Usability Factors in Website Design: A Case Study in Developing a New Literary Journal

Antoni Grgurovic

University of Minnesota

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Abstract

The field of usability is a fertile one for technical communicators looking to expand their skill sets and expertise. In this study, a literature review of usability factors was conducted to learn more about current best practices in usable website design. The usability factors identified from this review were then applied in developing a website prototype for a new literary journal. A usability test was conducted and the results analyzed to confirm the effectiveness of these best practices and to identify additional usability factors. Recommendations for technical communicators were then discussed regarding how best to incorporate usable design when developing content using the website as the primary medium.

Keywords: usability factors, usability testing, website design, literary journal

Introduction

The literary journal (or magazine) is a relatively new form of artistic expression. The first iteration of the genre in the United States was in 1815 with the publication of the *North American Review* (Kurowski, 2008). Since then, volumes of original literary work have been published in journals both short-lived and enduring. These artifacts of artistic thought serve as a reflection of contemporary society and a barometer for societal priorities and tastes. Moreover, literary journals continue to provide a medium in which marginalized and experimental voices gain exposure and momentum (Kuebler, n.d.).

Since the 1995 publication of the first online issue by the *Mississippi Review* (Kurowski, 2008), scores of literary content has been made available online. The 21st century has seen literary journals shifting, if not entirely transitioned, to online access. Readers who lament the loss of the printed volume may find encouragement in knowing that the less overhead required to publish affords greater flexibility in publishing experimental content (Pound, 1930). Online publications thus enjoy greater freedom in publishing and distributing literature from writers who would otherwise not have an audience due to the reduced production costs.

In order to continue the literary tradition and encourage talented writers to submit their work and avid readers to experience the literature in an online setting, literary journals must make their websites accessible for both writers and readers. I have yet to locate any research that analyzes literary journal websites in terms of usability best practices. As such, it is not clear if the same usability best practices used in other types of websites are also used in online literary journals. Furthermore, it is not clear what distinguishes one online literary journal as better than another save for the usability of the website and the content. I will leave the analysis of the

content to the literary critics and focus instead on the usability factors that make up a successful literary journal website.

Literature Review

The focus of my literature review was twofold. I first needed to understand the history of the literary journal and its cultural relevance. The resources I gathered were the result of searching for the "history of the literary [journal/magazine]" in both the University of Minnesota (UMN) library database as well as in Google's search engine. Information collected from this first round of research highlighted the important development of the online literary journal, and a secondary search was conducted for the "history of the online literary journal" using the same databases. These articles thus helped formulate my introduction and clarify my research problem.

The second purpose of my literature review was to research the usability factors that contribute to a successful website design. This included both effective design principles and methods for conducting and evaluating usability testing on user interfaces. I exclusively used the UMN library database for this research, locating relevant articles through keywords such as "usability factors," "usability research," "usability testing," "information design," "website design," "visual design," and "cognitive ergonomics." The following review summarizes how this research guided me through the process of developing and evaluating my own online literary journal.

Reducing the "Symmetry of Ignorance"

Usability studies, at its most fundamental level, seeks to bridge the gap between the users' knowledge and human factors engineers' design knowledge to create "a shared understanding of the overall design problem" (Pai & Allendoerfer, 2006, p. 24). Shantanu Pai and Kenneth Allendoerfer write that "the intended users of a system understand their goals and

tasks, the good and bad aspects of the current system or process, and their working environment. Designers understand general approaches for solving design problems and know principles and best practices" (Pai & Allendoerfer, 2006, p. 24). Thus, in order to meet the user needs in a system, both the users and the designers must work together in reducing the "symmetry of ignorance" by sharing their knowledge and perspective of the overall design problem. The method used to facilitate this type of information sharing between the two groups is through a prototype, or what Pai and Allendoerfer refer to as a "boundary object."

Boundary objects such as an interface prototype create a shared problem-solving context where both users and designers can offer their expertise on how to improve a prototype design, thereby making their tacit knowledge explicit (Pai & Allendoerfer, 2006). By using the boundary object as the focus of collaboration, users and designers can educate one another on various concepts to create the most optimal design specifications. To put this into perspective, writers and readers both have different demands when it comes to the website of an online literary journal. In order for a journal to meet these demands, a website prototype should be developed to gather feedback on whether the users' needs are being met and what aspects of the design need improvement.

Finding the Right Participants and the User Viewer Gap

The success of early prototype testing depends on having an accurate representation of the intended user group (Falk, 2006). In her frequently cited book, *Letting Go of the Words*, Ginny Redish recommends bringing the user group to life through the use of personas (Redish, 2012). A persona is an amalgam of various characteristics that is representative of a group of real people. As such, personas help clarify and support design decisions that often affect entire populations of users and can be used to identify participants that mirror the intended user

population. Different participants, however, "might experience the same problem but might not experience the same impact" due to different experience levels and knowledge, even after they have been screened to fit a certain criteria (Lewis, 1994, p. 371). It is therefore important to understand the user's mental model to avoid the user viewer gap.

Within the user interface, or visualization, two distinct mental models can be found. The first is the *design model* created by the designer(s) and their vision for how the interface is intended to work. The second is the *user model*, which is the user's interpretation of the graphical elements in the interface (Raschke, Blascheck, & Ertl, 2014). A user viewer gap emerges when the *design model* and *user model* diverge from one another, leading to a misunderstanding of the visualized information. Designers can remedy this gap by paying attention to the requirements of the task and the skills of the user, thereby creating a visualization with the necessary affordances to allow the user to complete the task with the skills they already have (Raschke et al., 2014).

Conceptual Design and User Requirements

Developing an effective visualization requires planning of a conceptual design that explores the design problem before attempting to solve it. Specifically, designers should seek to understand and be capable of defining the overall design problem, the content or data that needs to be communicated to solve the problem, and the audience whose problem it is. Of these, the audience is the most complex as a variety of factors need to be taken into account such as "levels of visual literacy, education, needs, behaviors, and familiarity with [the] content" in order to arrive at an appropriate solution (Pontis & Babwahsingh, 2016, p. 256).

The conceptual design process is also fundamental in identifying user needs and user requirements. User needs refer to "factors or conditions necessary for a user to achieve desired

results," whereas user requirements are the "statements that provide the basis for design and evaluation of interactive systems to meet some or all of the identified user needs" (Spath, Hermann, Peissner, & Sproll, 2012, p. 1313). This process is necessarily iterative as designers go through information cycles beginning with their implicit knowledge (e.g., past experiences, principles, strategies, and theories), and then move to explicit knowledge such as user feedback and research of the problem domain (Pontis & Babwahsingh, 2016). The conceptual design is thus constantly evolving over the product cycle as new information is made available through usability testing.

Design Principles and Visual Hierarchy

Effective design principles complete the transition from planning a design to producing the final product. Published in 1994, Jakob Nielsen's heuristics on user interface design continue to be cited in usability design research (Wang & Caldwell, 2002). These heuristics include: (1) visibility of system status, (2) match between system and the real world, (3) user control and freedom, (4) consistency and standards, (5) error prevention, (6) recognition rather than recall, (7) flexibility and efficiency of use, (8) aesthetic and minimalist design, (9) help users recognize, diagnose, and recover from errors, and (10) help and documentation (Nielsen, 1994b).

More recent studies have also looked at the visual hierarchy of interfaces, specifically the different visual path models of users. In her article on "Visual Hierarchy and Mind Motion in Advertising Design," Doaa Eldesouky (2013) offers guidance on where to place certain content on a webpage. One visual path model, the Gutenberg diagram, suggests that because of "natural reading gravity," the strong (far right) and weak (far left) fallow areas will receive the least attention from viewers "unless emphasized visually in some way." The z-pattern layout, another visual path model, is essentially the same as the Gutenberg diagram with the exception that the z-

pattern layout encourages viewers to pass through the two fallow areas rather than skip over them as in the Gutenberg diagram. The last model discussed is the f-pattern layout, which begins in the top left corner and moves horizontally, but with each subsequent line of content the horizontal movement diminishes until the viewer is mostly skimming only the left edge of the visual. This type of layout is most commonly seen in online web-browsing. Regardless of the visual path model the viewer chooses to follow—different viewers will have different preferences based on the type of content—the designer can still override any of these patterns by carefully implementing a visual hierarchy into the interface design.

Methods

This study used both qualitative and quantitative data to assess the usability of literary journal websites. Before developing any prototype, I first conducted a content analysis of the websites of 35 current literary journals to survey the designs currently in use (see Appendix A). I looked specifically at the menu design and location, the terminology used for site pages, the method used to create or host the site, as well as the overall layout of the content on each page. I then coded this data to identify patterns in the menu design and the most common terminology used for the various sections of the websites.

From this preliminary research I was able to build my website prototype using WordPress, an open source blog hosting software commonly used by literary journals to host their websites.
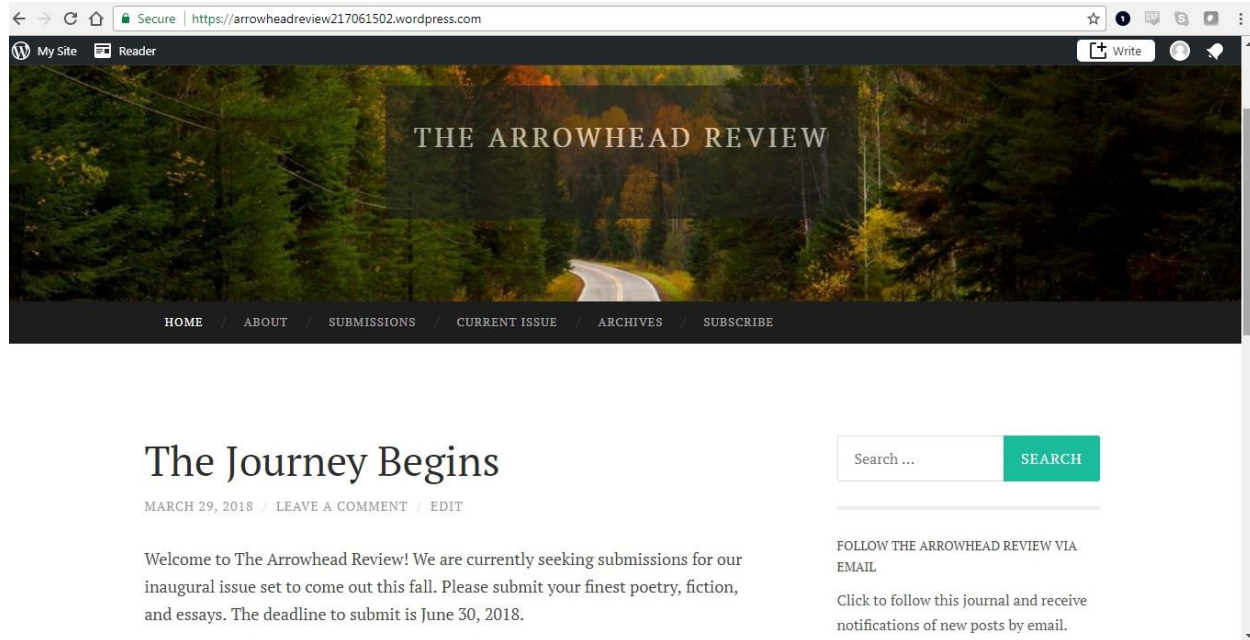
Figure 1: Screenshot of prototype homepage

I then selected two other literary journals to compare my prototype against for usability testing:

The Minnesota Review and *The Threepenny Review*. These journals were selected based on both

their long tenure as prominent literary journals and their different approaches to website design.

The Threepenny Review website uses a minimalist design whereas *The Minnesota Review* offers

a more stylized and collaborative design. Both journals, however, offer similar amounts of

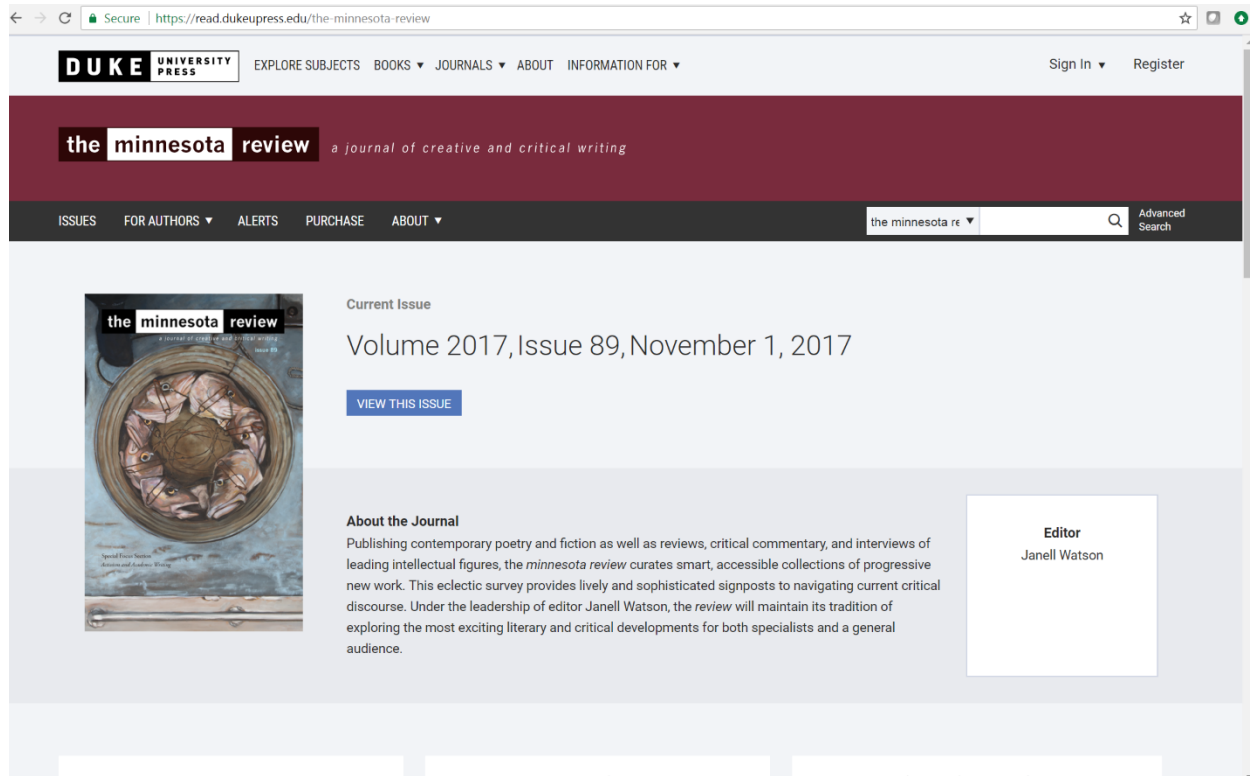content on their websites despite their design differences.

Figure 2: Screenshot of *The Minnesota Review* homepage

Figure 3: Screenshot of *The Threepenny Review* homepage

With the prototype developed and the journals selected, I then conducted two rounds of in-person usability testing using two specific user groups: writers looking to submit their work, and readers looking to find a particular story to read. Note that these user groups are not mutually exclusive. Some writers are also readers of the journals they submit their work to, though the needs of writers and readers are still different enough to warrant a bifurcation.

In the first usability test there were four participants: two prospective writers and two prospective readers. Each group was assigned a task to complete using the journal websites. For the writers the task was the same throughout, namely, to submit their work to the journal using the instructions provided on the website. The readers, on the other hand, were tasked with locating a particular story or poem buried in the archives of previous issues. A copy of the written instructions is provided below.

Table 1: List of instructions given to participants in each user group

Writer User Group	1. Please submit your short story to the (*Minnesota / Threepenny / Arrowhead*) Review using the instructions provided on the website.
Reader User Group	1. Please locate the poem "Ode to Home" written by Kimiko Hahn and published in *The Minnesota Review*. 2. Please locate the short story "Child's Play" written by Medardo Fraile and published in *The Threepenny Review*.

Both user groups were evaluated on time on task, success rate, and error rate. At the end of the quantitative usability test, I also conducted a qualitative debriefing interview with each participant. The interviews were semi-structured and brief, lasting no more than ten minutes. I asked participants to evaluate the ease of use of each site, pain points they experienced, and any suggestions they have to improve the user experience.

After this first round of usability testing, I revised my prototype based on the user feedback I received. I then repeated the same usability test and debriefing interview with two new participants, one for each user group. In total six users were tested with equal distribution between the two user groups.

Results and Discussion

The results of the content analysis and usability testing identified three major human factors issues with the design of current online literary journals. The first is that users are asked to recall from past experience how to navigate a journal's website rather than recognizing appropriate signifiers that help facilitate the navigation without needing to memorize pathways. The second issue is that the cognitive load of the users is frequently exceeded due to the organization and presentation of content on the website. Lastly, there is a lack of flexibility and efficiency of use when users attempt to locate a particular piece of work from the archives of a journal.

Recognition Rather Than Recall

The content analysis revealed first that there is substantial variation between the designs of different literary journals. While some websites used a minimal design with as little as four menu items, other journals had as many as 14 menu items. The average among all 35 journals

was 6.88 menu items. Furthermore, there is a lack of consistency in the naming conventions used for the various content pages across the different journals. To learn about a journal most websites had a designated "About" or "About Us" page. However, other websites referred to this page as the "Masthead," and in one instance both words were used to designate two separate content pages. As a result, users were denied a consistent terminology which could allow for quicker and more accurate navigation of a literary journal's website. Feedback from my debriefing interviews with participants also confirmed that the lack of consistent terminology made it more time-consuming to recognize which menu tab to select in order to complete the designated task. Although the participants were able to recall likely patterns of where to locate content based on their experience with other literary journals not included in the usability test, the lack of easy recognition poses an issue for new users who do not have sufficient experience with these types of journals, and is an area currently in need of design improvement.

Cognitive Load

From the perspective of the writer user group, the primary issue affecting their task completion and workflow was the high cognitive load, i.e., the amount of mental effort devoted to working memory. The instructions for how to submit a piece of writing totaled 716 words on *The Minnesota Review* submit page. Similarly, *The Threepenny Review* used 687 words to explain its submission process. *The Arrowhead Review* website prototype, one the other hand, used only 62 words to explain the submission process. The results below show a more than two minute average decrease in the time on task for *The Arrowhead Review* when compared to both *The Minnesota Review* and *The Threepenny Review*.

Table 2: Usability test results for writer user group

Writer User Group	Time on Task (min) *The Minnesota Review*	Success / Error Rate	Time on Task (min) *The Threepenny Review*	Success / Error Rate	Time on Task (min) *The Arrowhead Review*	Success / Error Rate
Participant 1	05:45	Success	06:15	Success	03:38	Success
Participant 2	04:46	Success	05:58	Success	03:12	Success
Participant 3	04:21	Success	06:02	Success	03:26	Success

In addition, while all participants were able to successfully submit their work to all three journals, their debriefing interviews revealed that it was difficult for participants to remember all the requirements for submission for *The Minnesota Review* and *The Threepenny Review*. Their workflow was thus interrupted by having to scroll up and reread certain sections that they initially skimmed on the first read-through. This feedback led me to revise the submission page of the prototype and reduce the word count from 128 words to only 62 words. All three participants agreed that the essay length submission instructions did not add sufficient value to the submission process to justify the extra cognitive effort required to process those instructions, preferring instead the briefer instructions of the prototype which did not interrupt their workflow and actually decreased their time on task.

Flexibility and Efficiency of Use

The results from the reader user group indicated a lack of flexibility and efficiency of use with the pathway navigation and content management of both *The Minnesota Review* and *The Threepenny Review*. This group also had the only instance of user error during usability testing. In order to locate the poem "Ode to Home" published by *The Minnesota Review*, users were directed away from the main website to the publisher's website where all the issues were sorted by year. The instructions purposely did not provide the volume and issue number in order to find out how users problem solved to find what they needed on the website. The search bar, while effective in locating the poem, was not initially noticed by users who all tried to first locate the

poem by browsing the table of contents of several different issues. When asked why they did not

directly opt for the search bar, users said that it was not clear whether the search bar pertained to

The Minnesota Review since the website they were directed to was for *Duke University Press*,

which publishes much more than just *The Minnesota Review*.

On the other hand, *The Threepenny Review* did not offer a search bar function to help

locate particular content. Users were made to guess which of the 152 issues dating back to 1994

had published the short story "Child's Play." One user, after nearly four minutes of searching this

way, gave up on the task altogether. The other two users were able to locate the story after

clicking on the correct issue in less than three minutes. The full results of the reader user group's

usability testing is shown in the table below.

Table 3: Usability test results for reader user group

Reader User Group	Time on Task (min) *The Minnesota Review*	Success / Error Rate	Time on Task (min) *The Threepenny Review*	Success / Error Rate
Participant 1	02:44	Success	01:30	Success
Participant 2	03:01	Success	03:50	Error
Participant 3	02:56	Success	02:38	Success

Recommendations and Further Research

There are three recommendations for developing and designing online content that were

derived from this study's usability testing and debriefing interviews. The first is that menu

design and website navigation should offer direct pathways to content. Users prefer to use as few

clicks as possible to access their desired content, and prefer to avoid hyperlink redirects to

separate websites. In addition, instructional content should be written with concision to reduce

the cognitive load of the user and the time spent completing a task. The extra details provided in

longer instructions was not reported to add sufficient value because users were more concerned

with completing their task efficiently. These first two recommendations engender a third point:

that the perceived ease-of-use of a website has a direct correlation with the perceived usability of that website. Thus, online literary journals can directly and quickly improve the user experience of their websites by implementing the above recommendations.

Further research on usability factors in website design should explore some of the limitations of this study. There was a limited and selective sample size of users which may not be representative of online users in general. In order to develop a consistent terminology across menu designs to help facilitate quicker navigation, users with little to no exposure with literary journals ought to be tested. Furthermore, there is a vital user group that was not researched for this study, namely, the editors of literary journals. This user group is directly responsible for any changes that get implemented to the online literary journal experience. A qualitative study researching the methods that editors are using, or plan to use, to attract new readers and writers to their journals will help ensure that this literary tradition continues to thrive as a source of cultural and intellectual expression.

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Appendix A

Table 4: Literary journal content analysis spreadsheet

Journal Name							
Four Chambers Press	About	Issues	Collections	Poetry	Order	Submit	Events & Programs
Sonora Review	News	Submit	Interviews	Reviews	Flash Prose	Shop	About
South Dakota Review	About	Masthead	Submit	Subscribe	Archives	wordpress.com	
The Literary Review	Read	Submit	Subscribe	Issues	About	HTML	
Fourteen Hills	Publications	Features	News	Subscribe	Support	Submit	About
Tulane Review	Home	Submission Guidelines	Staff	Archive	The Tulane Review	HTML	
Passages North	Home	Blog	Bonus Content	Current Issue	Archives	About	Submissions
Free State Review	Ontology	Contributors	Submit	Subscribe	Affairs	Bookstore	Currently
Hayden's Ferry Review	Home	The Dock: HFR Online	Blog	Submit	Store	The Masthead	HTML
Yemassee	Home	Masthead	Subscribe	Archives	Contests	Features	Submit
The Carolina Quarterly	About	Print Journal	Online Features	Submit	Subscribe & Buy	Contact	Donate
Willow Springs	Current Issue	Subscribe & Support	Prose, Poetry, and Author Profiles	Interviews	Back Issues	About	Submit
Cutthroat	Home	Contest	About Us	Submissions	Online Mentorship Program	Subscriptions	Winners
Black Warrior Review	BWR	About	Submit	Online	Issues	Purchase	Donate
Bat City Review	Home	About	Issues	Featured	Short Prose Content	Submit	Store
The Fourth River	Online Issues	Selections	Blog	Tributaries	Submit/Order	About Us	wordpress.com
Ellipsis	Prizes	Archive	Contributors	About	Submit Now	HTML	
The Minnesota Review	Issues	For Authors	Alerts	Purchase	About	HTML	
Natural Bridge	About	Subscribe	Submit	Masthead	Current Issue	Previous Issues	News and Notes
Portland Review	About	Blog	Submit	Subscribe	Contact	HTML	
A Public Space	Magazine	Books	Support	Events	Workshops	About	News and Notes
Redivider	Home	About	Archives	Submit	Issue 14.2 (Spring 2017)	15.1 (Fall/Winter 2018)	HTML
Puerto del Sol	Home	Poetry	Prose, Poetry, and Author Profiles	Black Voices	About	Blog	HTML
Boulevard	Home	Donate	Store	Submit	Contests	Excerpts	Recs
Witness Magazine	Home	Current	Issues	Fiction	Nonfiction	Poetry	Photography
Zone 3	Literary Journal	The Press	About	Events	Blog	Submissions	Z3 Online
Booth	About	Archives	Shop	News	Submit	HTML	
Cutbank Literary Journal	Home	Events	About	Read	Shop	Submit	HTML
Glimmer Train	Welcome	Open Now	Submit Your Stories	Glimmer Train Stories	Writers Ask	Writing Guidelines	FAQs
The Masters Review	Blog	Submissions	Calendar	New Voices	Anthology	Past Awards	About
LitMag	About	Issues	Subscribe	Submit	LitMag Online	Contact	HTML
The Suburban Review	About	Submit	Shop	News	HTML		
Chicago Review	About	Reviews	Commentary	Chicago	HTML		
Blue Earth Review	Home	Masthead	Submissions	Issues	Store	About	Contact
Threepenny Review	Home Page	Current Issue	Past Issue	Reading Room	Gallery	Books	Links
	Home x14	About x29	Submissions x6	Current Issue x4	Archives x7	Subscribe x12	HTML x24