# SITE Usability Analysis

# Prepared by Jason Goldwater from Clinovations for ONC as part of the SITE Task Order

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# I. Introduction

A comprehensive review and assessment of the Standards Implementation and Testing Environment (SITE) was conducted to provide a baseline analysis of the overall usability of the website as well as possible recommendations for improvements as the development process continues. The analysis focused on four major categories that are consistent with industry standards for usability:

* Accessibility
* Identity
* Navigation
* Content

In addition, a series of three additional metrics were used based on the Six Sigma methodology that promotes product or system quality. A primary benefit of Six Sigma is that it identifies meaningful goals for process measurements and provides a uniform scale on which process can be measured against those goals. This uniform scale provides a context for meaningful comparison between the different aspects of a process. It also provides a relative framework on which similar aspects can be compared across different processes. Using this methodology improves the analysis and communication of usability metrics so that they can effectively drive decision-making processes for future development. The metrics used for this analysis include:

* Task Completion
* Task Error Rates
* Task Time to Completion

Finally, since SITE is funded through monies appropriated and distributed by the US Department of Health and Human Services, the website must be compliant with the provisions of Section 508 of the Rehabilitation Act of 1973, which requires websites that are publicly financed to be accessible by individuals with disabilities. The use of the standard Voluntary Product Assessment Template (VPAT) was used in this analysis.

The results are provided below.

# II. Results

## Usability Assessment

In Table 1, a listing of the metrics under each category is provided, as well as the usability checkpoints and the results of the SITE evaluation.

**Table 1: Results of Usability Assessment**

| Metrics | Usability Checkpoints | Results |
| --- | --- | --- |
| *Accessibility* | | |
| Site load time is reasonable | Two seconds is the acceptable load time | The testing encompassed 25 random checks to determine load time. The low was .7 seconds with a high of 4.3 seconds. The average was 2.1 seconds, which is on target with the industry standard |
| Adequate text-to-background contrast | Text or diagrams and their background must have a luminosity contrast ratio of 4:5:1 for level 2 conformance to guideline 1.4, and at least 7:1 for level 3 conformance to guideline 1.4. The range for color brightness difference is 125. The range for the color difference is 500. | Luminosity contrast was 10:07:01 for the Sidebar  21:00:1 for the Main Page  12.78:00:1 for the Background  Color brightness difference was 255  Range for color difference was 500. |
| Font/Size Spacing | Minimum size is 10pt | Font is Arial 13 pt. |
| Flash and add-ons | Limited use of this technology | Not applicable |
| Site has custom non-found/404 page | Site provides direction to pages not found or operational within the site | Not applicable |
| *Identity* | | |
| Logo of site | Logo associated with the site or organization that developed it should be visible | SITE Logo is visible at the top of the web page. A logo for the organizational affiliation of the site is not displayed. |
| Tagline | Short sentence describing the web site | There is no tagline associated with the site, only a brief paragraph describing its content and intent |
| Home page | Must be digestible in five seconds | For the audience the site is geared to, the home page is easily interpreted |
| Company information | Clear path to company information | Easy navigation to “About” tab |
| Contact information | Clear path to contact information | Not listed on the home page nor is there a separate and unique tab or page to send information to a designated contact |
| *Navigation* | | |
| Main navigation | Main navigation is easily identifiable | Yes, links and domains of information are clearly marked |
| Navigation labels | Navigation labels are clear and concise | Yes, it is easily to identify the area of the site the user wants to visit |
| Button/Links | Number of buttons and links are reasonable | While there are a small number of links on the home page to navigate the user, there are a substantial number of links for each of the templates; the table of contents; and the sidebar |
| Company Logo | Company logo is linked to home page | The logo for the site appears on each page but only takes the user back to the home page of a particular section (such as C-CDA Knowledge Base) but not to the home page for SITE |
| Links | Links are consistent and easy to identify | The links on the SITE home page are easy to identify, but those on the section pages are difficult to identify and navigate unless you are familiar with the content prior to visiting SITE. |
| Site search | Site search is easy to access | There is no site search function the SITE home page, but it is easy to identify on each of the section pages. |
| *Content* | | |
| Headings | Major headings are clear and descriptive | Heading is easily identified and clear |
| Critical content | Critical content is above the “fold” | The major critical content is easily identified on the home page and each of the templates are identified |
| Styles and colors | Styles and colors are consistent | Yes, the style and combination of colors in consistent from page to page |
| Emphasis | Emphasis (bold, etc.) is used sparingly | Yes, there is not a lot of emphasis on the page |
| Ads and Pop-Ups | Ads and Pop-Ups are unobtrusive | Not applicable |
| Main copy | Main copy is concise and explanatory | Yes, information is presented in a concise form on the main SITE page |
| URLs | URLs are meaningful and user-friendly | Yes, URLs are easy to interpret and align with each of the section pages. |
| HTMLs page titles | HTMLs page titles are explanatory | Yes, they are easy to understand. |

## Six Sigma Analyses

### Task Completion

For the Six Sigma analysis, the focus on task completion involves moving from one page of the site to another within a load time of 2 seconds, per the industry standard. An error for this site would be classified as page that does not load within that defined time frame. This task completion involves discrete data (completed in time, did not complete in time) and a defect in task completion would be identified as an instance of a user failing a task. Therefore, every instance within a random sample can be defined as an opportunity for a defect to occur.

Within the task completion metric, a sample of 25 tasks were performed on the site in which various pages were visited to determine if they could load within two seconds or less. Twenty of the 25 tasks loaded under the two-second metric.

To calculate the defective rate, the following formula is applied:

1. Total Defects/Total Opportunities = Defective Rate
2. 5 tasks failures/25 task attempts = 20% defective

To calculate the process sigma, the follow steps are followed.

1. 1 - .20 = .80 or an 80% Quality Level
2. Corresponding z-score for 80% = .841
3. .841 +1.5 sigma shift = 2.34 sigma

This is the methodology for calculating process sigma using discrete data. The quality level of 80% corresponds to the area under a normal curve that represents part of the process that is non-defective. The corresponding z-score can be looked up on a standardized z-table. Process sigma is then calculated by adding a 1.5-sigma shift to the score, which is added to reflect changes in a process over time.

The results indicate an 80% quality level and a 2.34 process sigma rate. A process that is 99.9% free of errors measures at a 4.5 sigma rate. The disparity between the sigma score tested for task completion and the upper threshold for an error-free process is likely caused by the small sample size.

### Task Error Rates

Calculating task error rates requires the identification of the total number of opportunities for any user to make a single error. We define total opportunities as the probability of an error occurring as the number of sub-tasks that a user must conform to in order to complete a task error-free. For the SITE usability testing, we defined a task’s opportunities in terms of the following sub-tasks:

1. User must identify area within the site to create a login user name and password
2. User must enter the correct information and create a unique user name and password
3. User must navigate back to the SITE Home Page
4. User must access the C-CDA Knowledge Base section page
5. User must access the Immunization Activity template and return to the C-CDA home page
6. User must access the Encounters Section template and return to the C-CDA home page
7. User must access the Procedure Note template and return to the C-CDA home page
8. User must navigate back to the SITE Home Page

While this does not represent all of the potential tasks within SITE, this serves as a baseline to measure the task error rate. The C-CDA Knowledge Base page was used for this assessment because it had a large number of navigation links to the templates, the sidebar and the table of contents. It is expected that after future development on SITE, we will employ additional tasks to provide a more thorough analysis of task error rate.

There were eight opportunities for a user to make an error, with four participants attempting the task. Overall, seven defects were identified across all participants.

1. Total Defects/Total Opportunities – Defective Rate
2. 7/8\*4) = .218 = 22% Defective
3. 1 - .22 = 78% Quality Level
4. Corresponding z-score to 78% = .772
5. .772 + 1.5 sigma shift = 2.27 sigma

Error rate for this task has a quality level of 78% or 2.27 sigma.

### Task Time to Completion

For Task Time to Completion, we used continuous data to evaluate the task of creating a unique user name and login for the site. This was identified as a critical component of the site itself, particular since users can make contributions. Using an industry standard, we identified that the time to create a user name and password by first navigating to the page should take no longer than 30 seconds. This was based on the number of fields in the sign-up page and the information required.

From a sample of four users, the average time to create a login was 21.5 seconds, with a standard deviation of 4.80. Using the Sigma formula for continuous data, we calculate the following:

1. (Sample Mean – Specification)/Standard Deviation
2. (21.5 – 30)/4.80 = -1.77[[1]](#footnote-1)
3. 1.77 on a standardized z-table is = 92.3 Quality Level (7.7% Defective Rate)
4. 1.77 +1.5 = 3.27 process sigma

These usability metrics are summarized in Table 2.

**Table 2: Summary of Sigma Metrics for Usability**

|  |  |  |  |
| --- | --- | --- | --- |
| Metric | Process Sigma | Quality Level | Raw Value |
| Completion | 2.34 | 80% | 80% |
| Errors | 2.27 | 78% | 7 errors |
| Times | 3.27 | 92.3% | 21.5 seconds |

In conclusion, the time to create a login page was well within range and indicates high usability. The task completion and task errors have high quality levels for usability, but could use some modifications to increase the values.

## Section 508 Compliance

The final components of the usability analysis was to evaluate SITE against a Voluntary Product Assessment Template (VPAT) to determine if it conformed to Section 508 of the Rehabilitation Act of 1973. For the purposes of this evaluation, the focus was on assessing SITE against the standards for Web-based Internet information and applications. The results of the analysis are shown in Table 3.

**Table 3: Summary of Section 508 Compliance**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section 1194.22 Web-based Internet information and applications** | | |  |
| ***Criteria*** | **Supporting Features** | **Remarks and explanations** | **Notes** |
| (a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content). | Not Applicable | There are no non-text items within SITE | There is the site logo which already has alt text. All buttons should have alt text. Each Sandbox should have alt text |
| (b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation. | Not Applicable | There are no multimedia elements within SITE | OK |
| (c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup. | Supports | Content is not lost between color and black and white | OK |
| (d) Documents shall be organized so they are readable without requiring an associated style sheet. | Supports | Document is organized by sections | OK |
| (e) Redundant text links shall be provided for each active region of a server-side image map. | Not Applicable | No server-side image map | ? |
| (f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape. | Not Applicable | Site does not need a client-side server map as it is comprised of text elements |  |
| (g) Row and column headers shall be identified for data tables. | Supports | Each template category has an associated column header |  |
| (h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers. | Not Applicable | No data tables within the website |  |
| (i) Frames shall be titled with text that facilitates frame identification and navigation | Not Applicable | No frames within SITE |  |
| (j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz. | Supports | Pages do not flicker during navigation and viewing. |  |
| (k) A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes. | Not Applicable | Changes to the SITE Home Page do not necessitate changes to the section pages |  |
| (l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by Assistive Technology. | Not Applicable | SITE does not have any interface designed through scripting |  |
| (m) When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with Û1194.21(a) through (l). | Not Applicable | SITE does not require an applet or plug-n |  |
| (n) When electronic forms are designed to be completed on-line, the form shall allow people using Assistive Technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues. | Does Not Support | Sign-In Page and Create Account do not allow those with assistive devices to access the field elements; the fields do not provide directions or cues; and the Text Verification does not have an audio component |  |
| (o) A method shall be provided that permits users to skip repetitive navigation links. | Not Applicable | SITE does not have any repetitive navigation links |  |
| (p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required. | Not Applicable | SITE does not require timed responses. |  |

# III. Conclusions

From this initial analysis conducted of SITE using the industry-based metrics, the Six Sigma usability metrics and the Section 508 assessment, the following conclusions can be drawn:

From a usability standpoint, SITE is in fairly good shape. The Quality Levels are near or above the 80% threshold and it conforms to most of the industry standards. There are a few suggestions to improve the site overall.

1. SITE should have a common “look and feel” among all of its sections, which it is lacking. This includes fonts, the SITE logo and layout. This continuity enhances understanding of the website and makes it easier to use.
2. A lot of these pages deal with subjects that relate to SITE, but there is nothing that is common that ties them all together. As it stands now, its looks like a number of disparate websites that link to the main SITE page.
3. The navigation should include a path (breadcrumbs) back to the SITE main page
4. The layout for the templates under C-CDA Knowledge Base is too long and somewhat unwieldy. An attempt should be made to create a Table that classifies the template by common groups or elements to make it easier to navigate.
5. There should be a brief explanation (one sentence for each section page) to explain what it is about.
6. On the menu in the upper right corner of some of the sections the word “Guest” is lower case when it should be upper case
7. The Help section is just a general discussion of Wiki pages. It should be specific to SITE
8. The Blog link on the menu bar at the bottom of some of the section pages links only to general blog on Wikispace and is not specific to SITE.
9. Many of those items are not specific to SITE and should be removed.

Additional analysis will be performed after the next version is released.

1. Since lower task times are the goal, we reverse the sign of the z-score when calculating process sigma and -1.77 becomes 1.77 [↑](#footnote-ref-1)