
**A Cognitive Walkthrough of the What's the Score at the Bodleian?
task interface to increase volunteer participation**

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1. Introduction

Launched in May 2012, What's the Score at the Bodleian? (WTS) is an experimental crowdsourcing project that aims to improve access to parts of the Bodleian Libraries' music collections at the University of Oxford. A selection of uncatalogued piano sheet music from the mid-Victorian period has been digitised, and the public is invited to describe and transcribe them online using software adapted from Zooniverse projects like Old Weather. The main objective of this Google-sponsored pilot project is to investigate a cost-effective approach to making the scores more discoverable online, with a view to facilitating future research (Holmes, 2012). Project Manager David Tomkins (2011) explains that many of the scores have attractive, illustrated covers, or were composed in response to particular events. He suggests they might have an appeal beyond their musical content, and be of interest to "ephemerists and social historians, as well as musicologists." As the website continues to be enhanced, and the project team invites feedback from participants, this report presents a Cognitive Walkthrough that evaluates how easy it is for an online volunteer to start using the system. Following an explanation of the chosen methodology and a step-by-step analysis of the sequence of actions required to transcribe/describe a musical score, the report summarises the findings and presents several recommendations for further refinements.

2. Methodology

The Cognitive Walkthrough is "a usability inspection method that focuses on evaluating a design for ease of learning, particularly by exploration" (Wharton, Rieman, Lewis, and Polson, 1992, p.1). It is ideally suited to analysis of non-profit crowdsourcing websites, which rely on the participation of unsupervised volunteers of varying technical ability and subject expertise. The procedure is simple and concise, and can be undertaken by a single evaluator without any training in cognitive psychology (Wharton et.al., p.27). The evaluation of WTS incurred no financial cost, and was conducted within the space of a few hours.¹

¹ The evaluation was conducted on 21 August 2012, using a 20-inch iMac (OSX 10.7.4) and Safari Version 5.1.7. Any display issues encountered were also tested in Firefox version 13.0.1.

Musical expertise is not required of WTS volunteers, although some basic knowledge will enable volunteers to contribute more metadata. While anyone is welcome to participate, it is likely that most volunteers will have an interest in music, and basic computer skills. This evaluation analyses the experience of a new volunteer, who has the ability to read piano scores, and a familiarity with moderately complex interactive applications. Due to limited time and resources, this research reflects the experience of a single user. Extending usability testing to other new volunteers (and potentially other web browsers) may serve to affirm or challenge the significance of these findings.

The actions evaluated have been limited to those within the task interface, and do not include the steps necessary to sign up or login to Zooniverse, or access partially completed scores in “My descriptions”. User testing commenced with the cover page of a new score. The five actions required to describe a music score have been categorised as follows:²

1. Highlight: Create a box around the section of the page you want to describe
2. Categorise: Choose the tab that corresponds to what you want to describe
3. Describe: Choose the relevant option from the drop-down list and/or fill in free text box
4. Edit: Address description errors
5. End session: Save/submit page

To determine whether or not these actions are efficiently and effectively achieved, the evaluation considers four key questions (Wharton et.al., p.13):

- How does the user know what effect to achieve?
- How does the user know the action is available?
- How does the user know the action is appropriate?
- How does the user know that the action has been successful?

As the Cognitive Walkthrough is considered particularly useful for demonstrating how easy or difficult it will be to start using a system without reading the documentation, the user in this evaluation did not consult WTS guidelines prior to commencing description of a musical score (UKOLN, 2005).

² For the purposes of readability, this report uses the term “description” to cover both description and transcription.

3. Evaluation

The description of a musical score requires repetition of the actions tested. Thus, the first experience of each action is evaluated as a user ‘success’ or ‘failure’ story according to the aforementioned criteria, and any issues experienced as the user repeats the actions are outlined in the Notes that follow. This additional information serves to address the complexity of describing a variety of page elements, such as text, illustration, and the score itself.

Step 1. Highlight

Create a box around the section of the page you want to describe.

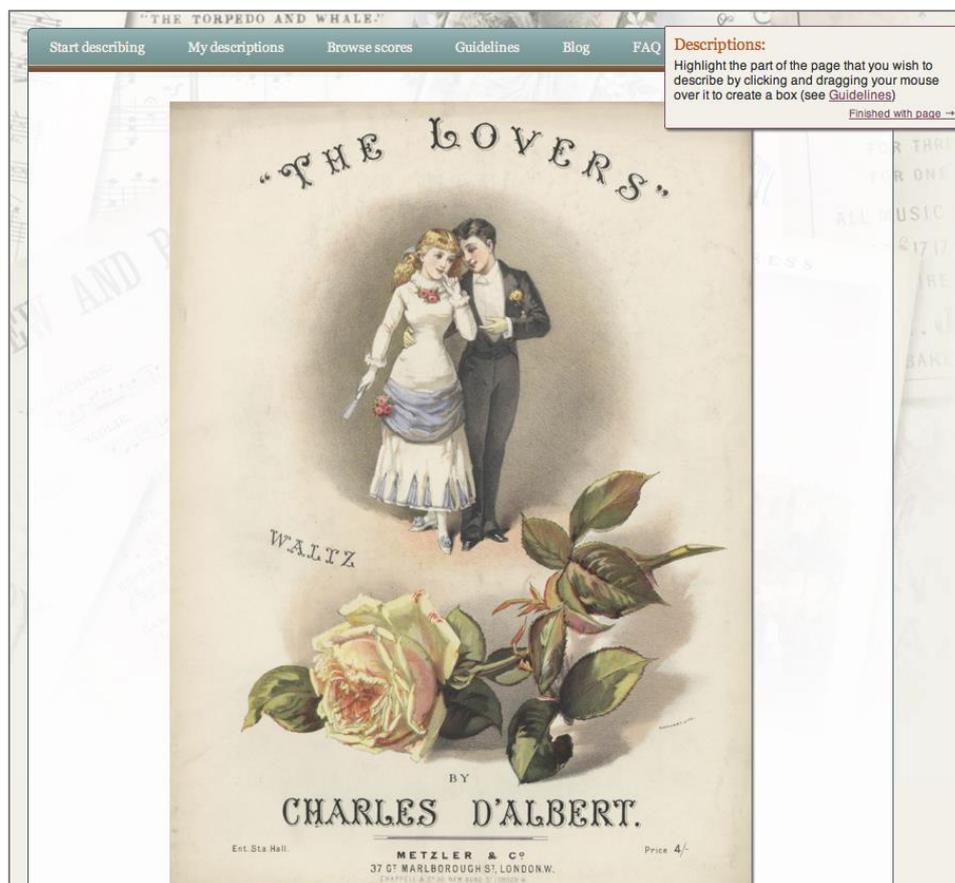


Figure 1 Highlight

Success: An automatic prompt at the top right of the screen instructs the user to highlight the relevant part of the page by clicking and dragging the mouse over it to create a box. This action results in a clearly defined box, an enlarged image of the highlighted section, and the appearance of the description toolbar.

Notes:

- The toolbar occasionally displayed beyond the browser when highlighting large sections of the page. In order to proceed, the user was required to locate the edges of the toolbar and drag it into view. After entering and saving the relevant data, the user found that the highlighted box was now positioned incorrectly. As there appeared to be no way to drag the box to the correct position, the user deleted the box and started the sequence again. This did not solve the problem, and the user was forced to abandon this section of the page.
- As more data was entered, and the “Descriptions” box took up more space down the right side of the screen, the toolbar was sometimes obscured. Dragging it into view affected the position of the highlighted section being worked on.
- The user encountered difficulties when attempting to highlight sections in close proximity to others. The edit/delete options that appear within a neighbouring box impeded the user’s ability to create a new box. Without the ability to tweak the position of existing boxes, the user was required to delete and recreate them, together with the corresponding data.

Step 2. Categorise

Choose the tab that corresponds to what you want to describe.



Figure 2 Categorise

Success: The multi-tab toolbar that appears after highlighting gives the user eleven categories to choose from, which are concise and straightforward. Clicking the desired tab results in new options and fields being displayed beneath. It's possible to browse the tabs without being bound by a selection, and the toolbar addresses any user uncertainty by providing brief instructions relevant to each option via "show help".

Step 3. Describe

Choose the relevant option from the drop-down list and/or fill in the free text box.

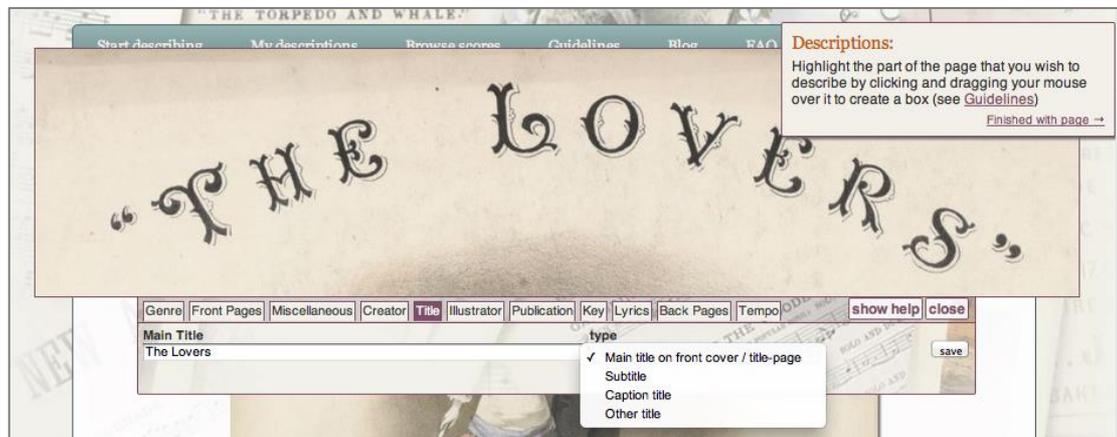


Figure 3 Describe

Success: Under each category tab the toolbar displays more options for description. These may be options in a drop-down box, to further refine the type of metadata being captured, and/or free text boxes. The enlarged image of the highlighted section minimizes the potential for typographical errors. The button to save selected options and data entered is clearly displayed at the right of the toolbar, and saved data is instantly displayed in a “Descriptions” box in the top right corner of the screen.

Notes:

- When the user captured several pieces of information in one highlighted section, such as publisher name, city, and address, they were unsure about the correct method of description. It was unclear whether the toolbar allowed for the capture of multiple pieces of metadata, or whether each piece of information needed to be highlighted, captured and saved separately. First, the user attempted to enter more than one piece of data under different tabs before saving. Only the last piece of data entered was saved. Next, the user tried to “edit” the highlighted box, in order to add information under a different tab. The user was hesitant to type over existing data because captured data continued to be displayed in the text field after choosing other metadata fields from the drop-down box. After doing so, the user discovered that the original

data had been overwritten, thus concluding that it was necessary to capture each piece of information in a separate box.

Step 4. Edit

Address description errors.



Figure 4 Edit

Failure: The section highlighting makes it easy to identify any page elements overlooked, and the descriptions displayed at the top right of the screen make it easy to identify any errors. However, when attempting to fix errors, the user was not sure how to proceed.

Criterion: How does the user know the action is available?

The user attempted to change typographical errors in the descriptions summary box directly, although it quickly became apparent that this was not possible. The user next attempted to edit by hovering over the relevant highlighted section, which displayed options to edit or delete.

Criterion: How does the user know the action is appropriate?

Instead of clicking on "Edit" directly, the user clicked inside the highlighted box. This resulted in a close-up image of that particular area of the box, and a toolbar that did not display the text to be corrected. Eventually, through a process of elimination, the user learned the required action.

Notes:

- When highlighted boxes overlapped, the user found it difficult to select a box for editing. For example, an attempt to click the edit button moved the cursor to the box below.

Step 5. End session

Save/submit page.

The screenshot displays a digital manuscript editor. On the left, a page of a manuscript is shown with several redaction boxes overlaid. The boxes are numbered 0 through 6. Box 0 covers the title "THE LOVERS". Box 4 covers a central illustration of a man and a woman. Box 5 covers the word "WALTZ". Box 6 covers the publisher's name "CHARLES D'ALBERT." Below the illustration, the text "BY" is visible. At the bottom of the page, the publisher's name "METZLER & CO" and address "10, BARKER STREET, LONDON W." are visible. The price "4/-" is also shown. On the right side of the interface, there is a "Descriptions:" panel with several fields and "Show/Hide" buttons. The fields contain the following information:

Descriptions:	
Title	
Main_title: The Lovers	Show/Hide
title_type: Main title on front cover / title-page	
Front Pages	
front_cover_type: Picture	Show/Hide
Front Pages	
front_cover_type: Picture	Show/Hide
Genre	
genre_type: Waltz	Show/Hide
Creator	
creator_name: Charles D'Albert	Show/Hide
creator_role: Composer	
Publication	
publication_name: Metzler & Co.	Show/Hide
publication_type: Publisher name	
Publication	
publication_name: London	Show/Hide
publication_type: City or town of publication	

At the bottom of the descriptions panel, there is a link: [Finished with page →](#)

Figure 5 End session

Failure: The user saved data as it was entered, using the button on the toolbar, and a summary of all data entered was displayed at all times on the right of the screen.

However, the user was unsure about the consequences of clicking the link “Finished with page” in the “Descriptions” box at the right of the screen.

Criterion: How does the user know the action is appropriate?

The user did not know whether it would be possible to complete the page at another time, or whether it was necessary to complete the page in one session.

Criterion: How does the user know that the action has been successful?

Clicking “Finished with page” resulted in display of a new page to be transcribed, which happened to be blank. There was no feedback indicating the user’s work had been successfully saved and submitted, or any acknowledgement of their effort.

Notes:

- After the user clicked “Finished with page” to move beyond the blank page, they were presented with a title page that replicated the cover page already described. As there appeared to be no way to duplicate and repurpose the cover page description, the user was required to repeat their previous actions.

4. Conclusions and Recommendations

The evaluation has shown that the WTS task interface supports the description of sheet music without reference to the guidelines, through textual and visual prompts, and straightforward categorisation for comprehensive information capture. Benefitting from simple, uncluttered design, the task interface displays only the tools required to complete the desired action. However, the evaluation has also highlighted several opportunities for improving the user experience and increasing volunteer participation. There are very few instructions in the WTS guidelines that the interface does not already address; it’s suggested that incorporating those outstanding would partially resolve the issues that impeded the progress of the new user as described in the evaluation. Further investigation into the display issues experienced may also contribute to further refinements. The following recommendations address the issues in the order outlined in the evaluation.

Step 1. Highlight

- Limit the dimensions of enlarged images, so the user is not required to drag the toolbar into view.
- Enable the user to drag the bounds of and reposition highlighted sections, so they are not required to delete and recreate them.
- In the top right or bottom left of the “Descriptions” box, an icon or text could be added that indicates this feature can be moved around the page to avoid obscuring the toolbar.

Step 3. Describe

- The WTS guidelines state, “You may only 'save' one description at a time for any given tab box, though you can describe the same thing a number of times as long as you create a new tab box each time. It is not possible to create a new tab box entirely 'within' an existing one, but boxes may overlap.” It's suggested this could be added below the highlighting instructions in the “Descriptions” box. Alternatively, this could be added to the toolbar "show help" boxes.
- These instructions could also be revised to aid comprehension: *You may only save one description at a time. If you would like to describe the same thing using different categories, please create a separate box for each description. It's not possible to create a new box entirely within an existing one, but boxes may overlap.*

Step 4. Edit

- To address the user's uncertainty about how to edit, the available option could be made more explicit. Rather than requiring the user to hover over the highlighted box, the “edit” and “delete” buttons could be displayed at all times. If it were technically feasible, it would be more efficient to correct typographical errors by editing the “Descriptions” box directly.
- To address the problem of selecting boxes for editing that are in close proximity to one another, the option to edit could be incorporated into each

“Descriptions” box beneath Show/Hide. Clicking this option would display the relevant section and toolbar.

Step 5. End session

- For new users unfamiliar with the task workflow, a question mark icon could be added next to “Finished with page”. Clicking on this would display a box that summarized the relevant points in the guidelines: *You're not expected to describe everything on a page, or describe every page of a score, or use every 'tab' option - describe as much or as little as you want! If you're not sure about how to describe a particular piece of information, just skip it. If you leave a score unfinished, you won't be able to return to it unless you skim through the remaining pages before ending your session. Clicking “Finished with page” will save them to “My descriptions”, which you can access at any time.*
- Although clicking "Finished with page" is no guarantee that a page has been described, the project team might consider incorporating some form of feedback that indicates to the user that their action has been successful and appreciated. A box superimposed over the next page (with a cross to close) could read: *Thanks {username}! Ready for the next page? (If it's blank, just click “Finished with page” and move on to the next one).*

References

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