Tagging, Folksonomy and Art Museums:
Results of steve.museum's research

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Abstract

Tagging has proven attractive to art museums as a means of enhancing access to on-line collections. The steve.museum research project studied tagging and the relationship of the resulting folksonomy to professionally created museum documentation. A variety of research questions were proposed, and methods for answering them explored. Works of art were assembled to be tagged, a tagger was deployed, and tagging encouraged. A folksonomy of 36,981 terms was gathered, comprising 11,944 terms in 31,031 term/work pairs. The analysis of the tagging of these works – and the assembled folksonomy – is reported here, and further work described.

Tagging is shown to provide a significantly different vocabulary than museum documentation: 86% of tags were not found in museum documentation. The vast majority of tags – 88.2% – were assessed as *Useful* for searching by museum staff. Some users (46%) always contributed useful tags, while others (5.1%) never assigned a useful tag. *Useful*-ness increased dramatically when terms were assigned more than once. Activity for Registered Users was approximately twice that of Anonymous Users. The behaviour of individual *supertaggers* had far more influence on the resulting folksonomy than any interface variable. Relating tags to museum controlled-vocabularies proved problematic at best.

Tagging by the public is shown to address works of art from a perspective different than that of museum documentation. User tags provide additional points of view to those in existing museums records. Within the context of art museums, user contributed tags could help reflect the breadth of approaches to works of art, and improve searching by offering access to alternative points of view. Tags offer another layer that supplements and complements the documentation provided by professional museum cataloguers.

Keywords: Tagging, folksonomy, art museums, vocabulary analysis, search log analysis, research agenda, user-generated content

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1.   Introduction

This paper reports on the research conducted by steve.museum between October 2006 and December 2008. It reviews current implementations of tagging in museums and – in the context of research about access to art museum collections – summarizes the research questions, reviews the methods adopted by steve.museum to answer them, and presents results. Outstanding issues are discussed.

Many questions remain about how tagging and folksonomy might function in the museum context. Research is needed develop a basic understanding of how users tag works of art, the kinds of terminology they use, and how that relates to documentation created in museums (Trant, 2009b). Further study will help build an understanding of the differences between tags and museum documentation and develop an appreciation of how tagging and the resultant folksonomy might be used to improve access to museum collections on-line.

This work was funded in part by the U.S. Institute of Museum and Library Services through a National Leadership Grant that ran from October 2006 through December 2008 (Indianapolis Museum of Art, Chun, Stein, & Trant, 2007; The Metropolitan Museum of Art & Trant, 2006).

2.   Problem Statement: Finding works of art on-line

2.1   Available access to art museums

Locating and gaining access to the primary sources – the works of art themselves – is one of the major challenges of a student, scholar, or enthusiast engaged with cultural heritage. Works of art related by subject, theme, artist, or other area of interest are dispersed throughout the world, in public and private collections. As a result, often, much of the 'work' in art historical scholarship is in identifying works appropriate for study, and building personal collections of textual and visual documentation to support research. Indeed, departments of art history – and many museums – have large Visual Resources collections of reproductions assembled at great cost to support teaching and research.

Traditions of sharing information about cultural collections through the distribution of reproductions stretch back to the creation of reproductive prints depicting famous paintings in the Renaissance, and were formalized in international agreements supporting the creation and exchange of plaster casts in the 19th century (*Convention for promoting universally reproductions of works of art for the benefit of museums of all countries* 1867). Integrating access to museum collections has been a goal since computing was introduced in the museum context (The Metropolitan Museum of Art, 1968), and played a large role in the founding of

the Museum Computer Network (MCN) in 1967 (Misunas & Urban, 2007). The movement to unite information about dispersed cultural collections was reinvigorated in those responsible for managing documentation about art collections with the development of on-line networked communications. "Virtual databases" – logical constructs that bring together information resources housed in distinct databases and maintained by different institutions – began to seem possible when the Internet offered ways to connect disparate text database resources (Bower, 1993). But it was the World Wide Web, with its approachable interfaces and easy integration of text and image that accelerated development.

Museums have moved (in the last ten years or so) from wondering whether they should put their collections on-line to exploring the implications of having their collections on-line. This openness has coincided with an increased focus on the role of museums in the community, and with the development of more user-centered philosophies for the creation and delivery of networked information resources (H. S. Hein, 2000; Parry, 2005; Vergo, 1989).

When viewed from a user perspective, on-line museums collections, while a vast improvement on the limited access offered previously, may not be fully satisfactory. Networked information still mirrors physical museum reality in many ways. It is still not possible to search art museum collections as a whole; one must separately visit each museum Web site. The information presented is structured according to museum goals and objectives – which may not mesh with those of the user. The language used is often highly specialized and technical, rendering resources inaccessible or incomprehensible. An on-line work of art or other museum object may be embedded in an exhibition or other interpretive context with a point-of-view not shared by the user. Or inversely, the object may only appear in a database, completely de-contextualized and without the meaning that comes from its cultural context (for example, seeing it alongside other artifacts of the same culture, or viewing how it was used).

2.2   Possible contribution of tagging

The challenge of creating and organizing personal collections of networked information resources is not unique to the users of on-line art museum information. Others who actively use Web-based resources, such as on-line databases of scientific articles, have developed tools to enable the creation of personal collections of 'bookmarks' or pointers to networked resources, that are described or 'tagged' with words that identify and categorize them (Mathes, 2004; Quintarelli, 2005) – see for example, del.icio.us (Golder & Huberman, 2005), Connotea (Hammond, Hannay, Lund, & Scott, 2005; Lund, Hammond, Flack, & Hannay, 2005), Cite-U-Like (Emamy & Cameron, 2007), and PenTags (Pennsylvania State University Library, 2005-). "Social Tagging" refers to the practice of publicly labeling or categorizing resources in such a shared environment. "Tagging" is that practice, conducted individually. The resulting assemblage of tags form a "folksonomy": a conflation of the

worlds 'folk' and 'taxonomy' used to refer to an informal, organic assemblage of related terminology (Vander Wal, 2005). When shared with others, or viewed in the context of what others have tagged, these collections of resource identifiers, tags and people begin to take on additional value through network effects. It has been theorized that searching tags enables the discovery of relevant resources, and the social relationships that develop among taggers become a means of information discovery in and of themselves (Marlow, Naaman, boyd, & Davis, 2006). Museums have been interested in social tagging, in part because of the success of image tagging environments such as the ESPgame [http://www.espgame.org], that became the Google image labeler (Bearman & Trant, 2005; von Ahn & Dabbish, 2004).

Museum documentation is known to address works of art from a different perspective than that of the public. Within the context of art museums, user contributed tags might help reflect the breadth of approaches to works of art, and offer access to alternative points of view. Tags could offer another layer that supplements and complements the documentation provided by professional cataloguers. Indeed, curatorial staff may not be able to provide access points of relevance to the public. As a curator at The Metropolitan Museum of Art said, "everything I know is *not* in the picture" (Jenkins, 2006). Proof-of concept studies at The Metropolitan Museum of Art solicited tags for works of art, and showed the potential contribution that tagging might make to improving access to art collections, through an analysis of the contributed tags and their comparison to documentation created by the museum (Trant, 2006a).

Tagging is a highly personal activity (Golder & Huberman, 2005). Tags exist in a liminal space between a user and an information resource, and as such represent a critical facet of personal meaning-making. The subjective nature of tagging might reveal something of how art collections are perceived by a broad public. As there are few tools to directly gather this kind of feedback from museum visitors, tagging merits exploration within the context of other museum-based community development and user-contributed content initiatives (Trant & Wyman, 2006).

User tags might help bridge the gap between professional and public discourse by providing a source of terms not in museum documentation (Trant, 2006b); empirical study of the nature of user tagging, and its comparison to documentation created in museums is needed to establish this (Trant, Bearman, & Chun, 2007). User tags could enhance the number and kind of access points for works of art, and therefore improve recall through the presence of more index terms. The folksonomy derived from user tags might serve as another layer, augmenting existing description and indexing tools, but not replacing them (Trant & Wyman, 2006). This broadens the scope of indexing vocabulary beyond that of professional cataloguers or indexers (Honigsbaum, 2005; Kipp, 2006a, 2007; Trant, 2006a, 2006b).

While early studies point to the possibilities, a large number of outstanding questions remained in 2006 when this study was framed. Further investigation was necessary to establish whether tagging and folksonomy might improve access to art museum collections on-line.

3.   The State of Research

3.1   Tagging, Folksonomy and Museums

A review of access to collections and collections documentation revealed room for improvement in the way art museums catalogue collections and make them available. A survey of the tagging and folksonomy literature (Trant, 2009a) points to a number of ways that tagging and folksonomy could enhance access to museum collections on-line. Preliminary studies have framed issues in tagging and folksonomy within a museological context, and modeled methods for their exploration. These studies provide direct context for the research that follows.

Genres of curatorial discourse are explored in the templates created for the Pachyderm project (Johnson, Mitroff, & Samis, 2005). Most curatorial texts – such as a gallery wall label, or an exhibition catalogue entry – are written for particular purpose. When the role of these texts is changed from their original purpose of offering interpretation to the support of information retrieval, they may not be as effective. The subject matter of a work of art is often taken as given – unless it is problematic – as the work is assumed to be present and visible. Social tagging seems a promising way to supplement museum records with terminology to answer some kinds of queries, but a large scale, multi-museum study comparing tags and terms found in museum documentation was needed to determine this.

In a study of tags contributed during prototype steve.museum data collection, tags for works of art were compared to museum documentation, to explore the actual contributions made by naïve users. Surprisingly large proportions (in one case > 90%) of tags represented terms not found in museum records. A comparison of tags assigned to the four most-tagged works in the steve.museum tagger prototype, with their documentation on the Web site of The Metropolitan Museum of Art, confirmed the distinction between public and professional vocabularies pointed to by the Proof of Concept studies (Trant, 2006a), and confirmed in prototype studies (Trant, 2006b).

The relationship between user tags and museum education and interpretation also remains to be established. Kellogg Smith (2006) adopted the steve.museum methodology of comparing tags to museum documentation (Trant, 2006a; Wyman, Trant, Chun, Cherry, & Hiwiller, 2006), but approached on-line tagging from a frame of in-gallery visitor studies, confusing the goals and purposes of on-line information access and in-museum art education. Tagging

needs to be studied within a robust model of the museum, its social and educational objectives, and its many types of interactions with users. The tagging activity needs to be positioned within a context of on-line information retrieval and use, and distinguished from possible studies of in-gallery applications or discursive art educational texts and programs.

Van Hooland reports a content analysis of comments made about a digital collection in the National Archive of the Netherlands (~500,000 photographs a core of news photography). The study was premised on the idea that comments provided more value than simple tags: "as comments are not restrained to a chain of one-word descriptors, they can offer a higher semantic value and have more potential use for implementation within cultural heritage databases" (van Hooland, 2006). While related through its content analysis of user contributions, this study does not address questions of access *per se*. Nor does it provide insight into the possible role of tagging or folksonomy.

The Cleveland Museum of Art has been experimenting with tagging, soliciting terms with the invitation to "help others find this object" (Cleveland Museum of Art, 2005). Their experiments revealed a difference between user behaviour when commenting (in a large text box), and when tagging (in a small text box) (Wyman, et al., 2006). Studies of tagging must take care to distinguish it from more discursive user commenting.

3.2   Improved Access to Collections

User tags could enhance the number and kind of access points for works of art, and therefore improve recall through the presence of more index terms. The folksonomy derived from user tags might serve as another layer, augmenting existing description and indexing tools, but not replacing them (Trant & Wyman, 2006). This broadens the scope of indexing vocabulary beyond that of professional cataloguers or indexers (Honigsbaum, 2005; Kipp, 2006a, 2007; Trant, 2006a, 2006b). This has certainly been the experience of the Library of Congress in their early experiments with the Commons on Flickr (Oates, 2008; Springer, et al., 2008), echoed in that of the Powerhouse Museum (Chan, 2008a, 2008b) and the National Library of New Zealand (Johnston, 2008), and was the motivation for tagging at the Philadelphia Museum of Art (Philadelphia Museum of Art, 2007), the Indianapolis Museum of Art, the McCord Museum, Montreal, Smithsonian Photography (Smithsonian Institution, 2006), and the Brooklyn Museum of Art (Bernstein, 2008a).

Searching based on tagging has been implemented in several on-line museum collections. The Powerhouse in Sydney is the best documented (Chan, 2006a, 2006b, 2007a, 2007b). Chan reports strong user participation in tagging and significant increases in use of the on-line public access catalogue. He also shows how tagging surfaced a popular object – a dress worn by Australian pop star Delta Goodrem – that had never been on display in the museum (Chan, 2007b). But the unique contribution of user generated tags cannot be determined in this context, as a number of different system enhancements were deployed together,

including tagging, the seeding of indexes with terms derived from collection documentation, and the creation of a Web of related objects derived from co-occurrence of index terms. Most recently, the Powerhouse has been further enhancing its collections documentation by integrating machine-generated tags, created using Open Calais (Chan, 2008c), further exploring hybrid solutions to improved access to collections.

The relationship between user tags and searches of art museum collections has not been systematically evaluated. A preliminary study of art museum searching showed a broad range of searches, many of which were unsuccessful (Trant, 2006c). But the correlation between tagging and collections searching has not been established. Larger comparisons of search terms to tags assigned to a broader range of objects from multiple museums are necessary to determine how user tags relate to searching of museum collections, and identify if including tags in search indexes might offer improved results. The relationship of user-assigned tags to user-provided search terms that produced no results when searching the same art collections would be of particular interest. However, the data to support this kind of research might not be readily available.

3.3 Understanding Audiences and Building Community

New perspectives in museum documentation might engage new communities and tagging might improve museums' understanding of users. For example, specialist design and textile historians engaged on-line and when given the opportunity provided user descriptions of swatches in a series of electronic swatchbooks of fabrics in the collection of the Powerhouse Museum (Powerhouse Museum & Chan, 2005), both making this previously inaccessible content searchable, and supporting their specific uses of it. Tagging and folksonomy may also offer new ways for museums to engage user communities and assist them in their use of collections (Coldicutt & Streten, 2005). This could be the general public tagging works in the Powerhouse Collection (Chan, 2007b) or 19th century scholars as part of The NINES Consortium (2005). They could be geographically connected, as in the Taggin' Tallinn project (Kaipainen & Pata, 2007). Or they could be in the context of a game, as at the McCord Museum of Canadian History (McCord Museum, 2007), or personal collections, as with Collection X at the Art Gallery of Ontario (Art Gallery of Ontario, 2007; Rubenzahl, Wiginton, McIntyre, & Lajoie, 2008).

Matusiak (2006) looked at examples of social classification (primarily in Flickr) as models of the ways that user generated tags could encourage user involvement with digital image collections. Museums might take advantage of the subjective nature of tags – particularly when tags move towards annotations, like they do in the PennTags application, an academic social bookmarking (annotation) tool for use on the Penn State campus (Pennsylvania State University Library, 2005-) – to learn more about users' interests. Museum-related entries in tag-driven environments like Flickr (2006) and del.icio.us (2006), provide another window into audience interests, behaviours and attitudes that might help further understanding of

how the museum and its collections are perceived. But while the public tagging of museum content in Flickr and del.icio.us is now quite extensive, it is difficult to sample and study.

As museums strive to be more relevant to their communities, comparison of results obtained by different methods of encouraging engagement with collections should be systematically analysed. Successful implementation of tagging in museum is dependent upon developing a basic understanding of how users tag works of art, the kinds of terminology they use, and how that relates to documentation created in museums. Only then can museums make informed decisions about how and where to implement tagging, which works to present, whether and how to recruit taggers, what choices of functionality to offer them, whether and how to review the tags they provide, whether to show those tags to others, how to use them in retrieval, and whether and how to integrate them into museum documentation.

4.   Methods: An Experiment in Tagging Art

Following several proof-of-concept studies in 2005/6, a this larger scale study of tagging works of art was conducted to establish whether adding tags to indexes could help improve access to on-line art museum collections. This study necessarily built on an understanding that tags might reflect a differing view that that of museums' own documentation, and probed those differences. It also explored the relationships between tagging and searching, to see if there might be ways to use tags to improve indexes.

4.1   steve.museum

This research was conducted within the steve.museum collaboration. Steve.museum is a group of art museums (and the professionals who support them) formed in 2005 to explore the role user-contributed descriptions play in improving on-line access to works of art. Participants include: Denver Art Museum; Guggenheim Museum; The Cleveland Museum of Art; Indianapolis Museum of Art; Los Angeles County Museum of Art; The Metropolitan Museum of Art; Minneapolis Institute of Arts; The Rubin Museum of Art; San Francisco Museum of Modern Art, Archives & Museum Informatics; and Think Design (Bearman & Trant, 2005; Trant, et al., 2007; Trant & Wyman, 2006; Wyman, et al., 2006). The group is funded in part by the U.S. Institute of Museum and Library Services through a National Leadership Grant that ran from October 2006 through December 2008 (Indianapolis Museum of Art, et al., 2007; The Metropolitan Museum of Art & Trant, 2006).

Collaborators in steve.museum wished to conduct 'real world' studies, as much as was possible (Markey, 2007). Working together on steve.museum provided a safe 'third space', not identified with any of the partners, where experimental approaches could be explored without a direct impact on existing institutional services. It also enabled cross-collection perspectives to develop, broadening the relevance of the work.

Over the course of this research project, the participants in steve.museum have assembled a collection of works of art to tag, created a piece of tagging software within which to collect tags and study tagging, recruited users to tag, assembled a significant body of tag data, and analysed that data from a number of differing perspectives. Tags were described, their vocabulary analysed, and their relationship to works of art established.

The close involvement of museum staff in the research ensured access to documentation, images of works from museum collections, and logs of searches made of museum Web sites. In addition, assessment of the contribution of tags required museum input. As many barriers to change in institutions are cultural, museum staff involvement was essential to assess impediments to the inclusion of user-contributed index terms in museum on-line documentation. Museum staff involvement also helped place the research in an appropriate museological context.

4.2   A Model of Tagging Works of Art
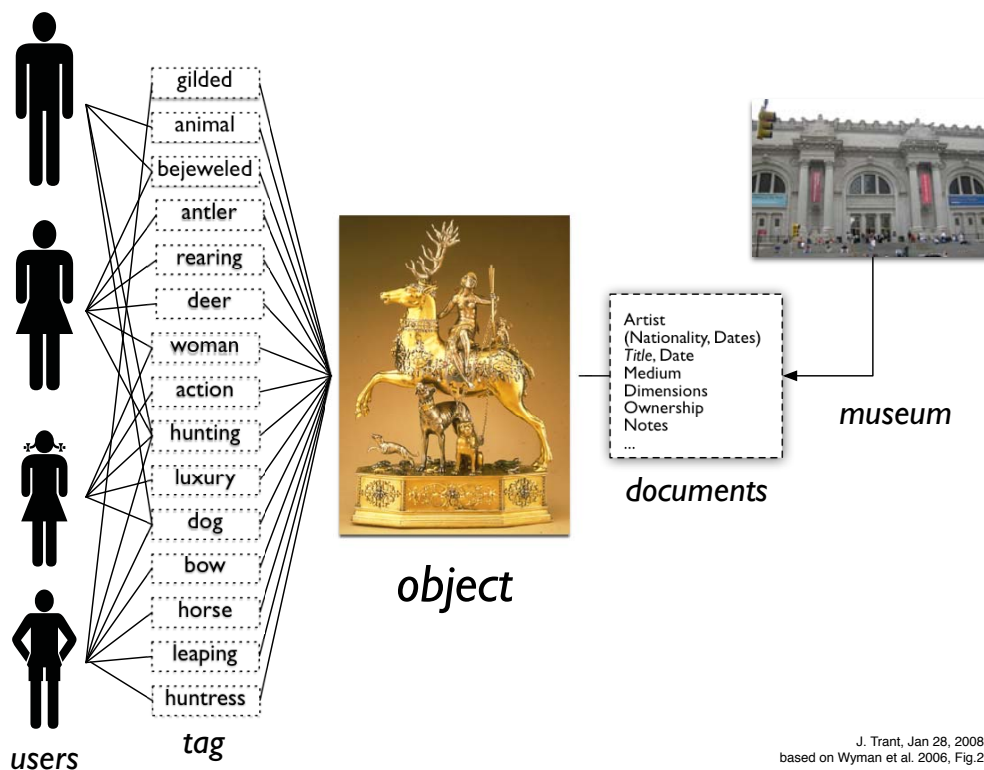
Figure 4-1. Differing perspectives / differing vocabularies: while users tag from multiple perspectives, the museum documents from a single, institutional point of view

Our model of tagging (Figure 4-1) builds on the literature survey of museum documentation and tagging/folksonomy. When museums document objects, they compile records according to internal standards and guidelines. Curatorial involvement ensures that works of art are researched and information is presented in a scholarly manner. A single, authoritative record is created describing each work of art, and this record represents the work in a collections database and other museum publications. However, when users tag a work of art, they respond to different aspects of it, often influenced by personal interests. Users' tags vary greatly, and may be highly idiosyncratic, or may overlap with those of others.

5. Our Research Question: Can Social Tagging and Folksonomy Improve On-line Access to Art Museum Collections?

Understanding the contribution that social tagging and folksonomy make to on-line access to art museum collections required an empirical study of real tags applied to different works of art by a broad range of users: i.e. a larger, longer duration study than the prototypes mentioned, that involved multiple museums, and gathered thousand of tags from a large number of users over many months. Such a study needed more access to details about users, tags and works tagged than was possible from harvesting Flickr tags and more diversity than was represented in single-institution tagging systems.

5.1 The Research Process

An examination of the multiple facets of tagging – and their relation to museum documentation – was necessary to determine how the parts inter-relate (Figure 5-1). Studies of the tags assigned made it possible to determine if tags add to the professional documentation of works of art, answering the question "Do user tags differ from terms in professional museum documentation?" Comparing tags to controlled vocabularies used in the profession – the Union List of Artists' Names (J. Paul Getty Trust, 2000b) and the Art and Architecture Thesaurus (J. Paul Getty Trust, 2000a), established if tags are comprised of a similar vocabulary to that of museum professionals, or if public terminology differs. A tag-by-tag review by museum staff answered the question "Do museum staff find user tags useful for searching art collections?" and helped establish if the contribution of the public might improve on-line searching. A comparison of tags assigned to searches of on-line collections, addressed the question, "Do user tags differ from terms used to search on-line art museum collections?". If there is correspondence between tags and search terms, and those tags that match search terms are not found in museum documentation, then their presence could improve retrieval, by increasing recall.
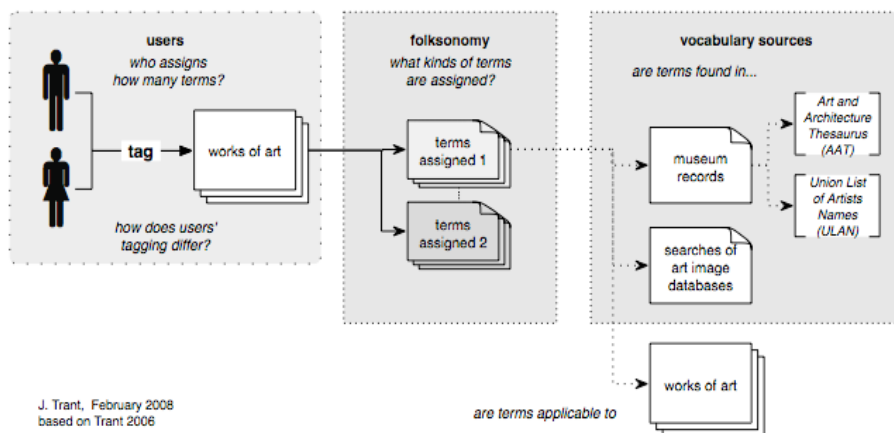
Figure 5-1. Studying social tagging and folksonomy in art museums: Interactions between Users, Tags, Tagging Environments and Institutional Perspectives

In the process, the steve.museum collaboration developed methods to address a set of related research questions, each of which adds to an understanding of the broader contribution of social tagging and folksonomy to on-line access to art museum collections. Three of these narrower questions are tag-related, and one relates to the social tagging system environment:

Tag-Related Questions:
- *Do user tags differ from terms in professional museum documentation? If so, how?*
  If user tags differ from terms in professional museum documentation they can be said to provide additional access points and thus improve recall when collections are searched.
- *Do museum staff members find user tags useful for searching art collections?*
  The usefulness of user tags for searching – i.e. the ability of naïve users to provide helpful descriptions – has been called into question by professionals. If museum staff review tags assigned to works of art, and find them useful for searching, this criticism of user tagging can be addressed.
- *Do user tags correspond to terms used to search on-line art museum collections, i.e. could their presence in indices improve retrieval?*
  It has been widely hypothesized in the tagging literature that tags will improve searching. This assertion can be probed by comparing tags to the terms used to search museum collections. If the tags and search terms match, then tagging could improve searching. How much tagging could improve searching cannot be established without also comparing search terms to museum documentation. The match between search terms and museum documentation reflects the *status quo*. Any increase in matching when tags are introduced can be considered an improvement.

Tagging Environment Question:

- *Does the tagging interface influence tags assigned?*
  It has been widely hypothesized that interface influences tags assigned. For example, term suggestion encourages term re-use. Museums interested in maximizing the utility of tags for searching might wish to tailor interfaces for certain circumstances (to produce more, varied tags for instance, rather than to validate particular tags already assigned). A series of controlled interfaces to the tagging software made it possible to test the effect of simple variations.

These questions represented the 'first order' of enquiry in a set of related research questions articulated by steve.museum participants (Cataloguing by Crowd Working Group & Trant, 2005). A pragmatic approach to this research was adopted, employing a variety of methods to describe the tags collected, compare them to documentation created for works of art, review them in conjunction with museum staff, compare tags with evidence of searching (found in search logs), and compare tags assigned across interfaces.

6. The Research Study

6.1 The steve tagger software

To gather data to enable the study of these questions, a tagging tool – or tagger – was made available on the Web. The tagger presents works of art to be tagged in a number of different interface configurations. It gathers detailed data about registered and anonymous taggers and records the tags they assign, linking tags both to works and to the system environment in which they were given. It is available for tagging works of art at http://tagger.steve.museum.

Data is recorded in a MySql database, and is readily available for analysis. See (Figure 6-1) for a simplified schematic of the data structure.
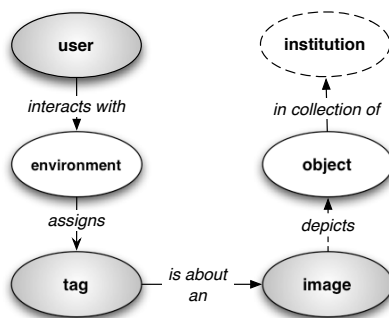
Figure 6-1. The steve.museum data model, simplified. Users assign tags to images of objects, within defined interface environments.

The data exported from the steve tagger for analysis is described in detail in Appendix I (Lee & steve.museum, 2008).

The steve tagger is Open Source, distributed under a General Public License (GPL). Source code is downloadable from sourceforge.net (http://sourceforge.net/projects/steve-museum). It was developed by a number of different steve.musuem partners, including Think Design and the programming team at the Indianapolis Museum of Art, based on specifications developed by the steve.museum team and the Principal Investigator.

6.2   The Data Set: Works of art to be tagged

Any study of tagging art museum collections requires a test collection of digital representations of museum objects that can be made available for users to tag. In order to be reflective of the actual documentation available in art museums, the collection was drawn from readily accessible, existing digital materials, created and used by art museums, and made available on the Web. New documentation was not compiled for this research.

6.3   The Data Set: Description

Prototypical tests (reported in Trant, 2006a) showed that tagging activity differed depending on the type of work presented – e.g. a medieval manuscript vs. an Impressionist painting – so the test collection included a broad range of works, and tried to avoid over-concentration in particular areas (beyond what is reflective of art museum collections generally).

Steve.museum assembled a test set of 1,784 works of art, with contributions from all participating museums, and a number of other interested museums. The breakdown between institutions is shown in Table 6-1. Works were released in two phases. Initially, between March 26, 2007 and October 14, 2007, 1,552 works were available for tagging. Works from the San Francisco Museum of Modern Art and Cleveland Museum of Art were added, bringing the total to 1,784 between October 15 and March 13, 2008.

Works remained available for tagging at http://tagger.steve.museum after March 13, 2008. However, a number of changes in the software environment made after that date – including the lining of the tagger to Facebook – encouraged certain kinds of behaviour – such as skipping through works to find attractive ones and redundant tagging so a work would appear on your profile – mean the subsequent data collected is not comparable. It is therefore not considered in this report.

Museum	Total	Term Set 1 26-Mar-07- 10-Jul-07	Term Set 2 11-Jul-07- 15-Oct-07	Term Set 3 15 Oct-07- 13-Mar-08	note
The Metropolitan Museum of Art	249	251	249	249	*2 removed July 23, 2007*
Indianapolis Museum of Art	250	250	250	250	
Minneapolis Institute of Arts	243	243	243	243	
Boston Museum of Fine Arts	237	237	237	237	
Los Angeles County Museum of Art	191	191	191	191	
San Francisco Museum of Modern Art	161	46	46	161	*115 added for 11 Oct., 2007*
Skirball Cultural Center	153	153	153	153	
Cleveland Museum of Art	117	0	0	117	*117 added for 11 Oct., 2007*
Rubin Museum of Art	111	111	111	111	
Tate Modern	50	50	50	50	
Denver Art Museum	20	20	20	20	
Total	**1782**	**1552**	**1550**	**1782**	

Table 6-1: Number of works in the steve.museum data set, by institution

Works were solicited that represented a broad range of styles and periods, and represented the full range of types of works in art museum collections. To ensure this representation, the works were classified (by two separate project participants) using the Object Types developed for the Art Museum Image Consortium Library (Art Museum Image Consortium (AMICO), 1996, 2000). The distribution, shown in Figure 6-2 shows that caution must be exercised when applying the conclusions gathered to some kinds of under-represented works of art: Audio-Video, Architecture, Books, Costume and Jewelry, Textiles, Installations, Prints, Mixed Media are each less that 5% of the data set. Architecture, Audio Visual, Installations and Mixed Media represent sets of fewer than 10 works.

Care was taken to ensure that the research set included two- and three-dimensional objects, and were both representational and non-representational works.

Multi-Institutional Tagger: Works by Object Type
[all 1784 works]

Figure shows a pie chart with the following segments:
- Audio-Video 0.5%
- Architecture 0.5%
- Textiles 3.0%
- Sculpture 20.2%
- Prints 4.4%
- Photographs 5.6%
- Paintings 35.8%
- Books 1.2%
- Costume and Jewelry 3.8%
- Decorative Arts and Utlilitarian Objects 18.8%
- Drawings and Watercolors 5.3%
- Installations 0.6%
- Mixed Media 0.4%

J. Trant
Nov. 27, 2008
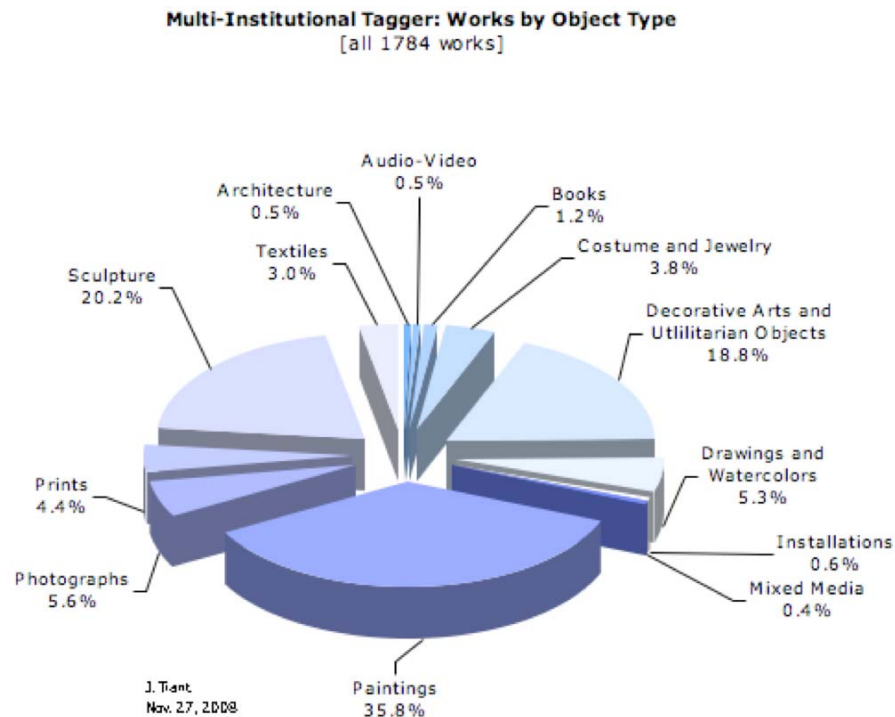
Figure 6-2. steve.museum Multi-Institutional Tagger: Distribution of works in steve.museum data set by Object Type

6.3.1   Associated Images

Images used for the study were gathered from existing collections, and were of the size and resolution that museum professionals have actually made available, or are comfortable releasing freely on the Web for broad use. They were captured according to procedures in-use in participating museums.

Each work in the steve.museum data set was represented by a digital image, 1024 x 768 pixels. This size was selected because it would support 'full screen' display for viewing works, but not be of so high a quality as to cause concerns about its distribution on the Web. This image was resized for display in the steve tagger software, to thumbnails used in lists and selection screens and 1/3 size images embedded in the tagging screen (see Section 8 below), and made available in full in the 'zoom' window.

6.3.2   Associated Documentation

Each work of art in the steve.museum test data set was also described in a fielded text record. Textual documentation reflected standards in-place, and content readily available. New research was not conducted in order to improve museum documentation prior to release of

works for tagging. In this way, the information about works of art encountered in our experimental tagging environment was representative of that encountered on a museum Web site.

Searching in museum on-line catalogues is supported on basic data fields, often prosaically referred to as 'tombstone data', that are likely to be present for most works. These are:

> Artist (nationality birthdate-deathdate)
> *Title*, date
> medium, support
> dimensions
> Acquisition details (accession number).

These data are commonly used to identify and describe the work of art inside the museum, and are presented on in-gallery labels ("label copy"). They are present for all works in the steve.museum data set. Extended Curatorial Notes may or may not be available (steve.museum, 2007). An example of the kind of documentation available is shown in Table 6-2.

Museum Data	Definition	Req.	Example
Institution	The display version of your museum's name	y	The Metropolitan Museum of Art
Image filename	The name of the image file that matches this object.	y	aps854.jpg
Institution ObjectID	An identifying number assigned to the object in your institution, other than an accession number (e.g. the record number from your collections management system).	n	11479
Title/Object Name	The display for of the work's preferred Title or Name.	y	The Gulf Stream
Date	The display form of the work's date.	y	1899
Maker/Culture	The display form of the creator's [or creators'] name[s] (and dates if desired)	y	Winslow Homer, 1836–1910
Medium	The display form of the material, support and/or techniques used to make the work	y	oil on canvas
Dimensions	The display form of the work's dimensions	y	28 1/8 x 49 1/8 in. (71.4 x 124.8 cm)
Object Type	The type of work, e.g. painting, sculpture, installation	y	painting
Credit Line	The display form of any credit to be shown with the work of art.	y	Catharine Lorillard Wolfe Collection, Wolfe Fund, 1906
Copyright	The Display form of any copyright statement for the work of art.	n	© Jasper Johns/Licensed by VAGA, New York, NY
Accession Number	The accession number assigned to the work of art in your museum	y	06.1234
Notes	curatorial or other notes about the work.	n	*The Gulf Stream* was based upon studies made during Homer's two winter trips to the Bahamas in 1884–85 and 1898–99. First exhibited at the Pennsylvania Academy of the Fine Arts in Philadelphia in 1900, the picture was subsequently reworked and "improved" [...]

Table 6-2: steve.museum Data Guidelines. Documentation for works of art submitted to be tagged was requested from participating museums in a format comparable to that of CDWA lite. A simple CSV format was used for data transfer, and files were accompanied by a digital image file (1024 x 768 pixels) for each work.

The structure for these records was derived from the Data Specification of The AMICO Library (Art Museum Image Consortium (AMICO), 1996, 2000), a pragmatically adopted data transfer format familiar to most participants and similar to CDWA Lite.

6.3.3   Why just art museums?

All the works presented to tag could be said to belong to the same 'discipline', and this defined subject scope facilitated analysis. For example, discipline-specific content standards, such as the *Categories for the Description of Works of Art* (Art Information Task Force (AITF), 1995; Baca & Harpring, 2006), and vocabulary sources, such at the *Art and Architecture Thesaurus* (J. Paul Getty Trust, 2000a) and the *Union List of Artists' Names (ULAN)* (J. Paul Getty Trust, 2000b) were used as benchmarks of professional vocabulary. For the purposes of this study, it was assumed that the language of the documentation and tagging was English, though some specialist terminology of foreign derivation, such as "chiaroscuro" was present.

6.4   steve tagger: Data Collected

The steve tagger was made available for public tagging of works of art at tagger.steve.museum [linked to the http://www.steve.museum site] and promoted as discussed below in Section 6.4.1.1. This is referred to as the Multi-Institutional Tagger. Users were asked to tag works of art from the steve collection. User behaviour, including the tags assigned to each work, details about the context in which they were assigned and whether users chose not to tag a work – to skip it without adding any tags – was recorded. Tagging sessions were also linked to a record of interface variables (see the discussion in Section 8 below).

Another installation of the steve tagger was made at The Metropolitan Museum of Art (MMA), referred to as the MMA tagger. It featured only MMA images, and only users known to the Met were invited to tag. Registration was mandatory. Otherwise, the taggers were identical.

6.4.1   Users

A total of 2,017 users can be identified in the steve.museum data set. Between March 2007 and March 2008, 826 users registered at tagger.steve.museum and tagged in 973 sessions; there were an additional 1,409 sessions by unregistered / anonymous users, bringing the total number of tagging sessions to 2,382.

Users had a choice of whether to login / register or just 'begin tagging' at the start of each tagging session. Of the 2,017 users, 608 people registered to use the tagger.

Some demographic information was collected about registered users as shown in Figure 6-3. Required data collected at registration included Language, Education, Art Experience and Year of Birth. Other optional information included Gender, Community Affiliation, Income, Relationship to a Museum (work in one, visit often, felt involvement], Internet Usage and Connection, Tagging experience and sites used. Finally, users were asked if they were willing to be contacted for follow-up during the research project.

As most of the demographic fields were optional, coverage is inconsistent; conclusions about user behaviour based on demographics do not appear to be possible with the multi-institutional steve tagger dataset.

Figure 6-3: steve.museum MMA Tagger: User registration screen

Users that did not register were assigned a sequential user identifier to group their tagging activity. Tagging activity was linked to that user identification number until it stopped (the userid was passed in all session interactions). Session length was defined as the time of the first tag (or skip) subtracted from the time of the last tag or skip. There were 1,409 anonymous users identified in the 2,017 total users.

6.4.1.1 Recruiting Users

Taggers were recruited from the broad Internet community, and asked to tag works of art. Within steve.museum, taggers were solicited through general museum electronic mailing list requests (e.g. MUSEUM-L), subject-specific lists (such as H-ArtHistory and CAAH), the popular press (including coverage in *The New York Times* (Pink, 2005); (O'Connell, 2007) and local press in cities like Indianapolis (Elig, 2007)), blog postings (175 tracked to the end of December 2008), and volunteer requests on craigslist.org and idealist.org. Appendix II details the project's collaborative Recruiting Activities. This varied strategy was successful recruiting users willing to tag works of art.

6.4.1.2 Users with Zero Tags

A large number of visitors to the steve tagger did not engage in tagging. The data shows 4,089 anonymous users, but of these 2,468 neither tagged a work, nor skipped on to the next one. These users were removed from the data set, were not reported in the total number of users, and were not counted in the session data. These were not likely software agents or 'bots' as this activity was removed from the data set based on the self-description in the httpd logs (see the table steve_bot_user_agent (Lee & steve.museum, 2008)).

In addition, 254 of the 826 registered users neither tagged a work of art nor skipped on to the next one, and 332 of the 826 registered users didn't tag (i.e. 78 registered users skipped at least one work but did not tag any).

We contacted 181 registered users who did not tag (all those who indicated we could contact them further) and asked:

> *Dear Colleague,*
>
> *In the past year you registered at steve.museum to look at the social tagging application we developed for museums as part of an IMLS funded research project. You were kind enough to tell us we could contact you further with questions.*
>
> *We have one question:*
>
> *As you can imagine, we have many people who tagged (including some who didn't register - choosing to remain anonymous), and many who registered (like yourself) but didn't tag.*
>
> *We are trying to understand more about the motivations of those who visited, told us about themselves, offered to help, but didn't tag.*
>
> *So... can you tell us a bit more about why you registered but did not tag?*

Fifty individuals (over 27%) responded; their responses are summarized in Table 6-3. Most of these told us they came to steve.museum because they were fellow professionals and that they didn't tag because they were busy. A significant number, 22%, said they had indeed tagged, but apparently they registered after tagging, so these tags were recorded as anonymous. Relatively few (less than 10%) didn't understand what was expected, felt unqualified or were not convinced it was worthwhile.

	Professional	Busy	Didn't understand	Did tag (registered later?)	Did tag (forgot login?)	Felt unqualified	Skeptical/ unconvinced	Don't recall
count	26	28	4	11	6	4	4	2
percent	52%	56%	8%	22%	12%	8%	8%	4%

Table 6-3: steve.museum Multi-Institutional Tagger: Registered Users who did not tag

Users that neither tagged nor skipped a work of art were omitted from the analysed data set.

A significant number of users – 396 of 2,017 or 19.6%, including 78 of 608 or 12.8% of registered users – did not tag any works of art. Users that did not tag were omitted from some calculations with the final data set (such as average tags per user), leaving a group of 530 distinct registered users, and 1,091 anonymous users who tagged (see Table 6-4).

Users	Registered	Anonymous	Total
Total	608	1409	2017
Zero Tags	78	318	396
In Study	530	1091	1621

Table 6-4: steve.museum tagger: Registered and anonymous users with zero tags

It seems likely that if this had not been a high profile project in the professional community of museums and informatics, the number of individuals who would have come merely "to look" would have been considerably fewer. The 'registered-user/zero-tagger' phenomenon is to some extent an artifact of steve.museum having been a research undertaking, of high interest to the museum and library community.

6.4.2   Tags
Between March 26, 2007 and July 7, 2008, 36,981 tags were assigned to the works in the steve.museum data set in three phases. These data are described in Table 6-5.

Term Set	Works		Users (incl. zero tags)			Terms					Sessions			Works per Session		
	total	tagged	total	reg. users	anon. users	total	per work tagged	reg. users	anon. users	black-listed	total	reg. users	anon users	avg.	reg. users	anon users
Term Set 1	1,552	1,199	602	147	455	9,611	8	4,663	4,948	4	675	220	455	5.2	6.4	4.6
Term Set 2	1,550	1,499	744	271	473	15,165	10	9,815	5,350	4	856	383	473	7.7	11.4	4.7
Term Set 3	1,782	1,440	731	250	481	12,205	8	7,141	5,064	12	851	370	481	5.1	6.9	3.8
Totals	1,784	1,772	2,017	608	1,409	36,981	21	21,619	15,362	20	2,382	973	1,409	6.1	8.6	4.4

Table 6-5: steve.museum Multi-Institutional Tagger: Number of Works, Users, Terms and Sessions
(including users with zero tags)

6.4.2.1   Blacklisted tags

Since tags were displayed to users in some tagging environments (see Section 8 below) a blacklist of terms that should not be shown, including obscenities and racial slurs, was developed. Tags that appeared on the blacklist were recorded, but not shown to the user who entered them, or to others.

Very few blacklisted terms were entered into the multi-institutional steve tagger: only 20 of the 36,981 total terms were on the blacklist. As these terms were such a tiny percentage of the total term set, and since some terms – such as *Niger Delta* – were inappropriately blacklisted, blacklisted terms have been identified in summaries but not omitted in analysis.

One reason for the low incidence of blacklisted terminology is likely that tags were not obviously displayed in any public manner in the steve tagger. This removes one of the performative motivations for misbehaviour (Zollers, 2007). It may also be that this is an unsubstantiated fear; the Library of Congress study of tagging in the Flickr Commons reported a similarly low level of inappropriate tagging (Springer, et al., 2008).

6.4.3   Users and Tags

Of the 36,981 tags entered, 21,619 tags were received from Registered Users and 15,362 from Anonymous Users. The number of tags entered per user varied significantly, from a low of 1 to a high of 1,921, a standard deviation of 73.6 and a median of 6 [users with zero tags removed], as shown in Table 6-6.

works	tags		taggers	# tags per tagger									
				total tags					distinct tags				
	total	distinct	total	high	low	average	std. dev.	median	high	low	average	std. dev.	median
1784	36981	11944	1621	1903	1	22.8	73.6	6	1127	1	19.1	49.1	6

Table 6-6: steve.museum Multi-Institutional Tagger: Tags Per User

The terminology used by each tagger varied a great deal, with taggers entering from between 1 and 1,127 distinct terms.

In the folksonomy of 36,981 tags entered, there were 11,944 distinct tags, defined as unique character strings, without stemming or other matching of synonyms. More meaningfully for tagging, there were 31,031 unique term/work pairs, indicating that even if the same terms were often used, they were not applied to the same works.

Registered users tagged more than Anonymous Users. Though Registered Users made up only 32.7% of the users in the study (530 of 1,621) they supplied 58.5% of the tags (21,619 of 36,981), almost twice the rate.

Figure 6-4 compares the number of tags assigned by Registered and Unregistered [Anonymous] Users and shows that Registered Users were far less likely to contribute a small number of tags: only 9.1% of Registered Users (48 of 530) supplied a single tag, while 20.4% of Anonymous Users (223 of 1,091) entered only a single tag.
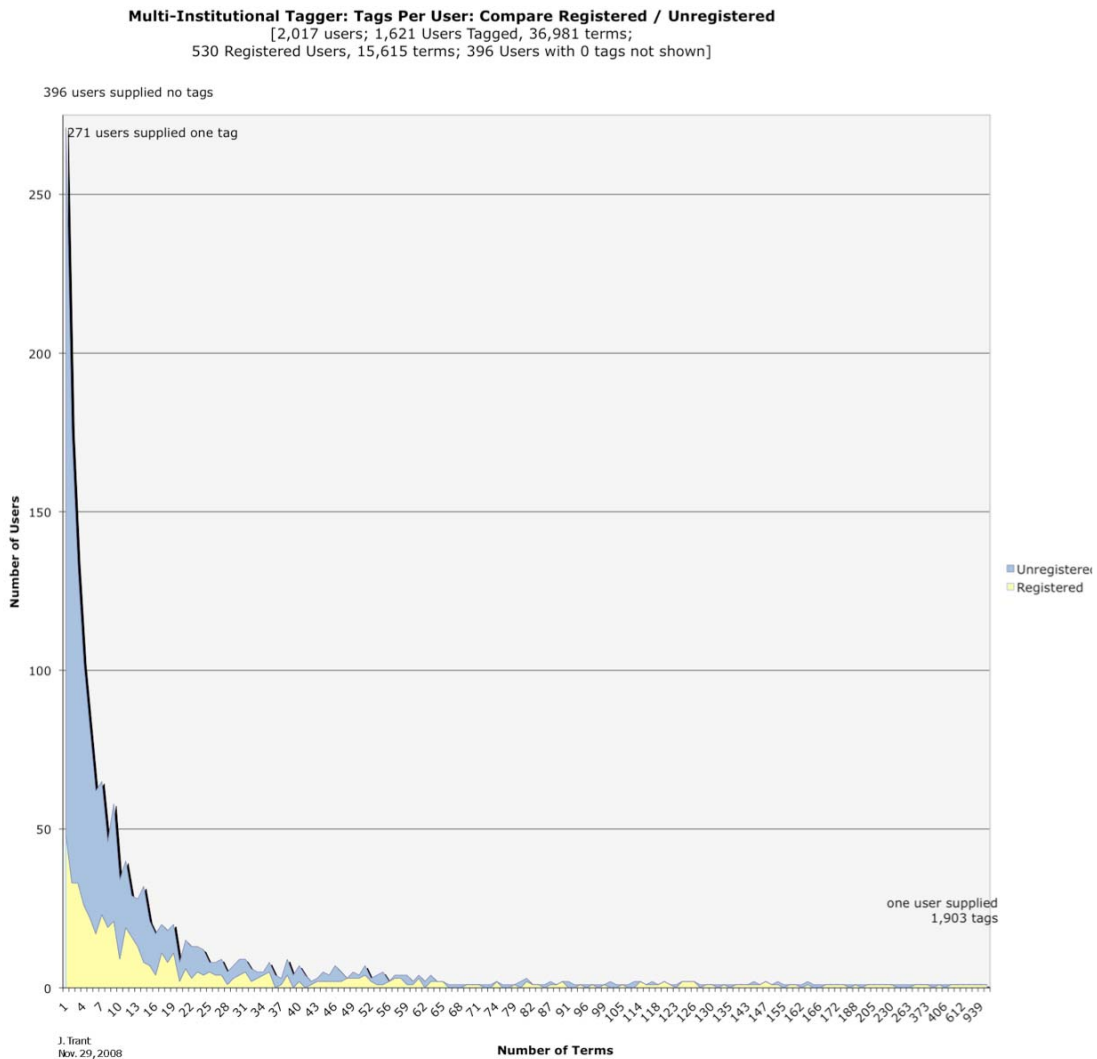
Figure 6-4: steve.museum Multi-Institutional Tagger: Number of tags per user, comparing Registered and Unregistered [Anonymous] Users

A small percentage of users is responsible for a significantly large proportion of all tags. See the discussion of *super taggers* in Section 8.2.1)

6.4.4   Users and Sessions

Tagging in the steve.museum experiment was voluntary and unsupervised. It was possible for users to return more than once to the steve tagger, and some users did.

The frequency of sessions for Registered and Anonymous Users is shown in Figure 6-5. By definition, Anonymous Users could only have one session, as they were not identified

sufficiently to track return visits (though anecdotally we learned that some un-registered Users returned to tag more than once). The vast majority of users engaged with the steve tagger only once. Some Registered Users, however, returned multiple times. One exceptional User tagged works in 32 discrete sessions, all in one Term Set (see Section 8.2.1).

Multi-Institutional Tagger: Sessions with Tags
[530 Registered Users with 879 sessions;
1,091 Unregistered Users with 1,091 sessions]
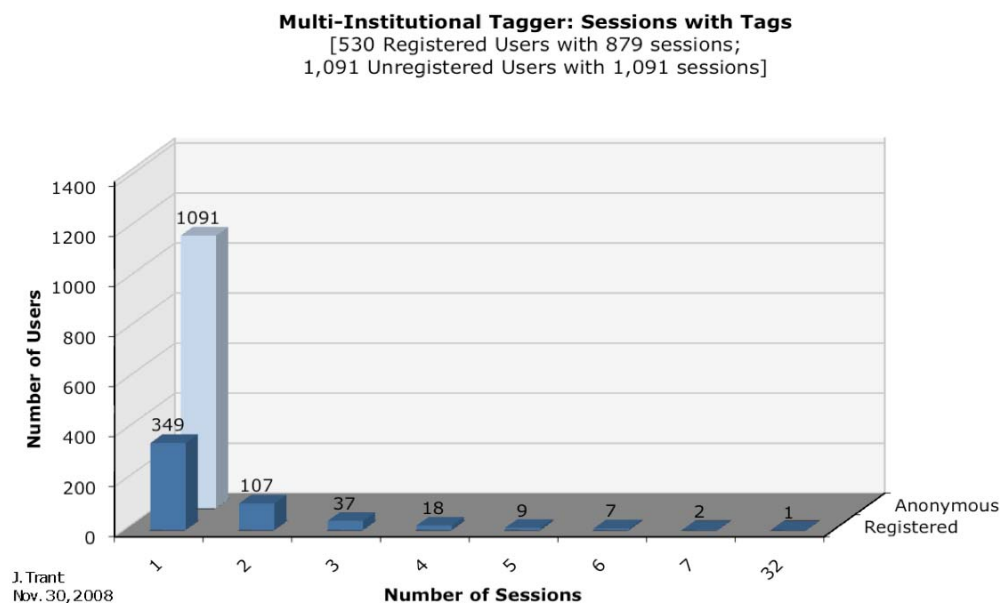
Figure 6-5: steve.museum Multi-Institutional Tagger: Sessions with Tags by Frequency. Compare Registered and Unregistered Users

More than 80% of users tagged some works of art. Even in the experimental environment, where tagging neither enabled additional uses, nor provided any particular user feedback, many taggers returned more than once. Figure 6-3 shows sessions by Registered Users who tagged: 34% returned a second time, and 7% made four or more repeat visits.

**Multi-Institutional Tagger: Sessions With Tags
for Registered Users**
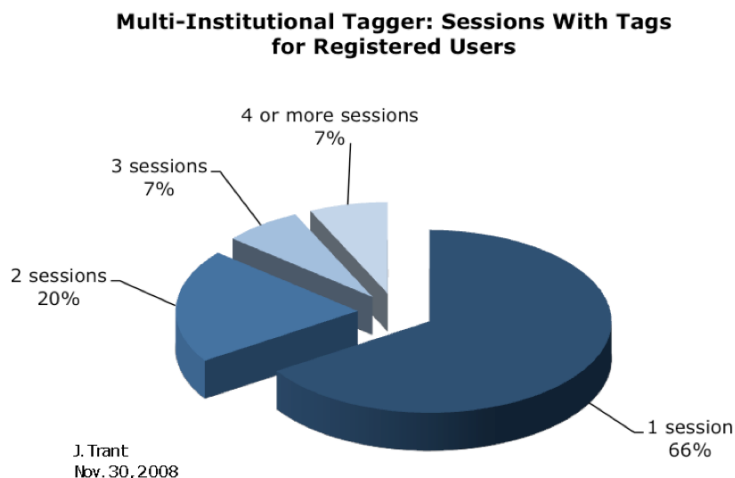
Figure 6-6: steve.museum Multi-Institutional Tagger: Repeat visits by Registered Users

6.4.5 Users and Works

The number of works tagged by each user varied widely, from 1 to 913 (see Figure 6-7), with the bulk of users tagging fewer than ten works.

Figure 6-7: steve.museum Multi-Institutional Tagger: Number of Works Tagged by Each User
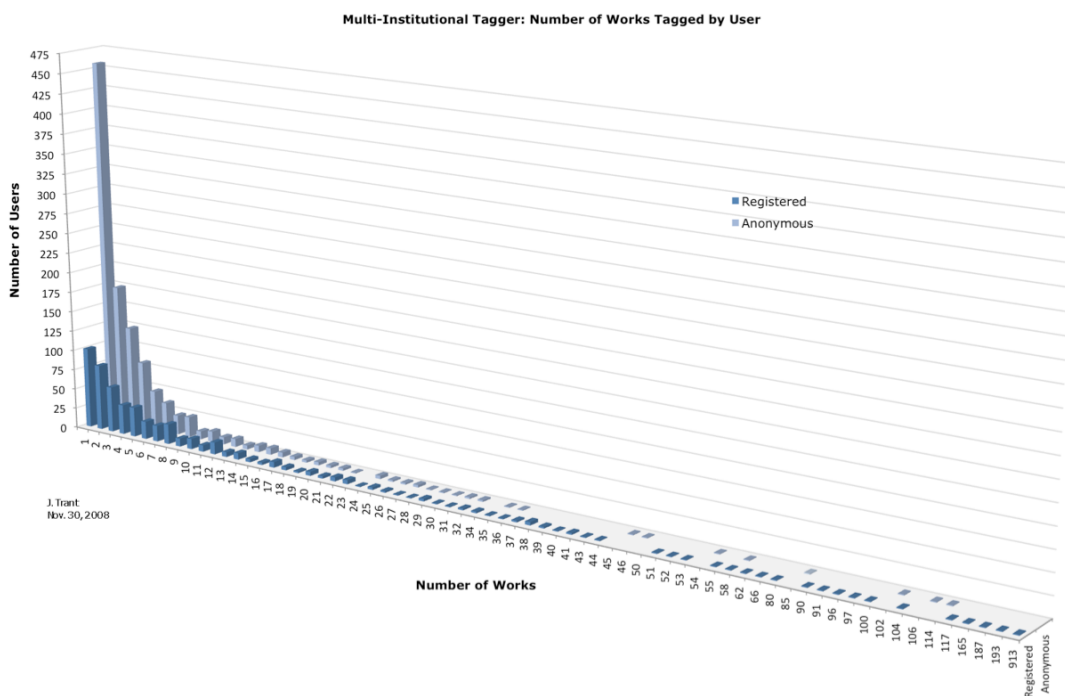
The largest group of Unregistered Users – 42% of anonymous users who tagged (457 of 1,090) – tagged only one work (see Figure 6-8). This compares to 20% of Registered Users who tagged (101 of 530) who only tagged one work. The vast majority of Registered Users – 80% – tagged more than one work.

Registered users were far more likely to tag a larger number of works: 24% of Registered users (139 of 530) tagged ten or more works. This is not to say that all Anonymous Users were not high-frequency taggers: 9% of Anonymous Users (105 of 1620) tagged 10 or more works.

Overall, activity for Registered Users was approximately twice that of Anonymous Users.
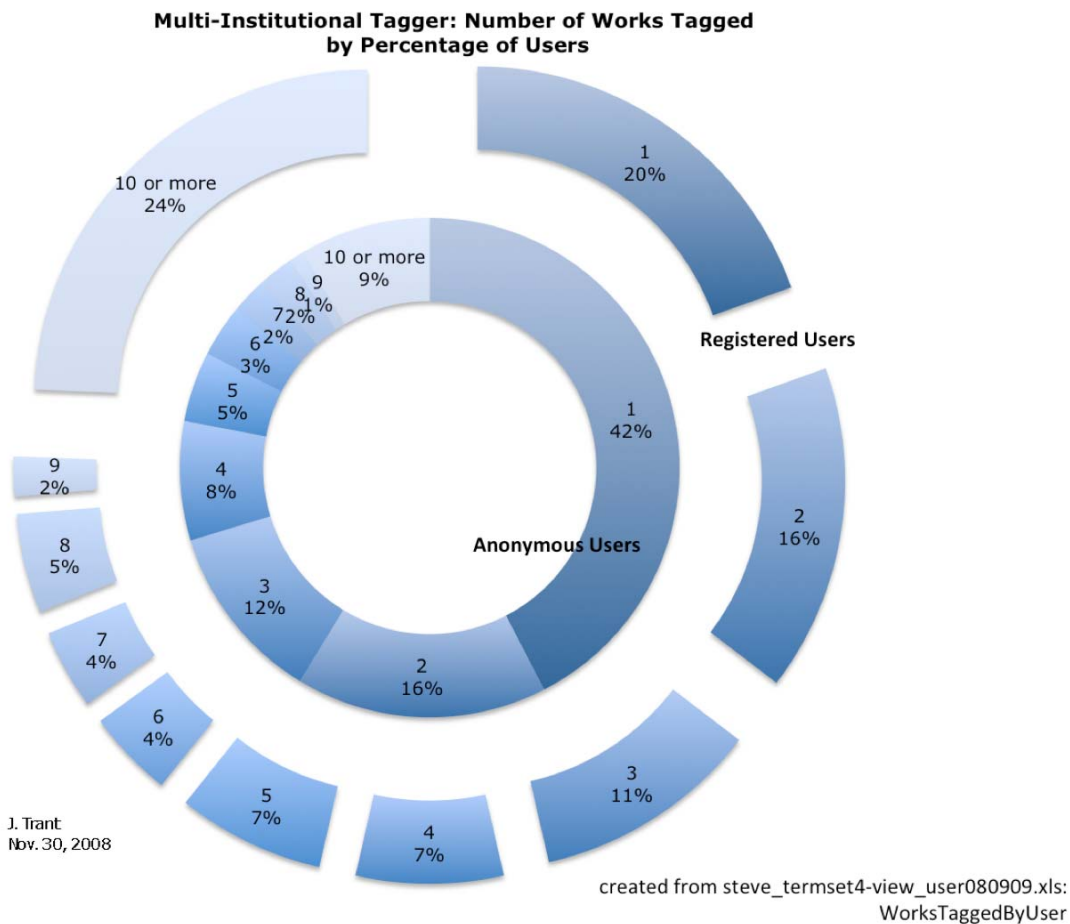
Figure 6-8: steve.museum Multi-Institutional Tagger: Number of Works Tagged by Percentage of Users

6.4.6   Works and Users

During most of the course of the steve.museum tagging experiment works were presented randomly to users. Users had the option to either enter tags for a work, or skip it.

Five works were never shown to users to be tagged. Seven works were shown, but never tagged. This totals twelve works that were not tagged (see Appendix III). The total number of works tagged was 1,772.

The 1,621 users tagged 1,772 works a total of 11,091 times, for an average of 6.2 taggers per work in the data set.

This distribution is not equal across the set of works, because a) works were presented randomly, b) some works were not present in the data set for the entire study (see Section 6.2), and c) Users had the option to skip works.
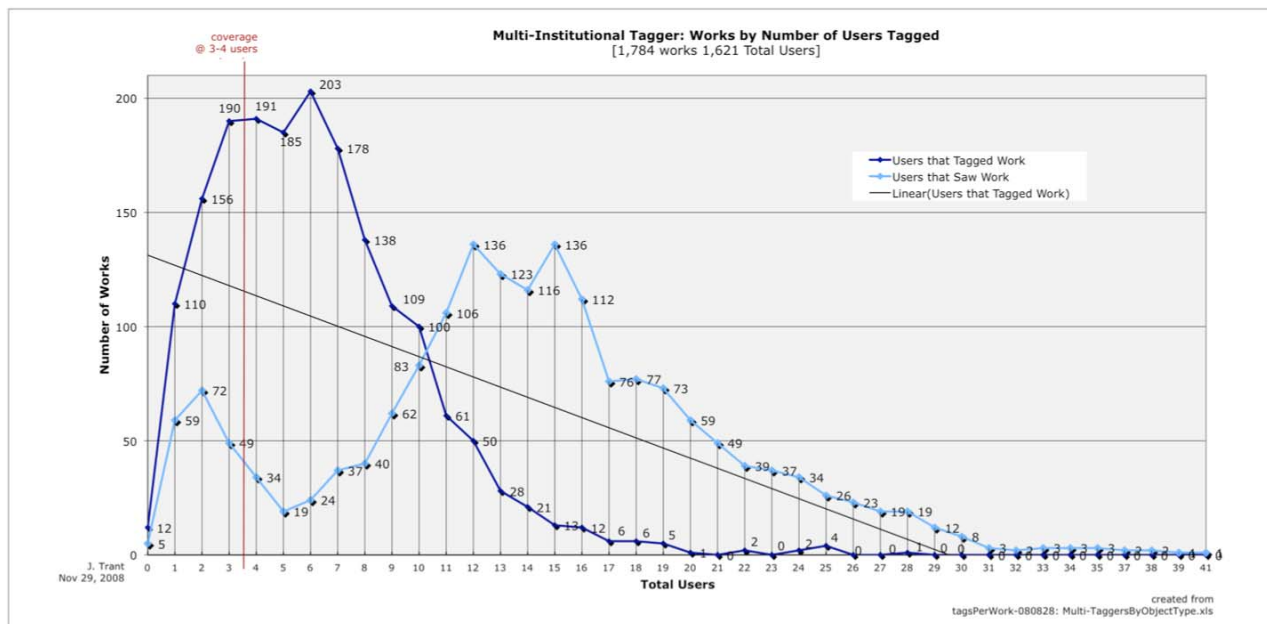
Figure 6-9: steve.museum Multi-Institutional Tagger: Works by Users Tagged and Skipped

Many users did not tag a large proportion of the works they saw. Figure 6-9 compares the number of works tagged (total: 11,091; average per user 6.2) to the number of works seen (tagged or skipped, total: 24,918; average per user 15.4). On average, Users skipped almost half – 44.5% – of the works they saw.

But skipping was concentrated in some users (see Figure 6-10). Many users – 69% (245) of Registered Users and 46% (984) of Anonymous Users – never skipped a work. One

registered user skipped 2,070 works. The effect of this individual behaviour on the data set may be significant.
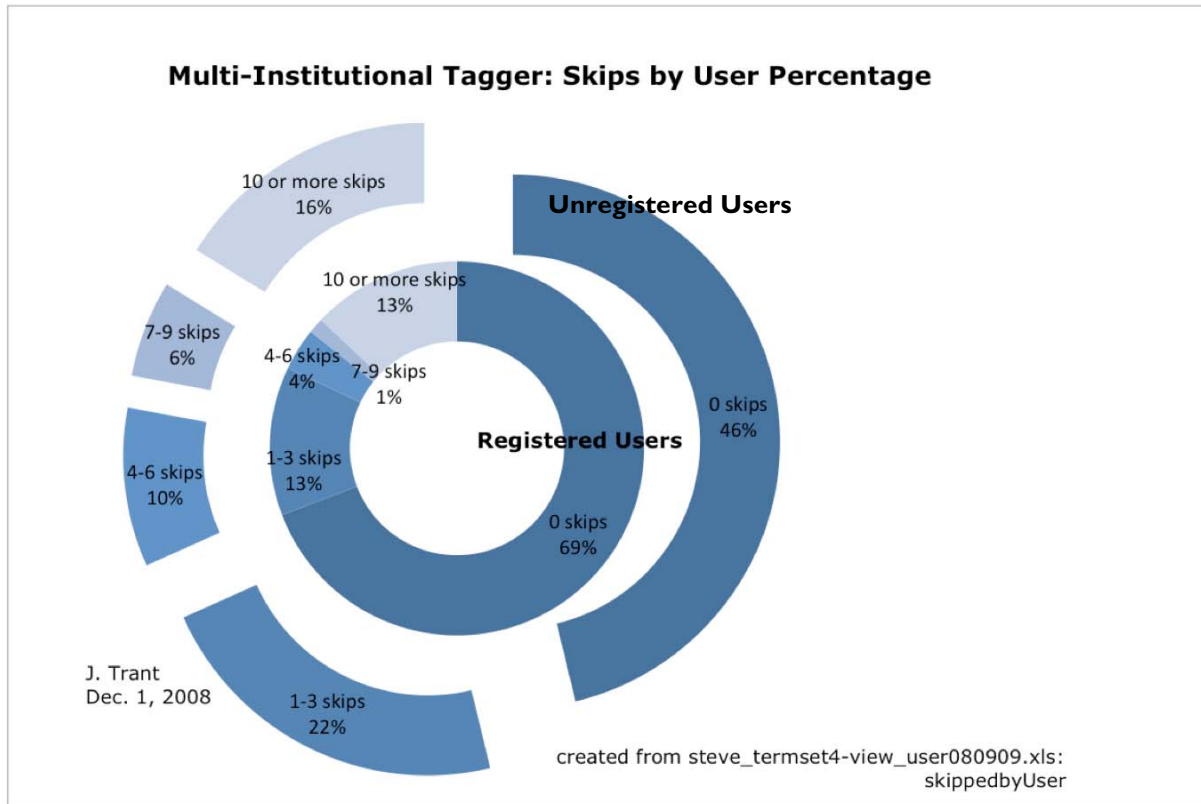
Figure 6-10: steve.museum Multi-Institutional Tagger: Works Skipped by Users:
Skip behaviour was not consistent across works (see Figure 6-11)

A few works (7) were always skipped; some works (151) were always tagged. These works are listed in Appendix III and Appendix IV. Here skipping seems to be related to legibility of a work's thumbnail image.

The likelihood a work would be tagged is shown in Figure 6-11. It shows that 8.5% of works were tagged by between 95 and 100% of the Users that saw them. The preponderance of works – between 25 and 34% – were tagged by 25.2% of the Users that viewed them.

Multi-institutional Tagger: Likelihood a work would be tagged
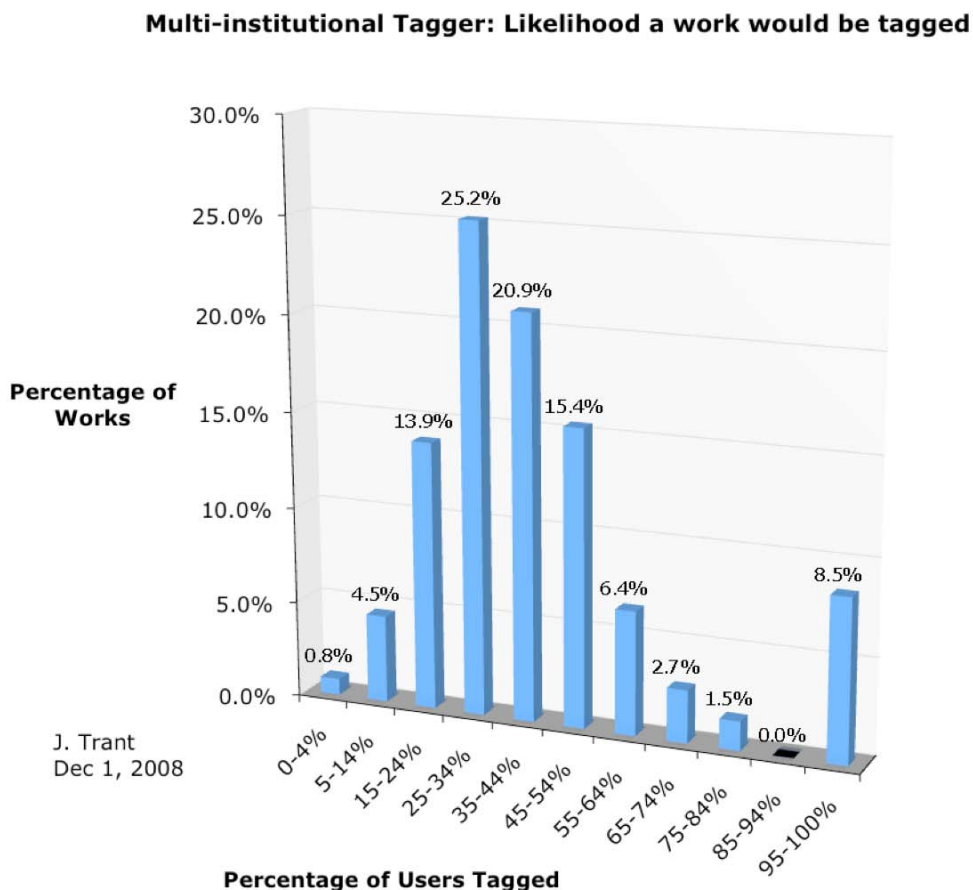
Figure 6-11: steve.museum Multi-Institutional Tagger: Likelihood a work would be tagged

6.4.6.1   Works and Users: Choice and Skipping

During Term Set 3 an element of choice was introduced (see Section 8 Environments). Users could select the works that they wished to tag. In this context, skipping meant first selecting a work to tag and then deciding not to tag it after all. The 151 works that were tagged every time they were shown (see Appendix IV) were only included in Term Set 3, so they were only shown to Users who chose to tag them. It is possible that if these works were shown to more Users, in different tagging environments, some would have chosen to skip them.

Further study is needed to establish if there are other relationships between skipping works and the user interface variables at play in tagging environments.

6.4.7   Tags and Works

A total of 36,981 tags were assigned to 1,772 works during the steve.museum data collection. These are described by Object Type in Table 6-7.

Object Type	Distinct tags (total)	Repeated tags (total)	Total Tags	% of All Tags	Average Tags / Work	Average Tags / User
Architecture *	155	37	192	0.5%	21.3	3.8
Audio-Video *	107	14	121	0.3%	13.4	3.2
Books	410	81	491	1.3%	23.4	3.5
Costume and Jewelry	1,198	274	1,472	4.0%	21.6	2.9
Decorative Arts and Utilitarian Objects	4,070	791	4,861	13.1%	14.5	3.2
Drawings and Watercolors	1,757	331	2,088	5.6%	22.2	3.3
Installations *	166	45	211	0.6%	21.1	3.7
Mixed Media *	120	11	131	0.4%	16.4	2.6
Paintings	12,492	2,415	14,907	40.3%	23.4	3.5
Photographs	2,727	615	3,342	9.0%	33.4	3.6
Prints	1,639	315	1,954	5.3%	25.1	3.5
Sculpture	5,023	753	5,776	15.6%	16.0	3.0
Textiles	1,168	267	1,435	3.9%	27.1	3.2
Total	**31,032**	**5,949**	**36,981**	**100.0%**	**20.7**	**3.3**

Table 6-7: steve.museum Multi-Institutional Tagger: Tags Per Work by Object Type [=groups of less than 10 works]*

6.4.8   Tags, Works and Object Type

The average number of tags per work varied by Object Type (see Figure 6-12). The overall average was 20.7 tags per work. But this ranged from 13.4 tags per Audio-Video work to 33.4 tags per Photograph.

The average number of tags per user also varied by Object Type. For All Works, the average was 3.3 tags. Mixed Media works had the lowest average number of tags per user (2.6), followed by Costume and Jewelry (2.9) and then Sculpture (3.0). Audio Video was in the center of the group. Architecture had the highest average number of tags per user (3.8), followed by Installations (3.7) and Photographs (3.6).
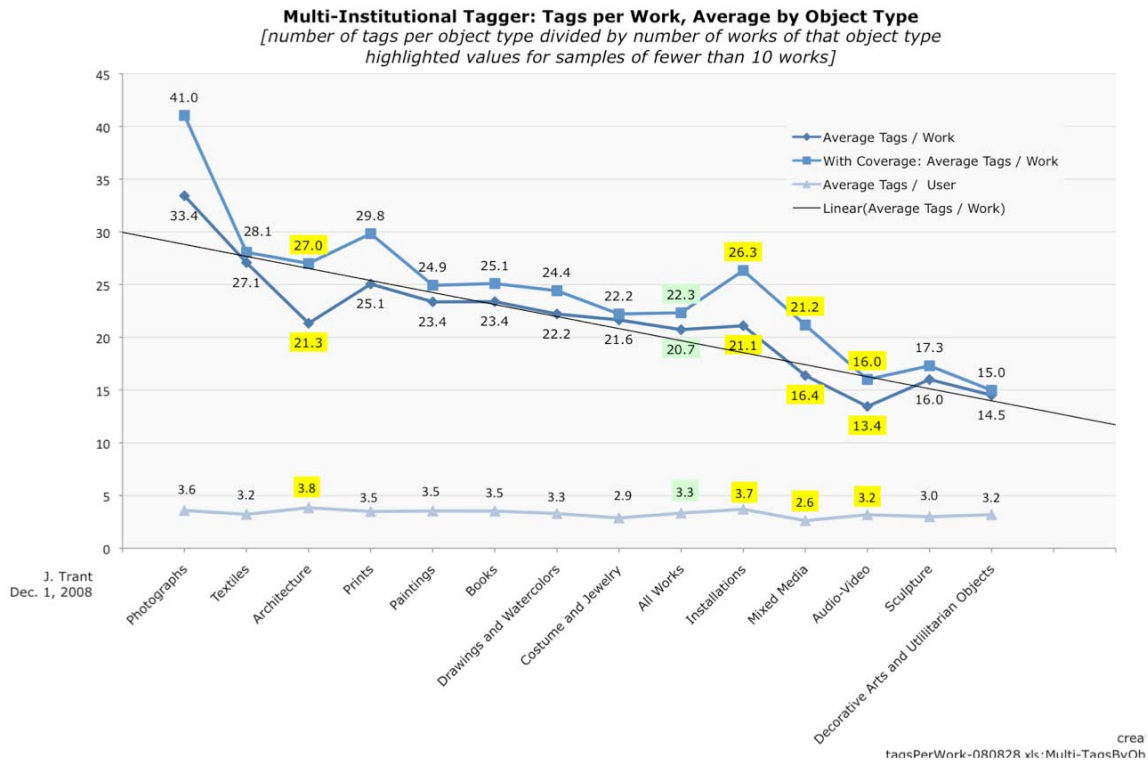
Figure 6-12: steve.museum Multi-Institutional Tagger: Tags Per Object Type, by Work and by Tagger [yellow = groups of fewer than 10 works]

Comparing the percentage of tags assigned by Object Type to the percentage of works in the data set of that Object Type (Figure 6-13) provides a good assessment of whether Object Type influences tagging. For many kinds of works, including Architecture, Audio-Video, Books, Costume and Jewelry, Drawings and Watercolors, Installations, Mixed Media, Prints and Textiles, the variation in Percentage of Tags and Percentage of Works was less than one percent. Decorative Arts and Utilitarian Objects, and Sculpture were under-represented in the tag set, having 5.6% and 4.6% fewer tags than works respectively. Paintings had 4.5% more tags than works, and Photographs 3.4% more tags than works.
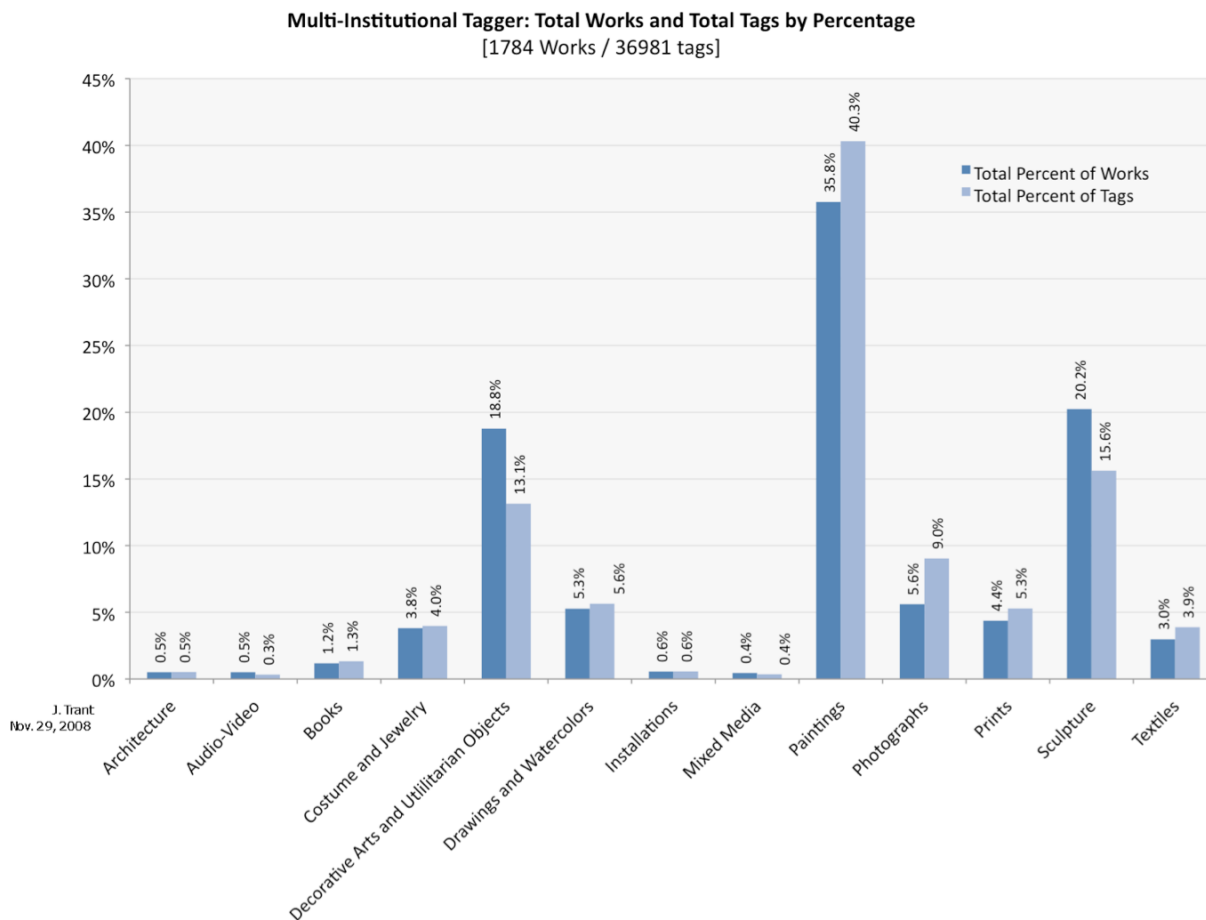
Figure 6-13: steve.museum Multi-Institutional Tagger: Total Works and Total Tags by Percentage

6.4.8.1   Tags and 3-Dimensionality

It may be that the correlation is less specific than the data in Figure 6-13 indicate. The Object Types that received the lower percentage of tags were all three-dimensional works, with the exception of Costume and Jewelry. This aspect of the object might have more effect on tagging than its specific type.

6.4.8.2   Tags and Representational Works

Three-dimensional works may also be more likely to be non-representational [i.e. not to depict a recognizable subject matter] and therefore more challenging to tag. This could also have an more of an effect on tagging than its specific type.

6.4.9   Tags by Occurrence

The tag vocabulary (folksonomy) was comprised of 11,944 distinct terms. These were distributed very broadly, as shown in Figure 6-14. A Zipf distribution with a long tail was expected (the tail is cropped on this graph), showing a shared use of a smaller number of terms, with a long tail of divergence.

The most common term in the data set *woman* was assigned 276 times, followed by *portrait* (272), *landscape* (235), *sculpture* (223), *blue* (223), and *gold* (215). Even the most commonly used term was not very common, representing only 2.3% of all terms assigned.
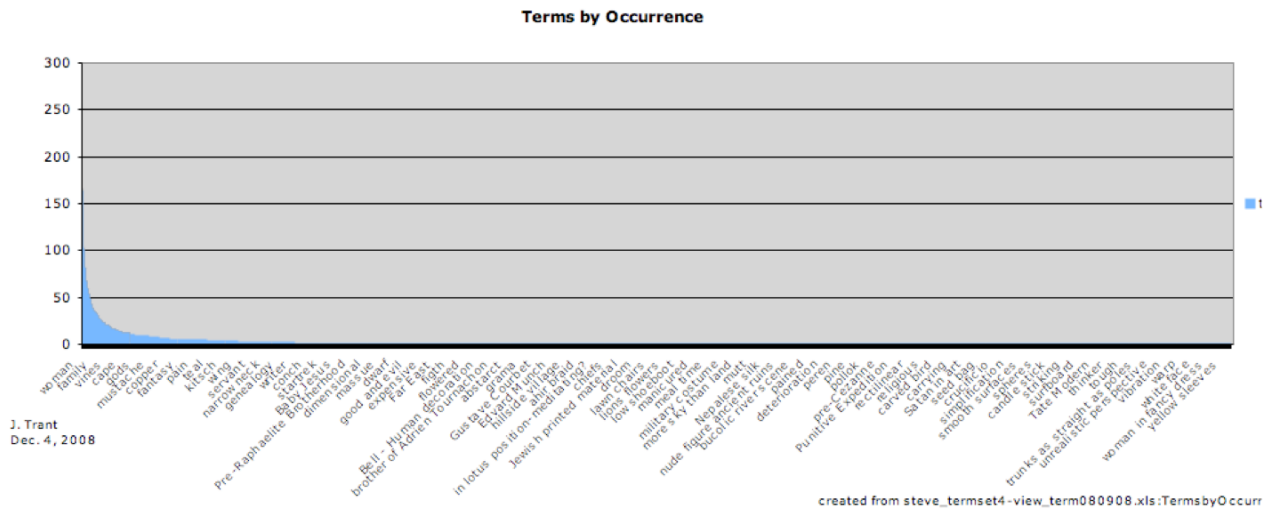
Figure 6-14: steve.museum Multi-Institutional Tagger: Terms by Occurrence

6.4.10   Tags, Works and Object Type: Variation in Tagging Vocabulary

When the data shown in Table 6-7 are charted to highlight the difference between new and repeated tags (Figure 6-15), it becomes clear that some kinds of works attracted a broader variation of tags than others.

Multi-Institutional Tagger: Total and Distinct Tags by Object Type

J. Trant
Dec 1, 2008

created from tagsPerWork080820-1-Multi-TagsByWork.xls:
Mult-TagsByWork
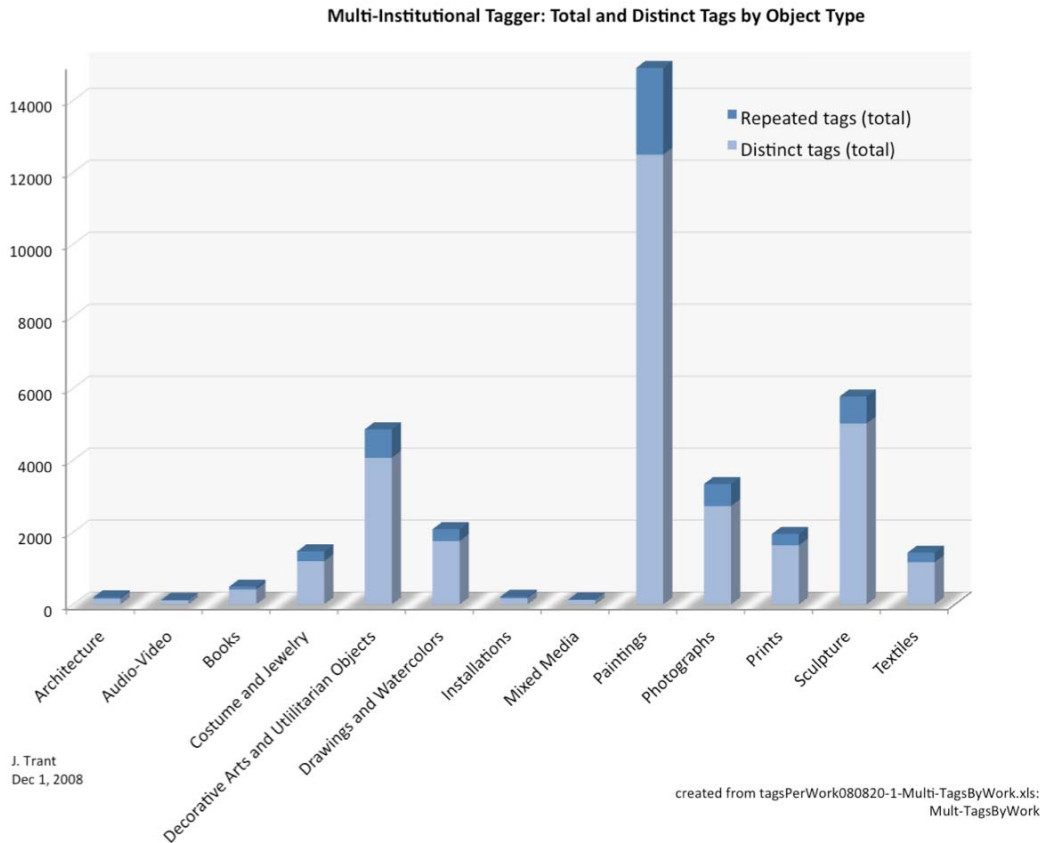
Figure 6-15: steve.museum Multi-Institutional Tagger: Total and Distinct tags by Object Type

By far the greatest repetition in tags was with Installations (72.9%), closely followed by Architecture (76.1%), Costume and Jewelry (77.1%) and Textiles (77.1%), and then Photographs (77.4%). Tagging vocabulary variation was greatest in Sculpture (85% distinct terms), Audio-Video (86.9%) and Mixed Media (90.8%). Both the extremes, the works with the highest and lowest percentage of distinct tags were small sets of fewer than 10 works. These may not be representative.

Whether a work of art was 3-D does not seem to have reduced the variation of tag vocabulary. Sculpture (all 3-D) had the most varied vocabulary of all Object Types.

The works with the highest variation in vocabulary are not the works that had the highest percentage of tags per Object Type. For example, 20.2% of the works were Sculpture. They attracted 15.6% of the tags; but 85% of those tags were distinct. This is in contrast to Paintings, where 35.8% of the works attracted 40.3% of the tags, but only 80.7% of the tags were unique. It is expected that as more tags are assigned the percentage of unique tags decreases, but that rate is not consistent across Object Types.

Object Type	% Distinct Tags
Installations *	72.9%
Architecture *	76.1%
Costume and Jewelry	77.1%
Textiles	77.1%
Photographs	77.4%
Books	80.2%
Decorative Arts and Utilitarian Objects	80.6%
Paintings	80.7%
Prints	80.8%
Drawings and Watercolors	81.2%
Sculpture	85.0%
Audio-Video *	86.9%
Mixed Media *	90.8%
Total	**80.8%**

Table 6-8: steve.museum Multi-Institutional Tagger: Percent Distinct Tags by Object Type
[= groups of fewer than 10 works]*

The range in percentage of distinct tags by Object Type is relatively small – from 77.1% to 85.0%. Even when more than 1,435 tags were assigned (as with Textiles) 77.1% of them were new.

However, these simple percentages of unique terms across the entire data set, do not consider the relationship between the number of users who tagged the work and the variation of tag vocabulary.

Nor do they take into account the relationship between a tag and a work, which is the context within which a tag has particular meaning for a user.

6.4.11 Tags, Works and Novelty (New to Work)

Tags were much more likely to be 'new to a work' than new to the folksonomy as a whole, but not a great deal more likely: 84% of tags were new to the work they were describing (i.e. they hadn't been assigned to that work before); compared to 67.7% of tags new to the entire tag set.

While there were only 11,944 distinct terms in the 36,981 tags, there were 31,032 tag/work pairs. Only 16% of the tags were assigned to a work more than once. Inter-tagger agreement on terms is said to be evidence of 'vocabulary stabilization' – one of the characteristics of tagging systems. The overall steve.museum data set did not appear to reach a point of stabilization.

Multi-institutional Tagger: Terms by Novelty to Work
[36,981 terms: Novel: 31,032; Not Novel: 5,949]

no
16%

yes
84%

J. Trant
Sept. 18, 2008

created from
steve_termset4-view_term080908.xls:TermsByNovelty
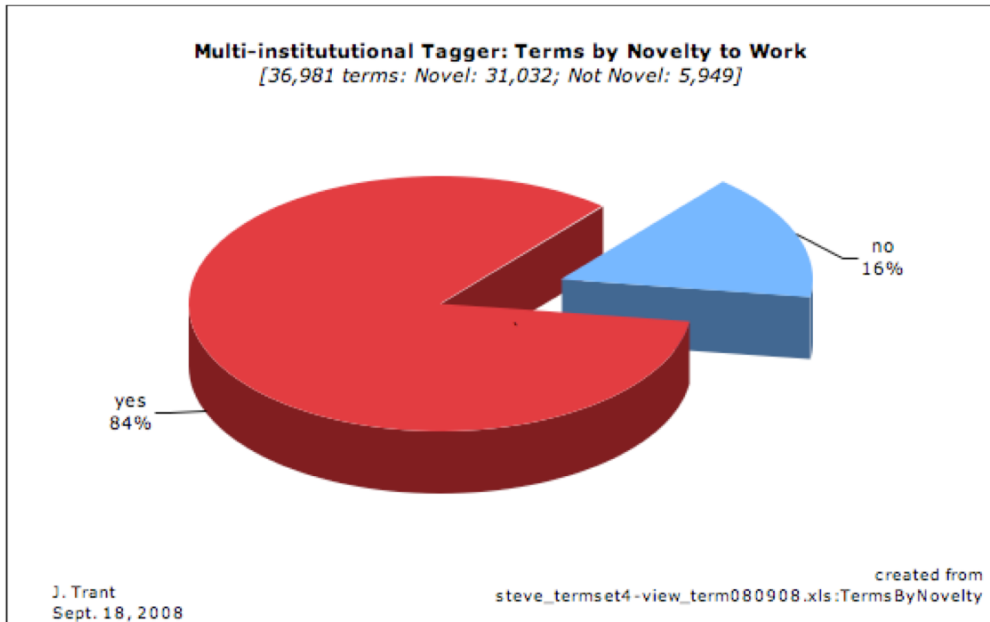
Figure 6-16: steve.museum Multi-Institutional Tagger: Tags by Novelty to Work

7.   Tags and Museums

Simply knowing the characteristics of terms in a folksonomy does not tell us if those tags might contribute to on-line access to art museum content. But research questions about the role of tagging and folksonomy in enabling access to art museum collections can be answered by studying the tags assigned to the test collection of works of art with a museum-centric frame of reference. Tags were compared to documentation of works of art to see if they add new terms (or represent new concepts), in a multi-faceted analysis of tag vocabulary. Tags were compared to search terms to see if their presence in indexes might improve the results of simple searches of on-line collections – in a quantitative assessment of their contribution. Tags were reviewed by museum professionals to see if they accurately reflect the work of art and could aid in its retrieval – a qualitative judgment of their efficacy. The results of all these reviews are compared, quantitatively, to see if there are areas where tagging makes a particular contribution.

7.1   Do user tags differ from museum documentation?

User-supplied tags were expected to differ from museum documentation. The reflection of a different point of view – of the individual perspective of the tagger rather than the

institutional perspective of the museum – is hypothesized to be one of the critical contributions of social tagging in the museum context (Wyman, et al., 2006). But this can only be established with a broad study of tags assigned to works of art. Prototypical tests at The Metropolitan Museum of Art (reported in Trant, 2006a) defined a methodology for establishing the contribution of tagging to the description of works of art. Tags collected from a range of users for a number of works were compared to museum documentation for those same works. Analysis of data gathered in this prototype showed a strong difference between user tags and curatorial documentation (Trant, 2006a; Trant & Wyman, 2006; Wyman, et al., 2006). This approach to tag analysis is also used by Kipp in her studies comparing user tags with professionally created metadata (Kipp, 2006a, 2006b).

Figure 7-1 shows the possible relationships between Tags and Museum Documentation. Tags that match museum documentation can be considered redundant. Tags that do not match represent additional descriptors. Tags were compared to the documentation supplied by museums, described in Section 6.3.2 above, and chosen because of its ready availability and its use in deployed on-line search systems. Comparisons were preformed between tags assigned to a particular work and the museum documentation for that work.
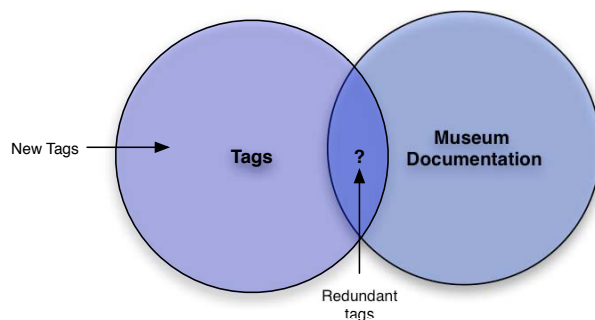
Figure 7-1: Compare Tags to Museum Documentation

Nuance was added by further studying tags that are – or are not – represented in museum documentation for this sub-set of works. Tags that are represented in museum documentation were profiled based on the part of the museum record where they were found. This parallels the methods of the Catechism project and the CIMI Access Points work (Janney & Sledge, 1995a, 1995b; McCorry & Morrison, 1993, 1995; Sledge, 1995).

7.1.1   Tags and Museum Documentation: Full Tag/Partial Field Match

The first comparison between tags and museum object data was a simple truncated character-string compare, with all data shifted into lower case. This simple match compared the full tag to any part of the data in a field of museum documentation [full tag/partial field]. It was employed because it reflects the way in which the majority of museum catalogues are searched on-line: single term is entered, and matched against a keyword index. The results of

this matching identify – at a basic level – where tagging contributes new terms and where it duplicates museum documentation.

Multi-Institutional Tagger: Tags and Museum Documentation
[36,981 terms: 31,949 unmatched; 5,032 matched in some way]

Matched
14%

Not Matched
86%

J. Trant
September 18, 2008
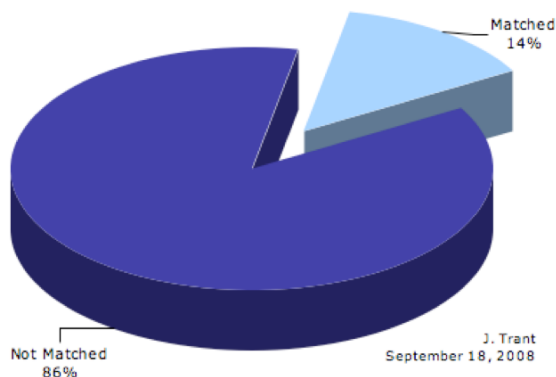
Figure 7-2: steve.museum Multi-Institutional Tagger: Tags and Museum Documentation

Figure 7-2 shows that when the full steve.museum tag set was compared to the assembled Museum Documentation, 86% (35,307 tags) were not found in Museum Documentation as either a full or a partial match. This is in line with the results found in prototype tests, where between 86.9% and 92.4% of tags where not found in museum documentation (Trant, 2006b), and represents a significant difference between the vocabulary of tagging and the vocabulary of museum documentation.

7.1.2 Matches by Category

The 14% of the tags that did match museum documentation were concentrated in particular fields of the museum record. The distribution of Full Field / Full Tag matches, by field in the Museum Documentation (a total of 1,005 tags) is shown in Figure 7-3. The largest group of these (44%) matched Object Type, and represented terms like *photograph* (104), *sculpture* (126), and *painting* (51). Matches in Materials (21%) included terms like *bronze* (32), *wood* (25), *gold* (16), and *marble* (15) and in Primary Title (24.8%) included terms like *guitar* (21), *mask* (15), and *dress* (14).

Multi-Institutional Tagger: Museum Documentation
[1,005 Full Matches by Field]
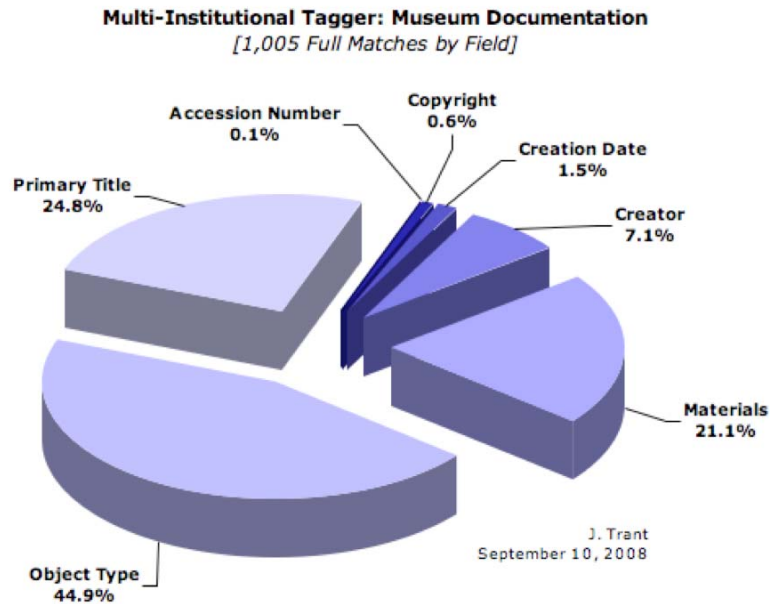
Figure 7-3: steve.museum Multi-Institutional Tagger: Full Matches by Field

The distribution across metadata fields was greater when tags were matched against only a part of the field's value, and the number of matches increased to 4,576 from 1,005 (see Figure 7-4.) Matches increased a great deal in Primary Title (to 41.1%), including terms such as *mask* (94), *portrait* (81), *still life* (41) and *woman* (26). There are more partial matches than distinct terms that match because terms appear in more than one place in an object record. For example, *mask* appears both as a full term match in Object Type and a partial match in Primary Title.

It is possible that the number of Full Word Partial Field matches is lower than it should be because of errors in the original load of the data. Manual spot-checking of match results showed some truncation in the longer text data fields, likely a result of an error when the records were loaded into the database. It was not possible to establish the extent of this problem.
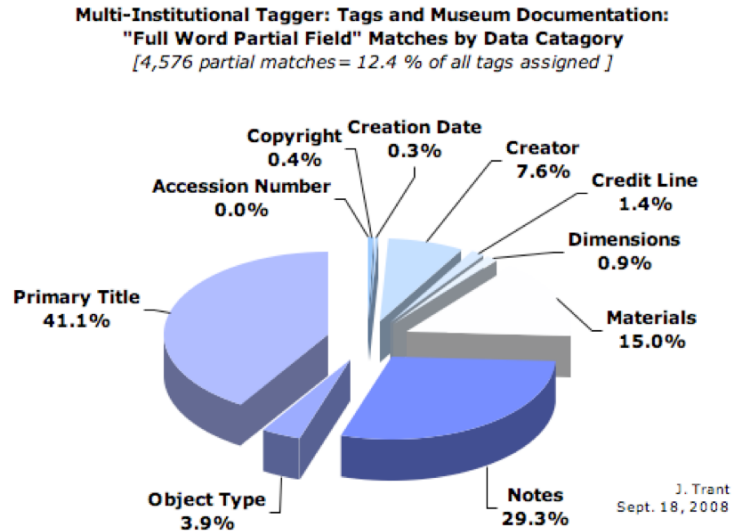
Figure 7-4: steve.museum Multi-Institutional Tagger: Partial Matches by Field

7.1.3 Tags that Did Not Match Museum Documentation

A considerable proportion of the 14% of tags that matched museum documentation were redundant tags. The vast majority of unmatched terms (8,016) were only assigned once. Those terms assigned more than 50 times are shown in Figure 7-5. These include *woman* (223), *blue* (197), *landscape* (185), *red* (171), *portrait* (171), and *man* (163).
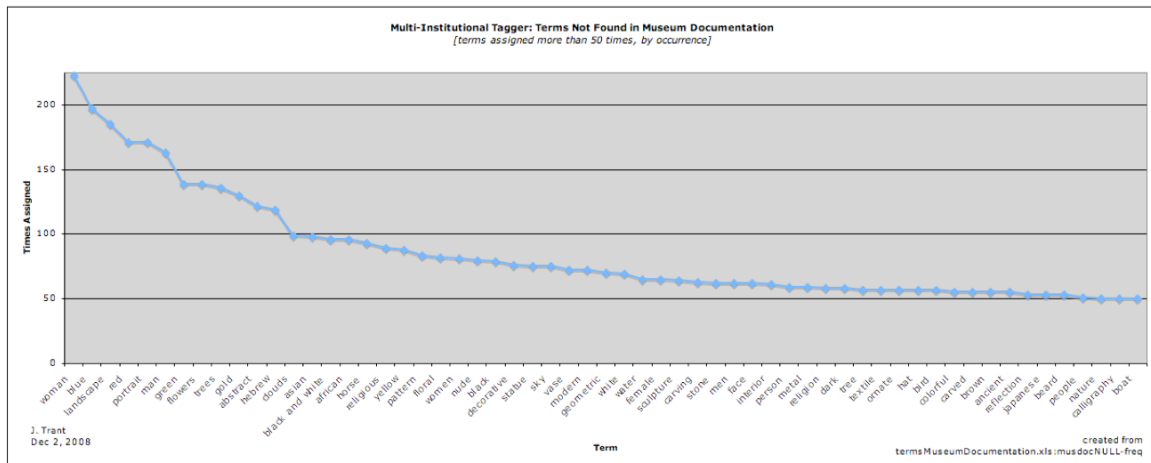
Figure 7-5: steve.museum Multi-Institutional Tagger: Unmatched Terms assigned more than 50 times, by frequency

If we look only at distinct terms, 11,376 distinct terms – or fully 95% of the 11,944 distinct terms in the tag set – did not match museum documentation. There is very little redundancy in the unmatched tag set, as is shown in Figure 7-6, a graph of the frequency of occurrence of unmatched terms.
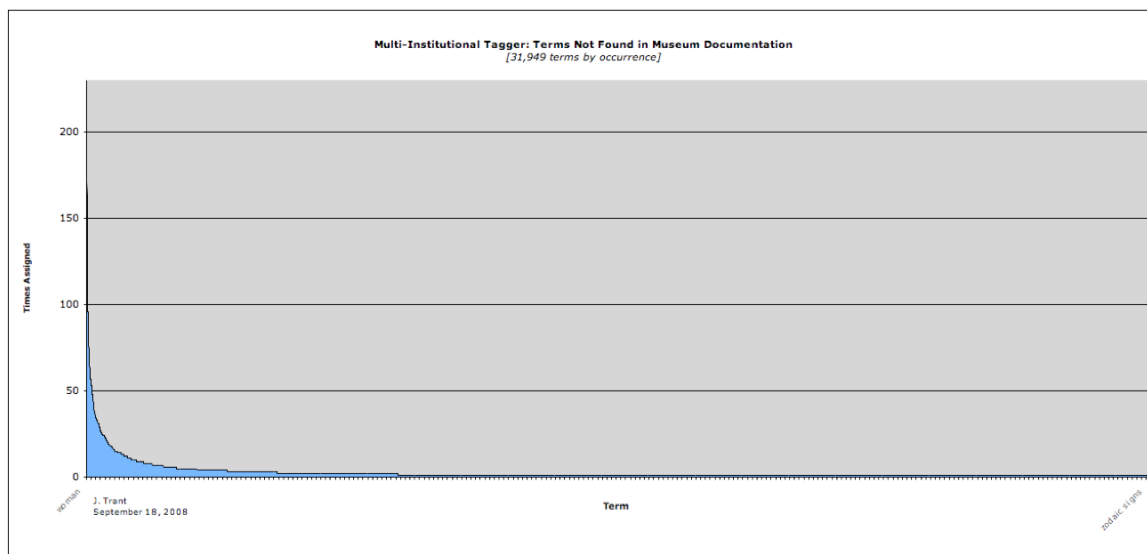
Figure 7-6: steve.museum Multi-Institutional Tagger: Tags that did match Museum Documentation by frequency

The most common unmatched terms were reviewed and classified according to what aspect of the work they referenced. As shown in Table 7-1, these were predominantly subject and genre terms, describing what was depicted (*woman*, *man*) and what kind of a work it was (*landscape*, *portrait*).

Top 100 Terms Not Matched	
subject	39
genre	27
color	10
geo-cultural	10
material	9
style/period	5

Table 7-1: steve.museum Multi-Institutional Tagger: Unmatched Terms by Category

Many taggers are supplying new terms, relating primarily to what they can see in the image. Museums do not have these kinds of terms in their on-line records.

7.2   Extended Museum Documentation

Preliminary results indicating that only a small percentage of terms assigned by the public in tagging were found in the documentation provided by museums on-line raised a further question. Would a majority of useful terms be found in museum documentation if we cast the net wider and included extended documentation that many museums have about some objects in their collections? We hypothesized that terms would be more likely to be found in museum documentation other than label copy.

We further hypothesized that certain genres of documentation – essentially those targeted to the public – would have a larger overlap with useful tags provided by the public than documentation created for internal or scholarly purposes.

To test these hypotheses, each museum selected a couple of works for which they had extensive additional documentation. These works are listed in Appendix V. Tags and documentation for twelve works, from six member institutions, were examined in detail. Each tag was categorized as useful/not useful by museum staff review.

We had hoped that we would be able to distinguish term hit rates within specific genres of extended documentation. However, the range of museum document types provided and the small number of works for which we had additional documentation, made it impossible to do this in a statistical way. Instead we categorized the documentation as either 1) designed for the public to encounter within the museum, or 2) scholarly or internal, and evaluated the specific genres only in the context of specific works.

7.2.1   Methodology

7.2.1.1   Tag categorization

Each tag was searched in all the documentation provided by the museums. Each time the tag term appeared, it was recorded as either a match or a partial match (the character string was found). Numerous strings matching words of three letters (man, bed, hat) were false, so only exact full word matches were counted for words of 3 letters. On the other hand, for longer words (painting), when the string appears (paintings), the meaning is usually what the User tagging intended, so the string was considered a likely match.

Often the extensive documentation provided by the museums dealt with general topics or groups of artists or paintings, rather than simply the one work the User saw. Therefore, the tag could be found, but within a text that was not at all relevant to the work that was tagged. If the context in which the term appeared was almost certainly irrelevant to the sense in

which the tagger used it (for example, the Millet peasant received the tag 'work' but the extended documentation speaks of the 'work' of art), the term was deemed found, but not applicable.

The museum review (see Section 7.4) had previously categorized each tagger provided term as either useful or not useful. Therefore, we could further establish the percentage of terms deemed useful or not useful that were found in museum documentation.

7.2.1.2   Document categorization

The Museums provided anywhere from five to two dozen additional documents. Some of these were searchable text, others were images of printed pages. Since the non-digital text documents could not be provided to potential users in response to an on-line search, the distinction between results from these two categories of documentation could have substantial practical consequences. Therefore documents were categorized based on whether digitally searchable or not. If terms from documents that are not available in searchable form (provided in image only) match terms assigned by taggers, we cannot obtain them otherwise than by adding them from tags unless we are prepared to transcribe these documents.

Four sets of documents can therefore be identified: public/non-public; machine readable/human readable.

7.2.1.3   Match Categorization

Four kinds of matches were found between tags and terms in the extended documentation: no match, exact matches, partial matches, and inapplicable matches.
- No match is self-explanatory: the string provided by the user didn't match a string in the documentation.
- Exact matches are reasonably straightforward: the character string proved by the user appears *in the sense the user might have meant* in the documentation ('hay'='hay' but not 'work' [in the sense of a painting in which a peasant is working] = 'work' [in the documentation in a discussion of 'this work of art']])
- In partial matches, the string provided by the user appears within a word of the documentation in a sense relevant to the search ('hay' in 'haystack', but not 'man' in 'many')
- Inapplicable matches occur when the sense of the term matched is different from what the user could have intended, or the match occurs in a portion of a document discussing a different work of art than that seen by the user (which happens frequently in documentation discussing several works of which the work in question is only one), e.g. 'work' [in the sense of a painting in which a peasant is working] != 'work' [in the documentation in a discussion of 'this work of art']])

7.2.1.4   Findings

Nine works had sufficient users and tags to be assessed. The results are summarized in Table 7-2.

work #	Image	# unique terms	# extended docs	possible doc hits	# docs applicable	# docs string	# docs n/a	# null doc hits	# tags assigned	# hits applicable	# hits n/a or string
148		19	11	209	23	5	16	165	21	51	87
160		46	14	644	100	6	44	494	64	303	168
670		34	6	204	43	0	3	158	54	164	3
993		16	13	208	13	0	4	191	16	14	6
1204		26	4	104	4	8	5	87	29	6	13
1214		31	2	62	16	3	0	43	42	37	18

work #	Image	# unique terms	# extended docs	possible doc hits	# docs applicable	# docs string	# docs n/a	# null doc hits	# tags assigned	# hits applicable	# hits n/a or string
1328		12	2	24	2	0	4	18	17	3	6
1342		24	4	96	17	0	0	79	26	32	0
1659		26	9	234	34	11	0	189	28	78	22

Table 7-2: steve.museum Multi-Institutional Tagger: Comparing tags to extended museum documentation. Full Descriptions of the works can be found in Appendix VI

7.2.1.5   Tags

On average, each work had been assigned 33 tags, representing an average of 26 unique terms. This compares with the average for the entire set of tagged works of 22.8 total and 19.1 distinct tags, showing these were highly tagged works, in addition to being well documented by the museums. Why this is the case is unknown – perhaps these are well-known works from easier to tag Object Types.

Of the tags assigned to the entire group of twelve works, 5.4% of the tags were in foreign languages or misspelled. An additional 9 tags were names of artists, works or museums. 18.6% were multi-word phrases (excluding artists' names, titles of works and names of museums). Only about 25% of the tags were single English language words that describe the work being tagged.

7.2.1.6   Documentation

The documentation provided in this extended set was highly varied. When it dealt directly with the work which the tagger was seeing, it was much more meaningful to say something about matches than when it was a more general piece addressing numerous works, artists or even periods.

Even then there were some unexpected discrepancies between documentation, reviewers and taggers. For example, Tag 23930 "impressionism", was assigned to Work160. The reviewers categorized it as "usefulness-useful, problematic-misperception", but the Indianapolis Museum of Art's own "Millet 12-06 audio tour" uses the term "impressionism", saying of Millet "his work showed some affinities with Impressionism". So part of the issue is that museum documentation is problematic if used for exact term matches: language is more subtle than exact matches suggest. Here the usage is preceded by "showed some affinities with". Often it can be a negation. In either case we find an exact match.

7.2.1.7   Extended Museum Documentation: Conclusions

Tags provided by users did not match extended museum documentation better than they did the more limited tombstone data, and when then did 'match' the matches were frequently inapplicable, and would doubtless have confused a person searching on that term and retrieving the associated document. Tags as provided by the public seem largely to use a different sort of language than that employed in museums or in the extended documentation created by other art professionals. The only document we found with a high overlap of terms to those of taggers was a popular press article about a new museum acquisition. Because the journalist was describing what people going to the museum would see, it appears he engaged in much the same exercise that taggers do; we don't know if this genre of document (a relatively rare one) would produce equally good matches to tags in other cases, though it seems likely.

7.3   Tags and Museum Controlled Vocabularies

Tags were also compared to two controlled vocabulary sources that museums have been urged to adopt in their cataloguing – the *Art and Architecture Thesaurus* (AAT) (J. Paul Getty Trust, 2000a) and the *Union List of Artists Names* (ULAN) (J. Paul Getty Trust, 2000b) – to determine if they share the professional vocabulary of the museum or a represented different vernacular vocabulary of the User.

Scripts written by Ron Daniel of Taxonomy Strategies compared tags to the vocabularies and recorded the results, along with where in the term record a tag was found. These results were then analysed.

7.3.1 Tags and AAT

Tags were compared to terms in the *Art and Architecture Thesaurus* (AAT). The structure and construction of the AAT is described in detail elsewhere (Getty Vocabulary Program, 2008).

Of the 36,981 terms entered, 25,978 (70.2%) matched some part of an AAT term record – either a Main Term or an Alternate Term matched in full or in part (see Figure 7-7). Only 29.8% of terms did not match any part of an AAT term record.

Multi-institutional Tagger: Terms Found in AAT
[36,981 Terms; 25,978 Matched Some Field in AAT- full or partial]

Unmatched
29.8%

Matched
70.2%

J. Trant
September 18, 2008

created from
termsAAT.xls:summary
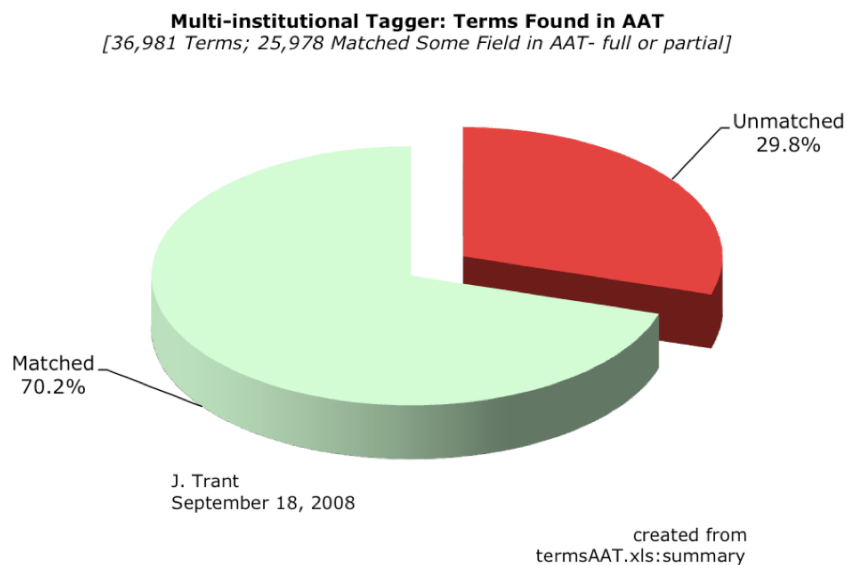
Figure 7-7: steve.museum Multi-Institutional Tagger: Terms found in AAT

However, when distinct terms are considered this ratio reverses. Only 37.2% of distinct terms (4,448 of 11,944) matched any term in AAT in full or in part (see Figure 7-8). Much of the redundancy in the steve tag set is in the terms that matched to AAT.

Multi-institutional Tagger: Terms Found in AAT: Distinct Terms
[11,944 distinct terms: 4,448 Matched Some Field in the AAT- full or partial]

Matched 37.2%

J. Trant September 18, 2008

Unmatched 62.8%

created from termsAAT.xls:summary
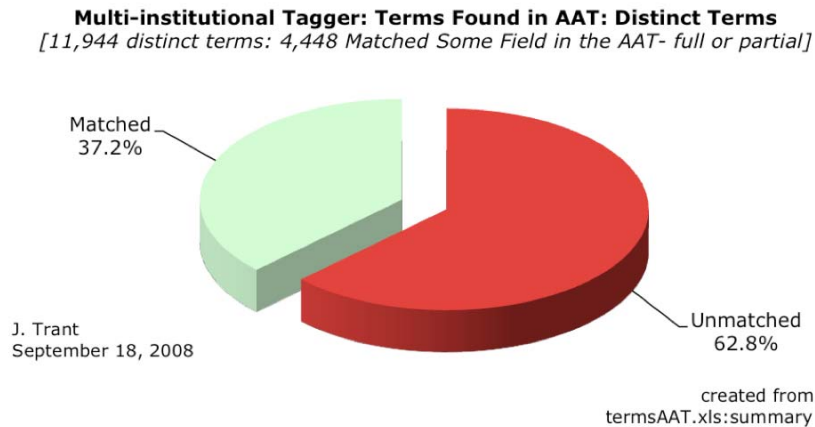
Figure 7-8: steve.museum Multi-Institutional Tagger: Distinct Terms found in AAT

Many terms were found more than once in AAT. When the Full Matches of term to AAT term are studied, the 3,324 terms that match fully, match a total of 32,795 AAT terms (see Table 7-3). This is almost a 1:10 ratio, and makes determining which match in the AAT is appropriate very difficult.

AAT Term Type	Number of Matching Tags	Number of Distinct Matching Tags
Preferred	13,328	1,548
Variant	19,467	2,139
Grand Total	**32,795**	**3,687**

Table 7-3: steve.museum Multi-Institutional Tagger: AAT Matches: Full Terms to AAT Terms by Type.
Variant matches are to either Alternate Descriptors (AD) or to Use For terms (UF)

The number of matches does not equal the number of tags (Table 7-3) because the same tag [character string] can appear both as a Descriptor and an Alternate Descriptor. For example, *drawing* with the qualifier (image-making) is a Descriptor in the Processes and Techniques hierarchy of the Activities Facet. *Drawing* is also an Alternate Descriptor for the term *drawings* with the qualifier (visual works) in the Visual Works hierarchy of the Objects Facet. Table 7-4 shows the distribution of matches across the AAT Term Record structure.

AAT Term Type	Number of Matching Tags
Alternate Descriptor (AD)	14,003
Descriptor (D)	13,481
Use for (UF)	5,311
Grand Total	32,795

Table 7-4: steve.museum Multi-Institutional Tagger: AAT Matches: Full Terms to AAT Terms by AAT Term Type

The full matches of tags to the AAT were compared by AAT Facet or Hierarchy [a selection determined by the steve.museum participants]. Figure 7-9 shows that the redundancy in the tags set is not evenly distributed across facets.
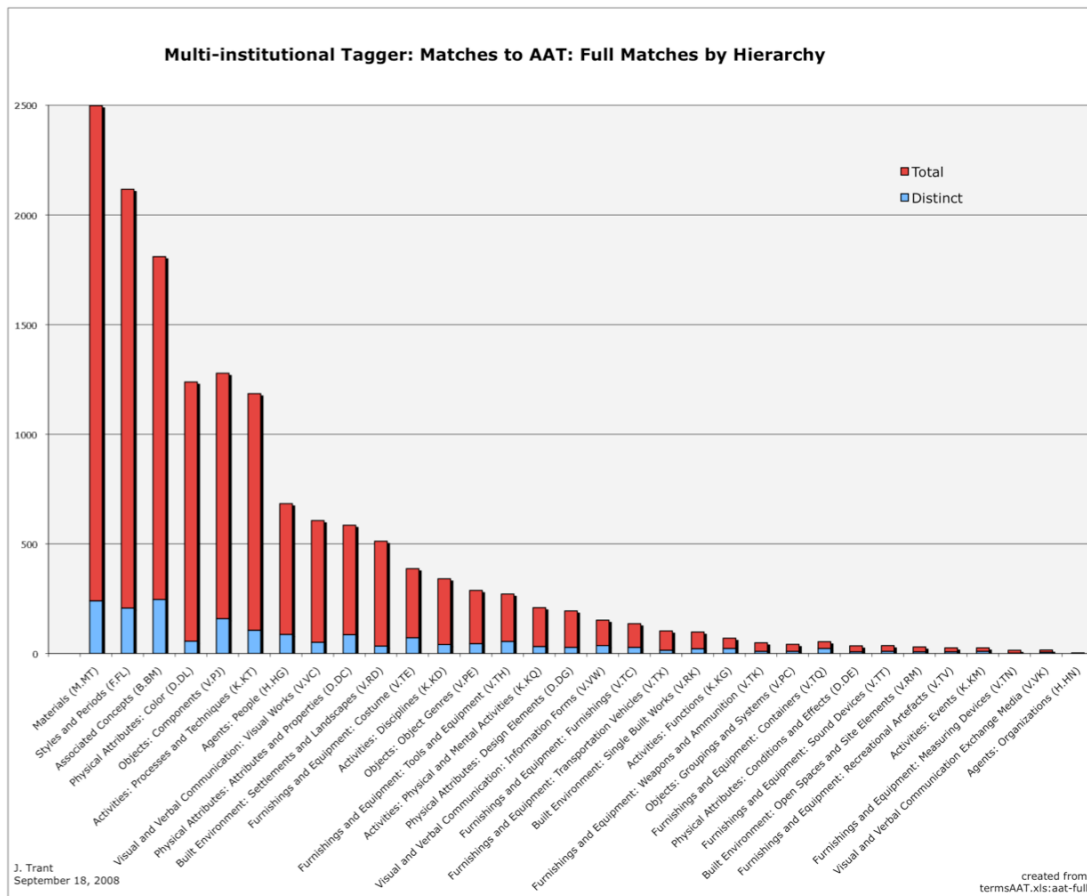
Figure 7-9: steve.museum Multi-Institutional Tagger: Tags to AAT: Full Matches by Hierarchy, showing both total and distinct terms

Distinct terms are distributed fairly evenly across the top four hierarchies: Materials (M.MT: 2,258 total; 240 or 10.6% distinct terms), Styles and Periods (F.FL: 1,910 total; 207 or 10.8% distinct terms), Associated Concepts (B.BM: 1,564 total; 246 or 15.7% distinct terms). The facet with the largest number of matches also had one of the highest percentages of redundancy in term assignment: Materials (M.MT: 10.5% are unique). The highest percentage of redundancy is in the terms that matched Physical Attributes: Color (D.DL), 4.7% unique (including terms like gold (215), red (171), and green (155), and in the terms that matched Built Environment: Settlements and Landscapes (V.RD), 7.1% unique, this included terms like flowers (153), trees (151) and mountains (43).

The distribution of full matches across AAT Facets and Hierarchies is shown in Table 7-5.

Matched to AAT Facet/Hierarchy	Total Tags	Distinct Tags	Percent Distinct Tags
Materials (M.MT)	2258	240	10.6%
Styles and Periods (F.FL)	1910	207	10.8%
Associated Concepts (B.BM)	1564	246	15.7%
Physical Attributes: Color (D.DL)	1182	56	4.7%
Objects: Components (V.PJ)	1119	159	14.2%
Activities: Processes and Techniques (K.KT)	1079	106	9.8%
Agents: People (H.HG)	596	87	14.6%
Visual and Verbal Communication: Visual Works (V.VC)	555	51	9.2%
Physical Attributes: Attributes and Properties (D.DC)	499	86	17.2%
Built Environment: Settlements and Landscapes (V.RD)	478	34	7.1%
Furnishings and Equipment: Costume (V.TE)	315	72	22.9%
Activities: Disciplines (K.KD)	300	41	13.7%
Objects: Object Genres (V.PE)	243	45	18.5%
Furnishings and Equipment: Tools and Equipment (V.TH)	216	55	25.5%
Activities: Physical and Mental Activities (K.KQ)	177	32	18.1%
Physical Attributes: Design Elements (D.DG)	166	28	16.9%
Visual and Verbal Communication: Information Forms (V.VW)	116	36	31.0%
Furnishings and Equipment: Furnishings (V.TC)	108	28	25.9%
Furnishings and Equipment: Transportation Vehicles (V.TX)	88	15	17.0%
Built Environment: Single Built Works (V.RK)	76	22	28.9%
Activities: Functions (K.KG)	47	23	48.9%
Furnishings and Equipment: Weapons and Ammunition (V.TK)	39	10	25.6%
Objects: Groupings and Systems (V.PC)	32	10	31.3%
Furnishings and Equipment: Containers (V.TQ)	31	23	74.2%
Physical Attributes: Conditions and Effects (D.DE)	27	8	29.6%
Furnishings and Equipment: Sound Devices (V.TT)	26	10	38.5%
Built Environment: Open Spaces and Site Elements (V.RM)	22	8	36.4%
Furnishings and Equipment: Recreational Artefacts (V.TV)	18	8	44.4%
Activities: Events (K.KM)	16	10	62.5%
Furnishings and Equipment: Measuring Devices (V.TN)	13	2	15.4%
Visual and Verbal Communication Exchange Media (V.VK)	10	6	60.0%
Agents: Organizations (H.HN)	2	1	50.0%
Grand Total	**13328**	**1765**	**13.2%**

Table 7-5: steve.museum Multi-Institutional Tagger: Full Matches to AAT by Hierarchy

The challenge of determining which AAT term record is an appropriate match for a tag may be a significant one. Table 7-6 shows the places where tags fully matched a term in AAT more than 300 times. These matches are distributed across all AAT term types and across multiple hierarchies. In some cases – such as *gold* as a colour or *gold* as a material – both senses of the match might be appropriate to a work of art. Determining which sense of a tag was intended by the user – and hence which is the intended AAT term to match to – may be impossible given the lack of any context for tags that might help impute their meaning.

Tag	AAT Hierarchy	Term Type	Number of Full Matches
wood	M.MT	D	160
		UF	160
	M.MT Total		*320*
	V.RD	AD	160
	V.RD Total		*160*
wood Total			**480**
flowers	D.DG	UF	159
	D.DG Total		*159*
	M.MT	AD	159
	M.MT Total		*159*
	V.RD	D	159
	V.RD Total		*159*
flowers Total			**477**
landscape	V.RD	AD	235
	V.RD Total		*235*
	V.VC	AD	235
	V.VC Total		*235*
landscape Total			**470**
sculpture	K.KT	UF	223
	K.KT Total		*223*
	V.VC	D	223
	V.VC Total		*223*
sculpture Total			**446**
gold	D.DL	UF	215
	D.DL Total		*215*
	M.MT	D	215
	M.MT Total		*215*
gold Total			**430**
painting	K.KT	D	274
	K.KT Total		*274*
	V.VC	AD	137
	V.VC Total		*137*
painting Total			**411**
red	D.DL	D	171
	D.DL Total		*171*
	F.FL	UF	171
	F.FL Total		*171*
red Total			**342**
green	D.DL	D	155
	D.DL Total		*155*
	V.RM	AD	155
	V.RM Total		*155*
green Total			**310**

Table 7-6: steve.museum Multi-Institutional Tagger: Terms with Full Matches to AAT 300 or more times by hierarchy and term type

7.3.1.1   Tags, AAT and Museum Documentation

Whether the terms that matched AAT are also the ones that matched Museum Documentation is a question worth exploring. There may be a correlation between matches in particular fields and matches in certain facets or hierarchies.

7.3.2   Tags and ULAN

When tags were compared to the Union List of Artists Names (ULAN), 64% of the tags did not match ULAN in any way (see Figure 7-10).

Multi-Institutional Tagger: Tags matched to ULAN
[36,981 Tags: 698 Full Matches; 12483 Partially Match ULAN]
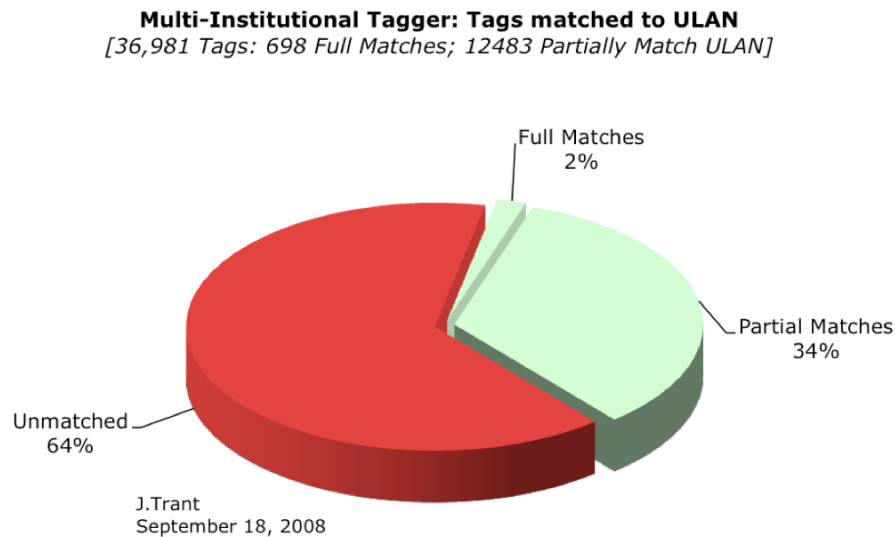
Figure 7-10: steve.museum Multi-Institutional Tagger: Tags compared to ULAN

When distinct tags are considered (Figure 7-11) only 15% of the 11,944 tags (or 1,811) matched ULAN in any way.

Further detail is shown in Table 7-7.

Multi-Institutional Tagger: Tags matched to ULAN
[11,944 Distinct Tags: 10,133 Don't Match ULAN]

Matched
15%

Unmatched
85%

J.Trant
Dec. 10, 2008
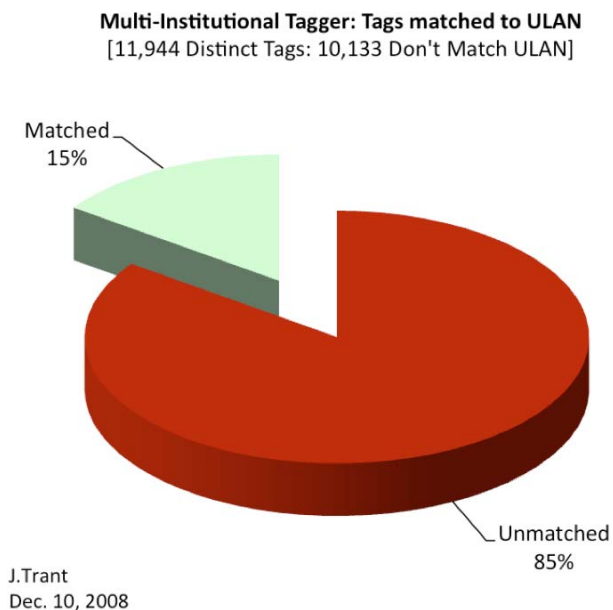
Figure 7-11: steve.museum Multi-Institutional Tagger: Distinct Tags compared to ULAN

	Total	Distinct
Tags	36,981	11,944
Unmatched to ULAN	23,800	10,133
Matched to ULAN (full or partial)	13,181	1,811

Table 7-7: steve.museum Multi-Institutional Tagger: Tags compared to ULAN

Even when tags do match with ULAN, there is considerable ambiguity, particularly with partial matches. Because a tag string could match with ULAN more than once, there are 273,750 partial truncated string matches (where the truncated tag string matches any part of a ULAN term, so the tag *gold* matches *Goldman or Golder*), and 334,102 full tag partial field matches (where the full tag string matches any part of the field, so *adam* matches *Topffer, Adam Wolfgang* and *Adam, Benno*).

The term *adam* appears in the tag set 3 times, assigned to two different works, but generates 6 full matches, 438 full word/partial field matches, and 134 truncated string matches when compared with ULAN. To further complicate the issue, in both cases the term as assigned by the tagger refers to the subject matter of the work (Adam and Eve), not to the name of an artist, something that just an analysis of the term would not reveal.

Nor is there much less ambiguity when the full term matches with a character string in ULAN. Figure 7-12 plots the distinct tags assigned 3 or more times that matched ULAN (562 of 698 total terms). Of these, only 11 of 33 tags (33.3%) are unambiguously identifiable as artists' names. Two-thirds of the tags that matched ULAN fully were terms like *wood*, *white* and *fish* that could be materials, colours, or subject matter as well as names.
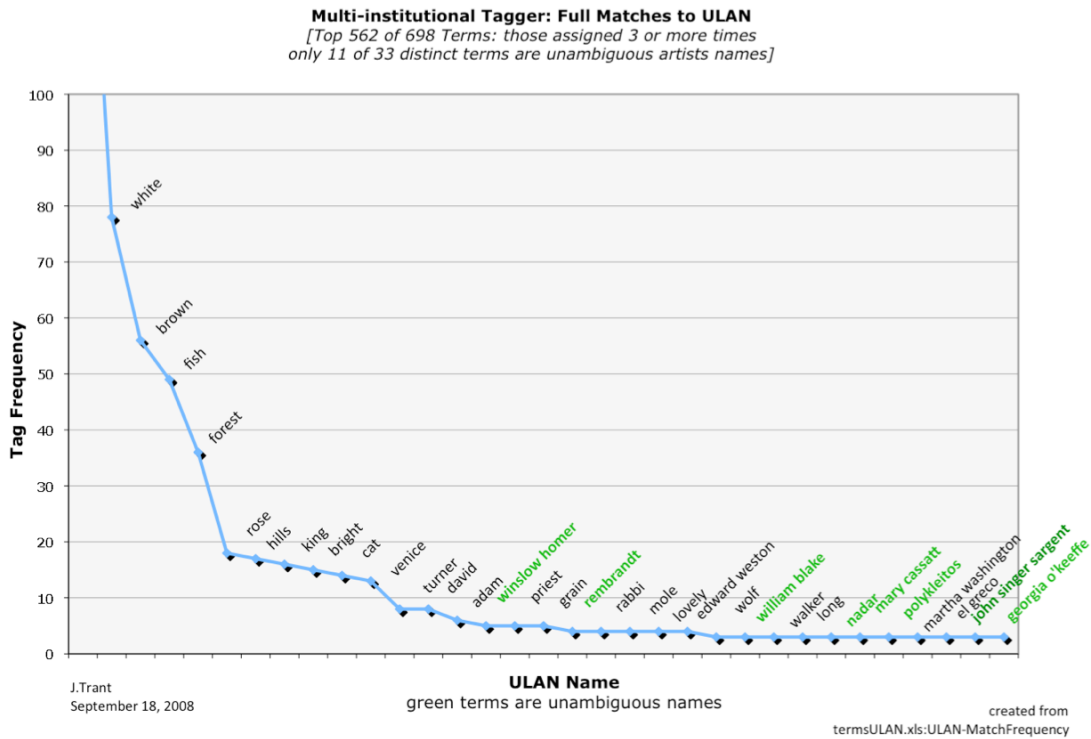
Figure 7-12: steve.museum Multi-Institutional Tagger: Full matches to ULAN

7.4 Do museum professional staff find folksonomic terminology useful?

Given that tags do not highly correlate with Museum Documentation and the terms used are found in neither AAT nor ULAN, we might reasonably wonder if museum staff find them useful at all.

Skepticism exists in the professional cataloguing community about the value of social tagging. In a survey of attitudes conducted within steve.museum, one respondent noted: "if well managed, this could be useful. if not, utter chaos" (Trant, et al., 2007). In order to establish if user-contributed tags are relevant to the work of art tagged, tags were reviewed by professional museum staff and compared to the works of art themselves. Tag by tag review

was the only way to establish whether – in the minds of the museum staff responsible for implementing on-line access to collections – tagging could improve searching.

Using a method similar to that of Von Ahn and Dabbish (2004), museum staff reviewed each tag collected in the experimental data set and assessed whether they would find the term helpful in finding the work to which it was assigned. They will be asked to consider the question:

> *if you found* **this work** *using* **this term** *in a* **query***, would you be surprised?*

Museum staff indicated – based on the above question – whether the tags could be *Useful* or *Not-Useful*. If they were not surprised, then the term can be considered *Useful*. If they were surprised, then the term would be flagged as *Not-Useful*.

In addition, based on discussions of the steve project team, nuance was built into the review of tags. Tags could be optionally identified as *judgmental*, representing a personal assessment of the work in a *positive* or *negative* way, e.g. "fantastic" or "ugly"; as the result of a *mis-perception*, e.g. a mis-identification of iconography; as a *misspelling* or typo, e.g. "gilrs"; as a reflection of a *personal point of view* or category that the museum can't judge, e.g. "mg2x"; or as a *foreign language* term, e.g. "vert". With this input, it is possible to determine not only the utility of tags assigned to works of art – as seen from the perspective of a museum staff person – but also to qualify the places where tags might be seen to be not useful. The goal here was not censorship, but the development of an understanding of the nature of tags and the role they could play in improving accessibility of on-line collections.

Reviews took place at each of the museums, conducted by one or more people (depending on available staff and resources). The circumstances of each review were documented in a questionnaire (steve.museum, 2008). Each museum group reviewed all tags assigned to works from their collection according to common guidelines (steve.museum, 2007 / 2008).

Results of the review were collected using an on-line tool. Museum staff could approach the review either from a display of works that have been tagged (which shows the number of unique terms assigned and reviewed for each work) or from a display of terms assigned (which then displays the works which have been tagged with that term). They then saw an image of the work of art, and a list of the terms assigned to it (Figure 7-13).
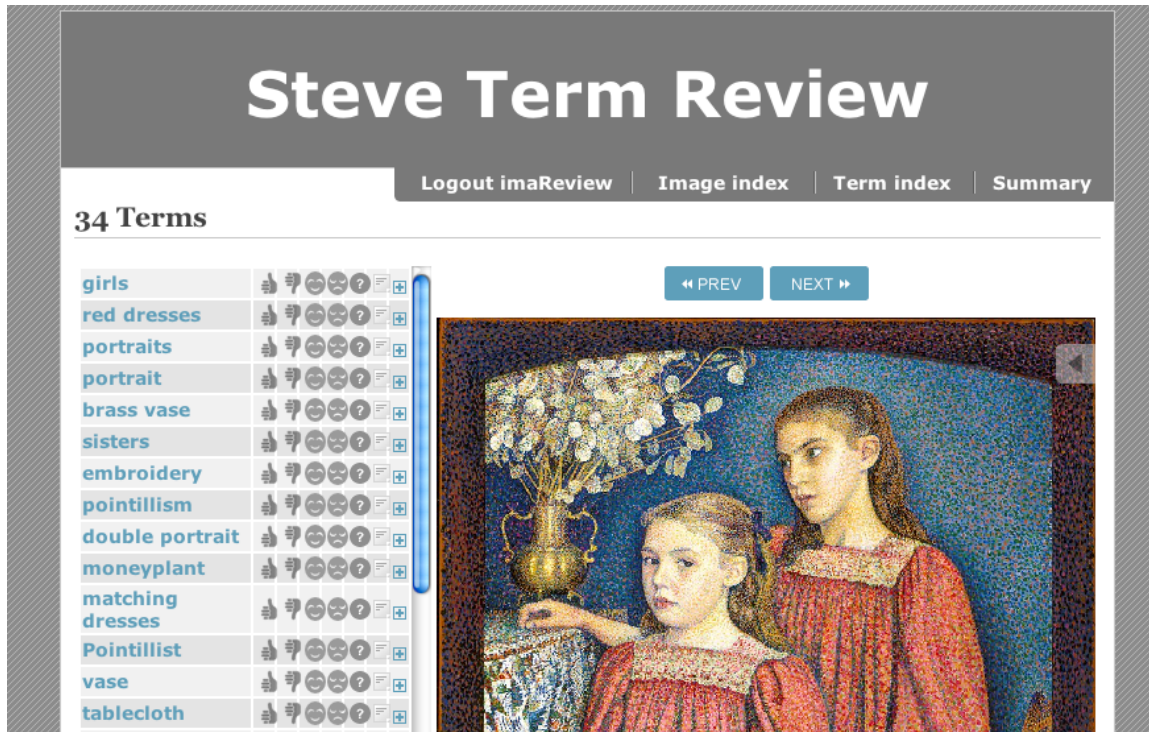
Figure 7-13: steve.museum Term Review Tool

7.4.1   Useful Terms

In all 36,931 terms were reviewed in relation to the specific work of art – a total of 31,032 term/work pairs. Of the 36,931 terms, 88% (32,609) were found to be useful in museum staff review (Figure 7-14).

Multi-Institutional Tagger: Useful Terms?
[36,931 Terms: 32,609 Useful]

no
12%

yes
88%

J. Trant
Sept. 18, 2008

created from
steve_termset4-view_term080908.xls:TermsByUseful
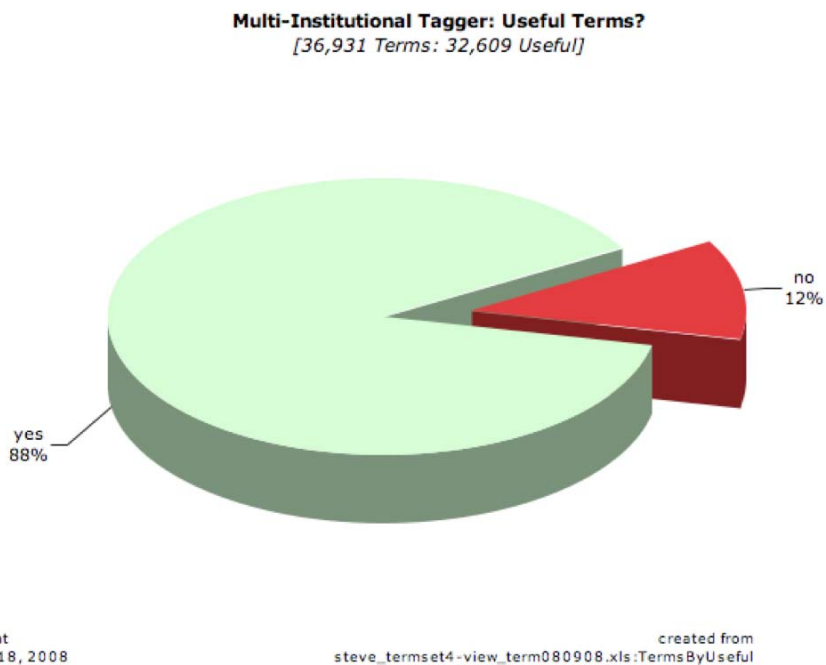
Figure 7-14: steve.museum Multi-Institutional Tagger: Term Review: Useful Terms

Not all works had the same percentage of useful tags. Figure 7-15 shows the percentage of useful tags for a group of sample works ranges from 65% (for a work from the Rubin Museum with unfamiliar iconography) to 100% (for a Chinese room from the Minneapolis Institute of Arts). A work's legibility at a small size may also affect the percentage of useful terms assigned to the work – as mis-identification is more likely in hard-to-read works.

Usefulness may also vary according to Object Type, Iconography and whether a work is two- or three-dimensional; this is a question for further study.
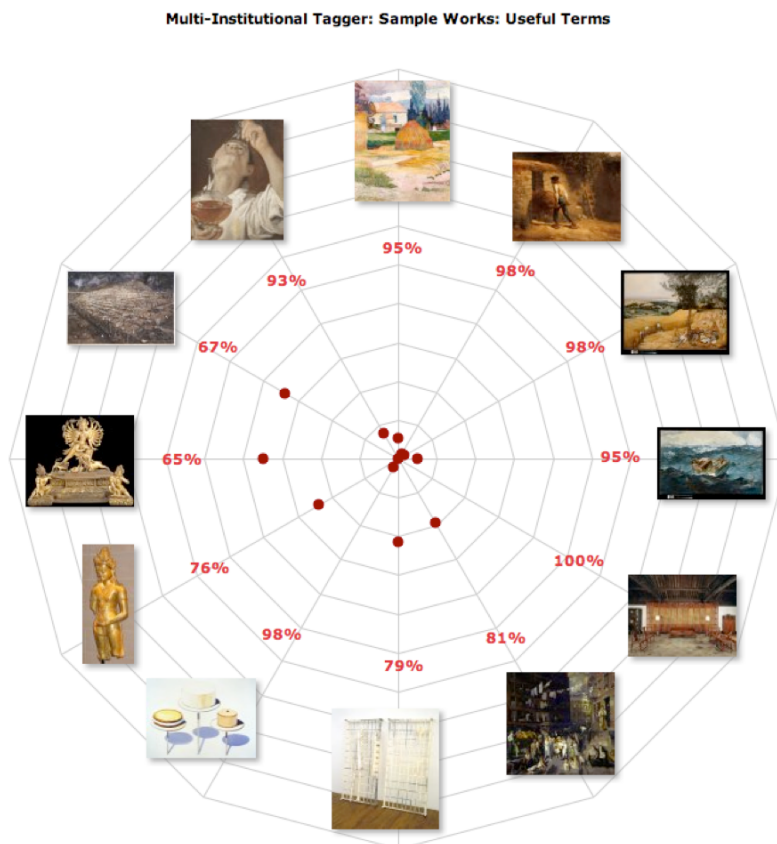
Figure 7-15: Mult-Institutional Tagger: Usefulness as a Percentage of the Tags assigned for a Range of Works

7.4.2 Nuance in Usefulness

Not all participating museums took full advantage of the ability to qualify their assessments of U*sefulness,* or to indicate why their terms were seen as *Not Useful,* perhaps because of the time required. However, a future study may be able to sample *Not Useful* tags and further profile the rationales for seeing tags as *Not Useful.* (See 7.4.5 Usefulness and Teachable Moments below). Care must be taken – in any study – to account for the wide differences in practice amongst museums (reflective of their differing corporate cultures), and the circumstances of each review (recorded in a questionnaire (steve.museum, 2008)).

7.4.3 Useful and Frequency

The *Useful-*ness of a tag increased in proportion to the frequency with which it was assigned to a work. Figure 7-16 shows the percentage of useful terms by frequency, from 1 to 4 or greater times assigned. Starting with an 88.2% useful rating to begin with, *Useful-*ness increased to 96.8% when a term was assigned 2 or more times and jumped to 98.5% when a term was assigned 3 or more times. All terms assigned 4 or more times were judged *Useful.*

Operationally, this suggests that museums could forgo review of multiply assigned terms, if they felt a review was necessary before including tags in "live applications".
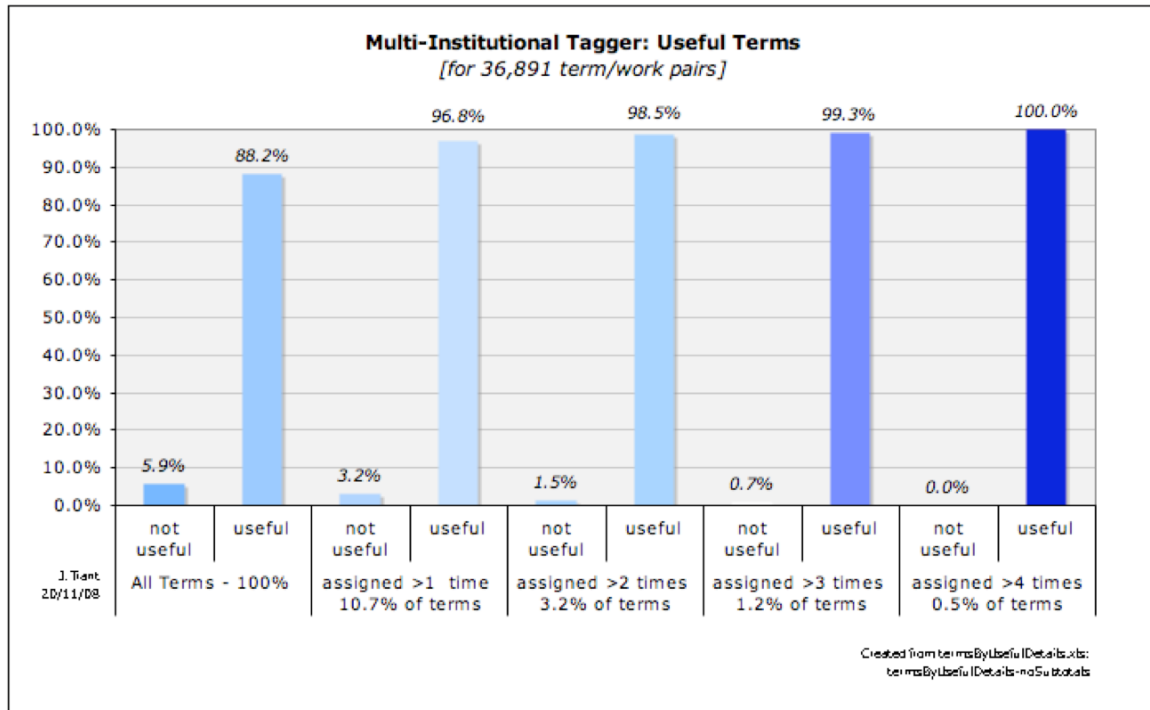
Figure 7-16: steve.museum Multi-Institutional Tagger: Usefulness and Term Frequency

7.4.4   Usefulness and Users

A review of usefulness in relationship to the users who assigned tags showed two things:

46% of users always assigned useful tags

5.1% of users never assigned a useful tag

Operationally, this points positively to being able to identify *Useful* users and enable them to add tags to "live applications" with little supervision or review.

7.4.5   Usefulness and Teachable Moments

It was theorized that terms that were *Not Useful*, but assigned to the same work multiple times might provide a 'teachable moment' for museum educators, identifying a common error or misperception. As the discussion above makes clear, this rarely happened, but when it did, as in the case of a *lute* tagged as *guitar* (WorkID: 303)*,* an *entombment* tagged as a *deposition* (WorkID: 756), or a *hanging* tagged as a *carpet* (WorkID: 1105) the theory holds true.

Another way of identifying 'teachable moments' – used by some review teams more than others – was the category of *Useful Misperception*. These were terms that museum staff felt might provide a useful access point to the work of art, even though they did not offer an accurate description. In total, 938 tags – assigned to 436 works and forming 838 term/work pairs – were identified as *Useful Misperceptions.*

Some of these represented a mis-reading of the image, as when sequins were mistaken for *leopard print* and *spotted* (WorkID: 112). Others show a mis-identification of an artist, such as *Seurat*, twice, for both Charles Angrand (WorkID: 220) and Maximilien Luce (WorkID: 230).

Others show a lack of familiarity with iconography, and religious traditions, such as *hindu* (WorkIDs: 601, 624, 636, and 886), or a confusion between things *Japanese* and Chinese (WorkIDs: 181, 202, 207, 523, 618, 693, 699, 953, 956, and 959). Still others show a difference in popular and academic understanding and use of terms like *Impressionism* (WorkIDs: 77, 93, 143, 160, 222, 243, 840, 874, 882, and 1193) or *Baroque* (WorkIDs: 192, 217, and 244).

Table 7-8 shows works with 10 or more terms identified as *Useful Misperceptions.* That these are all from the same museum is an artefact of the review process rather than a reflection of the nature of the collection. These works were reviewed by teams who valued this category; others did not use it.

ID	Work Details	*Useful Misperception* Terms	Total
882	Pablo Picasso, Spanish (worked in France), 1881-1973, Rape of the Sabine Women, 1963, Oil on canvas, 195.3 x 131.1 cm (76 7/8 x 51 5/8 in.), Juliana Cheney Edwards Collection, Tompkins Collection-Arthur Gordon Tompkins Fund, and Fanny P. Mason Fund in memory of Alice Thevin, Boston Museum of Fine Arts	child	1
		Expressionism	1
		Greek Mythology	1
		Guernica	2
		impressionism	1
		knight	1
		mother and child	1
		mythology	1
		Parthenon	1
		roman	4
		roman mythology	1
		romans	1
		rome	3
		tent	1
Total Taggers: 28	Total Tags: 158 Distinct Tags: 98	Useful Misperceptions:	20

ID	Work Details	*Useful Misperception* Terms	Total
929	Arthur Garfield Dove, American, 1880-1946, That Red One, 1944, Oil and wax on canvas, 68.58 x 91.44 cm (27 x 36 in.), Gift of the William H. Lane Foundation, Boston Museum of Fine Arts	absract expressionism	1
		abstract expressionism	1
		black olive on chop sticks	1
		chopsticks	2
		donut	2
		Expressionism	1
		Eye	3
		Moon	2
Total Taggers: 25	Total Tags: 111 Distinct Tags: 74	Useful Misperceptions:	19
880	the Dokimasia Painter, Mixing bowl (calyx krater) with the killing of Agamemnon, about 460 B.C., Ceramic, Red Figure, Height: 51 cm (20 1/16 in.); diameter: 51 cm (20 1/16 in.), William Francis Warden Fund, Boston Museum of Fine Arts	Aegisthus	1
		amphora	3
		men and women	1
		terracotta	1
		Theater	2
		vase	4
Total Taggers: 11	Total Tags: 45 Distinct Tags: 32	Useful Misperception	12

Table 7-8: Works with ten or more terms identified as Useful Misperception

7.4.6   *Useful and Museum Documentation*

Tags seen as *Useful* and *Not-Useful* were compared to the Found in Museum Documentation analysis. A very small number of *Not Useful* terms were found in Museum Documentation (see Table 7-9). These included the names of museums – which some institutions routinely marked as *Not Useful,* and some mis-reading of colours and materials – such as something *gold* tagged as *yellow.*

Term		Useful			
Found in Documentation		**no**	**yes**	**unknown**	**Total**
yes	acc_nbr	1	1		2
	copyright		3		3
	creation_date	1	13		14
	creator	7	340		347
	credit_line	10	42		52
	dimensions		16		16
	materials	11	656		667
	object_metadata	6	931	2	939
	object_type	5	132		137
	primary_title	12	1,867		1,879
Total Found		53	4,001	2	4,056
no	not found	4,257	28,616	34	32,907
Total Not Found		4,257	28,616	34	32,907
Grand Total		**4,310**	**32,617**	**36**	**36,963**

Table 7-9: steve.museum Multi-Institutional Tagger: Usefulness and Found in Museum Documentation

7.4.7   Useful and AAT

There was a slight possible relationship between tags found in AAT and tags seen as *Useful*. Slightly fewer of the terms that did not match AAT were seen to be *Useful* than in the overall data set (82% vs. 88%). It is unlikely whether this is a large enough difference to be actionable, particularly given the difficulties of acting on AAT matches noted earlier.
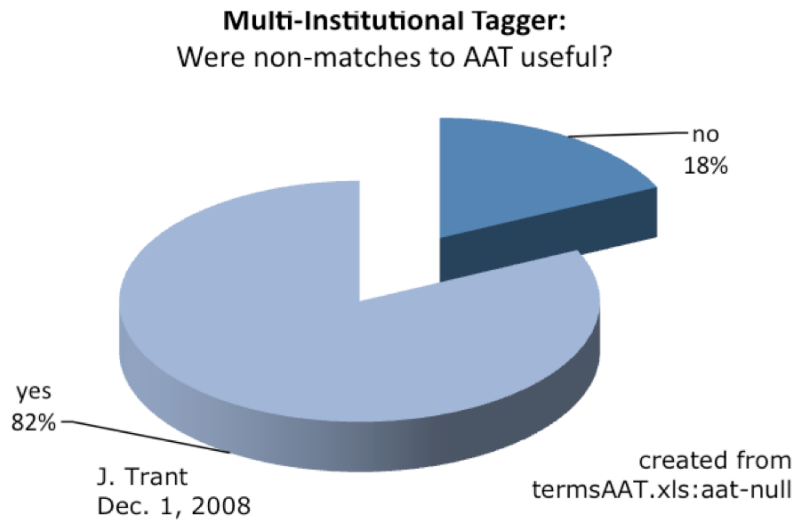
Figure 7-17: steve.museum Multi-Institutional Tagger: Terms not found in AAT: Where they useful?

7.4.8   *Differences Among Institutions*

The assessment of terms by museum staff was not completely consistent across institutions. The overall results of each institution were profiled, and some groups appear to be 'harder' in their assessments of usefulness than others. Attitudes to tagging vastly differed at the outset of the study both across museums and between professional specialties, as shown in Figure 7-18 (Trant & steve.museum, 2007). This is explored further in a separate report (Leason, Trant, & steve.museum, 2008).
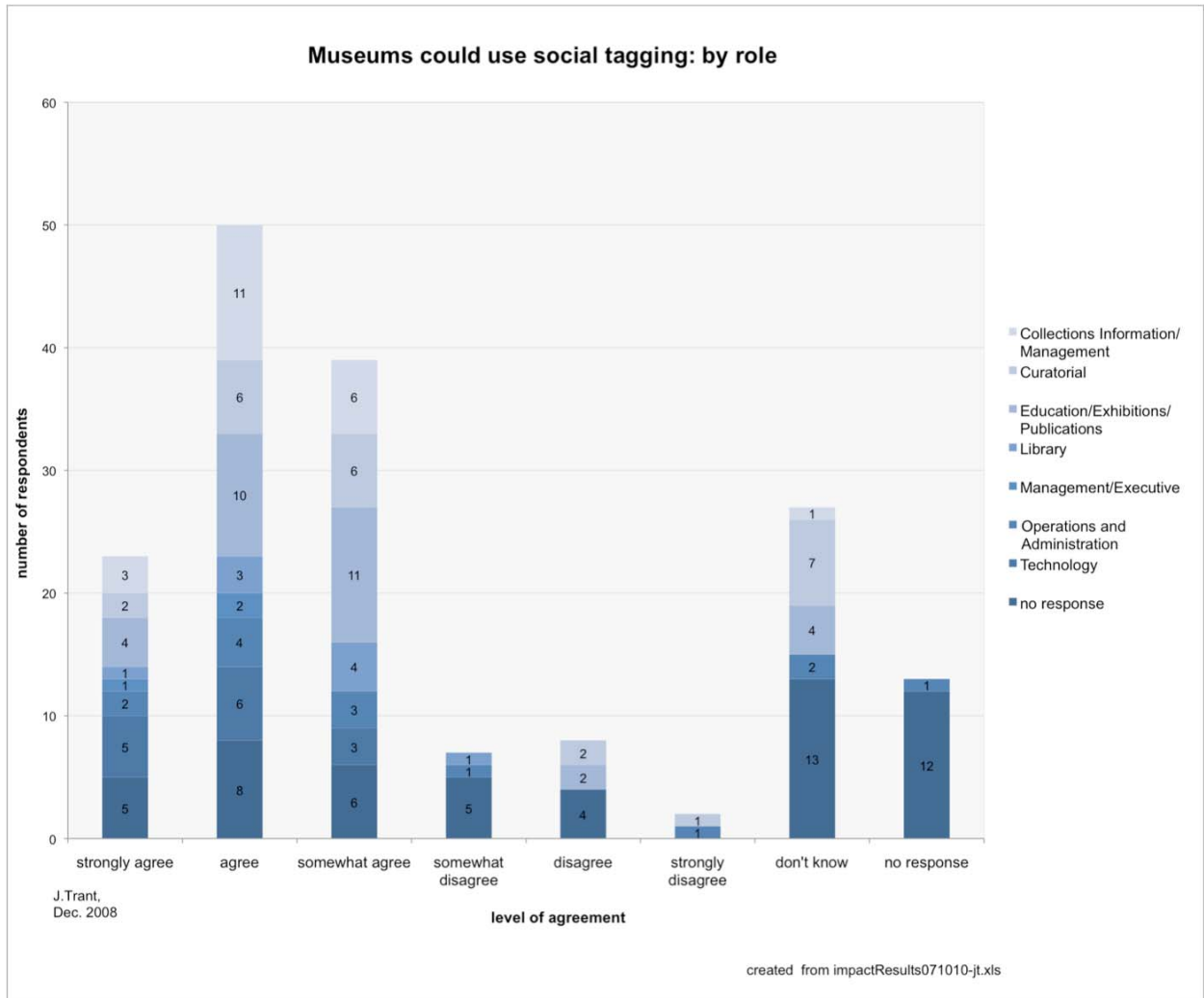
Figure 7-18: Museum Baseline Attitude Survey, Museums Could Use Social Tagging:
Responses by area of responsibility

Some difference between museums is to be expected, given their distinct corporate cultures, and their differing goals for tagging their particular museum collection. Since tags will be used on a per-museum basis, this is not problematic.

7.5   Visualizing Tags, Museum Documentation and Usefulness

Visualizations help illustrate inter-relationships between these analyses. For example, when frequency of use of a tag is plotted with its relation to museum documentation it is possible to see whether popular tags are also new tags.
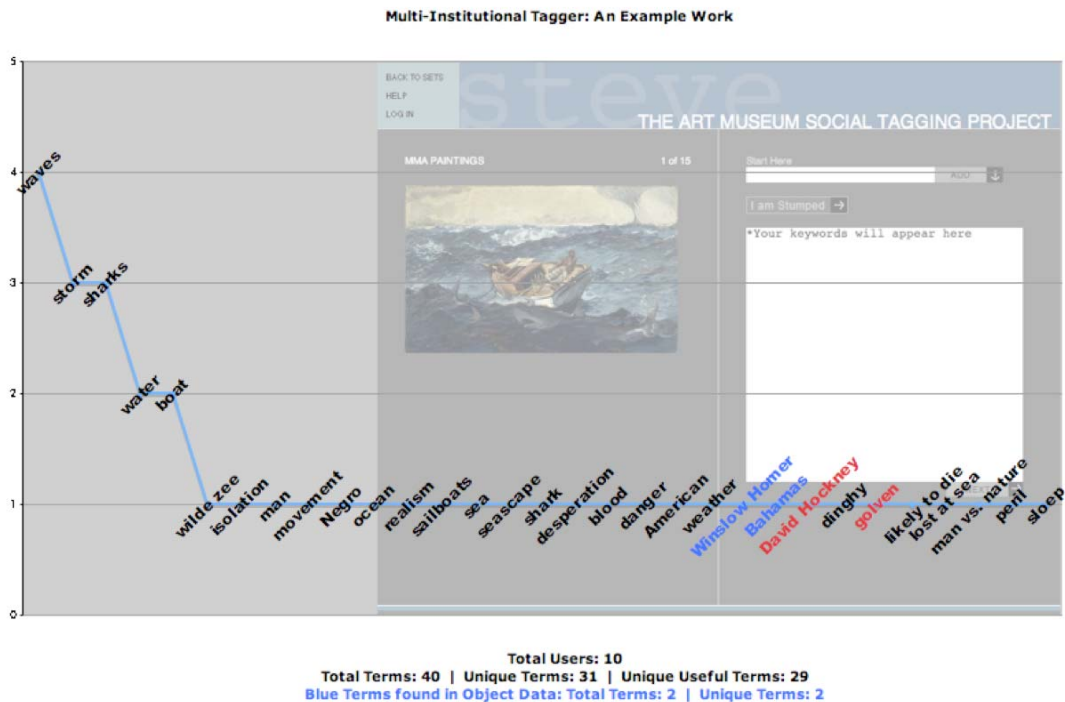
Figure 7-19: steve.museum Multi-Institutional Tagger: Tags for a sample work, showing Frequency, Useful, and Found in Museum Documentation

Figure 7-19 shows an example of all the tags assigned to Winslow Homer's *The Gulf Stream* in the collection of The Metropolitan Museum of Art. A total of 40 tags were assigned, 31 unique. Of these 29 distinct terms (93.5%) were *Useful*. The two *Not-Useful* terms (6.5%) are shown in red. One of these – "*golven*" – is actually an appropriate foreign language term unfamiliar to the term reviewers. This would bring *Useful* terms to 96.8% for this work.

Of these terms, only two – shown in blue – were also found in the museum documentation. Only two (6.5%) of the terms were redundant: 93.5% were new.

7.5.1   *Summary: Usefulness*

This qualitative analysis was designed to address museum-based concerns about the appropriateness of tags assigned by the general public, and contribute to our understanding the contribution of tagging. It has helped to establish that the vast majority of tags assigned by users of the steve tagger were appropriate, and that misbehaviour in the steve tagging environment was very infrequent.

7.6   Tagging and Searching: Could tagging improve on-line searching of works of art?

The third tag-based comparison of tags to other vocabularies examined searching: would including tags in indexes improve search results? It may be possible to get better results when searching on-line for works of art, if folksonomic terminology was included in search systems. Search terms (gathered from logs of searches of museum Web sites) were compared to tags assigned to works from those collections, to determine if there was an overlap between terms assigned when tagging and terms used when searching.
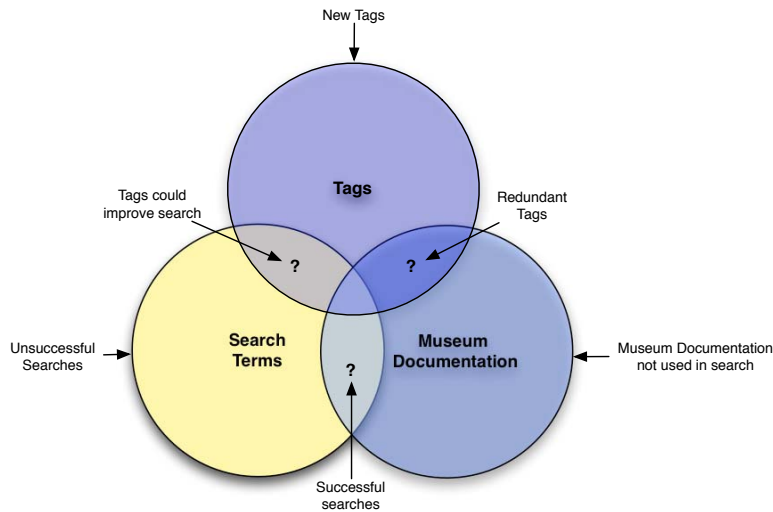
Figure 7-20: Tags, Search Terms and Museum Documentation

A high degree of overlap between tags assigned and search terms would indicate that tags could be useful for searching collections. A low degree of overlap questions whether the same terms are used to search as tag. Nuance in the analysis could come from seeing if tags match search terms that were used more or less frequently.

This method draws upon the experience of a preliminary study of art museum search logs (Trant, 2006c). The prototype analysis showed that public searching of an on-line

contemporary museum collection may have some particular characteristics, including a strong reliance on artists' names. However, it was not known if this would be shared with other types of art museums.

The tags assigned to the test collection were compared to the terms used to search on-line collections (recorded in the logs). Again, because most on-line collections catalogues use simple, truncated, character-string matching, the comparison was made by matching lower-case character-strings, truncated at the end. Punctuation was ignored.

7.6.1   Search Log Data

The literature of tagging assumes that tags assigned are similar to the terms used to search. However, this has not been proven. A comparison of tags assigned to works of art and the terms used to search for them in on-line museum catalogues may help answer this question.

A sample of search log data from some of the same museums that provided the test works of art for tagging was required to make this analysis. It was not possible, however, to include log data from all museums that contributed works to be tagged, as not all museums have searchable database of their collections on-line. Log data from two representative institutions – the Minneapolis Institute of Arts (MIA) and the San Francisco Museum of Modern Art (SFMOMA) – was studied (see Table 7-10).

	Museum	Start Date	End Date	No. of Searches
Minneapolis Institute of Arts	01-Sep-05	31-Aug-06	251,918
San Francisco Museum of Modern Art *	01-Jan-04	31-Dec-05	151,102
top 10,000 search terms for each year			

Table 7-10: Search log data from steve.museum participants

These two institutions were selected in order to compare search behaviour at contemporary art museum (SFMOMA) with that at an encyclopedic collection (the MIA). Preliminary studies of search logs have indicated that contemporary collections may not be representative of art museum searching as a whole (Trant, 2006c).

7.6.2   Tags Matching Search Terms

The overall number of terms in each log file was established, as was the number of distinct terms. These were then compared to the tags collected for MIA and SFMOMA works. Results are presented in Table 7-11.

Institution	search log terms			search terms matching tags			matching statistics	
	total search terms	distinct search terms	ratio	total searches matching tags	distinct searches matching tags	ratio	% of tags matching search terms	% of distinct tags matching search terms
MIA	251,918	43,303	1/6	108,515	16,654	1/7	43.1%	38.5%
SFMOMA	151,108	16,079	1/9	27,201	3,632	1/7	18.0%	22.6%

Table 7-11: steve.museum Multi-Institutional Tagger: tags compared to search terms

Search terms in the SFMOMA log file were less likely to be repeated (16,079 of 151,08 or 1/9 distinct) than those in the MIA (43,303 of 251,918 or 1/6 distinct), a difference that should be more pronounced, as the SFMOMA log data only include the top 10,000 terms for each year (lessening the variation in the file). However this variation in search vocabulary did not translate into an improvement in the match between tags and search terms. Total tags matched search terms 18% of the time for SFMOMA and 43.1% of the time for MIA. This spread is lessened when distinct terms are compared: 38.5% of distinct tags matched distinct search terms at MIA and 22.6% at SFMOMA.

While this match-rate seems low, it must be remembered that both search log data sets for SFMOMA and MIA included queries of the entire museum Web site. Neither museum has a separate collections search function. So a large proportion of the searches – such as those for the hours or location of the museum – could not be satisfied by tags applied to works of art.

In addition, those search terms that were art-related referred to the entirety of a museum's collection, and only a small subset of which was represented in the steve.museum test data set. So a low proportion of matches is not unexpected.

7.6.3   Types of Terms in Search Logs

7.6.3.1   Top 100 search terms

To understand how search terms related to tags, search terms were categorized into clusters that facilitated distinguishing collections-related searches from others.
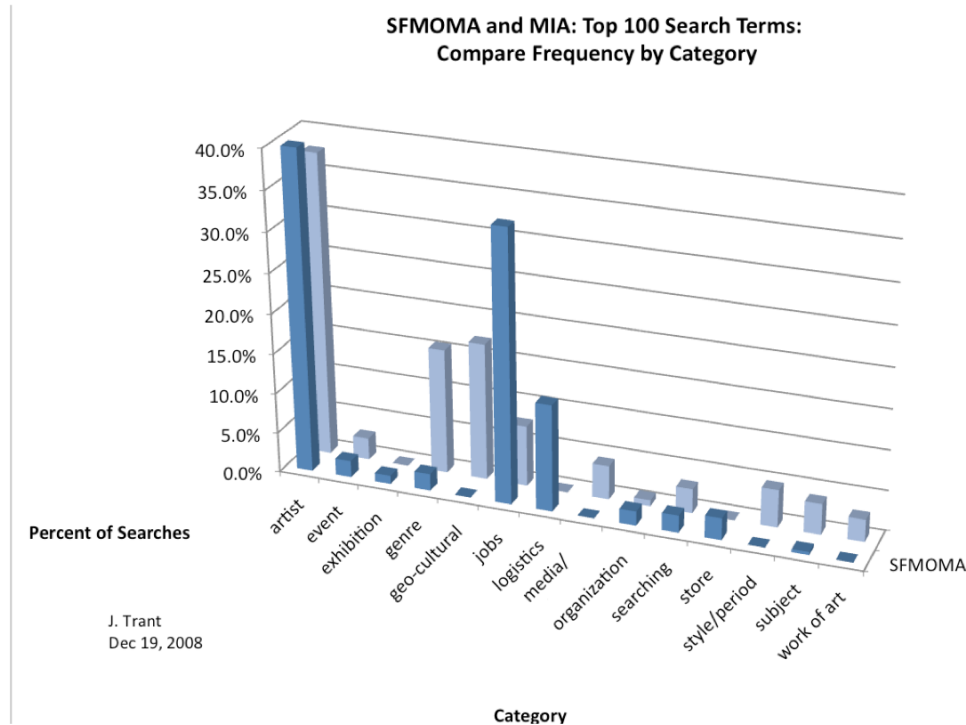
Figure 7-21: Search Terms: Compare MIA and SFMOMA by Category

Both MIA and SFMOMA search logs contain a high preponderance of artists' names – in direct contrast to the tagging data, that contained few unambiguous artists names (see 7.3.2). This is in direct agreement with the results of the study of the Guggenheim search logs (Trant, 2006c). The presence of a large percentage of artists' names in the MIA search logs discounts the theory that a reliance on artists' names was a characteristic of searching only contemporary collections. Searching artists' names may be a learned behaviour, as this is one of the few ways to reliably get results in on-line museum catalogues.

7.6.3.2   Search Terms: Does the tail equal the head?

To explore the question of learned behaviour – assuming that repeat or more frequent searches are those that were more successful but not necessarily more desirable – we sampled the search logs at different points, and repeated the categorization. Figure 7-22 and Figure 7-23 show categorized samples from the MIA and SFMO from the top 100 terms, the middle 100 terms and the first 100 single searches.

Searches by Category: MIA
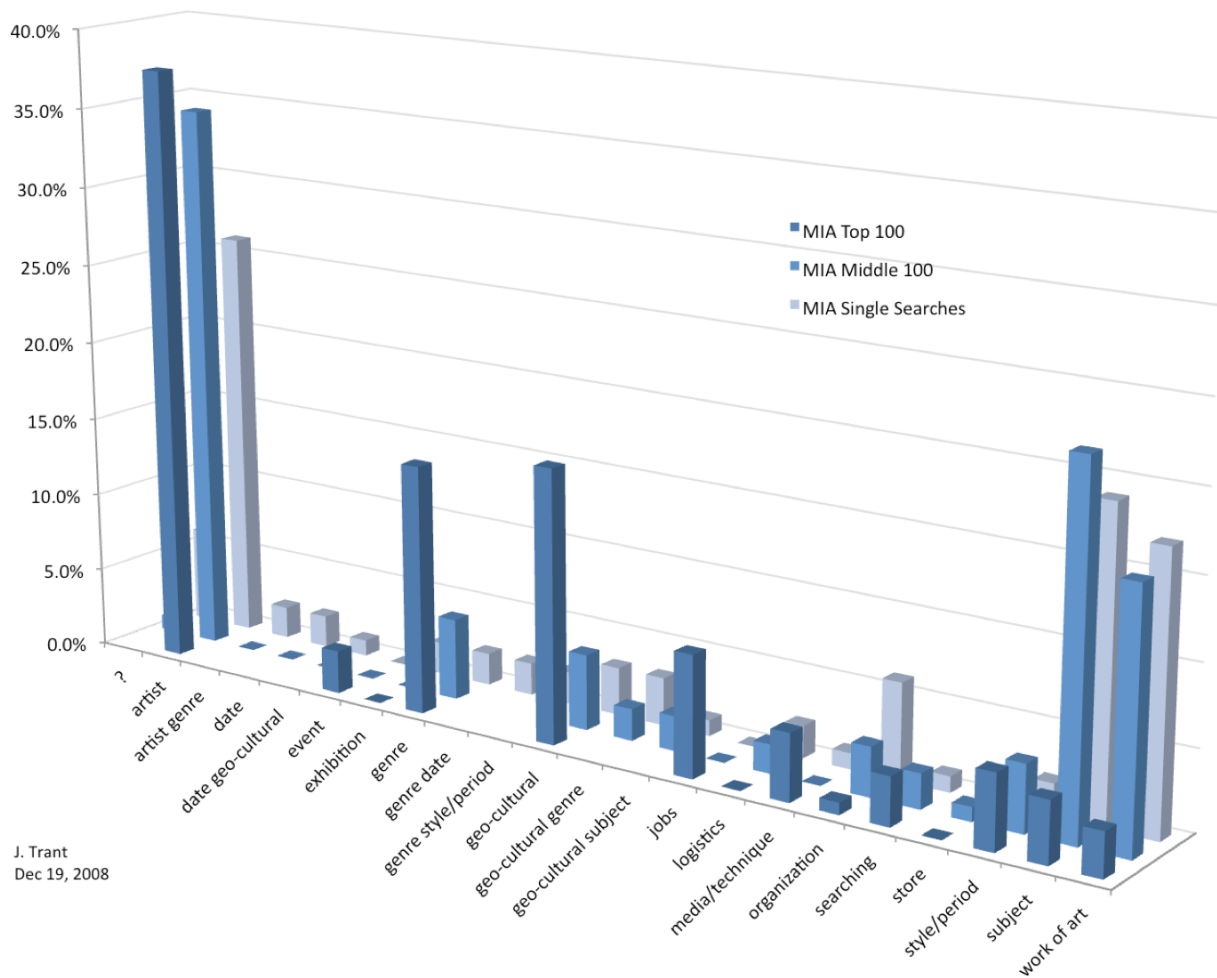
Figure 7-22: Search Terms: MIA by Category at different frequencies

Searches by Category: SFMOMA
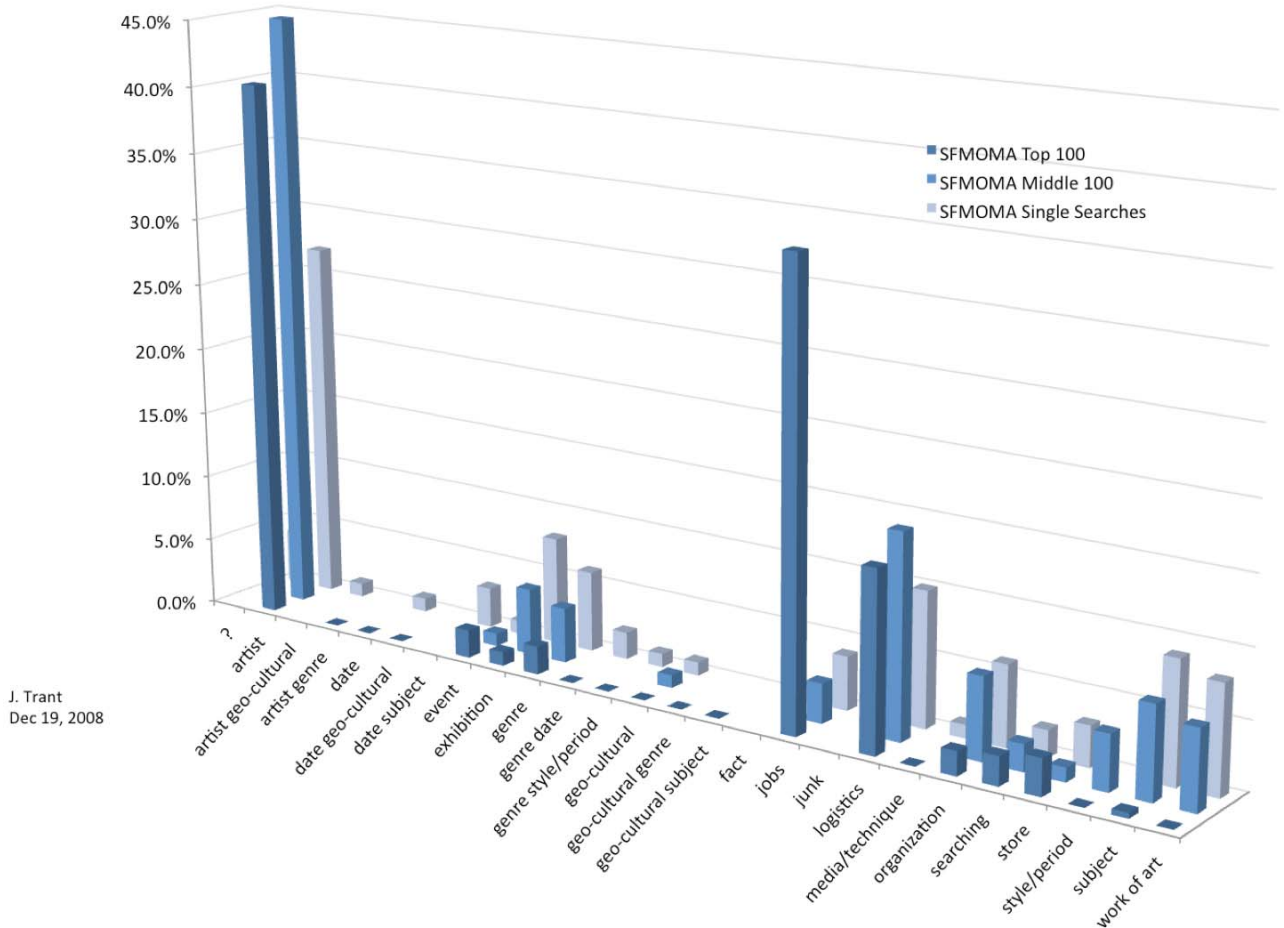
Figure 7-23: Search Terms: SFMOMA by Category at different frequencies

The type of term varies significantly in different parts of the search log curve. *Artists' names* remain important, but their percentage of the terms is not as great at lower search frequencies. *Genre* and *subject* become more important, as do searches for particular works of art.

7.6.4   *Search Logs and Tags: Types of Terms that Match*

Multi-institutional Tagger: Compare Tags to Search Terms: Top 100 Full Matches by Category
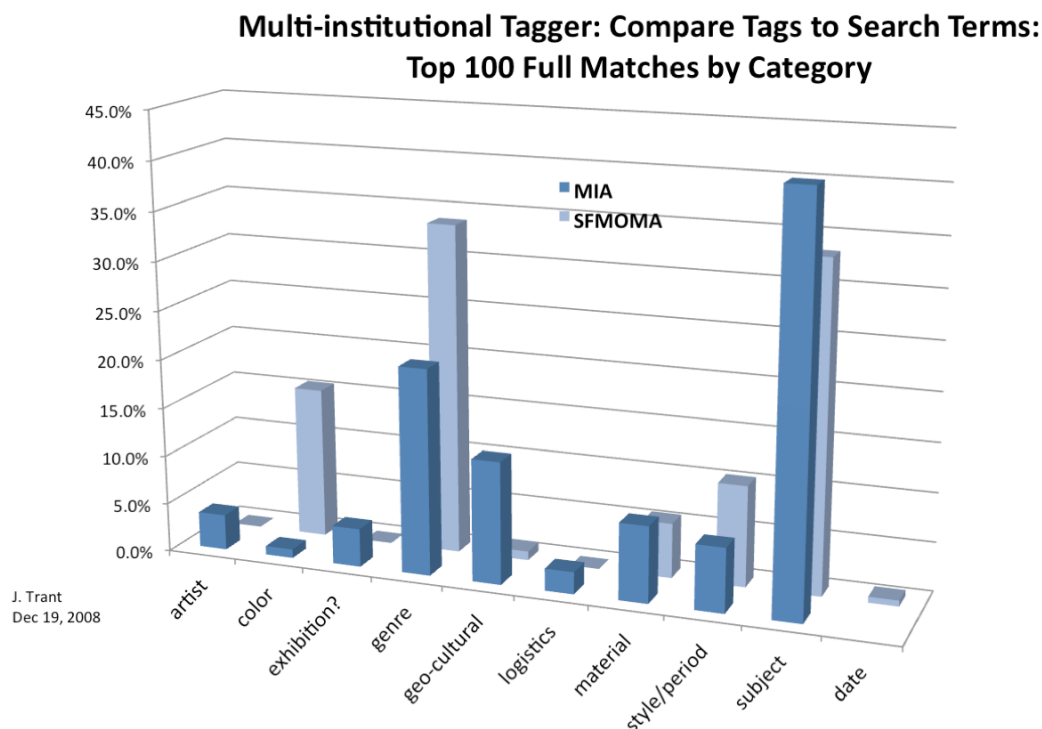
Figure 7-24: Search Terms and Tags: Top 100 Matches by Category

The top 100 matches of tags to search terms were categorized as well, to see if there was a relationship between the kinds of tags that were matching search terms and the kinds of terms in the search logs (see Figure 7-24). At both SFMOMA and MIA there was a strong match of *subject*-related terms, followed by significant matches on *genre*, and *color* (only at SFMOMA). These areas may be ones where tagging can make a particular contribution.

7.6.5   *Search Terms and Museum Documentation, Search Terms and Usefulness*

It was not possible to establish a direct relationship between search terms and museum documentation with the data set available, because tags and search terms were compared on the basis of distinct terms, and matches to museum documentation are based on term/work pairs.

It is also not possible to establish a relationship between Search Terms, Tags and Usefulness, because Tags were assessed as *Useful* only in the context of a particular work. The same tag could be judged useful in one context and not in another. So the distinct term basis of the search term / tag comparison makes a *Useful*-ness assessment impossible.

7.6.6   *Tags and Search Terms: Searching On-line*

Another way of assessing the contribution of tags to searching is to see how many terms assigned to a work retrieve it in a museums' on-line catalogue. A probe was conducted using Wayne Thiebaud's work *Display Cakes*, shown in Table 7-12.

Wayne Thiebaud, 1920-
Display Cakes, 1963
oil on canvas
28 in. x 38 in. (71.12 cm x 96.52 cm)
San Francisco Museum of Modern Art (73.52)
Collection SFMOMA, Mrs. Manfred Bransten Special Fund purchase

Table 7-12: Tags and Searching: San Francisco Museum of Modern Art Sample work to Query

Each of the tags assigned to this work was used as a query in the San Francisco Museum of Modern Art's on-line catalogue. Only four (4) of the 30 distinct tags successfully retrieved the work (see Table 7-12), showing that if tags were present in indexes recall would be improved. It is unknown how much precision might be sacrificed as a result (but in museum catalogues, where searches with no results are common (Trant, 2006c), improving recall is a goal).

Tag	Frequency	Useful	Museum Documentation	Found in Search
20th century	l	y	n	
baked goods	l	y	n	
balanced	l	y	n	
balancing	l	y	n	
cake	2	y	n	y
cake stand	2	y	n	
cakes	6	y	y (fwpfm)	y
cherry on top	l	y	n	
coconut cake	l	y	n	
cream filling	l	y	n	
cream_filling	l	y	n	
dessert	l	y	n	
desserts	l	y	n	
food	l	y	n	
frosting	2	y	n	
genoise	l	y	n	
lemon merangue	l	y	n	
lollypop_shadows	l	y	n	
painting	l	y	y (fwm)	y
pie	l	y	n	
plates	2	y	n	
portrait	l	n	n	n
shadow	l	y	n	
shadows	2	y	n	
simple	l	y	n	
tall stands	l	y	n	
Thiebaud	l	y	y (fwpfm)	y
three	l	y	n	
trio	l	y	n	
white background	l	y	n	
Totals	**40 total** **30 distinct**	**39**	**3**	**4**

Table 7-13: Tags and Searching: Sam Francisco Museum of Modern Art,
Tags Assigned to Sample Work and Queried On-line

7.6.7   Tags and Search Terms: Summary

The link between tags and search terms does not appear to be as close as was hypothesized. However, there are some areas, particularly in subject and genre terms, where tags could make a contribution to more successful searching of art collections.

Some Search Terms were not found in tags. But, because the universe of works of art is not complete in this study, we cannot make any inferences about search terms that do not match.

In a probe, tags that were judged *Useful* as search terms did not find the works of art when searching an existing on-line catalogue; their presence in indexes might improve search results.

7.7   Summary: Tag-Related Questions

Study of multiple aspects of the relationship between tags, searches, and museum documentation shed some light on how the parts inter-relate. Comparing tags to Museum Documentation shows that users tag with a significantly different vocabulary from that used by museum professionals to describe their collections. Tags also do not match other kinds of documentation created by museums (such as extended catalogue essays and docent tour notes).

Many tags are not found in the *Art and Architecture Thesaurus*, and when they do match the AAT it is difficult to determine which of many matches is appropriate. Most of the terms are not found in the *Union List of Artists Names*. Many terms that are found in ULAN are false matches.

Even though tags represent a new kind of vocabulary, museum staff find the vast majority (88%) of them *Useful* for searching. The more often a tag is assigned, the more likely it is to be useful. Tags assigned more than once had a greater than 97% likelihood of being *Useful*. Many users (46%) always assigned useful tags. A few (5.1%) never assigned a useful tag.

Establishing a relationship between tags and search terms is more problematic. That few tags matched search terms may be a result of learned behaviour: people search for things that they know they can find – hence a reliance on artists' names that are not widely found in tags. A probe of on-line searching with tags judged as *Useful* shows that many tags are not now access points to works of art. Including tags in indexes is likely to improve access on some broad categories of terms.

8.   Tagging Environment Questions

Assuming we decide to implement tagging in on-line museum collections, many questions remain about how effective tagging systems should be designed. Before decisions can be made about how to incorporate tagging on museum sites, the impact of interface variables on tagger behaviour should be established. The steve.museum research project also explored the question: How does the tagging interface influence tags assigned? (Trant, et al., 2007)

The literature of vocabulary evolution (surveyed in (Trant, 2009a)) suggests that variations in the tagging interface should influence tagging behaviour and the tags assigned. As a number of different user tagging scenarios can be envisioned in the museum context,

understanding the variables at play in an art museum tagger should increase the likelihood of a successful implementation. For example, if a museum's goal was to collect as many tags as possible for a work of art, then reducing factors that might limit the number of tags assigned would be important. But if an institution would like to gather new terms, then an environment that reduces tag redundancy would be more desirable. We explored three questions:

- What are the interface variables at play in tagging systems?
- How does the tagger interface influence tagging (as shown by tags assigned)?
- What interface characteristics facilitate certain kinds tagging?

A series of experimental interfaces to the steve tagger were deployed, each with the same content to be tagged (described in Section 6.2 above). Each combination of variables launched together is referred to as an *environment*. In discussion, the steve.museum team agreed that the most basic interface variables related to whether or not the tagger had seen:
1. a description of the work of art (museum metadata) or
2. tags assigned by other users (Cataloguing by Crowd Working Group & Bearman, 2005).

It was also decided to explore how showing groups of works or allowing users to choosing works to tag effects tagging (these concepts are explored in Trant, et al., 2007). Each collection of variables deployed in the steve tagger was considered a tagging environment. A number of different environments were deployed in each Term Set (see Section 6.3 above).

8.1   The Different Environments

The environments in the steve.museum tagging experiments grouped the following variables:
- No Tags, No Metadata
- Metadata Only
- Tags Only
- Metadata and Tags

Users coming to the site were assigned to random environments. Users that returned to tag again encountered the same environment, unless it had been retired; in that case they were randomly assigned a new environment. Users were linked to a record of environment variables, so that it is possible to analyze accumulated tag data on a per-environment basis and determine the influences, if any, of seeing metadata and existing tags on users' tagging behaviour.

The analyses of the influence of interface takes advantage of the tag analyses discussed previously, particularly measures of *tagger velocity* (the number of tags per work), *tag variation* (the range of tags per work), *novelty* when compared to museum documentation, and *usefulness* as judged by museum review.

8.1.1 No Tags, No Metadata

The simplest environment, one that could be considered a baseline against which to measure others, would be a simple configuration, showing only an image of a work and a box to collect tags. (see Figure 8-1). No other data is shown on the screen.
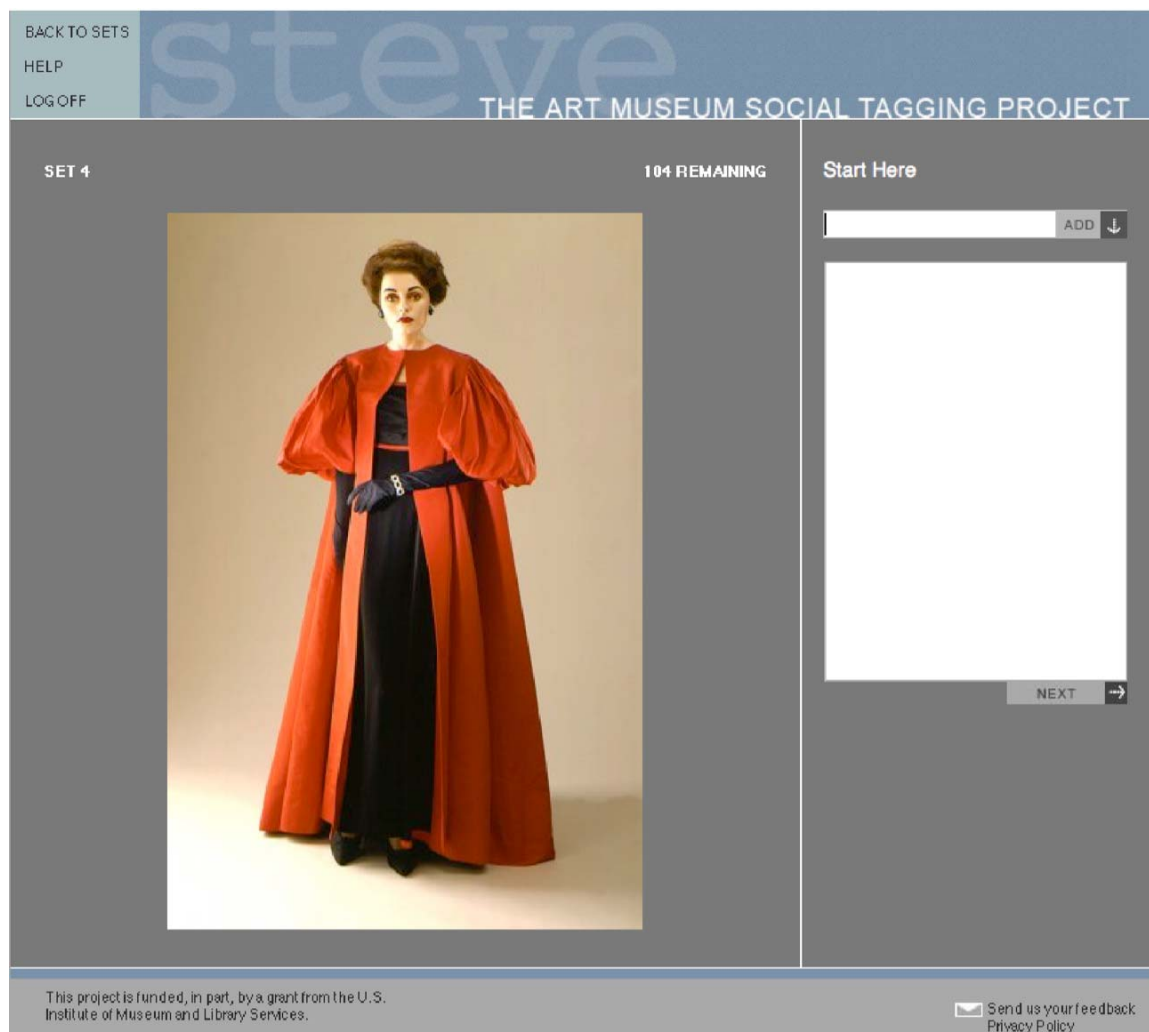
Figure 8-1. steve tagger: Do users tag differently when they don't see others' tags or museum metadata?

8.1.2 Metadata Only

The second test environment (Figure 8-2) shows only museum-supplied metadata. Does the display of museum documentation for a work of art influence the tags assigned? Do users mimic a museum label, or do they contribute new, different tags? An environment that adds museum metadata, formatted as 'traditional label copy' to the tagger interface (see Section

6.3.2 above), enables comparison of tags assigned to the same work with and without metadata showing.

Figure 8-2. steve tagger: show museum documentation. Do the tags supplied by users vary when they can see museum documentation (metadata)?

Questions that can be answered by studying tags assigned in this interface include:
• Do users duplicate museum documentation in their tags? Are more tags assigned in the 'show metadata' environment found in museum documentation?

- Inversely, are users prompted to contribute new tags when museum documentation is shown? (Fewer tags assigned in the 'show metadata' environment are found in museum documentation.)
- Are more useful tags assigned when museum documentation is shown?

8.1.3 Tags Only

Does user behaviour change when they see the tags that others assign? We can hypothesize two possibilities: that users mimic what is presented to them, or that they strive to be different. Understanding this is critical to future deployments of tagging on museum sites, particularly if statistical thresholding is considered as a way of assessing tags contributed. If a tag is considered useful after it has been assigned n times, then an interface that impedes the multiple assignment of redundant tags perturbs this equation.

An experimental interface that shows tags previously assigned (Figure 8-3) makes it possible to assess if user tagging is encouraged, dissuaded or otherwise influenced by the presence or absence of pre-existing tags for works of art.

Questions that can be answered by studying tags assigned in this interface include:
- Do users assign different tags when they are shown tags assigned by others?
- Do users assign tags that are not in museum documentation when they are shown others tags? Does this differ from when they are not shown tags or metadata?
- Do users assign more useful tags when they are shown tags assigned by others?
- Do users mimic what others have already said (enter duplicate tags) when they can see others' tags?

Figure 8-3. steve tagger: show tags. Do the tags supplied by users vary when they can see what others have done?

8.1.4   Metadata and Tags

Exploring the relationships between user-supplied tags, and the presence or absence of museum metadata and others' tags raises questions about interaction effects between metadata and tags. Do tags vary when both museum metadata and user supplied tags are shown (Figure 8-4)? Users might just 'give up' at this point, thinking there was nothing else to say. It might also be possible that that tags contributed in this environment might be the most useful, as they may add the most to the description of the work of art.

Figure 8-4. steve tagger: show tags and metadata. Do the tags supplied by users vary when they can see user tags and museum documentation?

Questions that can be answered by studying tags assigned in this interface include:
- Does the volume of tags decrease when users are shown both museum metadata and other's tags?

- Do users assign different tags when they are shown tags assigned by others and museum metadata?
- Do users assign unique tags that are not in others tags or in museum documentation when they are shown both? Does this differ from when they are not shown tags or metadata or only shown one or the other?
- Do users assign more useful tags when they are shown tags assigned by others and metadata from the museum?
- Do users mimic what others have already said (enter duplicate tags) when they can see others' tags? Are the tags entered already in the tag set?

8.1.5   Works In Sets

One final scenario for deploying tagging envisioned users volunteering to tag works of art as their contribution to a museum (Cataloguing by Crowd Working Group & Trant, 2005). Here, creating an environment that effectively stimulates tagging would be important. It may be likely that users 'get in the groove' when tagging similar works, and that their tagging of sets of like-works might be more useful than tags assigned to randomly presented, diverse works (as in (Figure 8-5). Grouping works in sets by medium – providing some continuity between one work and the next and preventing the jarring sense of seeing a non-representational contemporary painting right after a classical sculpture – would test this hypothesis.

Sets were presented in random order, because prototype studies had discovered that position in the interface had a significant influence on which works were chosen to tag; the vast majority of users started at the upper left work, skewing tag numbers in its favour (Trant, 2006b).
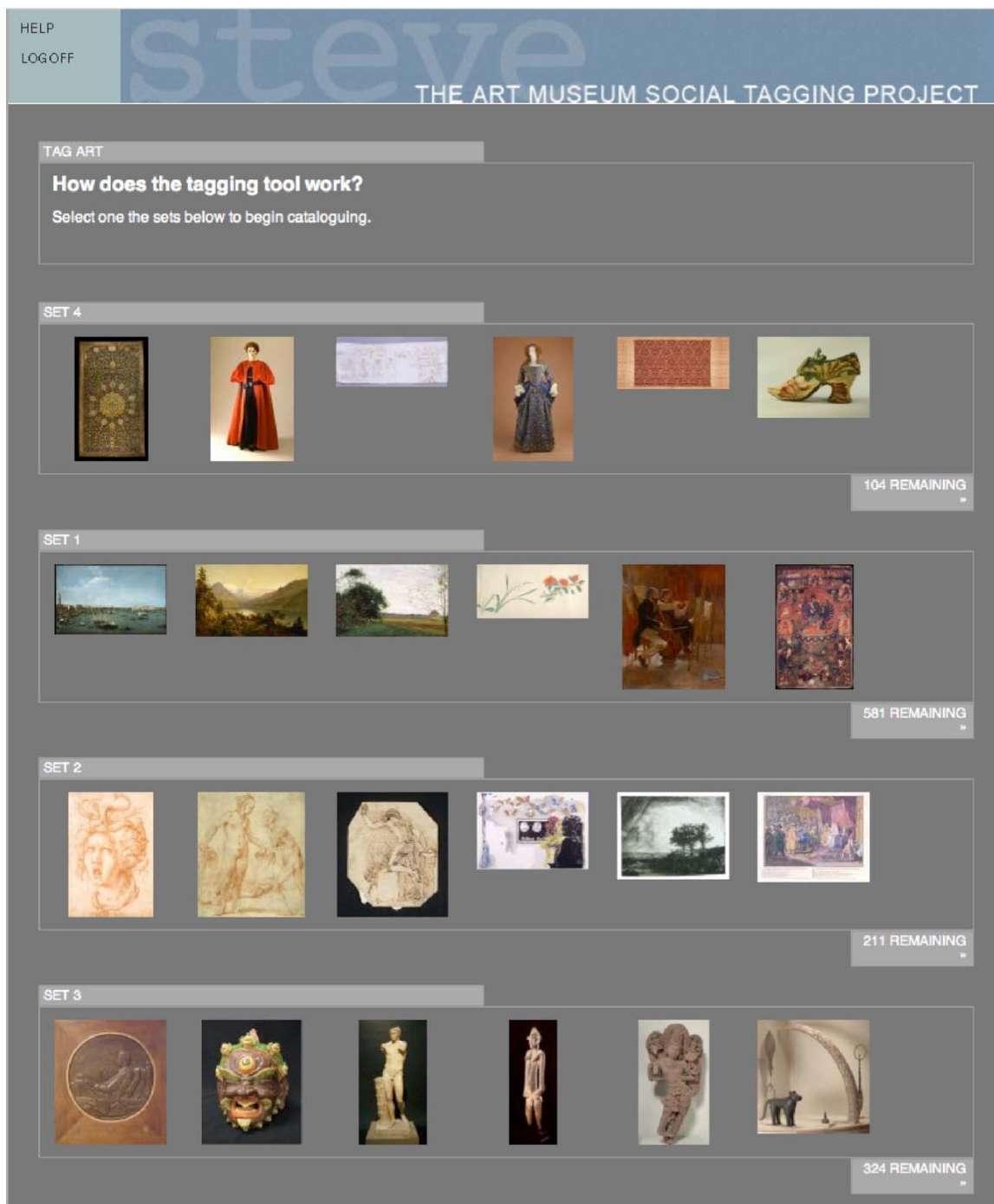
Figure 8-5. steve tagger: show sets Does users 'get in the groove' when they tag groups of like works?

Questions that can be answered by studying tags assigned in this interface include:
- Are more tags assigned when users are shown works in sets?
- Are more useful tags assigned when users are shown works in sets?
- Are users more likely to return for subsequent tagging sessions when they are shown works in sets?

We also wondered whether user-defined sets would be more productive than museum-defined sets. So interfaces were created that allowed users to select works to tag, either using words (Figure 8-6) or using images (Figure 8-7).
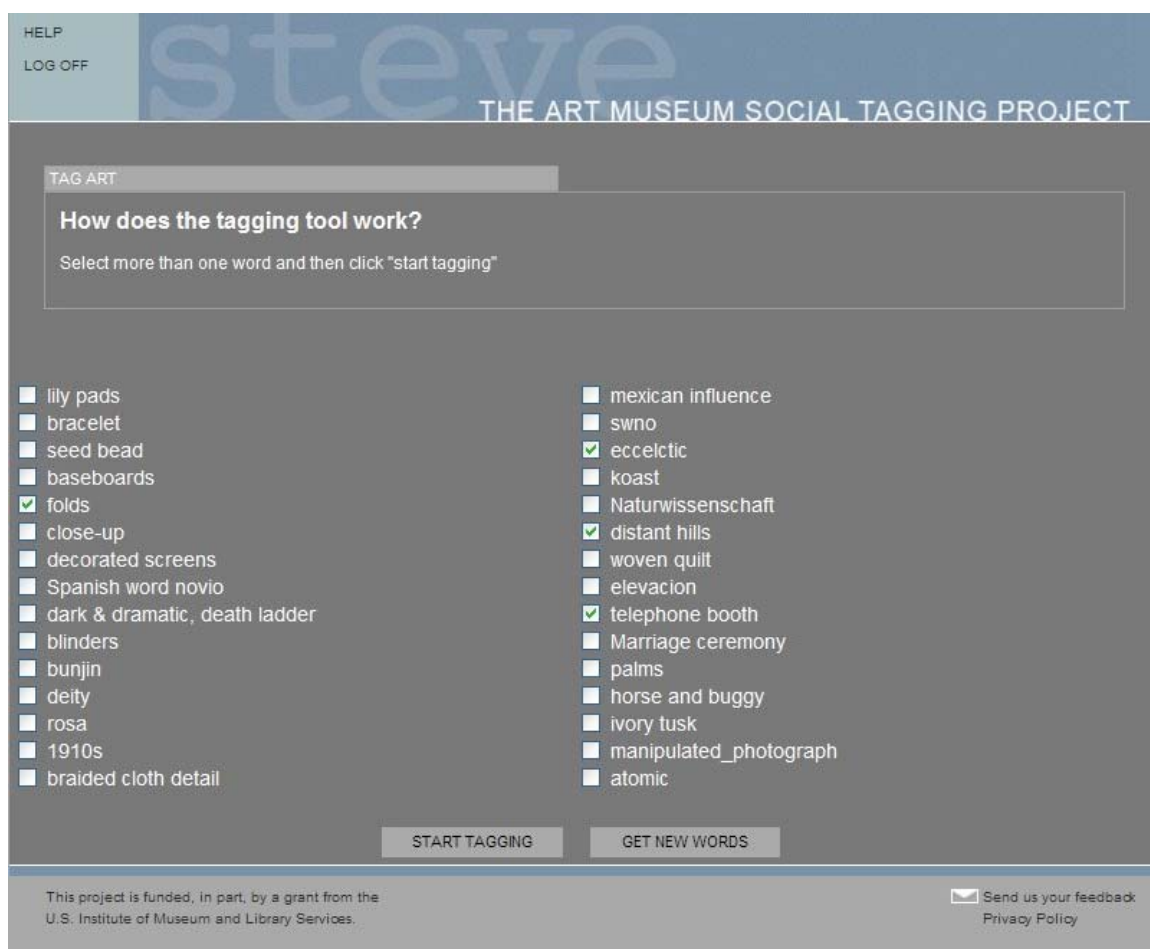
Figure 8-6: steve tagger: select works to tag using tags already assigned
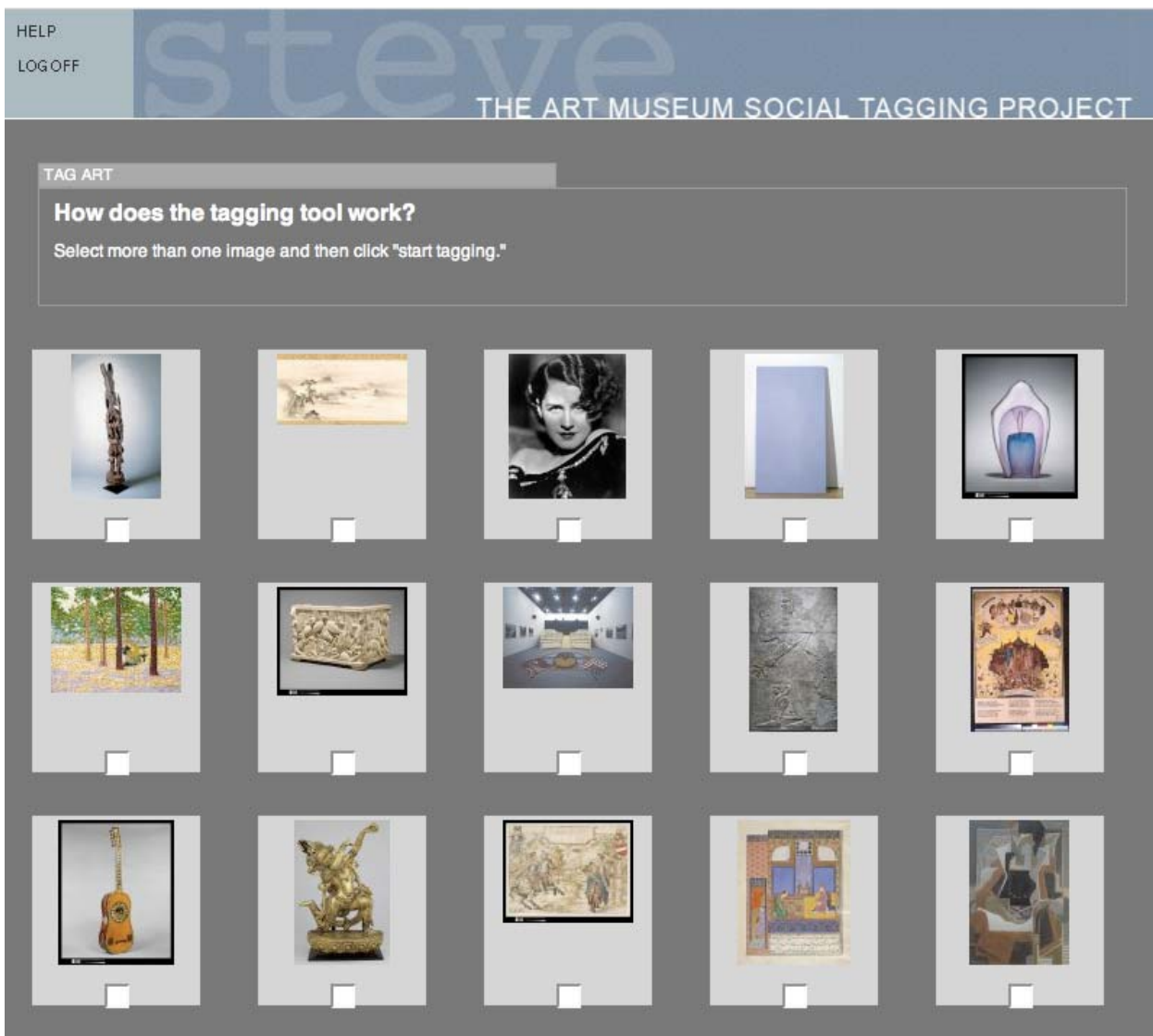
Figure 8-7: steve tagger: select works to tag by image

Questions that can be answered by studying tags assigned in this interface include:
• Are user-defined sets more effective than museum-defined sets? Does tagging behaviour differ when users choose works to tag?

8.2   Tags by Environment

Table 8-1 shows summary statistics for all taggers in all environments.

Not all interfaces were deployed at all times; variables were cycled through the steve tagger software in the various Term Sets (described in Table 8-1).

Term Set	No.	Description	Works total	Works Tagged total	distinct	reg. users	anon. users	Users total	reg. users	anon. users	Sessions total	reg. users	anon. users	Terms total	black-listed	no black-list	reg. users	anon. users	Terms per work	per user	per user / no black-list	Works per session total	reg. users	anon. users
Term Set 1			1552	2251	1200	926	1325	461	122	339	496	157	339	9611	4	9607	4663	4948	4.3	20.8	20.8	4.5	5.9	3.9
26-Mar-07	1	no sets + metadata	338	332	121	217		109	28	81	117	36	81	1523	2	1521	757	766	4.5	14.0	14.0	2.9	3.4	2.7
10-Jul-07	2	sets + no metadata	740	635	337	403		116	26	90	127	37	90	3418		3418	1791	1627	4.6	29.5	29.5	5.8	9.1	4.5
	3	sets + metadata	590	521	253	337		114	30	84	124	40	84	2483	1	2482	1034	1449	4.2	21.8	21.8	4.8	6.3	4.0
	4	no sets + no metadata	583	532	215	368		122	38	84	128	44	84	2187	1	2186	1081	1106	3.8	17.9	17.9	4.6	4.9	4.4
Term Set 2			1550	3735	1499	2340	1395	565	230	335	496	157	339	15165	4	15161	9815	5350	4.1	26.8	26.8	7.5	14.9	4.2
11-Jul-07	2	sets + no metadata (cont.)	661	582	295	366		150	53	97	117	62	97	2812		2812	1145	1667	4.3	18.7	18.7	5.6	4.8	3.8
15-Oct-07	3	sets + metadata (cont.)	606	543	357	249		144	57	87	127	63	87	2293		2293	1308	985	3.8	15.9	15.9	4.8	5.7	2.9
	6	sets + no metadata + tags	1701	1341	1275	426		134	67	67	124	109	83	7556	3	7553	6071	1485	4.4	56.4	56.4	13.7	11.7	6.4
	7	sets + metadata + tags	767	667	413	354		137	53	84	128	61	84	2504	1	2503	1291	1213	3.3	18.3	18.3	6.0	6.8	4.2
Term Set 3			1784	2990	1440	1675	1315	615	215	401	686	286	400	12205	12	12193	7137	5056	4.1	19.8	19.8	4.4	5.9	3.3
15-Oct-07	9	Image hub without tags	757	663	396	361		163	49	114	185	71	114	3898	4	3894	2206	1688	5.1	23.9	23.9	2.9	5.6	3.2
13-Mar-08	10	Image hub with tags	622	563	353	269		147	54	93	160	67	93	2303	4	2299	1392	907	3.7	15.7	15.6	3.9	5.3	2.9
	11	Word hub without tags	773	657	462	311		150	55	95	170	75	95	3145	3	3142	2053	1089	4.1	21.0	20.9	4.5	6.2	3.3
	12	Word hub with tags	838	713	464	374		155	57	98	171	73	98	2859	1	2858	1486	1372	3.4	18.4	18.4	4.9	6.4	3.8
All			1784	8976	1772	4941	4035	1641	567	1075	1678	600	1078	36981	20	36961	21615	15354	4.1	22.5	22.5	5.3	8.2	3.8

Table 8-1: Multi-Institutional Tagger: Tagging Activity by Environment: All users that tagged

8.2.1   Users and Environments

Table 8-2 shows the number of users that contributed at least one tag, broken down by environment, and confirms that a relatively even distribution of taggers across all environments.

Environment	no sets, metadata	sets, no metadata	sets metadata	no metadata no sets	no metadata sets + tags	metadata + sets + tags	metadata choice - l	tags choice -l	metadata choice -w	tags choice -w	Total
Number of Users	109	265	258	122	150	137	163	147	151	155	1621
Anonymous	81	187	171	84	83	84	114	93	96	98	1091
Registered	28	78	87	38	67	53	49	54	55	57	530

Table 8-2: steve.museum Multi-Institutional Tagger: Users by Environment

Not all taggers used the same interface. Taggers were randomly assigned to an environment. This distribution is also relatively balanced, as shown in the Users / Total column of Table 8-1.

Not all taggers contributed equally. Table 8-1 shows average number of tags per work and per tagger; but there is a very large variation in individual behaviour (as was shown in Section 6.4.5 above). The presence of highly prolific taggers in particular interface environments skews the statistics for that environment.

Table 8-3 shows that a small group of users were *super-taggers*, contributing significantly more tags than others. Eleven (11) of the 1,691 users each contributed more than 1% of the total number of tags. Together, these 11 users contributed 20.4% of the tag set. This behaviour was perturbing, particularly in Term Set 2, Environment 6, where one user tagged 1,903 works.

Not all super-taggers were Registered Users; two of the eleven were anonymous.

user_id	is anonymous	no sets, metadata 1	sets, no metadata 2	sets metadata 3	no metadata no sets 4	no metadata sets + tags 6	metadata + sets + tags 7	metadata choice - l 9	tags choice -l 10	metadata choice -w 11	tags choice -w 12	Grand Total	environ-ments
1836	0	0.0%	0.0%	0.0%	0.0%	25.2%	0.0%	0.0%	0.0%	0.0%	0.0%	5.1%	1
1118	0	22.4%	0.0%	0.0%	0.0%	7.9%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	2
630	0	0.0%	13.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	1
1760	0	0.0%	0.0%	0.0%	0.0%	10.2%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	1
4602	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.7%	0.0%	0.0%	0.0%	1.7%	1
1828	0	0.0%	0.0%	0.0%	0.0%	6.2%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	1
1761	0	0.0%	0.0%	0.0%	0.0%	5.9%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	1
964	1	0.0%	6.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1
3750	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.1%	0.0%	0.0%	1.1%	1
2024	1	0.0%	0.0%	0.0%	0.0%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1
372	0	0.0%	0.3%	0.0%	15.1%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	1.0%	3

Table 8-3: steve.museum Multi-Institutional Tagger: Users whose total contributed tags each comprised more than 1% of the total tag set, showing the percentage of tags they contributed for each environment.

The presence of *super taggers* is not unusual. In its report of a tagging experiment on the Flickr Commons, the Library of Congress noted that 40% of 59,193 tags were added by a small group of 10 users, and that one account added over 5,000 tags (Springer, et al., 2008, p. 19).

We designed the experience so that Registered Users would view the same interface environment if they returned to steve.museum during one session, as we felt this would reduce confusion. But one unintended consequence was that very few users tagged in more than one environment. Only 34 of the 1,621 Registered Users (2.1%) tagged in more than one environment (no attempt was made to link possible repeat sessions from Anonymous Users). Only two (2) users tagged in more than two environments. Not all of the users that tagged in multiple environments were *super-taggers*. This lack of repetition of taggers across

environments also makes it difficult to distinguish the effects of variations in interface from those that result from variations in individual user behaviour.

8.2.2 *Preliminary Conclusions*

We asked a number of questions as we designed the experimental interfaces. Some preliminary conclusions are possible, based on the data gathered. Table 8-4 shows the relationship between Environments and Usefulness, Variation in Vocabulary, and whether tags were found in Museum Documentation. Table 8-5 shows similar data, organized by environment.

When read in conjunction with the general statistics in Table 8-1 we can propose some preliminary conclusions about the effect of environment on tagging.

Useful	Variation: new to image	Novelty: found in musdoc	no sets, metadata	sets, no metadata	sets metadata	no metadata no sets	no metadata sets +	metadata + sets + tags	metadata choice - l	tags choice -l	metadata choice -w	tags choice -w	Grand Total
not useful	not new	found	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		not found	0.1%	0.3%	0.3%	0.2%	0.4%	0.3%	0.5%	0.5%	0.8%	0.5%	0.4%
	not new Total		0.1%	0.3%	0.3%	0.2%	0.4%	0.3%	0.5%	0.5%	0.8%	0.5%	0.4%
	new	found	0.1%	0.1%	0.1%	0.0%	0.1%	0.2%	0.3%	0.1%	0.1%	0.1%	0.1%
		not found	11.8%	8.4%	12.6%	13.1%	10.9%	10.3%	9.5%	10.2%	12.9%	14.9%	11.1%
	new Total		12.0%	8.5%	12.7%	13.2%	11.0%	10.6%	9.9%	10.3%	13.0%	15.0%	11.3%
Not Useful Total			12.0%	8.7%	13.0%	13.4%	11.4%	10.9%	10.4%	10.8%	13.8%	15.5%	11.7%
useful	not new	found	2.2%	3.7%	3.0%	2.1%	2.6%	2.6%	6.4%	4.0%	6.0%	3.1%	3.6%
		not found	7.0%	10.8%	11.0%	5.3%	7.7%	8.4%	21.7%	15.6%	22.3%	12.8%	12.1%
	not new Total		9.3%	14.5%	13.9%	7.3%	10.2%	11.0%	28.1%	19.5%	28.3%	15.9%	15.7%
	new	found	8.6%	8.5%	6.2%	8.3%	7.5%	9.3%	7.7%	5.8%	5.4%	5.1%	7.3%
		not found	70.1%	68.3%	66.9%	70.9%	70.8%	68.9%	53.8%	63.9%	52.5%	63.5%	65.4%
	new Total		78.7%	76.7%	73.1%	79.2%	78.3%	78.2%	61.5%	69.7%	57.9%	68.6%	72.6%
useful Total			88.0%	91.3%	87.0%	86.6%	88.6%	89.1%	89.6%	89.2%	86.2%	84.5%	88.3%
Grand Total			100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 8-4: steve.museum Multi-Institutional Tagger: Usefulness and Novelty by Environment

	Users				no super taggers (> 1% of tags)				All Tags / All Users					
	All (tagged at least once)								Useful		Museum Doc.		New to Work	
	count of term	# users	avg. tags / user	% of terms	count of terms	# users	avg tags /user	% of terms	not useful	useful	not found	found	not new	new
no sets, metadata	1523	109	14.0	4.1%	1181	108	10.9	4.0%	12.0%	88.0%	89.0%	11.0%	9.3%	90.7%
sets, no metadata	6230	266	24.1	16.9%	4951	262	18.9	16.6%	8.7%	91.3%	87.8%	12.2%	14.8%	85.2%
sets metadata	4776	258	18.9	12.9%	4775	258	18.5	16.0%	13.0%	87.0%	90.7%	9.3%	14.2%	85.8%
no metadata no sets	2187	122	17.9	5.9%	1857	121	15.3	6.2%	13.4%	86.6%	89.6%	10.4%	7.6%	92.4%
no metadata sets + tags	7556	134	56.4	20.4%	3428	267	12.8	11.5%	11.4%	88.6%	89.8%	10.2%	10.6%	89.4%
metadata + sets + tags	2504	137	18.3	6.8%	2503	137	18.3	8.4%	10.9%	89.1%	87.9%	12.1%	11.3%	88.7%
metadata choice - i	3898	163	23.9	10.5%	3282	162	20.3	11.0%	10.4%	89.6%	85.6%	14.4%	28.6%	71.4%
tags choice - i	2303	147	15.7	6.2%	1879	145	13.0	6.3%	10.8%	89.2%	90.1%	9.9%	20.0%	80.0%
metadata choice - w	3145	150	21.0	8.5%	3142	297	10.6	10.5%	13.8%	86.2%	88.5%	11.5%	29.0%	71.0%
tags choice - w	2859	155	18.4	7.7%	2858	155	18.4	9.6%	15.5%	84.5%	91.7%	8.3%	16.4%	83.6%
Total	36981	1641	22.9	100.0%	29856	1912	15.6	100.0%	11.7%	88.3%	89.0%	11.0%	16.1%	83.9%

Table 8-5: steve.museum Multi-Institutional Tagger: Environment, Usefulness, Museum Documentation, and New to Work

8.2.2.1   Tagger Return Visits

It is impossible to determine any relationship between environment and whether taggers come back to tag again, because so few taggers returned for more than one session in different environments. As noted in 8.2.1 above, only 34 of 1,621 Registered Users (2.1%) entered tags in more than one environment.

However, a significant number of Registered Users (115 of 530 users who tagged or 21.7%) returned for more than one session in the same environment. Table 8-6 shows the average number of sessions per environment for Registered Users with more than one session, with and without the *super taggers.* The average session rate in the *no metadata + sets + tags* environment is most significantly skewed because of the presence of the most prolific tagger: 1836.

Interestingly, the environments with the highest return rates – all those involving choice – are also the ones with some of the lowest numbers of works tagged per session. So choosing works to tag appears to be engaging, but not highly productive. Here tagging might be encouraging looking – one of the goals of museum educators participating in the steve.museum research.

Sesions by User / Environment		no sets, metadata	sets, no metadata	sets metadata	no metadata no sets	no metadata sets + tags	metadata + sets + tags	metadata choice - I	tags choice -I	metadata choice -w	tags choice -w	all
ST		1	2	3	4	6	7	9	10	11	12	Total
115	Average	1.7	1.8	1.8	1.8	3.5	1.7	2.6	2.3	2.3	1.9	2.8
106	No Super Taggers	1.7	1.6	1.6	1.6	1.8	1.6	2.3	2.0	2.1	1.9	2.3

Table 8-6: Multi-Institutional Tagger: Registered Users with More than One Session, Average by Environment. See full detail in Appendix VI.

8.2.2.2 Tags and Sets

Environments where works were shown randomly, (i.e. *no sets + metadata* and *no sets + no metadata*) were not as productive as those where works were grouped into sets (*sets + metadata*, *sets + metadata + tags, sets + no metadata, sets + no metadata + tags*), with the exception of one (*sets + metadata + tags*). Not providing groups of works seemed to reduce both the number of tags per work and the number of works tagged per session.

However, the number of works tagged fell off when user-defined sets were created – again because users were spending more time choosing works and therefore spent less time tagging them. The number of works per session in all of the choice-enabled environments (*metadata, choice – i, tags choice – i, metadata choice – w, tags choice - w*) was lower than all environments other than *no sets + metadata.*

There may be some relationship between seeing works in sets and assigning useful tags, but it is not definitive. On average, 88.3% of tags assigned were useful. All of the environments with more useful tags than the average had sets: *sets, no metadata*: 91.3%; *metadata choice – i*: 89.6%; *tags choice – i*: 89.2%; *metadata + sets + tags*: 89.1%; and *no metadata, sets + tags*: 88.6%. But *sets + metadata* (88.0%) and both word choice user-defined set environments (*metadata choice – w*: 86.2% and *tags choice – w:* 84.5%) had lower than average percentages of useful terms. Usefulness may be more related to groups of like images than to groups of works that share the same tag (created as user-defined groups with the word hub in *metadata choice – w* and *tags choice – w*).

8.2.2.3 Tags and Museum Documentation

On average, 89% of tags were not found in museum-supplied documentation (see Table 8-4). When viewed by environment, this ranged from 91.7% for the environment where users selected works to tag using others' tags and didn't see museum metadata (*tags choice – w)* to 85.6% for the environment were users selected works to tag based on images and saw museum metadata (*metadata, choice – i*). Four environments where metadata was shown cluster in the bottom five, suggesting that taggers do to some extent, echo the metadata they

see. But the *no metadata + sets* environment was the second lowest, and the *metadata + sets* environment was the second highest (90.7% new). The data is not conclusive about whether showing metadata has an effect on the novelty of tags.

There seems to be no relationship between the *Usefulness* of a tag and whether or not metadata was shown when it was assigned. Environments where metadata was shown are evenly distributed in the range of between 84.5% and 91.3% *Useful* terms (see Table 8-4) with an average of 88.3% *Useful.*

8.2.2.4   Tags and Others' Tags

All tags were reviewed to see if they had been previously assigned to a work, or if they represented a new term, to assess the variation of tag vocabulary in each environment. This ranged by environment from 71.4% to 92.4% novel terms (see Table 8-5). As would be expected, the first four environments deployed showed the highest percentages of terms new to the work; the fewer terms assigned to a work, the more likely a new term is to be new. As time progressed through the experiment, it was expected that variation in the tag data set would decrease as more terms would repeat those already assigned. This was certainly the case, as two of the last environments deployed *metadata choice – i* and *metadata choice – w* had the lowest percentages of new terms (71.4% and 71.0% respectively).

Whether or not tags were shown had a noticeable effect on whether new tags differed from those already assigned. In the four final environments, the two where tags were shown (*tags choice – i* and *tags choice – w*) produced a vocabulary with more new terms: 80% vs. 71.4% when the choice was with images, and 83.6% vs. 71.0% when the choice was made with tags. In contrast to their behaviour with metadata, users tended not to duplicate tags shown with a work of art, and instead entered different terms.

This variation in tag vocabulary may decrease the likelihood that tags will be found in museum documentation. Though on average 89% of tags were found not in Museum Documentation, three of the five environments with rates above this average were ones that showed other users' tags.

There seems to be no relationship between the usefulness of a tag and whether or not other tags were shown. Three of the four environments that showed tags are above the average of 88.3% useful terms, but the lowest percentage of useful terms in an environment – 84.5% – was in the *tags choice-w* environment.

Fewer tags were entered when tags were shown. None of the environments with the top three average tags per tagger showed other tags. The presence of tags on the screen seems to limit tagging. Users aren't repeating what they see.

8.3   Summary: Interface-Related Questions

Understanding the influence of the data shown to a tagger on the tags assigned is critical prior to implementing tagging on museum Web sites. Testing these simple variables – whether or not users see others' tags, and the museum's metadata – provides insight into how live tagging environments might be optimized for particular effect, or how tagging might be influenced by 'traditional' museum information design paradigms.

Interface characteristics did influence the tags assigned. Showing tags decreased the number of new tags entered. This may be learned behaviour carrying over into the steve tagger. For example, tags cannot be assigned more than once in Flickr; users assuming that the steve tagger behaved the same way would not try to enter duplicate tags when tags were shown.

Showing tags also increased the number of novel tags assigned. Users were encouraged to enter something different when other tags were on the screen.

Showing too much information was intimidating though. Showing tags and metadata produced the lowest percentage of useful terms. Perhaps there was nothing left to say.

Allowing users to select the works they wished to tag reduced tagging overall, but encouraged return visits. For the long-term, maintaining stickiness in a tagging system – encouraging user engagement – may be more desirable than generating more tags. Session length data might shed further light on this question.

The actual impact of sets and metadata was difficult to judge. It did appear, though, that showing unrelated works in random order was the least effective presentation.

The impact of single users on the apparent behaviour of tagging systems is significant. Any future studies need to account for the super tagger phenomenon, and adjust accordingly. One highly prolific tagger's behaviour can skew the results for an experiment.

There are many other choices to make when deploying a tagging system, including those around requiring user-registration, enabling user profiles and personal collections, including just one institution's works or many institutions' works, and using gaming, personal information management, or description metaphors. All of these build on the basic research outlined here. The data collected may be probed further for other relationships.

9. User Affiliation Question

Motivations for tagging are often unclear. While the literature of tagging and folksonomy points initially to a selfish motivation for personal information management, the members of the steve.museum team have posited another, more altruistic motivation for tagging museum collections. People may just want to "help out" museums (Trant & Wyman, 2006). As well as distributing questionnaires to taggers to ask them about their motivations for tagging, (see (Leason & steve.museum, 2008)) we tested the relationship of institutional ties to tagger activity.

The steve tagger was implemented in two separate instances. The first, described above, presents a collection of works drawn from a range of museums. It is branded with the name of the research project. Recruiting was done broadly, and relatively anonymously.

A second instance of the steve tagger was launched by The Metropolitan Museum of Art. It presented only works from The Met's collection, and access was by personal invitation only. Invitations to 'help out' were distributed to people who had registered on the MMA's site, or purchased something in their gift shop. This tagger was branded with the Met's name (Figure 9-1).
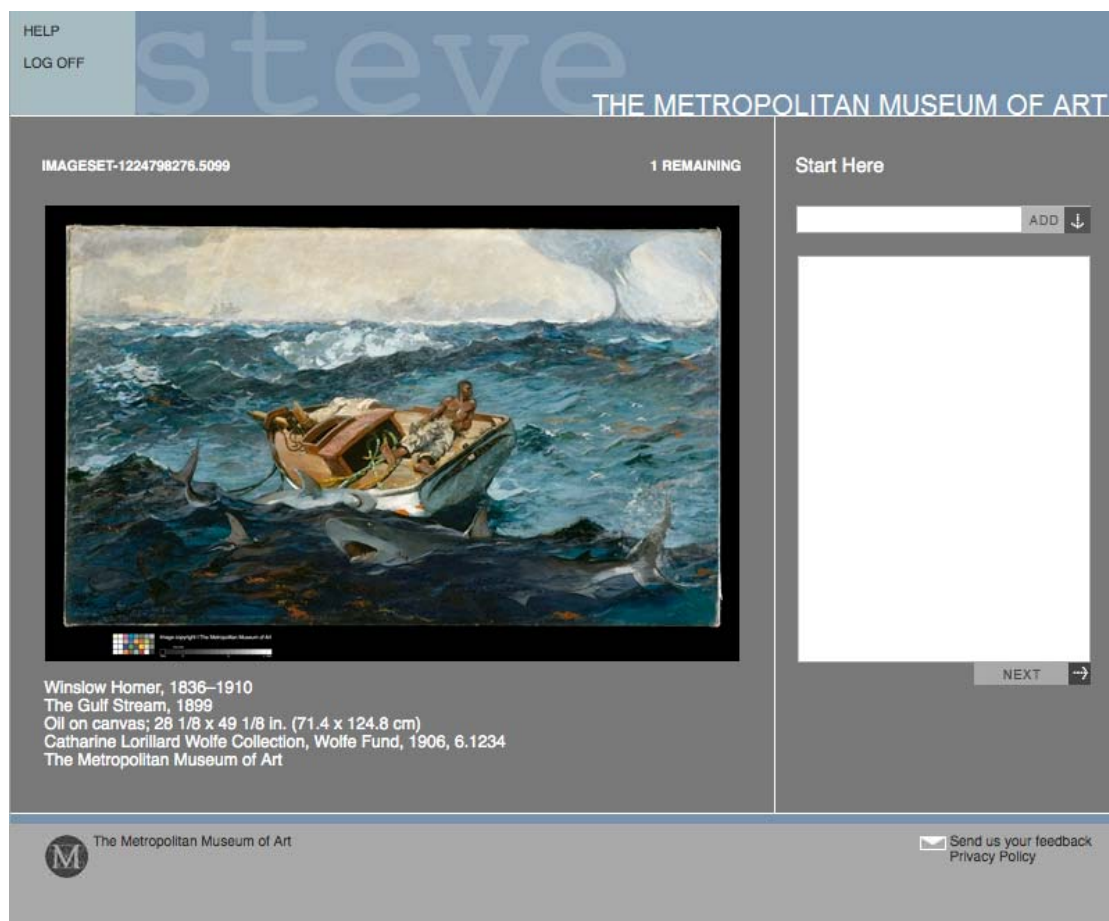
Figure 9-1: The Metropolitan Museum of Art's implementation of the steve tagger.

The differences in tagger behaviour in these two implementations provide some insight into taggers' motivations.

9.1 Affiliated Users Tag Much More

A total of 251 works were included in the MMA tagger. These were tagged by a total of 690 users, who assigned 56,399 total tags, using 21,577 distinct terms. There were a total of 36,955 tag/work pairs in the MMA tagger.

All users of the MMA tagger were registered; it was not possible to tag anonymously.

Multi-Institutional Tagger			MMA Tagger		
# of works	# of tags		# of users	# of works	# of tags		# of users

# of works	# of tags		# of users	# of works	# of tags		# of users
	Total	Distinct	Total		Total	Distinct	Total
1784	36,981	11,944	1,621	251	56,399	21,557	690
	22	Tags per user			**82**	Tags per user	

Table 9-1: Compare MMA and Multi-institutional Tagger

When compared to the multi-institutional tagger, MMA works were tagged *four times* as much. This is a significant difference.

Users that are invited to help out a museum will do so. The feeling of connection with the museum – of contributing something for the greater good – appears to be a significant motivator.

9.2   Further Studies

Other tests could be performed to compare aspects of the MMA tagger along the vectors of Usefulness, Tag Variation, and Novelty, to see if the MMA tags have a similar profile to those in the Multi-institutional steve tagger. These were not possible in the time allowed this study.

As the same variation in environments was implemented in the MMA tagger, comparative analyses would confirm conclusions about the influence of environmental variables on user behaviour.

Qualitative assessments of tagger attitudes – from the tagger survey – should also be compared by affiliated and un-affiliated users.

As users at The Metropolitan Museum of Art were required to register, it may be possible to mine demographic data from this group, and compare the effects of differences in subject expertise, age, and internet savvy, on tagging behaviour.

10. Conclusions

Efforts to improve access to visual collections often focus on establishing vocabulary and authority control (Harpring, 2002; Shubert, 1996). But even when – or particularly when – terminology is rigorously controlled, the concepts represented by museums may not match the interests of museum users. Studies of questions asked of museums (McCorry & Morrison, 1993) and queries of museum information resources (Janney & Sledge, 1995b) reveal gaps between the professional framework of museum documentation and the perspective of users of museum collections. Studies that begin with user needs (such as (Elinich, 2004; Johnson, et al., 2005; Reich & Lindgren-Streicher, 2006; Schaller, Cannon, Beaumont, & Burrough, 2003; Stephenson & McClung, 1998) surface differences between what museums have available and what users expect or want.

Acknowledging that people are "searching for meaning, not just records" (Doolan, Peacock, & Ellis, 2004), museums provide many ways to encounter collections on-line, including exhibitions, in-depth features, publications, games, and educational materials for teachers (Reilly, 2000). It is ironic that, for some kinds of users, making collections databases available on-line may not make collections themselves more accessible. The 'semantic gap' between these museum professionals and the general public is a significant one that museums may not be able to bridge themselves (Trant, 2006a, 2006b). User-generated tags serve as stepping stones across this chasm.

Providing the public with the opportunity to tag works of art does result in tagging. Some visitors to museum Web sites will find this an attractive thing to do even without any incentive and without any functional advantages. In the case of steve.museum, 87% of Registered Users, and 72% of Anonymous Users, tagged some works; most who did not were interested in the experiment as fellow information professionals rather than as viewers of art. Over 80% of Registered Users tagged more than one work. If invited by the museum, so that they feel they are helping out, even more visitors participated and they provided four times as many tags on average.

Most taggers will provide six or fewer tags, but Registered Users will provide more tags, and some individuals will provide a very large number of tags. Although most taggers came only once in the experiment, over a third of the users we could track returned more than once, and 14% engaged in three or more sessions. This return rate bodes well for implementations that allow users to do something with tags, for added functionality could build on the inherent interest of tagging.

If not given a chance to select which works to tag, Users skipped more works than they tagged, showing that their decision to tag a work was itself a judgment. They chose to tag two-dimensional works over three-dimensional works, and assigned more tags to those when they did.

The folksonomy (vocabulary of tagging) developed for our test collection of works of art is highly variable; 77-85% of tags assigned to every Object Type were new terms in the vocabulary and well over 84% of the tags were new to the work being described. Over 95% of the unique terms were not in the on-line documentation for those works of art. Of the 5% that were, these were largely terms from Object Type or from the Primary Title of the work. Terms not found in the documentation from the museum included 39% subject terms, 27% genre terms, 10% geo-cultural and 10% color terms. Tags were not largely found in extended museum documentation either, and the extended documentation produced a large number of false matches that would preclude its being used to improve the overall match.

The folksonomy contained only 37% of unique terms that matched to terms in the *Art and Architecture Thesaurus* (AAT), and these occurred overwhelmingly in the Materials, Styles and Periods, and Associated Concepts hierarchies. However, matches to the same term often occurred in so many places that it will be operationally very difficult to make use of the match result. In the U*nion List of Artists' Names* (ULAN), full matches occurred in only 2% of cases and even there, the terms typically were words like *wood* and *white* that – while names – were doubtless used in a different sense by taggers.

Museum staff found the vast majority (88%) of tags *Useful*. For those tags assigned twice to the same work, this rose to 96.8%. By the time a word was assigned four or more times to the same work, museum staff agreed it was *Useful* 100% of the time. Many users (46%) always assigned *Useful* tags. A few (5.1%) never assigned a *Useful* tag.

Unfortunately we cannot tell from search logs which works were actually being sought by on-line visitors searching museum Web sites. So we cannot directly answer the concrete question of whether the tags assigned by visitors to those museums' works would have improved search results. However terms assigned in tagging matched terms in search logs between 22.6% and 38.5% of the time (for the two institutions studied). A further probe of an on-line collections catalogue showed that only 4 of 39 tags judged *Useful* successfully retrieved a test work – showing tags do have some role to play in improving searching.

User interfaces have an impact on what users do in tagging as in all other computer interactions. However the variations in interface that were introduced in the steve.museum experiments did not result in overwhelming differences. Users assigned more tags when they saw sets of related works, whether selected by the museum or by themselves, than they did when presented with random works to tag. In addition, Users provided fewer tags when they were shown tags others had already assigned (they did not mimic others' tags). However, they assigned more tags that were in museum documentation when they saw metadata, transferring the 'formal' knowledge of the museum into the informal tag cloud. Finally, if given the opportunity to choose works from an image set or a word set, Users tagged fewer works, but returned more often. Most significantly, the behaviour of individual *supertaggers* has far more influence on the resulting folksonomy than any interface variable.

The research described here looks at museum collections documentation and searching as a continuum. User tagging forms a bridge between two previously separate areas of activity. If tags are added to indexes, social tagging and folksonomy could make a positive contribution to the accessibility of on-line art museum collections by improving recall.

Tagging is also an engaging activity for some on-line visitors. As museums are also increasingly interested in dialogue with their visitors in a dialogue, and encouraging community participation with collections (Anderson, 2004; H. S. Hein, 2000; Vergo, 1989), tagging has a role to play, particularly in institutions that are adopting individuated learning and constructivist educational philosophies that emphasize personal meaning-making and user-centered on-line and in-gallery experiences (G. E. Hein, 1998). Rather than being documentation written by and for museums, tagging is user-generated, user-initiated content, representative of points of engagement between people and collections. It should be one of a suite of on-line strategies that encourage user generated content (Bernstein, 2008b; Farber & Radensky, 2008; Oates, 2008; Samis, 2008), offering a quick, low-investment, way for visitors to make contact with collections. These points of contact are critical for museums, for they offer a direct indication of visitor interests, visitor perceptions, and perhaps, mis-perceptions. Museums can learn from watching what and how people tag, perhaps surfacing points of interest or 'teachable moments' where additional interpretation is necessary. Just as search terms are a direct trace of a trajectory of interest, so too can tags offer a window into the objects that engage users.

11. Data Available for Future Studies

The data collected by steve.museum is to be deposited with ICPSR/CPANDA and will be available for further study. As noted throughout this report, as many questions have been raised as answered in our exploration of tagging and folksonomy in the context of art museum collections. Users of that data are encouraged to contact the author.

12. Acknowledgements

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14.   Appendices

Appendix I.   **Data Description: Database steve_export**

Appendix II.   **Recruiting Strategy and Activities**

Appendix III.   **Works Not Tagged**

Appendix IV.   **Works Always Tagged**

Appendix V.   **Sample works for Extended Documentation Analysis**

Appendix VI.   **Repeat Sessions by User**

steve.museum Data Description:
Database steve_export

W. Lee and steve.museum

November, 2008

1.   Table structure for table steve_batch

steve_batch tracks automatically stores an entry for each batch of metadata uploaded by an administrator

Field	Type	Null	Default	Comments
batch_id	int(11)	Yes	NULL	Primary key, auto incremented
batch_dtm	timestamp	Yes	CURRENT_TIMESTAMP	Timestamp

2.   Table structure for table steve_blacklist

steve_blacklist contains the phrases that were blacklisted in the program. When a user submitted a blacklisted term, a popup informed that the term was blacklisted. The term was stored in the term table and flagged, but it was not shown back to the user in any part of the application. The original blacklist was imported from an open source list. Terms would match the blacklist only if there was a full word match, no stemming or substringing was applied.

Field	Type	Null	Default	Comments
id	int(10)	Yes	NULL	Primary Key, auto incremented
word	varchar(100)	Yes	NULL	Blacklisted term

3.   Table structure for table steve_bot_user_agent

steve_bot_user_agent was a hand compiled list of user agents we assumed to be bots, spiders, or other assorted robots. This was used to filter sessions we suspected were not human users.

Field	Type	Null	Default	Comments
bot_user_agent_id	int(11)	Yes	NULL	Primary Key, auto incremented
user_agent	varchar(255)	Yes	NULL	user_agent string, compared to steve_session.user_agent

4. Table structure for table steve_category

Unused, planned to use to categorize terms, but ideas went unrealized.

Field	Type	Null	Default	Comments
category_id	int(11)	Yes	NULL	
category_text	varchar(255)	Yes	NULL	

5. Table structure for table steve_education

steve_education stored the choices for education level in the drop down in user registration

Field	Type	Null	Default	Comments
education_id	int(11)	Yes	NULL	Primary Key, auto incremented
education_name	varchar(45)	Yes		Text shows the user in the registration drop down

6. Table structure for table steve_email_invite

steve_email_invite was used in the fourth termset. In some environments, users could send an email inviting someone to tag. Invites were sent by email address, so invited users were not necessarily other users of the tagger.

Field	Type	Null	Default	Comments
invite_id	int(11)	Yes	NULL	Primary Key, auto incremented
from_user	int(11)	Yes	NULL	Foreign Key, steve_user.user_id
mime_id	int(11)	Yes	NULL	Foreign Key, steve_image.mime_id
to_email_address	varchar(100)	Yes	NULL	originally stored email address of recipient, one way hashed for privacy purposes
invite_accepted	tinyint(1)	Yes	0	1 if url with the invite_id was followed

7.   Table structure for table steve_environment

steve_environment stored data about the tagging environments that were offered.

Field	Type	Null	Default	Comments
environment_id	int(11)	Yes	NULL	Primary Key, auto incremented
environment_name	varchar(255)	Yes	NULL	Descriptive name, not always used
version	decimal(10,0)	Yes	NULL	Not used
change_desc	text	Yes	NULL	Not used
show_metadata	tinyint(1)	Yes	0	1 if the enivronment showed the user museum information about the work of art while they were tagging. This data is found in steve_object.
show_sets	tinyint(1)	Yes	0	1 if the works were presented in sets of like works of art
show_tags	tinyint(1)	Yes	0	1 if the user was shown tags that others had entered
show_imagehub	tinyint(1)	Yes	0	1 if the user was shown a gallery of thumbnails to choose which images they would tag
show_wordhub	tinyint(1)	Yes	0	1 if user was presented a screen of tags to select which images to tag
show_facebook	tinyint(1)	Yes	0	1 if the environment was shown through facebook
show_esocial	tinyint(1)	Yes	0	1 if the user was given the ability to email an invite to someone

8. Table structure for table steve_facebook_invite

steve_facebook_invite stored data about facebook invites in the fourth termset.

Field	Type	Null	Default	Comments
invite_id	int(11)	Yes	NULL	Primary Key, auto incremented
to_user	int(11) exported as varchar(255)	Yes	NULL	orginally the facebook account number of the recipient. One way hashed for privacy
from_user	int(11) exported as varchar(255)	Yes	NULL	Foreign key, steve_user.facebook_user_id Originally the facebook account number of the sender. One way hashed for privacy.
mime_id	int(11)	Yes	NULL	Foreign key, steve_image.mime_id
date_invited	timestamp	Yes	CURRENT_TIMESTAMP	timestamp of when invite was sent
invite_accepted	tinyint(1)	Yes	0	1 if recipient accepted the invite and saw the image in facebook

9. Table structure for table steve_frontpage

steve_frontpage describes the imageset shown and their order in environments that showed sets

Field	Type	Null	Default	Comments
frontpage_id	int(11)	Yes	NULL	Primary Key, auto incremented
imageset_id	int(11)	Yes	0	Foreign Key, steve_imageset
order_no	int(11)	Yes	NULL	ordinal

10. Table structure for table steve_image

steve_image describes images

Field	Type	Null	Default	Comments
mime_id	int(11)	Yes	NULL	Primary Key, auto incremented
filename_orig	varchar(255)	Yes	NULL	Filename of image
filename	varchar(255)	Yes	NULL	Normalized name of filename. Note: in this dataset, no filenames were transformed
filepath	varchar(255)	Yes	NULL	relative path the file was stored in
priority	int(11)	Yes	NULL	Not used
image_metadata	text	Yes	NULL	Not used
batch_id	int(11)	Yes	NULL	Foreign Key, steve_batch.batch_id
institution_id	int(11)	Yes	NULL	Foreign Key, steve_institution.institution_id

11. Table structure for table steve_imageset

steve_imageset stores the sets created by admins for set based environments as well as the sets that describe which images a user chose to tag in imagehub based environments.

Field	Type	Null	Default	Comments
imageset_id	int(11)	Yes	NULL	Primary Key, auto incremented
user_id	int(11)	Yes	0	Foreign Key, steve_user.user_id
imageset_name	varchar(255)	Yes		text description of imageset, only available to admins

12. Table structure for table steve_imageset_image

Join table for imagesets and images

Field	Type	Null	Default	Comments
imageset_id	int(11)	Yes	0	foreign key, steve_imageset.imageset_id
mime_id	int(11)	Yes	0	foreign key, steve_image.mime_id
order_no	int(11)	Yes	NULL	ordinal

13. Table structure for table steve_image_object

Join table for images and objects

Field	Type	Null	Default	Comments
mime_id	int(11)	Yes	0	foreign key, steve_image.mime_id
museum_object_id	int(11)	Yes	0	foreign key, steve_object.museum_object_id
batch_id	int(11)	Yes	NULL	foreign key, steve_batch.batch_id

14. Table structure for table steve_institution

Institutions with data in steve

Field	Type	Null	Default	Comments
institution_id	int(11)	Yes	NULL	Primary Key, auto incremented
institution_name	varchar(255)	Yes		Name of institution

15. Table structure for table steve_language

Languages presented to the user in user registration form

Field	Type	Null	Default	Comments
language_id	int(11)	Yes	NULL	Primary Key, auto incremented
language_code	char(3)	Yes	NULL	ISO code
language_name	varchar(45)	Yes		Name of language
language_standard	varchar(20)	Yes	ISO 639-2/T	standard used

16. Table structure for table steve_log_entry

Logging of some actions in the tagger such as using help, zoom, and skipping an image. The skip log is questionable and if better inferred by image views that don't have tags.

Field	Type	Null	Default	Comments
log_id	int(11)	Yes	NULL	Primary key, auto incremented
session_id	int(11)	Yes	NULL	Foreign key, steve_session.session_id
invoked_from_url	varchar(500)	Yes	NULL	URL action occured on
mime_id	int(11)	Yes	NULL	Foreign key, steve_image.mime_id when appropriate
invoked_timestamp	timestamp	Yes	CURRENT_TIMESTAMP	timestamp
action_string	varchar(255)	Yes	NULL	action performed

17.   Table structure for table steve_match

Several types of data analysis looked for matches in existing documentation and vocabularies. Museum documentation matches looked at the data in steve_object. Search log matches looked at search log data from three museums. These were only performed on objects from collections where we had search log data and only within those collections. These included MIA, SFMOMA, and the Metropolitan. AAT matches were against the Getty Art and Architecture Thesaurus. ULAN matches were against the Gettty Union List of Artist Names.

Field	Type	Null	Default	Comments
match_id	int(10)	Yes	NULL	Primary key, auto incremented
resource_type	varchar(255)	Yes	NULL	Type of documentation matched
match_type	varchar(255)	Yes	NULL	NULL = not matched full = entire token found as entire entry in matched documentation partial-fwpfm = entire token found as a full word within a larger entry partial-tsm = truncated string match, token exists in the resource with right-side truncation when the inputted tag > 3 characters.
rel_id	varchar(100)	Yes	NULL	- for museum docs, this is steve_object.object_id - for search logs, the search_term.search_term_id - for ulan and aat, this is the term_id.
term	varchar(255)	Yes	NULL	term matched or searched for in the documentation
token	varchar(255)	Yes	NULL	term the user entered

18. Table structure for table steve_match_aat

Licensed data, not included in data export

Field	Type	Null	Default	Comments
match_id	int(10)	Yes	0	
display_order	int(10)	Yes	NULL	
historic_flag	char(1)	Yes	NULL	
preferred	char(1)	Yes	NULL	
qualifier	varchar(100)	Yes	NULL	
subject_id	int(30)	Yes	NULL	
term	varchar(200)	Yes	NULL	
term_id	int(30)	Yes	NULL	
term_type	varchar(20)	Yes	NULL	
vernacular	char(1)	Yes	NULL	

Table structure for table steve_match_documentation

Field	Type	Null	Default	Comments
match_id	int(10)	Yes	0	Foreign key, steve_match.match_id
field	varchar(30)	Yes		field where the match was found

19.   Table structure for table steve_match_ulan

Licensed data, not included in export

Field	Type	Null	Default	Comments
match_id	int(10)	Yes	0	
display_order	int(10)	Yes	NULL	
historic_flag	char(1)	Yes	NULL	
preferred	char(1)	Yes	NULL	
qualifier	varchar(100)	Yes	NULL	
subject_id	int(30)	Yes	NULL	
term	varchar(200)	Yes	NULL	
term_id	int(30)	Yes	NULL	
term_type	varchar(20)	Yes	NULL	
vernacular	char(1)	Yes	NULL	

20.   Table structure for table steve_museum_object

contains data from museums about the object submitted. The data comes directly from the museums and does not use a standardized vocabulary.

Field	Type	Null	Default	Comments
museum_object_id	int(11)	Yes	NULL	Primary Key, auto incremented
iobject_id	int(11)	Yes	NULL	Museum's primary key
institution_id	int(11)	Yes	0	foreign key, steve_institution.institution_id
batch_id	int(11)	Yes	0	foreign key, steve_batch.batch_id
acc_nbr	varchar(255)	Yes	NULL	Accession number, a standard human readable id number from the museum. These generally note the year acquired followed by a sequential number, e.g.

				2000.14 is the 14th item acquired in 2001
primary_title	varchar(255)	Yes	NULL	Title of object
creator	varchar(255)	Yes	NULL	Artist or culture that created the object
creation_date	varchar(255)	Yes	NULL	Date the object was created, often a text description, e.g. Late Ming Dynasty
materials	varchar(255)	Yes	NULL	Materials used in the object
dimensions	varchar(255)	Yes	NULL	free text description of the size of the object
credit_line	varchar(255)	Yes	NULL	text describing the donor
copyright	varchar(255)	Yes	NULL	text describing the rights held on this item
object_metadata	text	Yes	NULL	Free text notes, often contain short paragraphs like the wall label
object_type	varchar(255)	Yes	NULL	Museum's categorization. Not a standardized vocabulary across museums

21.   Table structure for table steve_museum_object_info

Some works were further categorized for further analysis

Field	Type	Null	Default	Comments
museum_object_id	int(11)	Yes	NULL	foreign key, steve_museum_object.museum_object_id
amico_object_type	enum('Architecture', 'Audio-Video', 'Books', 'Costume and Jewelry', 'Decorative Arts and Utlilitarian Objects', 'Digital Arts', 'Drawings and Watercolors', 'Installations', 'Mixed Media', 'Paintings', 'Performance Arts', 'Photographs', 'Prints', 'Sculpture', 'Textiles', 'Other')	Yes	NULL	object type maped to this stanrdized vocabulary

in_sample	int(11)	Yes	NULL	some items were flagged for inclusion into further analysis, marked here
is_3D	tinyint(1)	Yes	NULL	1 if object depicted is three dimensional
is_rep	tinyint(1)	Yes	NULL	1 if object depicted is representational (not abstract)

22.   Table structure for table steve_session

Field	Type	Null	Default	Comments
session_id	int(11)	Yes	NULL	Primary Key, auto incremented
web_session_id	varchar(255)	Yes	NULL	session string from php
session_start_dtm	timestamp	Yes	0000-00-00 00:00:00	timestamp from start of session
session_end_dtm	timestamp	Yes	CURRENT_TIMESTAMP	Not useful
user_id	int(11)	Yes	0	foreign key, steve_user.user_id
environment_id	int(11)	Yes	0	foreign key, steve_environment.environment_id represents default environment. Users may have used more than one environment as the project created new ones and retired old ones.
search_criteria	text	Yes	NULL	Not used
language_id	int(11)	Yes	0	foreign key, steve_language.language_id
interface_settings	varchar(255)	Yes	NULL	Not used
remote_address	varchar(255)	Yes	NULL	originally ip address of remote system, one way hashed for privacy
user_agent	varchar(255)	Yes	NULL	user agent string reported by browser
http_accept_languag	varchar(255)	Yes	NULL	language string reported by the browser

e

operating_system	varchar(255)	Yes	NULL	Operating system as reported by the browser
browser	varchar(255)	Yes	NULL	browser ID as reported by the browser

23.   Table structure for table steve_session_imageset

Join table between sessions and imagesets

Field	Type	Null	Default	Comments
imageset_id	int(11)	Yes	NULL	foreign key, steve_imageset.imageset_id
session_id	int(11)	Yes	NULL	foreign key, steve_session.session_id
notes	text	Yes	NULL	not used

Table structure for table steve_stopwords

List of stopwords

Field	Type	Null	Default	Comments
id	int(10)	Yes	NULL	Primary Key, auto incremented
word	varchar(20)	Yes	NULL	term considered a stop word

24.   Table structure for table steve_term

The bulk of the data!

Field	Type	Null	Default	Comments
term_id	int(11)	Yes	NULL	Primary Key, auto incremented
session_id	int(11)	Yes	NULL	foreign key, steve_session.session_id
language_id	int(11)	Yes	0	foreign key,

				steve_language.language_id
				inferred from the browser stats, not from the term
term	varchar(255)	Yes	NULL	full text of the terms as entered
term_norm	varchar(255)	Yes	NULL	text of term in lower case letters with leading and trailing whitespace removed
entered_dtm	timestamp	Yes	CURRENT_TIMESTAMP	timestamp of tag entry
mime_id	int(11)	Yes	0	foreign key, steve_image.mime_id
category_id	int(11)	Yes	0	unused. foreign key, steve_category.category_id
corrected_id	int(11)	Yes	NULL	if the user tries to correct a term, a new term is added and this stores the steve_term.term_id of the corrected term. If a term is deleted by the user, -1 is entered. -2 signifies a blacklisted term. Only terms with null values are considered the final term.

25.   Table structure for table steve_term_review

Terms were reviewed by museum staff

Field	Type	Null	Default	Comments
term_review_id	int(11)	Yes	NULL	Primary Key, auto incremented
entry_time	timestamp	Yes	CURRENT_TIMESTAMP	timestamp of this rating
user_id	int(11)	Yes	NULL	foreign key, steve_user.user_id
term_str	varchar(64)	Yes	NULL	term string evaluated

mime_id	int(11)	Yes	NULL	foreign key, steve_image.mime_id
evaluation	varchar(30)	Yes	NULL	evaluation, standardized vocabulary from web application
comments	text	Yes	NULL	free text comments from reviewer

26. Table structure for table steve_user

Table represents registered users as well as anonymous taggers. For anonymous taggers, new users were created for each session.

Field	Type	Null	Default	Comments
user_id	int(11)	Yes	NULL	Primary Key, auto incremented
login_id	varchar(46) exported as varchar(255)	Yes		Originally an email or account name. one way hashed for privacy
passwd	varchar(32)	Yes		password, hashed in original application. Data removed for privacy.
user_status	int(11)	Yes	NULL	5 = anonymous, 2 = review user, NULL = registered user
email	varchar(40) exported as varchar(255)	Yes	NULL	Originally the email address of the user, one way hashed for privacy
language_id	int(11)	Yes	0	foreign key, steve_language.language_id entered by user in registration process
experience	varchar(63)	Yes	NULL	"Art Experience" values are restricted by the web app, Novice, Intermediate, Expert
education_id	int(11)	Yes	NULL	foreign key, steve_education.education_id
birthdate	date	Yes	NULL	"Year of birth" web app only accepts a four digit year, stored as a date
country	varchar(255)	Yes	NULL	Not used

admin	tinyint(1)	Yes	0	1 if marked as an administrator by administrators
group_membership	varchar(255)	Yes	NULL	free text groups. useful to filter steve team members to filter out testing data
gender	enum('M', 'F')	Yes	NULL	gender, database and apllication restricted to M or F
ethnicity	varchar(255)	Yes	NULL	Not used
community	varchar(63)	Yes	NULL	restricted by web app to urban, suburban, and rural
household_income	varchar(63)	Yes	NULL	restricted by web app to "less than $30k/year", "$30k-$49,999," "$50k-$74,999," "$75k and greater"
work_in_museum	tinyint(1)	Yes	NULL	1 if user works in a museum
museum_visits	int(11)	Yes	NULL	Museum visitis per year
involvement_level	varchar(63)	Yes	NULL	restricted by web app to "not active," "somewhat active," "very active"
internet_usage	varchar(255)	Yes	NULL	restricted by web app to "Several Times a Day," "About Once a Day," "3-5 Days per Week," "1-2 Days per Week," "Every Few Weeks," "Less Than Every Few Weeks," "Don't Know"
internet_connection	varchar(255)	Yes	NULL	restricted by web app to "Dial-Up," "DSL," "Cable Modem," "High-speed T1 or Greater," "Don't Know"
tagging_experience	tinyint(1)	Yes	NULL	1 if tagged before
tagging_sites	text	Yes	NULL	free text entry of other sites used with tagging
referral	text	Yes	NULL	free text entry of referral
opt_in	tinyint(1)	Yes	NULL	1 if
				"The steve research project may wish to contact you with additional questions about your experience with tagging art. Please check here if you are willing to participate in additional research activities.

				Allow?"
default_environment_id	int(11)	Yes	1	foreign key, steve_environment.environment_id
				these values may have changed as environmens were added and removed as teh project progressed
facebook_session_key	varchar(50) exported as varchar(255)	Yes	NULL	facebook key for their api, one way hashed for privacy
facebook_user_id	int(10) exported as varchar(255)	Yes	NULL	orginally contained the users facebook account id if they added the facebook application. one way hashed for privacy

27.   Table structure for table steve_users_institution

Join table for users and institutions

Field	Type	Null	Default	Comments
user_id	int(11)	Yes	NULL	foreign key, steve_user.user_id
institution_id	int(11)	Yes	NULL	foreign key, steve_institution.institution_id
role	varchar(20)	Yes	NULL	"Administrator" if administrator, ROLE_ANONYMOUS for others

28.   Table structure for table steve_user_image

tracks which user has seen which images. images were not reshown to users

Field	Type	Null	Default	Comments
user_id	int(11)	Yes	0	foreign key, steve_user.user_id
mime_id	int(11)	Yes	0	foreign key, steve_image.mime_id
view_date	timestamp	Yes	CURRENT_TIMESTAMP	timestamp showing when the user was shown this image.

teve.museum Recruiting Strategy and Activities

Table of Contents

1.   Term Set 1 [launched March 27, 2007]

1.1   New York Times Museum Section Article
March 28, 2007

http://www.nytimes.com/2007/03/28/arts/artsspecial/28social.html?ex=1332734400&en=3
2f94eb0bdd44469&ei=5090&partner=rssuserland&emc=rss

This article will generate more publicity for steve.museum than we could possibly do on our
own. We're adjusting launch dates to be able to take andvantage of this, and will recruit
broad-based public taggers from the response to this article.

1.2   Blog Comments

Where steve is mentioned in a blog post, we'll post comments that encourage people to come
out and tag. For a list of blogs with comments see jtrant's del.icio.us tags tracking
steve.museum:
http://del.icio.us/search/?fr=del_icio_us&p=steve.museum+blog+mention&type=all

For a sample comment, see:
http://www.slaw.ca/2007/01/31/a-project-called-steve/
or http://researchforward.wordpress.com/2007/05/14/tagging-museum-collections/

or a list of comments at
http://del.icio.us/search/?fr=del_icio_us&p=steve.museum+comment+blog+mention&type=
all

1.3   Presentations

-   steve taggers were recruited at a series of presentations including:
-   Museums and the Web 2007 (exhibit)

2.   Term Set 2 [launched July 9 2007]

2.1   Interested communities

On Wednesday July 11, 2007, a notice was posted to:
-   steve.discuss@steve.museum

On Thursday July 12, 2007, notices were posted on the mailing lists of interested
organizations:

- VRA-L [forwarded by Sherman Clarke] see
  http://listserv.uark.edu/scripts/wa.exe?A2=ind0707&L=VRA-L&P=R6215&I=-3
  who also mentions the steve.discuss thread on 'appropriate tagging'
- ARLIS-L [forwarded by Sherman Clarke]
- Museum-L see
  http://home.ease.lsoft.com/scripts/wa.exe?A2=ind0707B&L=MUSEUM-
  L&P=R11680
- H-MUSEUM
- H-ARTHIST
- HUMANIST see
  http://lists.village.virginia.edu/lists_archive/Humanist/v21/0155.html
- DIGLIB
- IMAGELIB see http://listserv.arizona.edu/cgi-
  bin/wa?A2=ind0707&L=imagelib&T=0&P=1072
- CHArt see http://www.jiscmail.ac.uk/cgi-
  bin/webadmin?A2=ind0707&L=chart&T=0&F=&S=&P=670
- On July 17, 2007 the announcement prompted further discussion [about multi-
  lingual tagging] on:
- MCN-L see http://toronto.mediatrope.com/pipermail/mcn-l/2007-
  July/001024.html
- On Thursday, January 17, 2008 a message was posted by Rob Stein to
  steve.discuss@steve.museum

2.2   Blog Comments
- ongoing as above

2.3   Contact Known Taggers
Email all registered taggers from the steve beta and Term Set 1 asking them to come back.
- 209 non-steve taggers registered before the beginning of Term Set 2 contacted on October
1, 2007 asking them to come back and try the new interface. [jtrant]

> Email: Come back and tag some more art!
> Hi!
> Some time ago, you logged into http://tagger.steve.museum and tried out our
> experimental art tagging tool. Things have changed a bit since then, and we'd
> like you to come back and see what's up.
>
> Please take a bit of a break and :
> – drop in to http://tagger.steve.museum
>
> – log in [if you can't remember your account info, click the link to get it
> emailed to you]
>   – Tag Art!

We appreciate your interest in our on-going research project. Thanks for your contribution to its success!

jennifer (for all the participants in steve.museum)

2.4   Participating museums' communities

Draft an announcement that can be sent to the mailing lists of participating museums [newletter, etc.]

- Museum Docent Programs (rstein)
- Museum Member email lists (rstein)
- Skirball - rich
- SFMOMA
- MIA

2.5   Participating Museums' Staff

Log any presentations or meetings [intentional attempts to engage people]:

- Skirball – All staff email sent on 7/30/07 – Rich
- Rubin – On August 4 the staff of the rubin museum of art was invited to register and tag. It has been reported to me (Helen) that a number of staff members have done so and interns have been assigned to tag daily.

2.6   General Lists / Communities
- Craig's List
- LA - Rich
- MN Willy Posted 2007-09-18, 8:46AM CDT
  - SF – SFMOMA
- NYC - Susan
- Squidoo – Rich
- Facebook
    o Michael J.
    o Rob
    o 'wall' posting in International Museum Web Professionals by jtrant - sept 7, 2007

- Skirball - Rich
- FARK
    o Willy
- Volunteer Match
- NTEN
- Flickr and other image sharing social tagging sites

2.7   Museum Community Blogs
- jtrants @ conference.archimuse.com
`see`
http://conference.archimuse.com/blog/jtrant/steve_museum_term_set_2_lanched
- Fresh + New
- Musematic
- HangingTogether
- MuseumEd
- Ideum
- Museum 2.0

2.8   Other Blogs
- Tim Bray – Ron **Contacted**
- Seth Godin – Rich **Completed**
- Carleton College Alumni – Willy **Completed**

2.9   Presentations
- J. Trant, Tagging and Folksonomy: Improved access to art? a steve update, for the Dublin Core Annual Meeting in Singapore, August 2007: download the podcast
- S. Chun (in abstentia) and M. Jenkins, Digitization Matters: Breaking through the barriers-scaling up the digitization of special colletions, August 2007
- W. Lee, Steve.museum, The Adventures of Libraries 2.0, The College of St. Catherine, September 17, 2007 [Monday Community Night is sponsored by the College of St, Catherine MLIS Program. Every Monday evening of the academic year programs are held for St. Kate's MLIS students, alums, faculty, librarians and others who are interested in library-related topics in order to encourage community, discussion of library-related issues, technology training and celebration of MLIS student accomplishments. In its first year (2006-2007) over 1100 attendees participated.]
- ICHIM07 steve paper (released september 28, 2007)
Trant, J., D. Bearman and S. Chun, The eye of the beholder: steve.museum and social tagging of museum collections , in International Cultural Heritage Informatics Meeting (ICHIM07): Proceedings, J. Trant and D. Bearman (eds). Toronto: Archives & Museum Informatics. 2007. Published September 30, 2007 at http://www.archimuse.com/ichim07/papers/trant/trant.html [presentation @ ICHIM scheduled for Friday October 26, 2007]

2.10   Newspaper Articles
- Article in The Indianapolis Star 9/30/07 – 'Your art' online: IMA shatters storehouse model, providing cyber access to whole collection see http://www.indystar.com/apps/pbcs.dll/article?AID=/20070930/ENTERTAINMEN T01/709300311/-1/LOCAL17

3.   Term Set 3 [launch October 15 2007]

- LACMA - Diana Folsom invited graduate students at UCLA to tag through their professor 11/2/07 Jonathan Furner, Ph.D, Associate Professor, Graduate School of Education and Information Studies University of California, Los Angeles

3.1   Presentations

- -NFAIS, Annual Humanities Roundtable, October 22, 2007, Graduate Center, CUNY, New York, NY. Michael Jenkins presented an overview of the steve project and our work to date.
- ICHIM07 steve paper (released september 28, 2007)
  Trant, J., D. Bearman and S. Chun, The eye of the beholder: steve.museum and social tagging of museum collections, in International Cultural Heritage Informatics Meeting (ICHIM07): Proceedings, J. Trant and D. Bearman (eds). Toronto: Archives & Museum Informatics. 2007. Published September 30, 2007 at http://www.archimuse.com/ichim07/papers/trant/trant.html
  - presentation @ ICHIM scheduled for Friday October 26, 2007
- Steve @ MCN in Chicago, November 9, 2007
- Presentation of Tag You're It: A Dialog Between Social Tagging and Traditional Classification February 22, 2008 at UCLA by Rich Cherry

3.2   Blog Discussions

- ichim07 paper discussed on fresh+new (seb chan) http://www.powerhousemuseum.com/dmsblog/index.php/2007/10/15/opac20-latest-tag-statistics-and-trends-for-simple-comparison-with-steve-project/ and electric museum (mike ellis) http://electronicmuseum.wordpress.com/2007/10/12/ceci-nest-pas-une-tag/

3.3   List Postings

- Rob posted a message to steve.discuss inviting people to tag in response to Flickr thread 1/17/08.
- CAAH (art historians' list) posting in response to social tagging thread. j. trant, Jan 28, 2008.
  see archive [authentication required]
- Recruiting email sent by Helen Abbott to Rubin Museum of Art e-news mailing list (11,000 recipients). They inlcude members and also people who sign up through the RMA website and programs. 1/30/08
  steve website was down for a few days during this time and the link may have been broken when recipients attempted to access the site.
- Email invitation re-sent in RMA enews on Wednesday, February 13, 2008.
- J. Trant sent a message the following lists:
   Subject: help us understand how interfaces affect tagging
  hi all,

we've deployed the another phase of the steve.museum tagging experiment, at http://tagger.steve.museum

the steve tagger (a piece of open-source software) is a key tool in our IMLS-funded study of the contribution social tagging and folksonomy can make to on-line access to art collections. throughout our experiment we'll be varying the interface of the tagger to find out what encourages tagging. there's another instance of online now, and we'd like you to come and try it out.

we're looking forward to sharing the results of our study with the community. If you'd like to participate, please come by. [it's ok if you don't work in an art museum—and ok if you do!]

Go to http://tagger.steve.museum
> – create an account, or log into your existing one
> [this is important for our research]
> – Tag Art!

Thanks.

jennifer

- IMAGELIB Listserv 2:09 PM 2/22/08 -0500
- h-arthist@h-net.msu.edu, h-museum@h-net.msu.edu 2:10 PM 2/22/08 -0500
- Humanities Computing Discussion List 2:11 PM 2/22/08 -0500
- Digital Libraries List 2:11 PM 2/22/08 -0500
- IFLA-L 2:12 PM 2/22/08 -0500
- MUSEUM-L@HOME.EASE.LSOFT.COM 2:12 PM 2/22/08 -0500
- CHArt Computers and History of Art 2:13 PM 2/22/08 -0500

3.4   Volunteer recruiting
- Craig's List NYC and Idealist.org 2/12/08? – Susan
- Craig's List Indianapolis 2/12/08 – Tiffany
- Craig's List San Francisco 2/15/08 – Peter
- Craig's List Cleveland 2/19/08 – Andrea
- Craig's List Chicago and Detroit 2/26/08 – Tiffany
- Craig's List Miami, Dallas, re-post NYC 2/26/08 – Susan
- Craig's List Toronto, February 26, 2008 – jt
- Craig's List Philadelphia, 5/23/08 – Helen

4.   Term Set 4 [launch March 13, 2008]

4.1   Strategy

We are ready to begin recruiting on Craigslist and other "public" lists for TS4. We're asking everyone to make a Craigslist posting (and/or a posting to other general listservs/volunteer sites), just as you did for TS3. We've prepared a general recruiting text, pasted below, for this purpose, although you should feel free to modify the text for local use, or if you intend to use it on a list other than Craigslist, or if you send it to bloggers with whom you have a relationship. For those who haven't done this before, it's quick and easy to do the Craigslist posting: look for the Craigslist site in your region, find the volunteer link (in the "community" area), and follow the instructions for posting there. You'll get a confirmation email to which you'll need to respond in order to officially publish your ad, which means that you must use a real email address. In addition, Craigslist will limit posting to one per email address, so you will only be able to post in one state/city pair, unless you have multiple email addresses from which to submit ads.

In cities where there is a great deal of activity on Craigslist you may want to post on a weekly or biweekly basis. We encourage you to mark your calendars with reminders to do this periodically throughout TS4 (i.e. through mid-June).

Here are your assignments for posting on Craigslist. During the recruiting phase for TS3, several of you submitted to other local blogs, and we encourage you to do the same this time around.

- San Francisco: Peter
- Denver: Bruce
- Los Angeles: Diana
- Indianapolis, Houston, Dallas: Tiffany, Charlie, Ed
- Cleveland: Andrea
- Chicago: Matt
- New York, Manhattan, Atlanta, Seattle: Susan
- New York/any borough(s) other than Manhattan: Michael
- Philadelphia: Helen
- Washington DC: Evi
- Minneapolis: Willy

Your original posts should be done some time this week, May 20-25.

4.2 Facebook

Please continue to do your recruiting in Facebook using the steve Art Tagger functionality by sending images to your Facebook contacts and asking them to tag.

Here's the text:

Subject: Tag works of art / help museums improve access to collections

Steve.museum is a collaboration of art museums that is studying the potential of social tagging (user-contributed descriptions) to improve access to online art collections. Our research is conducted online, where visitors are invited to look at and tag works of art from the collections of U.S. and U.K. museums. We need volunteers to help out by visiting our website, tagging some art, and inviting their friends to participate. Tagging is simple and easy, and even a brief visit (or visits) to the site will help us.

You'll find the steve tagger online at http://tagger.steve.museum. If you have not tagged previously, you'll have the option to create an account. Doing so is not mandatory, but registering does help us to collect more useful information for our research.

If you're a Facebook user, you can find the steve Facebook application (steve Art Tagger) at http://apps.facebook.com/steve-museum/. When you install the application, you'll have the opportunity to link a previously-created steve account, if you have one, with your Facebook account. Otherwise, we'll create a new account for you automatically. Facebook users can invite friends to tag by sharing artworks and tags, and display their tagged artworks and tags on their Facebook profiles.

Please note that if you would like to explore both the steve tagger at tagger.steve.museum and the Facebook application, you'll need to close your browser between sessions to avoid conflicts that may cause errors. Also, the choice to link your steve account with Facebook is persistent: steve will remember you as a Facebook user in the future.

More about the project: You can learn more about the steve project by visiting our project website at www.steve.museum. Museums contributing images to the current research project include the Boston Museum of Fine Arts, the Cleveland Museum of Art, the Denver Art Museum, the Guggenheim Museum, the Indianapolis Museum of Art, Los Angeles County Museum of Art, the Metropolitan Museum of Art, Minneapolis Institute of Arts, the Rubin Museum of Art, San Francisco Museum of Modern Art, and the Tate.

4.3   Craigslist ad for steve Facebook application:
Subject: Facebook Users: Help Museums / Share Art

Would you like to share images of art from the collections of U.S. museums with your friends, while helping museums to improve access to their online art collections? If you're a Facebook user, you can do so by installing a recently-released Facebook application, the steve Art Tagger, found at http://apps.facebook.com/steve-museum/. Once you've installed the Tagger application, you'll be able to tag works of art, invite your friends to participate, and display tagged artworks and tags on your Facebook profile page.

Want to know more about the project?

The steve project is a collaboration of art museums that is studying the potential of social tagging (user-contributed descriptions) to improve access to online art collections. Our research is conducted online, where visitors are invited to look at and tag works of art from the collections of U.S. and U.K. museums. We need volunteers to help out by tagging art and inviting their friends to participate. Museums contributing images to the current research project include the Boston Museum of Fine Arts, the Cleveland Museum of Art, the Denver Art Museum, the Guggenheim Museum, the Indianapolis Museum of Art, Los Angeles County Museum of Art, the Metropolitan Museum of Art, Minneapolis Institute of Arts, the Rubin Museum of Art, San Francisco Museum of Modern Art, and the Tate. You can learn more about the steve project by visiting our website at www.steve.museum.

4.4   Activities

- 3/28/08 Sent thank you letter to tagger experience survey respondents inviting them to come back – Tiffany
- 4/9/08 – 4/12/08 Printed 1000 steve business cards with web address to distribute during MW conference – Rob
- 5/20 Posted; 5/27 reposted TS4 text to Craigslist Atlanta, Seattle, Manhattan; VRA listserv, M&T listserv, MCN listserv – Susan
- 5/20 Posted TS4 to Brooklyn Craigslist – Michael
- 5/20 Posted TS4 to Chicago Craigslist – Matt

- 5/21 Posted TS4 text to Craigslist in Indianapolis, Houston, Dallas – Tiffany, Rob, Ed

- 5/22 Similar TS4 text emailed to previous taggers for public and MMA - Susan and Tiffany
- 5/26 Updated news on steve Facebook group page to reflect launch of TS4 – Susan
- 5/23 Posted to Craigslist, Philadelphi—Helen
- 5/28 Posted to Craigslist Indianapolis, Tiffany
- 5/30 Posted to Craigslist Brooklyn, Michael
- 5/30 Posted to Craigslist Dallas, Tiffany
- 6/12 Posted Facebook ad on Craigslist Indianapolis, Tiffany
- 6/12 Posted Facebook ad on Craigslist Houston, Tiffany
- 6/13 Re-posted TS4 to Chicago Craigslist – Matt
- 6/13 Posted Facebook ad on Chicago Craigslist – Matt
- 6/13 Posted Facebook ad on Philiadelphia Craigslist—Helen

Appendix III:
steve.museum Works Not Tagged

Image	Work ID	Description	Institution	object type	total tags	distinct tags	total taggers	Times viewed	Times Skipped [views - taggers]
	1784	WW, established 1999, X House Project, Northfield, Massachusetts. 2000. digital chromogenic prints, 24 in. x 36 in. (60.96 cm x 91.44 cm), Collection SFMOMA, Accessions Committee Fund	San Francisco Museum of Modern Art	Drawings and Watercolors	0	0	0	0	0
	1557	Guatemala, Petén region, Maya style (250-900), Maya style (250-900), Noble, 250-600, earthenware with colored slips, Overall - h:59.00 cm (h:23 3/16 inches), John L. Severance Fund	Cleveland Museum of Art	Sculpture	0	0	0	0	0
	1562	Pierre Auguste Renoir (French, 1841-1919), The Apple Seller, c. 1890, oil on fabric, Framed - h:93.03 w:82.23 d:9.52 cm (h:36 5/8 w:32 5/16 d:3 11/16 inches) Unframed - h:65.80 w:54.50 cm (h:25 7/8 w:21 7/16 inches), Bequest of Leonard C. Hanna, Jr.	Cleveland Museum of Art	Paintings	0	0	0	0	0
	1558	Albert Bierstadt (American, 1830-1902), Fir Trees and Storm Clouds, c. 1870, oil on paper mounted on canvas, Unframed - h:35.00 w:47.00 cm (h:13 3/4 w:18 1/2 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	0	0	0	0	0
	1596	Italy (?), early 16th Century, Brigandine (front panel), c. 1500-1525, linen, yellow velvet; steel plates and brass rivets, Overall - h:56.50 w:47.60 cm (h:22 3/16 w:18 11/16 inches) Wt: 2.5 kg, Gift of Mr. and Mrs. John L. Severance	Cleveland Museum of Art	Decorative Arts and Utilitarian Objects	0	0	0	0	0
	1775	Hiroshi Sugimoto, 1948 -, Canton Palace, Ohio, 1980, gelatin silver print, 8 in. x 10 in. (20.32 cm x 25.4 cm), Collection SFMOMA, Gift of Ursula Gropper	San Francisco Museum of Modern Art	Photographs	0	0	0	1	1
	1774	Jack W. Stauffacher, 1920 -, Shifting and Inking, 1967, ink on paper, 10 in. x 10 in. (25.4 cm x 25.4 cm), Collection SFMOMA, Gift of Jack Werner Stauffacher	San Francisco Museum of Modern Art	Prints	0	0	0	1	1
	236	NULL, Ecclesiastical panel: The Sacrifice of Issac, NULL, Gold Thread	wool	wire, 22 3/4 x 31 1/2 in., Emma Harter Sweetser Fund	Indianapolis Museum of Art	Textiles	0	0	0	1	1
	387	Sa amulet, Rogers Fund, 1925	The Metropolitan Museum of Art	Costume and Jewelry	0	0	0	7	7
	253	Ritual Vessel: Horse with Figures (Aduno Koro): VESSEL (ADUNO KORO), RITUAL, HORSE WITH FIGURES, 16th - 19th century, Wood, L. 93 in. (236.2 cm), The Michael C. Rockefeller Memorial Collection, Bequest of Nelson A. Rockefeller, 1979	The Metropolitan Museum of Art	Decorative Arts and Utilitarian Objects	0	0	0	12	12
	329	Maker: Alexandre-Jean Oppenordt, 1639 - 715, Small Desk (bureau brisé), 17th century (ca. 1685), Oak, pine and walnut veneered with tortoiseshell; engraved brass, ebony and rosewood; bronze-gilt and steel, H. 30 5/16 in. (77 cm), W. 41 3/4 in. (106 cm), D. 23 3/8 in. (59.4 cm), Gift of Mrs. Charles Wrightsman, 1986	The Metropolitan Museum of Art	Decorative Arts and Utilitarian Objects	0	0	0	13	13
	421	Tip of a Pointer, late 11th - early 12th century, Cloisonné enamel, gold, H. 1 in. (2.5 cm), Louis V. Bell Fund and Henry G. Keasbey Bequest, 1997	The Metropolitan Museum of Art	Decorative Arts and Utilitarian Objects	0	0	0	22	22

Appendix IV:
steve.museum Works Always Tagged

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1741	Christian Marclay, 1955 -, Telephones, 1995, single-channel video with sound, NULL, Collection SFMOMA, Camille W. and William S. Broadbent Fund	San Francisco Museum of Modern Art	Books	30	29	7	7	0		yes
1677	George C. Ault, 1891 - 1948, The Hudson from Riverside Drive, 1920-1921, oil on linen, 24 in. x 30 in. (60.96 cm x 76.2 cm), Collection SFMOMA, Gift of Rena Bransten	San Francisco Museum of Modern Art	Paintings	34	31	6	6	0	no	yes
1659	Annibale Carracci (Italian, c. 1560-1609), Boy Drinking, 1582-1583, oil on canvas, Framed - h:79.00 w:67.00 d:5.50 cm (h:31 1/16 w:26 3/8 d:2 1/8 inches) Unframed - h:55.80 w:43.70 cm (h:21 15/16 w:17 3/16 inches), Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Paintings	27	24	6	6	0	no	yes
1649	Albert Bierstadt (American, 1830-1902), Fir Trees and Storm Clouds, c. 1870, oil on paper mounted on canvas, Unframed - h:35.00 w:47.00 cm (h:13 3/4 w:18 1/2 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	23	15	6	6	0	no	yes
1776	Massimo Tamburini, Ducati Senna 916 Series III Motorcycle, 1997, metal, plastic, and rubber, 42 in. x 79 in. x 24 in. (106.68 cm x 200.66 cm x 60.96 cm), Collection SFMOMA, Gift of Ducati Motor S.p.A.	San Francisco Museum of Modern Art	Decorative Arts and Utlilitarian Objects	23	22	5	5	0	yes	
1757	Shaun O'Dell, 1968 -, Primary Engagement Diagram, 2001, ink and gouache on paper, 19 3/4 in. x 15 3/4 in. (50.17 cm x 40.01 cm), Collection SFMOMA, Purchased through a gift of the Wallace Alexander Gerbode Foundation	San Francisco Museum of Modern Art	Drawings and Water-colors	18	11	5	5	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1688	Elmer Bischoff, 1916 - 1991, Yellow Sky, 1967, oil on canvas, 79 5/8 in. x 92 1/8 in. (202.25 cm x 234 cm), Collection SFMOMA, Paul L. Wattis Special Fund purchase	San Francisco Museum of Modern Art	Paintings	19	15	5	5	0	no	yes
1619	Frederic Leighton (British, 1830-1896), David: ""Oh, that I had wings like a Dove! For then would I fly away, and be at rest."" Psalm 55:6, NULL, oil on fabric, Framed - h:125.00 w:152.40 d:4.50 cm (h:49 3/16 w:60 d:1 3/4 inches) Unframed - h:96.50 w:122.50 cm (h:37 15/16 w:48 3/16 inches), Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Paintings	31	28	5	5	0	no	yes
1568	Henri Matisse (French, 1869-1954), The Windshield, On the Road to Villacoublay, NULL, oil on canvas, Framed - h:58.00 w:75.00 d:7.00 cm (h:22 13/16 w:29 1/2 d:2 3/4 inches) Unframed - h:38.20 w:55.20 cm (h:15 w:21 11/16 inches), Bequest of Lucia McCurdy McBride in memory of John Harris McBride II	Cleveland Museum of Art	Paintings	25	19	5	5	0	no	yes
1765	Gerhard Richter, 1932 -, 9 Objekte (9 Objects), 1969, offset lithograph, 18 1/8 in. x 18 1/2 in. (46.04 cm x 46.99 cm), Collection SFMOMA, Gift of John Gutmann	San Francisco Museum of Modern Art	Prints	11	10	4	4	0	no	yes
1752	Jennifer Morla, 1955 -, San Francisco 2012: U.S. Olympic Bid City Poster, 2002, offset lithograph, 36 in. x 24 in. (91.44 cm x 60.96 cm), Collection SFMOMA, Gift of Morla Design	San Francisco Museum of Modern Art	Prints	18	16	4	4	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1725	Arne Jacobsen, 1902 - 1971, Series 7 Chair (model 3107), 1955, chrome-plated tubular steel and teak veneer, 30 in. x 20 in. x 20 in. (76.2 cm x 50.8 cm x 50.8 cm), Collection SFMOMA, Gift of Michael and Gabrielle Boyd	San Francisco Museum of Modern Art	Decorative Arts and Utlilitarian Objects	10	9	4	4	0	yes	
1714	Arnold Genthe, 1869 - 1942, Untitled, 1906, printed later, gelatin silver print, 10 in. x 8 in. (25.4 cm x 20.32 cm), Collection SFMOMA, Gift of Joe Wemple	San Francisco Museum of Modern Art	Photographs	26	26	4	4	0	no	yes
1666	David Octavius Hill (British, 1802-1870), and Robert Adamson (British, 1821-1848), Elizabeth Rigby, later Lady Eastlake (1809-1893), c. 1844-1845, salted paper print from calotype negative, Image - h:21.50 w:15.60 cm (h:8 7/16 w:6 1/8 inches), Andrew R. and Martha Holden Jennings Fund	Cleveland Museum of Art	Photographs	11	9	4	4	0	no	yes
1661	Georges Seurat (French, 1859-1891), Café-concert, 1887-1888, Conté crayon heightened with white chalk, Sheet - h:31.40 w:23.60 cm (h:12 5/16 w:9 1/4 inches), Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Drawings and Watercolors	15	15	4	4	0	no	yes
1652	Otto H. Bacher (American, 1856-1909), Mary Holland Bacher, NULL, oil on canvas, Unframed - h:90.60 w:57.40 cm (h:35 5/8 w:22 9/16 inches), Gift of Will Low Bacher	Cleveland Museum of Art	Paintings	15	13	4	4	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Representational
1640	Hendrick ter Brugghen (Dutch, 1588-1629), Heraclitus (or Saint Jerome), c. 1621, oil on canvas, Framed - h:147.96 w:124.14 d:6.99 cm (h:58 1/4 w:48 13/16 d:2 3/4 inches) Painted surface - h:125.50 w:102.00 cm (h:49 3/8 w:40 1/8 inches) Tacking margins of oritinal fabric let out - h:131.50 w:107.00 cm (h:51 3/4 w:42 1/8 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	23	21	4	4	0	no	yes
1635	Otto H. Bacher (American, 1856-1909), Mary Holland Bacher, NULL, oil on canvas, Unframed - h:90.60 w:57.40 cm (h:35 5/8 w:22 9/16 inches), Gift of Will Low Bacher	Cleveland Museum of Art	Paintings	11	8	4	4	0	no	yes
1626	South Italy, Apulian, attributed to the Group of the Dublin Situlae, 4th Century BC, Apulian Situla, c. 350 BC, red-figure terracotta, with handle - h:30.30 cm (h:11 7/8 inches) Diameter of rim - w:24.50 cm (w:9 5/8 inches) Diameter of foot - w:13.10 cm (w:5 1/8 inches) without handle - h:28.00 cm (h:11 inches), Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Decorative Arts and Utlilitarian Objects	13	13	4	4	0	yes	yes
1584	Camille Dolard (French, 1810-aft 1884), Self-Portrait in Painting Studio, c. 1843, daguerreotype (full-plate), Platemark - h:20.50 w:15.00 cm (h:8 1/16 w:5 7/8 inches), Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Photographs	18	16	4	4	0	no	yes
1583	Emilie Preyer (German, 1849-1930), Still Life with Fruit, NULL, oil on fabric, Unframed - h:35.00 w:46.50 cm (h:13 3/4 w:18 1/4 inches), Hinman B. Hurlbut Collection	Cleveland Museum of Art	Paintings	26	23	4	4	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1788	John Bock, 1965 -, Marlit, 2003, mixed media, 86 5/8 in. x 141 3/4 in. x 49 3/16 in. (220 cm x 360 cm x 125 cm), Collection SFMOMA, Purchased through a gift of Chara Schreyer	San Francisco Museum of Modern Art	Installations	15	14	3	3	0	yes	yes
1782	Rachel Whiteread, 1963 -, Contents, 2005, plaster, 48 in. x 122 in. x 137 3/4 in. (121.92 cm x 309.88 cm x 349.89 cm), overall, Collection SFMOMA, Purchase, by exchange, through gifts of Harriet Lane Levy, Lily Lawlor, Albert M. Bender, Maurine Church Coburn, Mrs. Winifred Yelland Phelps, Mr. and Mrs. Forrest Engelhart, Mrs. Charles de Young Elkus, R.E. Lewis, Miss Bess Replogle,	San Francisco Museum of Modern Art	Sculpture	6	6	3	3	0	yes	no
1780	Henry Wessel, 1942 -, Waikiki Beach, Hawaii, 1975, gelatin silver print, 10 15/16 in. x 13 7/8 in. (27.78 cm x 35.24 cm), Collection SFMOMA, Gift of Maggie Keating	San Francisco Museum of Modern Art	Photographs	10	9	3	3	0	no	yes
1755	George Nelson, 1908 - 1986, Marshmallow Sofa, 1956, metal and upholstery, 31 1/4 in. x 52 1/2 in. x 31 1/4 in. (79.38 cm x 133.35 cm x 79.38 cm), Collection SFMOMA, Accessions Committee Fund: gift of Jean and Jim Douglas, Evelyn Haas, Diane and Scott Heldfond, Elaine McKeon, Norah and Norman Stone, Danielle and Brooks Walker, Jr., and the Modern Art Council	San Francisco Museum of Modern Art	Decorative Arts and Utlilitarian Objects	8	7	3	3	0	yes	

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1754	Eadweard Muybridge, 1830 - 1904, Woman Jumping over Barrier, 1887, collotype, 8 in. x 12 in. (20.32 cm x 30.48 cm), Collection SFMOMA, Gift of Frederick P. Currier and Amy McCombs	San Francisco Museum of Modern Art	Photo-graphs	5	5	3	3	0	no	yes
1747	J. Abbott Miller, 1963 -, Princeton University School of Architecture Lecture Series Spring 1997, 1997, offset lithograph, 30 in. x 22 1/2 in. (76.2 cm x 57.15 cm), Collection SFMOMA, Gift of the artist	San Francisco Museum of Modern Art	Prints	7	7	3	3	0	no	yes
1745	Julie Mehretu, 1970 -, Stadia I, 2004, ink and acrylic on canvas, 108 in. x 144 in. (274.32 cm x 365.76 cm), Collection SFMOMA, Fractional gift of Dominique Levy and purchase through the Accessions Committee Fund with the additional support of Gay-Lynn and Robert Blanding, Jean and James E. Douglas, Jr., Ann and Robert S. Fisher, and Pat and Bill Wilson	San Francisco Museum of Modern Art	Paintings	3	3	3	3	0	no	no
1715	Arnold Genthe, 1869 - 1942, Untitled, n.d., gelatin silver print, 10 in. x 8 in. (25.4 cm x 20.32 cm), Collection SFMOMA, Gift of Joe Wemple	San Francisco Museum of Modern Art	Photo-graphs	13	10	3	3	0	no	yes
1710	Lorser Feitelson, 1898 - 1978, Genesis First Version, 1934, oil on celotex, 24 in. x 30 in. (60.96 cm x 76.2 cm), Collection SFMOMA, Gift of Helen Klokke	San Francisco Museum of Modern Art	Paintings	16	16	3	3	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1705	Dante Donegani, b. 1957, and Giovanni Lauda, b. 1956, Passepartout, 1998, fabric, polyurethane foam, and metal, 75 9/16 in. x 22 1/16 in. x 74 13/16 in. (192 cm x 56 cm x 190 cm), Collection SFMOMA, Accessions Committee Fund	San Francisco Museum of Modern Art	Decorative Arts and Utlilitarian Objects	11	8	3	3	0	yes	
1702	Richard Diebenkorn, 1922 - 1993, Large Bright Blue, from the group, Eight Color Etchings, 1980, 1980, spit bite aquatint and softground etching, 40 in. x 26 in. (101.6 cm x 66.04 cm), Collection SFMOMA, Purchased with the funds of the Ruth and Moses Lasky Fund and a gift from Dr. and Mrs. Allan Roos	San Francisco Museum of Modern Art	Prints	10	9	3	3	0	no	no
1691	Tom Bonauro, 1955 -, Todd Oldham Fall 1997 Collection Invitation, 1997, offset lithograph, 8 3/4 in. x 5 3/4 in. (22.23 cm x 14.61 cm), Collection SFMOMA, Gift of Tom Bonauro	San Francisco Museum of Modern Art	Prints	11	10	3	3	0	no	no
1690	Tom Bonauro, 1955 -, Diana Slavin, 1998 Spring Poster, 1998, offset lithograph, 17 in. x 11 in. (43.18 cm x 27.94 cm), Collection SFMOMA, Gift of Tom Bonauro	San Francisco Museum of Modern Art	Prints	7	6	3	3	0	no	yes
1689	Jeremy Blake, 1971 - 2007, Guccinam, 2000, digital animation with sound, dimensions variable, Collection SFMOMA, Accessions Committee Fund	San Francisco Museum of Modern Art	Audio-Video	8	8	3	3	0		no
1686	Billy Al Bengston, 1934 -, Untitled JWS, 1968, lacquer and polyester resin on aluminum, 11 1/4 in. x 12 in. x 1 3/4 in. (28.58 cm x 30.48 cm x 4.45 cm), Collection SFMOMA, Anonymous gift	San Francisco Museum of Modern Art	Paintings	5	5	3	3	0	no	no

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1682	Matthew Barney, 1967 -, CREMASTER 2: The Drones' Exposition, 1999, mixed media sculptural installation including 35mm film, 12 prints and 5 drawings, dimensions vari-able, Collection of the Walker Art Center, Minneapolis, and the San Francisco Museum of Modern Art through the Accessions Committee Fund, 2000	San Francisco Museum of Modern Art	Installations	7	7	3	3	0	yes	yes
1676	Kim Anno, 1958 -, Ukiyo-e #6, 2001, oil on wood, 40 in. x 29 in. (101.6 cm x 73.66 cm), Collection SFMOMA, Purchased through a gift of the Wallace Alexander Gerbode Foundation	San Francisco Museum of Modern Art	Paintings	8	8	3	3	0	no	no
1657	Germany, Swabia near Bodenese (Lake Constance), early 14th century, Christ and Saint John the Evangelist, 1300-1320, poly-chromed wood, Overall - h:92.71 w:64.45 d:28.84 cm (h:36 1/2 w:25 5/16 d:11 5/16 inches), Purchase from the J. H. Wade Fund	Cleveland Mu-seum of Art	Sculpture	8	8	3	3	0	yes	yes
1656	Vincent van Gogh (Dutch, 1853-1890), The Poplars at Saint-Rémy, NULL, oil on fabric, Framed - h:80.96 w:66.67 d:7.30 cm (h:31 13/16 w:26 3/16 d:2 13/16 inches) Unframed - h:61.60 w:45.70 cm (h:24 1/4 w:17 15/16 inches), Bequest of Leonard C. Hanna, Jr.	Cleveland Mu-seum of Art	Paintings	16	14	3	3	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Representa-tional
1623	Rossello di Jacopo Franchi (Italian, c.1376-1457), Virgin and Child, late 1430s, tempera on wood, Framed - h:79.50 w:64.00 d:5.50 cm (h:31 1/4 w:25 3/16 d:2 1/8 inches) Unframed - h:69.20 w:55.20 cm (h:27 3/16 w:21 11/16 inches), Holden Collection	Cleveland Museum of Art	Paintings	15	14	3	3	0	no	yes
1617	South India, Chola period (10th-13th century), Ganesha, c. 1070, bronze, Overall - h:50.20 cm (h:19 3/4 inches), Gift of Katharine Holden Thayer	Cleveland Museum of Art	Sculpture	14	14	3	3	0	yes	yes
1604	Pierre Auguste Renoir (French, 1841-1919), Mother and Child, NULL, pastel, Sheet - h:79.10 w:63.50 cm (h:31 1/8 w:25 inches) Framed - h:99.00 w:82.50 d:4.20 cm (h:38 15/16 w:32 7/16 d:1 5/8 inches), Bequest of Alexander Ginn	Cleveland Museum of Art	Drawings and Water-colors	7	7	3	3	0	no	yes
135	NULL, Mummy Mask, 332BCE - 30BCE, linen, plaster, papyrus, pigment, gold, 14 x 10 1/2 in., Emma Harter Sweetser Fund	Indianapolis Museum of Art	Sculpture	12	11	3	3	0	yes	yes
1567	Henri Matisse (French, 1869-1954), Interior with an Etruscan Vase (Intérieur au vase étrusque), NULL, oil on canvas, Framed - h:102.23 w:129.54 d:12.07 cm (h:40 3/16 w:51 d:4 3/4 inches) Unframed - h:73.70 w:108.00 cm (h:29 w:42 1/2 inches), Gift of the Hanna Fund	Cleveland Museum of Art	Paintings	19	16	3	3	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1785	Shizuka Yokomizo, 1966 -, Stranger No. 1, 1998, chromogenic print, 50 in. x 42 1/2 in. (127 cm x 107.95 cm), Collection SFMOMA, Purchase through a gift of Mary and Thomas C. Field	San Francisco Museum of Modern Art	Photo-graphs	5	5	2	2	0	no	yes
1777	Unknown, Sculpture, Ravenna, 1870s, al-bumen print, 9 1/8 in. x 7 1/16 in. (23.18 cm x 17.94 cm), Collection SFMOMA, Ac-cessions Committee Fund	San Francisco Museum of Modern Art	Photo-graphs	3	3	2	2	0	no	yes
1764	Brett Reichman, 1959 -, A Painting That Tells a Story, 1997, oil on canvas, 96 in. x 72 in. (243.84 cm x 182.88 cm), Collection SFMOMA, Ruth Nash Fund purchase	San Francisco Museum of Modern Art	Paintings	9	9	2	2	0	no	no
1753	Jennifer Morla, 1955 -, SculptureCenter Poster, 2000, Roland Digital Pigment: Ul-traChrome ink on Legion Photo Gloss pa-per, 33 in. x 17 1/2 in. (83.82 cm x 44.45 cm), Collection SFMOMA, Gift of Morla Design	San Francisco Museum of Modern Art	Prints	4	3	2	2	0	no	yes
1750	Tina Modotti, 1896 - 1942, Untitled (Woman Carrying Load of Wood), n.d., gelatin silver print, 3 7/8 in. x 2 15/16 in. (9.84 cm x 7.46 cm), Collection SFMOMA, Purchased through a gift of¬†the Art Sup-porting Foundation, John ""Launny"" Stef-fens,¬†Sandra Lloyd, Shawn and Brook Byers,¬†Mr. and Mrs. George F. Jewett, Jr., and anonymous donors	San Francisco Museum of Modern Art	Photo-graphs	7	7	2	2	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1743	John McLaughlin, 1898 - 1976, #26, 1964, oil on canvas, 48 in. x 60 in. (121.92 cm x 152.4 cm), Collection SFMOMA, Gift of Thea Westreich and Ethan Wagner in memory of John Caldwell	San Francisco Museum of Modern Art	Paintings	4	4	2	2	0	no	no
1738	Reagan Louie, 1951 -, Beijing, from the series Toward a Truer Life, 1987, chromogenic print, 20 in. x 24 in. (50.8 cm x 60.96 cm), Collection SFMOMA, Anonymous Donors' Challenge Fund	San Francisco Museum of Modern Art	Photo-graphs	5	4	2	2	0	no	yes
1737	LOT/EK, established 1993, LITE-SCAPE 8, 2002, poured rubber, neon tubes, and cords, 24 in. x 6 in. x 3 in. (60.96 cm x 15.24 cm x 7.62 cm), Collection SFMOMA, Purchased through gifts of various donors	San Francisco Museum of Modern Art	Sculpture	3	3	2	2	0	yes	no
1734	Paul Kos, 1942 -, Tower of Babel, 1990, twenty-channel video installation with steel and monitors, 264 in. x 216 in. x 288 in. (670.56 cm x 548.64 cm x 731.52 cm), Collection SFMOMA, Gift of Paule Anglim and Paul Kos	San Francisco Museum of Modern Art	Audio-Video	8	7	2	2	0		yes
1731	Anselm Kiefer, 1945 -, Die Sechste Posaune (The Sixth Trumpet), 1996, emulsion, acrylic, shellac, and sunflower seeds on canvas, 204 3/4 in. x 220 1/2 in. (520.07 cm x 560.07 cm), Collection SFMOMA, Purchased through a gift of Phyllis Wattis	San Francisco Museum of Modern Art	Paintings	3	2	2	2	0	no	yes
1729	Anish Kapoor, 1950 -, Hole, 1988, fiberglass and pigment, 84 in. x 84 in. x 102 in. (213.36 cm x 213.36 cm x 259.08 cm), Collection SFMOMA, Gift of Mrs. Milo Gates	San Francisco Museum of Modern Art	Sculpture	6	5	2	2	0	yes	no

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1728	Geoff Kaplan, b. 1963, and Gail Swanlund, b. 1963, While You Wait: Come and Get It Poster, 1998, offset lithograph, 11 in. x 17 in. (27.94 cm x 43.18 cm), Collection SFMOMA, Gift of the artists	San Francisco Museum of Modern Art	Prints	8	8	2	2	0	no	yes
1727	Craig Kalpakjian, 1961 -, Corridor, 1995, computer-generated animation on laser video disc, NULL, Collection SFMOMA, Accessions Committee Fund	San Francisco Museum of Modern Art	Audio-Video	9	9	2	2	0		yes
1719	Morris Graves, 1910 - 2001, Bird Mad-dened by the Sound of Machinery in the Air, 1944, watercolor on rice paper, 32 5/8 in. x 59 3/8 in. (82.87 cm x 150.81 cm), Collection SFMOMA, Anonymous gift	San Francisco Museum of Modern Art	Drawings and Water-colors	3	3	2	2	0	no	yes
1717	Alexander Girard, 1907 - 1993, Salt and Pepper Shaker for La Fonda del Sol Restau-rant, New York, ca. 1960, glazed ceramic, 3 1/2 in. x 2 in. x 2 in. (8.89 cm x 5.08 cm x 5.08 cm), Collection SFMOMA, Gift of Carl James	San Francisco Museum of Modern Art	Decorative Arts and Utlilitarian Objects	5	5	2	2	0	yes	
1709	Luciano Fabro, 1936 -, Demetra (Demeter), 1987, stone and steel cable, 44 3/4 in. x 79 3/4 in. x 31 in. (113.67 cm x 202.57 cm x 78.74 cm), Collection SFMOMA, Gift of Robin Quist in memory of George Quist	San Francisco Museum of Modern Art	Sculpture	3	3	2	2	0	yes	yes
1708	Terry Evans, 1944 -, Flora of Kansas, A. Olsen, White Daisy, 1886, 2000-2001, ink-jet print on paper, 20 in. x 24 in. (50.8 cm x 60.96 cm), Collection SFMOMA, Acces-sions Committee Fund	San Francisco Museum of Modern Art	Photo-graphs	17	13	2	2	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1703	Richard Diebenkorn, 1922 - 1993, Untitled, 1945-1946, watercolor, gouache, and graphite on paper, 23 1/4 in. x 29 1/8 in. (59.06 cm x 73.98 cm), Collection SFMOMA, Gift of Jermayne MacAgy	San Francisco Museum of Modern Art	Drawings and Water-colors	9	9	2	2	0	no	no
1699	Ralston Crawford, 1906 - 1978, Vertical Building, 1934, oil on canvas, 40 1/8 in. x 34 1/8 in. (101.92 cm x 86.68 cm), Collection SFMOMA, Arthur W. Barney Bequest Fund purchase	San Francisco Museum of Modern Art	Paintings	15	13	2	2	0	no	yes
1697	Vija Celmins, 1939 -, Untitled (Ocean), 1977, graphite on acrylic ground on paper, 10 in. x 12 7/8 in. (25.4 cm x 32.7 cm), Col-lection SFMOMA, Bequest of Alfred M. Esberg	San Francisco Museum of Modern Art	Drawings and Water-colors	9	9	2	2	0	no	yes
1681	Richard Barnes, 1953, Pitangus sulphuratus (Western Tanager), from the series Grid of Nests, 2000, gelatin silver print, 11 1/2 in. x 10 1/2 in. (29.21 cm x 26.67 cm), Collec-tion SFMOMA, Purchased through a gift of Carla Emil, Ronald Garrity, Tony Hooker, and Jane Levy Reed	San Francisco Museum of Modern Art	Photo-graphs	9	9	2	2	0	no	yes
1672	Julius Ibbetson (British, 1759-1817), A Storm on the Isle of Wight, c.179(?), oil on canvas, Framed - h:70.00 w:85.50 d:5.50 cm (h:27 1/2 w:33 5/8 d:2 1/8 inches) Unframed - h:50.80 w:67.60 cm (h:20 w:26 9/16 inches), Bequest of Henry W. Kent	Cleveland Mu-seum of Art	Paintings	20	19	2	2	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1669	Egypt, Karnak, New Kingdom, Dynasty 18, reign of Amenhotep IV, 1353-1337 BC, Talatat: Portrait of Nefertiti, 1353-1337 BC, painted sandstone, Overall - h:21.50 w:24.30 cm (h:8 7/16 w:9 9/16 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Sculpture	6	6	2	2	0	yes	yes
1667	China, Southern Song dynasty (1127-1279), Samantabhadra, 12th Century, hanging scroll, ink and color on silk, Image - h:114.80 w:55.10 cm (h:45 3/16 w:21 11/16 inches) Mounted - h:208.60 w:75.40 cm (h:82 1/8 w:29 5/8 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	8	8	2	2	0	no	yes
1662	Byzantium, Late Roman, Constantinian Era, Pendant with a Double Solidus of Constantine I, 324-326, gold, Overall - h:9.70 w:9.40 d:1.70 cm (h:3 13/16 w:3 11/16 d:5/8 inches) Wt: 75.585 grams, Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Costume and Jewelry	4	3	2	2	0	yes	
1660	attributed to Tang Yin (Chinese, 1470-1523), Listening to the Qin, late 15th-early 16th Century, hanging scroll, ink and light color on silk, Overall - h:35.90 w:29.00 cm (h:14 1/8 w:11 3/8 inches), Gift of Herbert F. Leisy in memory of his wife, Helen Stamp Leisy	Cleveland Museum of Art	Paintings	7	7	2	2	0	no	yes
1654	Otto H. Bacher (American, 1856-1909), Mary Holland Bacher, NULL, oil on canvas, Unframed - h:90.60 w:57.40 cm (h:35 5/8 w:22 9/16 inches), Gift of Will Low Bacher	Cleveland Museum of Art	Paintings	15	14	2	2	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1651	Albert Bierstadt (American, 1830-1902), Fir Trees and Storm Clouds, c. 1870, oil on paper mounted on canvas, Unframed - h:35.00 w:47.00 cm (h:13 3/4 w:18 1/2 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	5	5	2	2	0	no	yes
1648	Charles Sheeler (American, 1883-1965), Church Street El, NULL, oil on canvas, Framed - h:60.00 w:67.50 d:6.00 cm (h:23 9/16 w:26 9/16 d:2 5/16 inches) Unframed - h:41.00 w:48.50 cm (h:16 1/8 w:19 1/16 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	4	4	2	2	0	no	yes
1639	Viktor Schreckengost (American, b. 1906), made by Cowan Pottery Studio (American, -), New Yorker or The Jazz Bowl, ca. 1930, engobed and glazed ceramic, with sgraffito design, Overall - h:28.60 w:41.30 cm (h:11 1/4 w:16 1/4 inches), John L. Severance Fund	Cleveland Museum of Art	Decorative Arts and Utlilitarian Objects	13	13	2	2	0	yes	
1633	Pablo Picasso (Spanish, 1881-1973), La Vie, NULL, oil on canvas, Framed - h:239.00 w:170.00 d:10.00 cm (h:94 1/16 w:66 7/8 d:3 7/8 inches) Unframed - h:196.50 w:129.20 cm (h:77 5/16 w:50 13/16 inches), Gift of the Hanna Fund	Cleveland Museum of Art	Paintings	12	10	2	2	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1630	Frederic Edwin Church (American, 1826-1900), Twilight in the Wilderness, NULL, oil on canvas, Framed - h:124.00 w:185.00 d:13.00 cm (h:48 13/16 w:72 13/16 d:5 1/16 inches) Unframed - h:101.60 w:162.60 cm (h:40 w:64 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	14	10	2	2	0	no	yes
1625	Jean-Bernard Restout (French, 1732-1797), Sleep---Figure Study, c.1771, oil on canvas, Framed - h:127.50 w:160.00 d:14.00 cm (h:50 3/16 w:62 15/16 d:5 1/2 inches) Unframed - h:97.60 w:130.00 cm (h:38 3/8 w:51 1/8 inches), Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Paintings	12	11	2	2	0	no	yes
1624	William Adolphe Bouguereau (French, 1825-1905), Rest, NULL, oil on fabric, Framed - h:204.00 w:156.00 d:15.00 cm (h:80 5/16 w:61 3/8 d:5 7/8 inches) Unframed - h:164.50 w:117.80 cm (h:64 3/4 w:46 3/8 inches), Hinman B. Hurlbut Collection	Cleveland Museum of Art	Paintings	11	11	2	2	0	no	yes
1621	Africa, Nigeria, Benin, 20th century, Rattle Staff, 1900s, wood, Overall - h:149.50 w:7.50 d:8.00 cm (h:58 13/16 w:2 15/16 d:3 1/8 inches), Gift of Phyllis Sloane in memory of Rose White	Cleveland Museum of Art	Sculpture	7	7	2	2	0	yes	
1620	Japan, Heian Period (794-1185), Shinto Deity, 9th-10th century, wood, with traces of polychromy, Overall - h:50.30 w:38.10 cm (h:19 3/4 w:15 inches), Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Sculpture	6	5	2	2	0	yes	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1618	Caterino Veneziano (Italian), Madonna of Humility, late 1370s, tempera on panel, Framed - h:91.50 w:70.00 d:4.00 cm (h:36 w:27 1/2 d:1 9/16 inches) Unframed - h:79.60 w:54.60 cm (h:31 5/16 w:21 7/16 inches), Gift of Dr. Rudolf J. Heinemann	Cleveland Museum of Art	Paintings	6	6	2	2	0	no	yes
1614	Central Mexico, Teotihuac√°n style, 1-750, Basin with Feathered Serpent, 400-650, earthenware, stucco, pigment, Diameter - h:16.20 w:34.50 d:34.50 cm (h:6 3/8 w:13 9/16 d:13 9/16 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Decorative Arts and Utlilitarian Objects	9	8	2	2	0	yes	
1612	Central Mexico, Teotihuac√°n style, 1-750, Figurine Head Fragment, 350-750, molded earthenware with pigment, Overall - h:6.20 w:6.70 d:2.20 cm (h:2 7/16 w:2 5/8 d:13/16 inches), The Norweb Collection	Cleveland Museum of Art	Decorative Arts and Utlilitarian Objects	9	7	2	2	0	yes	yes
1594	Africa, Sierra Leone or Guinea, possibly so-called Sapi people, possibly early 15th century, Figure, possibly early 1500s, soapstone (steatite), Overall - h:23.80 w:11.20 d:12.50 cm (h:9 5/16 w:4 3/8 d:4 7/8 inches), Gift of Lucile Munro in memory of her husband Thomas Munro, Curator of Education from 1931 to 1967	Cleveland Museum of Art	Sculpture	3	3	2	2	0	yes	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1588	Byzantium, Constantinople, 11th century, Leaf from a Lectionary with St. Luke, 1057-1063, ink, tempera and gold on vellum, Sheet - h:28.90 w:22.60 cm (h:11 3/8 w:8 7/8 inches) Matted - h:48.89 w:36.19 cm (h:19 3/16 w:14 3/16 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Books	11	10	2	2	0	no	yes
1587	Italy, Tuscany or Umbria, 14th century, Single Leaf Excised from an Antiphonary: Inital A[spiciens a longe] with Christ in Majesty, c. 1330-1350, ink, tempera, and gold on vellum, Sheet - h:57.80 w:40.70 cm (h:22 3/4 w:16 inches) Framed - h:72.50 w:55.00 d:4.00 cm (h:28 1/2 w:21 5/8 d:1 9/16 inches) Folio - h:72.50 w:55.00 d:4.00 cm (h:28 1/2 w:21 5/8 d:1 9/16 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Books	8	8	2	2	0	no	yes
1581	Antonio di Puccio Pisano (Italian, c. 1395-1455), Portrait Medal of John VIII Palaoelogus, Emperor of Constantinople, 1424-1428 (obverse), c. 1438-1439, lead, Diameter - h:10.40 cm (h:4 1/16 inches), John L. Severance Fund	Cleveland Museum of Art	Sculpture	8	8	2	2	0	yes	yes
1580	Thomas Moran (American, 1837-1926), Grand Canyon of Arizona from Hermit Rim Road, c. 1912, color lithograph, Sheet - h:80.60 w:106.00 cm (h:31 11/16 w:41 11/16 inches) Image - h:67.30 w:89.70 cm (h:26 7/16 w:35 5/16 inches), Gift of Dr. Gerard and Phyllis Seltzer in honor of Phyllis Sloane	Cleveland Museum of Art	Prints	5	5	2	2	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Representational
1577	Albert Pinkham Ryder (American, 1847-1917), The Race Track (Death on a Pale Horse), c. 1896-1908, oil on canvas, Framed - h:84.50 w:102.00 d:6.50 cm (h:33 1/4 w:40 1/8 d:2 1/2 inches) Unframed - h:70.50 w:90.00 cm (h:27 3/4 w:35 3/8 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Paintings	9	9	2	2	0	no	yes
1576	William Merritt Chase (American, 1849-1916), Dora Wheeler, 1882-1883, oil on canvas, Framed - h:180.60 w:188.60 d:11.00 cm (h:71 1/16 w:74 1/4 d:4 5/16 inches) Unframed - h:159.00 w:165.50 d:11.50 cm (h:62 9/16 w:65 1/8 d:4 1/2 inches), Gift of Mrs. Boudinot Keith in memory of Mr. and Mrs. J. H. Wade	Cleveland Museum of Art	Paintings	6	5	2	2	0	no	yes
1572	John Singleton Copley (American, 1738-1815), Nathaniel Hurd, c. 1765, oil on canvas, Framed - h:90.50 w:78.00 d:6.50 cm (h:35 5/8 w:30 11/16 d:2 1/2 inches) Unframed - h:76.20 w:64.80 cm (h:30 w:25 1/2 inches), Gift of the John Huntington Art and Polytechnic Trust	Cleveland Museum of Art	Paintings	6	6	2	2	0	no	yes
1569	Alberto Salietti (Italian, 1892-1961), The Country Woman, NULL, oil on wood, Unframed - h:89.20 w:70.00 cm (h:35 1/16 w:27 1/2 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Paintings	4	4	2	2	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1564	Claude Monet (French, 1840-1926), The Red Kerchief: Portrait of Mrs. Monet, 1868-1878, oil on fabric, Framed - h:128.27 w:105.73 d:14.60 cm (h:50 1/2 w:41 5/8 d:5 11/16 inches) Unframed - h:99.00 w:79.80 cm (h:38 15/16 w:31 3/8 inches), Bequest of Leonard C. Hanna, Jr.	Cleveland Museum of Art	Paintings	8	8	2	2	0	no	yes
1563	Paul Gauguin (French, 1848-1903), In the Waves, NULL, oil on fabric, Framed - h:123.19 w:106.00 d:6.98 cm (h:48 1/2 w:41 11/16 d:2 11/16 inches) Unframed - h:92.50 w:72.40 cm (h:36 3/8 w:28 1/2 inches), Gift of Mr. and Mrs. William Powell Jones	Cleveland Museum of Art	Paintings	5	5	2	2	0	no	yes
1561	Antoine Chintreuil (French, 1814-1873), The Marl Pit at Mulcent: Evening, after 1857, oil on paper, mounted to cardboard, mounted to plywood, Framed - h:64.20 w:115.80 d:7.70 cm (h:25 1/4 w:45 9/16 d:3 inches) Unframed - h:47.60 w:99.20 cm (h:18 11/16 w:39 inches), Bequest of Noah L. Butkin	Cleveland Museum of Art	Paintings	7	7	2	2	0	no	yes
1560	Théodore Caruelle d' Aligny (French, 1798-1871), The Bathers, Souvenir of the Banks of the Anio River at Tivoli, c. 1860/1861, oil on wood panel, Framed - h:58.50 w:60.50 d:8.00 cm (h:23 w:23 13/16 d:3 1/8 inches) Unframed - h:37.50 w:41.00 cm (h:14 3/4 w:16 1/8 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	8	8	2	2	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1787	Tom Marioni, 1937 -, FREE BEER, 1970-1979, beer bottles, 114 in. x 114 in. x 60 in. (289.56 cm x 289.56 cm x 152.4 cm), Collection SFMOMA, Anonymous gift	San Francisco Museum of Modern Art	Mixed Media	2	2	1	1	0	yes	yes
1786	Thom Faulders, 1961 -, Soft City, 1988, graphite and colored pencil on paper, 40 in. x 30 in. (101.6 cm x 76.2 cm), Collection SFMOMA, Accessions Committee Fund	San Francisco Museum of Modern Art	Drawings and Water-colors	1	1	1	1	0	no	yes
1783	Lebbeus Woods, 1940 -, Concentric Field, from the series Centricity, 1987-1988, 1987, graphite on Strathmore paper, 23 in. x 24 in. (58.42 cm x 60.96 cm), Collection SFMOMA, Purchase through a gift of the Members of the Architecture + Design Forum, SFMOMA Architecture and Design Accessions Committee, and the architecture and design community in honor of Aaron Betsky, Curator of Architecture, Design and Digi …	San Francisco Museum of Modern Art	Drawings and Water-colors	1	1	1	1	0	no	no
1778	Justin Walsh, 1971 -, Mudhoney, 2003, screenprint, 25 in. x 19 in. (63.5 cm x 48.26 cm), Collection SFMOMA, Accessions Committee Fund	San Francisco Museum of Modern Art	Prints	1	1	1	1	0	no	yes
1772	Richard Shaw, 1941 -, Fishjar #2, 1973, porcelain, underglaze, 13 1/2 in. x 10 in. x 10 in. (34.29 cm x 25.4 cm x 25.4 cm), Collection SFMOMA, Gift of Mrs. Creighton Peet	San Francisco Museum of Modern Art	Sculpture	1	1	1	1	0	yes	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1768	Robert Ryman, 1930 -, Untitled, 1958, oil on canvas, 43 in. x 43 in. x 2 in. (109.22 cm x 109.22 cm x 5.08 cm), Collection SFMOMA, Purchased through a gift of Mimi and Peter Haas	San Francisco Museum of Modern Art	Paintings	1	1	1	1	0	no	no
1767	Mark Ruwedel, 1954 -, Robert Smithson's Spiral Jetty, Rozel Point, Great Salt Lake, 1993, gelatin silver print, 24 in. x 28 in. (60.96 cm x 71.12 cm), Collection SFMOMA, Purchased through a gift of the Judy Kay Memorial Fund	San Francisco Museum of Modern Art	Photo-graphs	3	3	1	1	0	no	yes
1763	Sigmar Polke, 1941 -, Untitled, 1990, acrylic and artificial resin on fabric, 45 3/4 in. x 54 1/8 in. (116.21 cm x 137.48 cm), Collection SFMOMA, Gift of Phyllis Wattis in memory of John Caldwell	San Francisco Museum of Modern Art	Paintings	2	2	1	1	0	no	no
1748	James R. Miller, 1946 -, Perspective sketch for a skyscraper, ca. 1920s, pencil and col-ored pencil on paper, 29 1/2 in. x 12 1/16 in. (74.93 cm x 30.64 cm), Collection SFMOMA, Purchased through a gift of Agnes Bourne	San Francisco Museum of Modern Art	Drawings and Water-colors	2	2	1	1	0	no	yes
1744	John McLaughlin, 1898 - 1976, #6, 1959, oil on canvas, 43 7/8 in. x 60 1/4 in. (111.44 cm x 153.04 cm), Collection SFMOMA, T. B. Walker Foundation Fund purchase	San Francisco Museum of Modern Art	Paintings	5	5	1	1	0	no	no
1742	John McCracken, 1934 -, Right Down, 1967, fiberglass and polyester resin on wood, 84 1/4 in. x 46 1/4 in. x 2 3/4 in. (214 cm x 117.48 cm x 6.99 cm), Collec-tion SFMOMA, Anonymous gift	San Francisco Museum of Modern Art	Sculpture	4	4	1	1	0	yes	no

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1740	Greg Lynn, 1964 -, Embryologic House, 1998, rubber, 1/4 in. x 48 in. x 48 in. (0.64 cm x 121.92 cm x 121.92 cm), Collection SFMOMA, Accessions Committee Fund	San Francisco Museum of Modern Art	Other	1	1	1	1	0	yes	no
1736	Charles LeDray, 1960 -, Come Together, 1995-1996, fabric, thread, and steel, 34 1/2 in. x 26 in. x 6 1/2 in. (87.63 cm x 66.04 cm x 16.51 cm), Collection SFMOMA, Purchased through a gift of Kimberly S. Light	San Francisco Museum of Modern Art	Sculpture	2	2	1	1	0	yes	yes
1735	Paul Kos, b. 1942, with Marlene Kos, b. 1942, Tokyo Rose, 1975-1976, aluminum wire mesh cage enclosing a video on moni-tor, 120 in. x 124 in. x 304 in. (304.8 cm x 314.96 cm x 772.16 cm), Collection SFMOMA, Purchased with the aid of the T. B. Walker Foundation Fund	San Francisco Museum of Modern Art	Installations	1	1	1	1	0	yes	yes
1733	Martin Kippenberger, 1953 - 1997, Absolut L.A. International, 1995, screenprint, 33 1/8 in. x 23 5/16 in. (84.1 cm x 59.2 cm), Col-lection SFMOMA, Ruth and Moses Lasky Fund purchase	San Francisco Museum of Modern Art	Prints	1	1	1	1	0	no	yes
1732	Anselm Kiefer, 1945 -, Osiris und Isis (Osiris and Isis), 1985-1987, oil and acrylic emulsion with additional three-dimensional media, 150 in. x 220 1/2 in. x 6 1/2 in. (381 cm x 560.07 cm x 16.51 cm), Collection SFMOMA, Purchased through a gift of Jean Stein by exchange, the Mrs. Paul L. Wattis Fund, and the Doris and Donald Fisher Fund	San Francisco Museum of Modern Art	Paintings	1	1	1	1	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Representational
1730	Toba Khedoori, 1964 -, Untitled (Rooms), 2001, oil and wax on paper, 144 in. x 144 in. (365.76 cm x 365.76 cm), Collection SFMOMA, Accessions Committee Fund purchase: gift of Shawn and Brook Byers, the Modern Art Council, Elaine McKeon, Christine and Michael Murray, Lenore Pereira-Niles and Richard Niles, and Robin Wright	San Francisco Museum of Modern Art	Drawings and Water-colors	4	4	1	1	0	no	yes
1726	Sargent Johnson, 1888 - 1967, Negro Woman, 1933, terracotta, 6 in. x 5 in. x 6 in. (15.24 cm x 12.7 cm x 15.24 cm), Col-lection SFMOMA, Bequest of Albert M. Bender	San Francisco Museum of Modern Art	Sculpture	3	3	1	1	0	yes	yes
1724	Jim Hodges, 1957 -, No Betweens, 1996, silk, cotton, polyester, and thread, 360 in. x 324 in. (914.4 cm x 822.96 cm), Collection SFMOMA, Purchased through a gift of Kimberly S. Light	San Francisco Museum of Modern Art	Sculpture	1	1	1	1	0	yes	yes
1723	David Octavius Hill, 1802 - 1870, Miss Crampton of Dublin, 1843-1847, salt print from a paper negative, 8 1/16 in. x 6 in. (20.48 cm x 15.24 cm), Collection SFMOMA, Fractional gift of Prentice and Paul Sack, and collection of the Prentice and Paul Sack Photographic Trust	San Francisco Museum of Modern Art	Photo-graphs	3	3	1	1	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1722	Georg Herold, 1947 - , Untitled, 1990, caviar and lacquer on canvas, 79 in. x 110 1/2 in. (200.66 cm x 280.67 cm), Collection SFMOMA, Accessions Committee Fund: gift of Collectors Forum, Mr. and Mrs. Donald Fisher, Susan and Robert Green, and Elaine McKeon	San Francisco Museum of Modern Art	Paintings	2	2	1	1	0	no	no
1720	Robert F. Heinecken, 1931 - 2006, Untitled (Connie Chung), 1985, inkjet print, 23 3/16 in. x 28 9/16 in. (58.9 cm x 72.55 cm), Collection SFMOMA, Gift of the artist	San Francisco Museum of Modern Art	Photo-graphs	4	4	1	1	0	no	yes
1718	Robert Gober, 1954 -, Untitled, 1990, beeswax, pigment, and human hair, 23 3/4 in. x 17 1/2 in. x 11 1/4 in. (60.33 cm x 44.45 cm x 28.58 cm), Collection SFMOMA, Purchased through a gift of Rita and Toby Schreiber, by exchange, various donors, the Members Accessions Fund, the Lenore and Ira Gershwin Fund, and the Accessions Committee Fund: gift of Carla Emil and Rich Silverstein, Lisa and John M	San Francisco Museum of Modern Art	Sculpture	3	3	1	1	0	yes	yes
1698	Chuck Close, 1940 -, Self-Portraits/Scribble/Etching Portfolio, 2001, boxed set of nine one-color state proofs and nine progressive proofs, 18 1/4 in. x 15 1/4 in. (46.36 cm x 38.74 cm), Collection SFMOMA, Gift of the artist	San Francisco Museum of Modern Art	Prints	5	5	1	1	0	no	yes
1694	Jerry Burchard, 1931 -, Jay DeFeo, 1958, 1999, gelatin silver print on color paper, 20 in. x 16 in. (50.8 cm x 40.64 cm), Collection SFMOMA, Gift of Jerry Burchard	San Francisco Museum of Modern Art	Photo-graphs	5	5	1	1	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1687	Fletcher Benton, 1931 -, Synchronetic C-3300, 1966, aluminum, acrylic, and Plexiglas with electrical apparatus, 20 in. x 24 1/2 in. x 4 5/8 in. (50.8 cm x 62.23 cm x 11.75 cm), Collection SFMOMA, Gift of Mr. and Mrs. William C. Janss	San Francisco Museum of Modern Art	Sculpture	4	4	1	1	0	yes	no
1685	Yves Béhar/fuseproject, 1967 -, Philou Shampoo Bottle, Licorice, 2000, low-density polypropelene, soft touch coat, ABS, 5 5/16 in. x 2 9/16 in. x 2 15/16 in. (13.5 cm x 6.5 cm x 7.5 cm), Collection SFMOMA, Gift of Yves Béhar	San Francisco Museum of Modern Art	Decorative Arts and Utlilitarian Objects	5	5	1	1	0	yes	yes
1679	Miroslaw Balka, 1958 -, History, 1988, plaster, burlap, straw, steel, and ceramic, 74 3/4 in. x 19 3/4 in. x 19 3/4 in. (189.87 cm x 50.17 cm x 50.17 cm), Collection SFMOMA, Accessions Committee Fund: gift of Shawn and Brook Byers, Collectors Forum, Mimi and Peter Haas, Diane and Scott Heldfond, Patricia and Raoul Kennedy, Vicki and Kent Logan, Christine and Michael Murray, Leanne B. Roberts, Phyllis Wattis	San Francisco Museum of Modern Art	Sculpture	1	1	1	1	0	yes	yes
1678	Aziz + Cucher, established 1990, Plasmorphica #1, 1997, cast polyurethane, cast rubber, thermoforming plastic, and stainless steel, dimensions variable, Collection SFMOMA, Accessions Committee Fund	San Francisco Museum of Modern Art	Mixed Media	2	2	1	1	0	yes	no

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre- senta- tional
1673	Iran, Seljuk Period, 13th Century, The Wade Cup, c. 1200-1225, brass inlaid with silver, Diameter - w:16.10 cm (w:6 5/16 inches) Overall - h:11.50 cm (h:4 1/2 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Decorative Arts and Utlilitarian Objects	3	3	1	1	0	yes	
1670	Egypt, New Kingdom, Dynasty 18 (1540-1296 BC). reign of Amenhotep III to Akhenaten, Lotus Blossom Necklace Terminal, 1391-1337 BC, polychrome faience with inlaid and painted decoration, Overall - h:4.70 w:3.90 d:5.00 cm (h:1 13/16 w:1 1/2 d:1 15/16 inches), Gift of Keith P. Smith	Cleveland Museum of Art	Costume and Jewelry	2	2	1	1	0	yes	no
1668	Egypt, Late Period, Dynasty 27, Bust of Ankh-Hor, 525-404 BC, basalt, Overall - h:21.50 w:15.00 cm (h:8 7/16 w:5 7/8 inches), Gift of the John Huntington Art and Polytechnic Trust	Cleveland Museum of Art	Sculpture	5	5	1	1	0	yes	yes
1664	Pieter de Hooch (Dutch, 1629-1684), Portrait of a Family Playing Music, NULL, oil on canvas, Framed - h:124.50 w:142.50 d:7.00 cm (h:49 w:56 1/16 d:2 3/4 inches) Unframed - h:98.70 w:116.70 cm (h:38 13/16 w:45 15/16 inches), Gift of the Hanna Fund	Cleveland Museum of Art	Paintings	5	5	1	1	0	no	yes
1663	Anne Vallayer (French, 1744-1818), Basket of Plums, NULL, oil on canvas, Unframed - h:38.00 w:46.20 cm (h:14 15/16 w:18 3/16 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	3	3	1	1	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1658	India, Mathura, Kushan Period (1st century-320), Nagini, 1st - 2nd century, red mottled sandstone, Overall - h:49.00 w:124.40 cm (h:19 1/4 w:48 15/16 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Sculpture	5	5	1	1	0	yes	yes
1655	Phoenicia, 7th Century BC, Dish with Tambourine Players, 700-600 BC, silver, partially gilt, Overall - h:1.30 w:19.50 d:19.50 cm (h:1/2 w:7 5/8 d:7 5/8 inches), Private Collection, New York	Cleveland Museum of Art	Decorative Arts and Utlilitarian Objects	2	2	1	1	0	yes	
1653	China, Ming dynasty (1368-1644), Manjusri, c. 1500-1550, Thangka mounted as a hanging scroll; color on cotton, Image - h:124.00 w:107.30 cm (h:48 13/16 w:42 3/16 inches) Overall - h:208.80 w:120.60 cm (h:82 3/16 w:47 7/16 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	3	3	1	1	0	no	yes
1647	Charles Sheeler (American, 1883-1965), Church Street El, NULL, oil on canvas, Framed - h:60.00 w:67.50 d:6.00 cm (h:23 9/16 w:26 9/16 d:2 5/16 inches) Unframed - h:41.00 w:48.50 cm (h:16 1/8 w:19 1/16 inches), Mr. and Mrs. William H. Marlatt Fund	Cleveland Museum of Art	Paintings	3	3	1	1	0	no	yes
1646	India, Mathura, early Kushan Period (1st century-320), Miniature Head of a Bodhisattva, 1st Century, red Sikri sandstone, Overall - h:8.70 cm (h:3 3/8 inches), Bequest of Mrs. Severance A. Millikin	Cleveland Museum of Art	Sculpture	2	2	1	1	0	yes	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1645	Peter Wtewael (Dutch, 1596-1660), The Denial of Peter, 1620s, oil on wood, Framed - h:42.00 w:59.50 d:6.50 cm (h:16 1/2 w:23 3/8 d:2 1/2 inches) Unframed - h:28.00 w:45.50 cm (h:11 w:17 7/8 inches), Gift of Mr. and Mrs. Noah L. Butkin	Cleveland Museum of Art	Paintings	1	1	1	1	0	no	yes
1644	Pompeo Batoni (Italian, 1708-1787), The Fall of Simon Magus, c. 1750, oil on canvas, Framed - h:207.00 w:133.00 d:10.50 cm (h:81 7/16 w:52 5/16 d:4 1/8 inches) Unframed - h:183.00 w:108.00 cm (h:72 w:42 1/2 inches), John L. Severance Fund	Cleveland Museum of Art	Paintings	2	2	1	1	0	no	yes
1643	Egypt, Karnak, New Kingdom, Dynasty 18, reign of Amenhotep IV, 1353-1337 BC, Talatat: Nefertiti Offers to the Aten, 1353-1337 BC, painted sandstone, Overall - h:20.50 w:41.20 cm (h:8 1/16 w:16 3/16 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Sculpture	3	3	1	1	0	yes	yes
1642	Egypt, Late Period, Dynasty 27, probably reign of Darius I, Naophorous Statue of the Overseer of Fields, Horwedja, 525-404 BC, graywacke, Overall - h:43.00 w:14.20 d:23.20 cm (h:16 7/8 w:5 9/16 d:9 1/8 inches), Gift of the John Huntington Art and Polytechnic Trust	Cleveland Museum of Art	Sculpture	3	3	1	1	0	yes	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre-senta-tional
1638	Carl Frederick Gaertner (American, 1898-1952), Eddie and Old Man Morpheus, NULL, oil on canvas, Framed - h:193.60 w:163.20 d:6.50 cm (h:76 3/16 w:64 1/4 d:2 1/2 inches) Overall - h:182.50 w:153.00 cm (h:71 13/16 w:60 3/16 inches), Gift of Mrs. Shuree Abrams	Cleveland Museum of Art	Paintings	5	5	1	1	0	no	yes
1634	Nagasawa Rosetsu (Japanese, 1754-1799), Puppies, Sparrows and Chrysanthemums, 1754-1799, fusuma panels mounted as hanging scrolls; ink and slight color on paper, Overall - h:211.40 w:94.00 cm (h:83 3/16 w:37 inches) Painted surface - h:167.60 w:91.50 cm (h:65 15/16 w:36 inches), John L. Severance Fund	Cleveland Museum of Art	Paintings	7	7	1	1	0	no	yes
1632	Egypt or Syria, Byzantine or Islamic periods, 6th-7th Century, Palmettes and Birds from a Tunic or Curtain, 500s-600s, complementary weft-faced plain weave with inner warps (samit); silk, Overall - h:31.20 w:14.00 cm (h:12 1/4 w:5 1/2 inches), Purchase from the J. H. Wade Fund	Cleveland Museum of Art	Textiles	4	4	1	1	0	yes	
1631	Songtian (Chinese), Squirrels, 14th Century, hanging scroll, ink on paper, Image - h:97.00 w:39.40 cm (h:38 3/16 w:15 1/2 inches) Overall - h:181.60 w:58.00 cm (h:71 7/16 w:22 13/16 inches), John L. Severance Fund	Cleveland Museum of Art	Paintings	6	6	1	1	0	no	yes

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Representational
1629	Camille Pissarro (French, 1830-1903), Rue Saint-Lazare, Paris, NULL, lithograph, Image - h:21.00 w:14.20 cm (h:8 1/4 w:5 9/16 inches) Paper - h:32.50 w:24.80 cm (h:12 3/4 w:9 3/4 inches), John L. Severance Fund	Cleveland Museum of Art	Prints	8	8	1	1	0	no	yes
1628	Italy, Tuscany, Pisa, 14th century, Head of a Prophet, 1300-1325, marble, Overall - h:31.80 w:18.60 d:13.35 cm (h:12 1/2 w:7 5/16 d:5 1/4 inches), Leonard C. Hanna, Jr. Fund	Cleveland Museum of Art	Sculpture	4	4	1	1	0	yes	yes
1616	Mexico or Central America, Maya stye (250-900), Cylindrical Vessel with Palace Scene, 600-900, earthenware with colored slips, Diameter - h:19.00 w:11.30 cm (h:7 7/16 w:4 7/16 inches) Overall - h:19.10 cm (h:7 1/2 inches), Gift of Edgar A. Hahn	Cleveland Museum of Art	Decorative Arts and Utlilitarian Objects	1	1	1	1	0	yes	yes
1611	Central Mexico, Guanajuato, Tlatilco (1200-900 BC) and Chup√≠cuaro (400-100 BC) culures, Seated Figurine, 1200-100 BC, earthenware with pigments, Overall - h:7.60 w:3.00 cm (h:2 15/16 w:1 1/8 inches), In memory of Mr. and Mrs. Henry Humphreys, gift of their daughter Helen	Cleveland Museum of Art	Decorative Arts and Utlilitarian Objects	1	1	1	1	0	yes	yes
1610	Central Mexico, Xochicalco Style, 8th-10th Century, Pendant Plaque, c. 700-1000, greenstone, Overall - h:9.50 w:6.70 cm (h:3 11/16 w:2 5/8 inches), John L. Severance Fund	Cleveland Museum of Art	Sculpture	8	8	1	1	0	yes	no

ID	Description [possibly truncated]	Institution	object type	total tags	distinct tags	total taggers	times viewed	times skipped [views - taggers]	3-D	Repre- senta- tional
1602	Guatemala, Petén region, Maya style (250-900), Maya style (250-900), Noble, 250-600, earthenware with colored slips, Over-all - h:59.00 cm (h:23 3/16 inches), John L. Severance Fund	Cleveland Museum of Art	Sculpture	5	5	1	1	0	yes	yes
1585	Yao Tingmei (Chinese), Leisure Enough to Spare, NULL, handscroll, ink on paper, Image - h:23.10 w:84.00 cm (h:9 1/16 w:33 1/16 inches) Overall - h:23.80 w:734.00 cm (h:9 5/16 w:288 15/16 inches), John L. Severance Fund	Cleveland Museum of Art	Paintings	1	1	1	1	0	no	yes

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1.   Descriptions of the Works of Art

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
148	Indianapolis Museum of Art	44.1	Landscape near Arles	Gauguin, Paul, 1848-1903	1888	oil on canvas	36 x 28 1/2 in.	Gift in memory of William Ray Adams	[RT2006.175: Unknown]	NULL

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
160	Indianapolis Museum of Art	49.48	Peasant with a Wheelbarrow	NULL	1848-1852	oil on canvas	14 7/8 x 17 17/8 in.	The James E. Roberts Fund and gift of the Alumni Association of the John Herron Art School	NULL	NULL

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
271	The Metropolitan Museum of Art	19.164	The Harvesters	Pieter Bruegel the Elder, Netherlandish, active by 1551, died 1569	1565	Oil on wood	Overall, including added strips at top, bottom, and right, 46 7/8 x 63 3/4 in. (119 x 162 cm); original painted surface 45 7/8 x 62 7/8 in. (116.5 x 159.5 cm)	Rogers Fund, 1919	NULL	This panel is part of a series showing the seasons or times of the year, commissioned from Bruegel by the Antwerp merchant Niclaes Jongelinck. The series included six works, five of which survive. The other four are: ""The Gloomy Day,"" ""Hunters in the Snow,"" and ""The Return of the Herd"" (Kunsthistorisches Museum, Vienna); and ""Haymaking"" (National Gallery, Prague). This remarkable group of pictures is a watershed in the history of Western art. The religious pretext for landscape painting has been suppressed in favor of a new humanism, and Bruegel's unidealized observation of the local scene is unified by his profound understanding of Italian Renaissance compositional principles.

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
310	The Metropolitan Museum of Art	6.12 34	The Gulf Stream	Winslow Homer, 1836,Äì191 0	1899	Oil on can-vas	28 1/8 x 49 1/8 in. (71.4 x 124.8 cm)	Catharine Loril-lard Wolfe Collection, Wolfe Fund, 1906	NULL	""The Gulf Stream"" was based upon studies made during Homer's two winter trips to the Bahamas in 1884,Äì85 and 1898,Äì99. First exhibited at the Pennsylvania Academy of the Fine Arts in Philadelphia in 1900, the picture was subsequently re-worked and ""improved"" by the artist. Early photographs show changes to the sea and to the back of the ship, making the com-position more dramatic and vivid. The painting was shown in this state at the Carnegie Institute in Pittsburgh in 1900,Äì01, and then at M. Knoedler and Co. in New York, where the artist placed on the picture the record-asking price of $4,000. There were problems selling the work be-cause of either its high price or its unpleasant subject matter. Homer may have reworked the painting again in the face of this criticism in order to add the rigger on the horizon that signals hope and rescue from the perils of the sea.

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
670	Minneapolis Institute of Arts	98.6 1.1	The Wu Family Reception Hall	Artist Unknown	Early 17th century	Wood, ceramic, tile, plaster, lacquer, stone	216 x 483 x 288 in. (548.64 x 1226.82 x 731.52 cm) (outer exterior wall dimension)	Gift of Ruth and Bruce Dayton	NULL	This three-bay reception hall was originally part of a traditional Suchou style courtyard house located in the east Tung-t'ing district near the present town of Tung-shan. Built in the early seventeenth century by the Wu family, it served as the main ceremonial hall (<I>ta chung tang<I>) of a traditional upper-class home. It was a public space where elders carried out rituals honoring their ancestors, received guests, entertained family and friends, and celebrated family events like birthdays, anniversaries, and weddings. As the most important room in a Confucian household, it was set with grand examples of fine furniture, hung with calligraphic panels declaring Confucian values, and decorated with fine art objects to express the social status and wealth of the family as well as its cultural refinement and artistic taste. The first original reception hall to enter an American collection, the room serves as an exhibition gallery for classical furniture featuring alternating installations for receptions and ancestor worship.

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
993	Los Angeles County Museum of Art	16.4	Cliff Dwellers	George Bellows, 1882-1925	1913	Oil on can-vas	40 3/16 x 42 1/16 in. (102.07 x 106.83 cm)	Los Angeles County Fund	2007 Mu-seum Associ-ates/LAC MA	NULL
1204	San Francisco Mu-seum of Modern Art	2002 .296. A-C	Untitled	Doris Sal-cedo, 1958-	1989-1993	animal ma-terial, plas-ter, steel, and button-down shirts	78 3/4 in. x 70 in. x 4 in. (200.03 cm x 177.8 cm x 10.16 cm)	Collection SFMOMA, Pur-chased through a gift of Shawn and Brook Byers	Doris Salcedo	NULL

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
1214	San Francisco Museum of Modern Art	73.52	Display Cakes	Wayne Thiebaud, 1920-	1963	oil on canvas	28 in. x 38 in. (71.12 cm x 96.52 cm)	Collection SFMOMA, Mrs. Manfred Bransten Special Fund purchase	0	NULL
1328	Rubin Museum of Art	C2003.24.1	Aspirant to Enlightenment	Unknown	12th cent	Gilt metalwork	38 x 47 in	Collection of Rubin Museum of Art	NULL	NULL

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
1342	Rubin Museum of Art	C20 05.1 6.11	Durga, Slayer of the Buffalo De-mon	Unknown	13th cent	Metalwork	11 x 13 x 7.25 in	Collection of Rubin Museum of Art	NULL	NULL
1556	San Francisco Mu-seum of Modern Art	87.3 4.A-C	Osiris und Isis (Osiris and Isis)	Anselm Kiefer, 1945 -	1985-1987	oil and acrylic emulsion with addi-tional three-dimensional media	150 in. x 220 1/2 in. x 6 1/2 in. (381 cm x 560.07 cm x 16.51 cm)	Collection SFMOMA, Pur-chased through a gift of Jean Stein by ex-change, the Mrs. Paul L. Wattis Fund, and the Doris and Donald Fisher Fund	Anselm Kiefer	NULL

ID	Institution	acc. no.	title	creator	creation date	materials	dimensions	credit line	copy-right	notes
1659	Cleveland Museum of Art	1994 .4	Boy Drinking	Annibale Carracci (Italian, c. 1560-1609)	1582-1583	oil on can-vas	Framed - h:79.00 w:67.00 d:5.50 cm (h:31 1/16 w:26 3/8 d:2 1/8 inches) Unframed - h:55.80 w:43.70 cm (h:21 15/16 w:17 3/16 inches)	Leonard C. Hanna, Jr. Fund	NULL	A boy vigorously drains a goblet of wine while grasping a glass decanter. Reflections of his finger tips and a distant window appear on the decanter. The radical fore-shortening of the head and the optical distortion of form result-ing from light passing through curving glass surfaces suggest that this painting may have been pro-duced as a studio demonstration of the artist's skill at rendering light, shadow, texture, and per-spective. The striking naturalism of form and color is characteristic of Carracci, a leader in the reac-tion against the artificial, fantastic concoctions of Mannerist art. He was also the finest artist from a family of painters active in Bolo-gna, Italy; in 1582 they established an art academy in their native city. Scholars speculate that Car-racci may have traveled to Venice, as his style suggests the influence of Titian, Correggio, and Veronese.

## 2.	Description of Tags Assigned

ID	Object Type	3-D	Repre-senta-tional	# tags	# skips	# views	# users	total tags	dis-tinct tags	total users	high tags / user	low tags/ user	avg. tags/ user	std. dev. tags/ user	median tags/ user	times viewed	times skipped [views - user]	Skip % [skip/ view]	Tag % [user/ view]
148	Paintings	no	yes	19	9	16	14	19	17	7	7	1	2.7	2.4	1	16	9	56.3 %	43.8 %
160	Paintings	no	yes	64	11	23	20	64	46	12	12	1	5.3	3.4	5	23	11	47.8 %	52.2 %

ID	Object Type	3-D	Repre-senta-tional	# tags	# skips	# views	# users	total tags	dis-tinct tags	total users	high tags / user	low tags/ user	avg. tags/ user	std. dev. tags/ user	median tags/ user	times viewed	times skipped [views - user]	Skip % [skip/ view]	Tag % [user/ view]
271	Paintings	no	yes	51	7	19	18	51	40	12	15	1	4.3	4.2	3	19	7	36.8 %	63.2 %
310	Paintings	no	yes	40	5	16	16	40	31	11	10	1	3.6	2.4	3	16	5	31.3 %	68.8 %

ID	Object Type	3-D	Repre-senta-tional	# tags	# skips	# views	# users	total tags	dis-tinct tags	total users	high tags / user	low tags/ user	avg. tags/ user	std. dev. tags/ user	median tags/ user	times viewed	times skipped [views - user]	Skip % [skip/ view]	Tag % [user/ view]
670	Architec-ture	yes	yes	47	13	23	18	47	31	10	10	1	4.7	3.1	5	23	13	56.5 %	43.5 %
993	Paintings	no	yes	16	7	13	11	16	16	6	4	1	2.7	1.1	3	13	7	53.8 %	46.2 %

ID	Object Type	3-D	Repre-senta-tional	# tags	# skips	# views	# users	total tags	dis-tinct tags	total users	high tags / user	low tags/ user	avg. tags/ user	std. dev. tags/ user	median tags/ user	times viewed	times skipped [views - user]	Skip % [skip/ view]	Tag % [user/ view]
1204	Mixed Media	yes	yes	28	21	32	22	28	26	11	7	1	2.5	2.1	1	32	21	65.6 %	34.4 %
1214	Paintings	no	yes	40	9	21	18	40	30	12	8	1	3.3	2.5	2	21	9	42.9 %	57.1 %

ID	Object Type	3-D	Repre-senta-tional	# tags	# skips	# views	# users	total tags	dis-tinct tags	total users	high tags / user	low tags/ user	avg. tags/ user	std. dev. tags/ user	median tags/ user	times viewed	times skipped [views - user]	Skip % [skip/ view]	Tag % [user/ view]
1328	Sculpture	yes	yes	17	10	16	14	17	12	6	5	1	2.8	1.5	3	16	10	62.5 %	37.5 %

ID	Object Type	3-D	Repre-senta-tional	# tags	# skips	# views	# users	total tags	dis-tinct tags	total users	high tags / user	low tags/ user	avg. tags/ user	std. dev. tags/ user	median tags/ user	times viewed	times skipped [views - user]	Skip % [skip/ view]	Tag % [user/ view]
1342	Sculpture	yes	yes	26	18	28	18	26	24	10	6	1	2.6	1.7	2	28	18	64.3 %	35.7 %

ID	Object Type	3-D	Repre-senta-tional	# tags	# skips	# views	# users	total tags	dis-tinct tags	total users	high tags / user	low tags/ user	avg. tags/ user	std. dev. tags/ user	median tags/ user	times viewed	times skipped [views - user]	Skip % [skip/ view]	Tag % [user/ view]
1556	Paintings	no	yes	3	3	4	3	3	3	1	3	3	3.0	0.0	3	4	3	75.0 %	25.0 %

ID	Object Type	3-D	Repre-senta-tional	# tags	# skips	# views	# users	total tags	dis-tinct tags	total users	high tags / user	low tags/ user	avg. tags/ user	std. dev. tags/ user	median tags/ user	times viewed	times skipped [views - user]	Skip % [skip/ view]	Tag % [user/ view]
1659	Paintings	no	yes	27	0	6	6	27	24	6	12	1	4.5	3.5	4	6	0	0	1

Appendix VI:

Repeat Sessions by User

Sessions by User Environment

super tagger	user_id	Environment										Total
		1	2	3	4	6	7	9	10	11	12	
*	1836					32						32
	2770							7				7
	1152			6								6
	2256		1							5		6
*	3750								6			6
*	372		1		3				1			5
*	630		5									5
	2017		3								2	5
	2095							2		3		5
	3451									5		5
	953	2							2			4
*	1118	3				1						4
	1156		1		2					1		4
	2792								4			4
	3225								4			4
	3484							4				4
	103		3									3
	181	1						2				3
	198			3								3
	443	2				1						3
	1194			1							2	3
	1716			1					2			3
	1790			1							2	3
	1930					3						3
	1960					3						3
	2015					2					1	3
	2067							2		1		3
	2548			3								3
	2636							2		1		3
	2979									3		3
	3035										3	3
	3397							3				3
	3676							3				3
	4354							3				3
*	4602							3				3
	50		2									2
	56				2							2
	81		2									2
	94		2									2
	131				1	1						2
	159		1		1							2
	264	2										2
	267	2										2
	297		1			1						2
	374		2									2

super tagger	user_id	Environment										Total
		1	2	3	4	6	7	9	10	11	12	
	380				2							2
	407			2								2
	434		1				1					2
	490			1			1					2
	541	2										2
	840	1	1									2
	1012				1	1						2
	1053										2	2
	1091		2									2
	1101	1	1									2
	1111	2										2
	1125				2							2
	1164			1				1				2
	1169	1		1								2
	1179		1			1						2
	1262			2								2
	1274		2									2
	1292		1			1						2
	1314			2								2
	1368						1			1		2
	1387		1					1				2
	1437		2									2
	1479						2					2
	1565		2									2
	1621			1					1			2
	1660		1					1				2
	1670			2								2
	1719		2									2
	1726					2						2
	1752		2									2
*	1761					2						2
	1780						2					2
	1804			2								2
	1859					2						2
	1926						2					2
	1928						2					2
	1937					2						2
	1961					2						2
	2120							2				2
	2278		2									2
	2292			1					1			2
	2309			1							1	2
	2314		2									2
	2337		2									2
	2370					2						2
	2417						1			1		2
	2575			2								2
	2584			2								2
	2640						2					2
	2740										2	2

super tagger	user_id	Environment										Total
		1	2	3	4	6	7	9	10	11	12	
	2785										2	2
	2832								2			2
	2913										2	2
	2947										2	2
	2963										2	2
	2980									2		2
	3023									2		2
	3024										2	2
	3150									2		2
	3209							2				2
	3388										2	2
	3427									2		2
	3445							2				2
	3498										2	2
	3584									2		2
	3652										2	2
	3757									2		2
	3861							2				2
	4150									2		2
	4156										2	2
115	**Average**	1.7	1.8	1.8	1.8	3.5	1.7	2.6	2.3	2.3	1.9	**2.8**
106	**No super taggers**	1.7	1.6	1.6	1.6	1.8	1.6	2.3	2.0	2.1	1.9	**2.3**