Examples of non-compliance include an unintuitive sequence of interaction, and confusing or interrupted workflows; an absence of the interactive functionality users need and expect, such as image magnification; requiring excessive effort to successfully manipulate digitized text or images; and unclear or difficult input formats.

*Minimize user error*

Websites for crowdsourcing cultural heritage support contribution quality by minimizing user error. The website should alert the user to actual errors, such as incorrect data formatting, required data entry fields that are incomplete, or spelling errors. Except in the case of some websites designed for recording/creating content, providing contextual information, or correcting/modifying content, users should be able to flag potential error, which may be due to the low standard of the digitized asset being worked on, or insufficient knowledge or skill to complete the task with confidence. Websites that assign the same task to multiple users, and rely on
computational algorithms for quality control, should explain this to users to allay concerns about potential error. Minimizing task error reduces the necessity for editorial intervention by the project team, and contributors feel confident about the quality of the work they submit.

Examples of methods used to minimize user error include diagnostic tasks or sandboxes for new contributors; and tools for standardization such as calendars for date formatting, automated capitalization, and authority control/controlled vocabulary in the form of drop-down lists or predictive text. Other examples include automatic reminders, informative error messages, and summaries or previews of contributions that encourage review prior to submission. Websites may also enable users to skip or flag difficult or ambiguous assets, and navigate to a previous step in the task for editing purposes.

Enable users to review contributions

Websites for crowdsourcing cultural heritage support contribution quality by enabling users to review contributions that have been submitted. Reviewers may include website visitors, contributors, and/or users of project output. The review process may involve approving, enhancing, editing, correcting, annotating or flagging contributions following initial submission; alternatively, websites may assign the same task to multiple users and employ computational algorithms to determine the accuracy of contributions. Websites should enable users to contact the project team with information or concerns about tasks submitted.

Providing visitors with the option of undertaking new tasks or reviewing submitted tasks allows them to contribute in a way that best utilises their knowledge and skills. Enabling users to refer to their previous contributions encourages consistency; and editing, enhancing and correcting their own work gives contributors a more satisfying user experience. Reviewing other contributors’ work promotes a sense of community, and contributors concerned about accuracy are reassured that their work will be reviewed.
**Clearly identify tasks**

Websites for crowdsourcing cultural heritage support participation by clearly identifying tasks. Websites should clearly identify the individual tasks to be started, completed and/or reviewed, by presenting them to users automatically, or providing users with easy to use navigation tools. Visitors should be able to start contributing within a short space of time, and websites should help contributors to maintain momentum and contribute more. The need to clearly identify tasks may be less relevant for websites used to record/create content.

Techniques used to clearly identify tasks include lists, categories, grid displays, flags, ticks, arrows, and icons. Other examples include displaying the level of completion against each task, and incorporating a call to action in the site navigation or on individual collection item pages. Making it difficult or time-consuming for the user to identify tasks, such as requiring the user to scroll lengthy webpages, is an example of non-compliance.

**Provide task options**

Websites for crowdsourcing cultural heritage support participation and contribution quality by providing task options. Enabling new visitors to select tasks that reflect their interests, level of expertise or available time, encourages them to contribute; providing contributors with task options encourages continued participation, and supports contributions of a high standard.

Websites may enable users to select tasks based on criteria such as type of asset, task or process; subject/theme; level of difficulty; collection item; collecting institution; or stage of task completion. Websites that randomly display assets to be processed should enable users to skip to the next asset, and websites that do not provide this option should explain the rationale. The provision of task options may be less relevant for websites used for recording/creating content.
**Simplify the task**

Websites for crowdsourcing cultural heritage support participation and contribution quality by simplifying the task. Tasks that appear manageable to new visitors encourage them to contribute, and simplifying tasks helps contributors to submit high quality work.

Examples of simplifying tasks include using expanding sections to give users an overview of the task, presenting different stages of the task over several pages, providing users with distinct data input fields for entering information, and highlighting the stage of the task being worked on using visual cues. Cultural heritage assets may be processed as small components; for example, a digitized text document may be presented as individual pages, sections, visual elements, or lines of text. Task simplification should not undermine the user's ability to view any contextual information necessary to complete the task, such as the preceding section of text.

**Engage users**

**Attractive design**

Websites for crowdsourcing cultural heritage support participation by being attractive to users. Attractive websites employ clean and consistent design; include interesting content; are well-organized, highly visual and aesthetically pleasing to users. Clean design ensures that no superfluous elements impede visitors from receiving key information and performing the task. Consistent design and navigation minimizes friction and ensures that visitors do not become disoriented or confused. A site that appears professionally designed increases visitor expectations about the probability of project success.

Websites that are attractive encourage new visitors to spend time on the site, and positively influence the decision to contribute. An attractive website contributes to a satisfying user experience, which incentivizes users to return to the site and contribute more. However, attractive design may be less influential on the decision to contribute for a visitor who is highly motivated by subject interest or project value.
Design techniques employed to attract users include generous use of space, keeping primary navigation options to a minimum, and conveying a sense of immersion. Other examples include large headers, easy to read font, webpages that present all text above the fold, and up to date design elements. Websites may include static and dynamic images, slideshows, a grid of collection images, graphics, data visualizations, themed backgrounds, or videos on the homepage.

Examples of non-compliance include webpages that are busy, text heavy, and feel daunting to visitors; and inconsistent or confusing navigation, which may be the result of integrating crowdsourcing functionality into an existing website or using a multi-purpose platform.

**Acknowledge participation**

Websites for crowdsourcing cultural heritage support participation by acknowledging user participation. User participation may encompass registration, completion of steps in the task, task completion, task submission, and cumulative contributions. Feedback on user participation is always positive, and may take the form of text or visual indicators; this encourages new visitors to complete a task, and encourages users to contribute more.

Examples of compliance include thanking the user for tasks completed and inviting them to contribute more, acknowledging the user's contribution to the goal, and updating individual progress indicators.

**Encourage users to engage with the collection**

Websites for crowdsourcing cultural heritage support participation by encouraging users to engage with the collection. Engagement refers to reading, browsing, searching, and returning to collection-related content. Stimulating interest in and promoting a sense of collaboration with the collecting institution encourages new visitors to contribute, and users to contribute more.
Techniques used to encourage collection engagement include displaying images of all collection items being processed, featuring collection items in a prominent place, describing highlights of the collection, and online exhibitions. Other examples include displaying collection item metadata; linking to related content; displaying stories about the collection and collection items, which may be in the form of blog posts integrated with the site; and sharing stories about collection items from contributors and output users. Websites may also enable user curation, such as the selection of favourite collection items; and enable users to download digitized collection item files.

**Convey a sense of fun**

Websites for crowdsourcing cultural heritage support participation by conveying a sense of fun. Visitors who find the site fun to use are more likely to contribute, and users are more likely to return and contribute more. However, a sense of fun may be more influential on the decision to contribute for visitors unfamiliar with these websites than for people who have visited or contributed to such websites before.

Techniques used to convey a sense of fun include using a light-hearted tone for webpage copy and "fun" or similar terms to describe the task; entertaining narrative and humour; games; and light-hearted music and graphics. Gamification involving comparative performance feedback may convey a sense of fun, but may not support participation in all cases.
Nurture and sustain the user community

Convey a sense of community

Websites for crowdsourcing cultural heritage support participation and contribution quality by conveying a sense of community. The project community is comprised of contributors and the project team, and may include users of project output. A visitor's decision to contribute may be positively influenced by the prospect of belonging to a community, and by the presence of other people, which raises expectations of project success. Users who are motivated by being part of a community may submit higher quality contributions due to a sense of commitment, and return to contribute more.

Methods used to convey a sense of community include emphasizing the collaborative nature of the project; requiring contributors to register; and displaying contributor names or handles, contributor profiles, and evidence of community interaction. Other examples include displaying welcome messages to new contributors; publicly acknowledging new contributors; publicly displaying community announcements, such as project news, progress updates and new website features; and linking to related crowdsourcing communities. A website that does not convey a sense of community to users, despite techniques employed with a view to achieving this, is an example of non-compliance.

Support community interaction

Websites for crowdsourcing cultural heritage support participation and contribution quality by supporting community interaction. The project community is comprised of contributors and the project team, and may include users of project output; the primary purpose of enabling interaction is to inform, support, and gather queries and feedback from contributors.

A visitor's decision to contribute may be positively influenced by the prospect of belonging to a community, and the knowledge that support will be provided. Interactions that support contributors with questions or concerns better enables them to submit quality contributions. Contributors can provide feedback to the project team, which may help to improve the user experience, and in turn incentivize
them to return and contribute more. The ability to interact with the project community may be more influential on the decision to contribute for visitors unfamiliar with these websites than for people who have visited or contributed to such websites before.

Examples of supporting community interaction include displaying a project email address; enabling users to subscribe to project newsletters; and integrating social networks, blogs and discussion forums. Other examples include comment functionality; feedback forms; and enabling users to send private messages between them, join user groups, and add other users as friends. Websites that do not integrate the project's social network account or link to it from the website are an example of non-compliance. If community interaction is intentionally unsupported, the website should explain the reason for this.

**Publicly recognize contributions**

Websites for crowdsourcing cultural heritage support participation and contribution quality by publicly recognizing the contributions of individual users. Examples of methods used include publicly displaying the number of tasks completed by individuals, linking user identifiers to project output, and displaying a list of users who have most recently completed tasks. Publicly recognizing the completed tasks or contributions submitted is an incentive to participate for users motivated by recognition or competition. Websites may allow users to choose whether their contributions are publicly recognized.

**Support content sharing**

Websites for crowdsourcing cultural heritage support participation by enabling users to share website content. Incorporating sharing functionality encourages users to share their project experiences and collection items of interest with people outside the community, and invite them to participate. Receiving an invitation to participate from someone they know is an incentive for new visitors to contribute, and working alongside people they know outside the community is an incentive for users to continue contributing.
Websites commonly support content sharing by incorporating email and social network functionality into the task interface, blog posts, discussion forums, and the collection database. A message to users, encouraging them to invite friends to the project, may be displayed alongside sharing functionality. Users may be encouraged to share webpage URLs, links to digitized collection items, and downloadable project promotion material. Users may also be encouraged to embed promotional project videos or other website content in their personal online spaces by providing them with website code.

References


