Blobgects: Digital Museum Catalogs and Diverse User Communities

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This paper presents an exploratory study of "Blobgects", an experimental interface to an online museum catalog that enables social tagging and blogging activity around a set of cultural heritage objects held by a preeminent museum of anthropology and archaeology. This study attempts to understand not just whether social tagging and commenting is useful around these objects, but rather whose tags and voices matter in presenting different 'expert' perspectives around digital museum objects. Based on an empirical comparison between two different user groups (Canadian Inuit high school students and museum studies students in the US), we found that merely adding the ability to tag and comment to the museum's catalog does not sufficiently allow users to learn about or engage with the objects represented by catalog entries. Rather, the specialist language of the catalog provides too little contextualization for users to enter into the sort of dialog that proponents of Web 2.0 technologies promise. Overall, we propose a more nuanced application of Web 2.0 technologies within museums -- one which provides a contextual basis that gives users a starting point for engagement, and permits users to make sense of objects in relation to their own needs, uses, and understandings.
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Introduction

In this paper, we report on an exploratory study of "Blobgects", an experimental interface to the online catalog of records representing objects in the collections of the University of Cambridge's Museum of Archaeology and Anthropology (MAA). This study is part of an ongoing exploration located at the intersection of a number of related areas of inquiry, including museum informatics, museum anthropology, and the sociology of knowledge, that are all concerned with the processes by which knowledge is produced and represented within cultural institutions that are starting to open up the means of describing their collections to diverse stakeholder communities. The interest this paper takes is in analyzing the ways such processes operate in the context of new digital museum systems, particularly exploring how museum objects can play a role in the creation and sharing of diverse forms of knowledge. We write from a perspective that is informed by the need to construct environments that support the generation and representation of knowledge in, by, and for diverse communities; and we evaluate the potential for the narratives, values, and interests of diverse knowledge communities to be appropriately represented in catalog records that are created using the technologies and practices of Web 2.0.

This paper builds on important studies that demonstrate the useful possibilities of engaging diverse users in tagging and commenting around objects that have been traditionally provided with a limited set of museum-specific descriptions (Srinivasan, Boast, and Furner, 2008; Chun et al., 2006). Assessments of the value of implementing Web 2.0 applications that allow users to engage with objects in museum collections have only recently begun to appear
Our study adds to this exploratory work, by focusing on two different expert communities that have a meaningful relationship to the collections we presented them with in this experiment. We conclude that while Web 2.0 applications may support meaningful interactions with digital museum systems, these applications must account for the highly specialized and esoteric nature of typical museum catalog entries, and they must go beyond simply adding Web 2.0 applications to museum catalogs as they stand. Rather, we encourage museums to reconsider the nature of the museum catalog, and how new technologies allow a different sort of engagement with local descriptions and vernacular accounts from diverse expert communities, one which lets users make sense of objects in relation to their own needs, uses, and understandings, but only if the catalog has given users a contextual starting point for engaging with objects.

**The motivation for our study**

Museums have been experiencing many changes over the past three decades, beginning most significantly with a re-orientation of the primary goal of museums, called by some the "new museology" (De Varine, 1978, Vergo, 1989). At the core of the new museology is an assumption that the museum is not a center of research nor primarily a collecting institution, but that the museum is in fact an educational instrument. The goal of the new museology was, and largely still is, the transformation of social practices through the transformation of the museum from the display of singular expert accounts to a site of diverse educational engagements. However, no matter how much museum studies scholars have argued for a pluralistic approach to interpretation and presentation, the intellectual control over the informational core of the museum, its catalog of objects, has largely remained in the hands of the museum and its staff of elite experts. The extension of the new museology into museums, over the past 30 years, has introduced a regime where the educator and the marketing manager control the voices of the museum's presentations for a relatively narrow, selective view of "public" interest. The maintenance of the museum as academic gatekeeper has been replaced by the museum as educational gatekeeper, focusing increasingly on simply supporting current educational programs and standardizing documentation of collections only to support their role as educational illustrations. This change is clearly represented in the dichotomy between the diversity of educational performances in museums (talks, guides, school tours, and exhibitions) and museum documentation, the methodical recording of information about the museum's objects through careful study. While the museum allows many voices to be expressed from different experts, authorities and even the public, rarely do these voices pass beyond a local and temporary educational performance, and rarely are they recorded in an enduring way in the museum's catalog. Despite the numerous recent technological innovations which encourage contributions from a wide variety of distributed groups of users, traditional museum documentation practices persist, with narrowly descriptive catalog entries are written by a small, select group of 'expert' contributors.

In Macdonald's re-assessment of the "new museology" (2006), she argued that an under-theorized core of museum practice remains which fails to recognize the fundamental biographies of objects and their uses. That is, digital museums have done little to classify or annotate objects according to the different narratives and uses to which they are connected (Curtis, 2006). This paper explores the hypotheses that this problem can be responded to by re-engaging objects with diverse expert accounts, and by reviving objects as agents within an ongoing exploratory dialog
Boast, Bravo, and Srinivasan, 2007). We assume that at least one of the principal motivations that people have when deciding to interact with an online catalog of museum objects, or any objects, is the goal of engaging with the objects themselves. Our understanding is that enabling users to directly engage with the objects themselves is the ultimate goal, but that resource discovery is a very important prerequisite for achieving that goal. We further argue that to engage with those objects, a mere technical description is not only insufficient, but counterproductive. This paper therefore explores the theory that users more deeply engage with digital museum objects when alongside those objects they are presented with diverse and even contradictory expert narratives (Turnbull, 2003).

Numerous well-established museums are starting to experiment with the social and technological phenomenon known as Web 2.0, the distributed, open-source, grassroots movement of Web users who are creating, modifying, and subverting online resources to an unprecedented degree (O'Reilly, 2005, O'Reilly, 2006). When applied to the museum context, Web 2.0 technologies have the potential to address the shortfalls of the single static object description which has garnered a lot of criticism for traditional museum catalogs (Phillips, 2005, Srinivasan and Huang, 2005, Boast, Bravo, Srinivasan, 2007). Several notable projects are exploring the application of recent technological innovations to cultural heritage objects, in particular tagging and commenting. The Steve.museum project (http://steve.museum/)-- a partnership between several US museums, Think Design, and Archives and Museum Informatics-- is an ongoing study of how applicable social tagging is to describing works of art. By drawing upon the descriptions, impressions, and vocabulary of non-experts, the partners in the Steve.museum project are hoping to ultimately improve access to and engagement with works of art (Chun et al., 2006, Trant, 2006). The Reciprocal Research Network, a partnership between the Museum of Anthropology (MOA) at the University of British Columbia, the Stó:lō Nation Tribal Council, the U'mista Cultural Society, and the Musequeam Indian Band, is a collaborative project designed to extend collections-based research to source communities (http://www.moa.ubc.ca/RRN/about_overview.html). While the project is still very much in development, the first iteration of their system takes advantage of the commenting capability built into many Web 2.0 applications, allowing users to comment on objects in MOA's collections (http://www.rrnpilot.org/). The Recontextualizing Digital Objects around Cultural Articulations project is a collaboration between the A:shiwi A:wan Museum and Heritage Center at Zuni (New Mexico, USA), the Museum of Archaeology and Anthropology at the University of Cambridge (UK), and the Department of Information Studies at UCLA (California, USA), designed to explore how digital repositories can be developed which recognize diverse forms of expertise, including the expertise of source communities, in describing museum objects. Their goal is to create a Web-based system which permits Zuni accounts to be directly incorporated into CUMAA's catalog, but that also functions according to local cultural protocols about the sharing of certain types of sacred or sensitive knowledge (Srinivasan, Becvar, Boast, and Enote, 2008).

While these projects demonstrate the potential of recent technological innovations to engage stakeholder groups to participate in digital museum projects, what is still unclear about the implementation of Web 2.0 technologies into museum catalogs is whether these efforts are sufficiently balancing the museum's account of objects with the input from the diverse set of users in a way that yields a useful system for experts and non-experts alike. Our study aims to interrogate the very basis of the museum's classification scheme and knowledge base, its catalog. We hypothesize that two basic design errors limit the usefulness of most existing online catalogs
of collections: (1) the requirement that catalog users search using concept labels drawn from a
single, predefined set of vocabularies, usually following the traditional standards and vocabulary
of the museum, and (2) the more general failure to provide catalog users with opportunities to
truly engage with and manipulate the content of the records representing museum objects, let
alone with the objects themselves. These design errors are the likely result of misunderstandings
of the nature and roles not just of online museum catalogs, but also of museum objects and their
removal from the consideration of practices of knowledge production (Bowker and Star, 1999).
Building on the case studies discussed above, we further hypothesize that the extent to which an
online museum catalog provides a positive experience to its users depends on the extent to which
its users are allowed to engage directly with museum objects through active participation in the
discourses about those objects, via tagging, commenting, and more (Srinivasan and Huang, 2005,
Chun et al. 2006). Examples of the kinds of direct engagement we aim to explore in this study
include: (1) generation and assignation of uncontrolled descriptors or tags to objects' records; (2)
discovery of objects of interest by navigating the tags of other users rather than the stagnant,
monolithic structures within traditional museum classification and (3) providing visual
representations of objects, not just verbal ones.

The data presented below is from a study using the University of Cambridge Museum of
Anthropology and Archaeology's (MAA) digital museum initiative. Our experiment presented
participants with the traditional museum catalog, as well as an augmented catalog system that
enabled the use of social tagging software, particularly using a Wordpress® blog with added
features of tagging and full categorical search. This augmented system is referred to as
"Blobgects" in this paper, and is described in the Blobgects Walkthrough below. Our first
concern was to test what impact access to relatively unaltered catalog records would have on our
control group. We thus investigated whether the presence of social tagging and commenting,
around these specialist catalog descriptions, would allow users to engage with the catalog in
sustained and satisfying manners. The promise of social tagging is that participants can describe
objects according to categories of their own choosing, and potentially allow the object to be
referenced by a rich set of descriptors that would be otherwise absent within the traditional
museum catalog (Chun et al., 2006, Furner et al., 2006).

This study provides a unique contribution because it explores the relationship that objects
hold not just to a single indigenous community but across a set of 'expert communities', and
because it also, for the first time, considers Web 2.0 technologies directly within the re-design of
digital museum catalogs. Our initial experiment, presented in the next section, attempts to
understand the interactions by which a system like this could inspire the sharing of diverse
ontologies around objects, largely absent in traditional digital museum and library information
systems.

Methodology

Blobgects Walkthrough

Blobgects (http://museum.archanth.cam.ac.uk/blobgects/) was created with the goal of
exploring how museum catalog data could be made more accessible and more useful to diverse
online communities. The name "Blobgects" is a mash-up of the words "Blog" and "Object," just
as the system itself is a mash-up of the functionality of a blog as applied to a catalog of museum
objects. Because the MAA's collections are quite numerous (250,000 accessions representing
roughly 1,000,000 artifacts, photographs and archives, all available online via the MAA's website), the decision was made to limit the objects available through Blobgects to the MAA's Arctic collections (approximately 11,000 accessions) to make the system easier to manage and navigate.

The catalog entries used in Blobgects were drawn directly from the MAA's Collections Management System using the approximately 11,000 accessions (objects and photographs) from the Arctic. The vast majority of the material is from collections made during the Wordie Arctic Expeditions of the 1930s to Greenland and Baffin Island. The material is not particularly contentious as it was largely openly traded for during the expedition. However, there is a small proportion of the material which was excavated from sites during the expeditions. The data presented from the MAA catalog, which conforms with the SPECTRUM documentation standard (http://www.mda.org.uk/stand), included the usual public information (see example below). This information was not rewritten nor modified for the Blobgects system, such as the inclusion of the original use of "Eskimo" throughout the records, as we wished to prompt discussions of the nature of existing museum records.

IDNO: Z 45064 G
DEPT: Anth/Arch
NAME: Bone; Carving
KEYWORD: Tools; ?Art
MATERIAL: Bone
DESCRIPTION: Worked †Note with the objects reads: "These seven specimens were part of the priests collection from Abverdjar but from their appearance are obviously different from the rest of the collection and are probably either surface finds or mixed in by mistake by the Eskimo or at the priests house" This record originally said this was a slate point. The slate point is marked A. The object marked G is bone. It has a dot pattern on the curved upper surface. The under side is flat. This object resembles a broken carving of a figure. S-J Harknett 23/1/2001†
LOCAL NAME:
MAKER:
CULTURE GROUP:
SOURCE DATE: ? 1938; ? 1939
PLACE: Americas; North America; Arctic; Canada; Northwest Territories; Fox Basin; Abverdjar
PERIOD: Eskimo
CONTEXT: Date: ?Recent -; Collected by: Rowley.Graham.W

The system has been inspired by the idea of creating a blog that would allow museum objects to be commented upon and tagged online. However, only text-based catalog entries were to be shared in the initial version of the system. While sharing images was considered, the goal was to study the hypothesis that the traditional catalog entry would not provide enough insight into the object for diverse knowledge communities; thus characteristics reflecting the materiality of the object, such as images, were removed to study this claim. Thus, the Blobgects 'experimental' system version simply made the same metadata possible as the MAA's standard catalog, the key difference being its allowance of users to modify, tag, comment, and so on. The results of our study confirm that it is not simply the presence of Web 2.0 technologies that matter, but the nature of the voices that use those technologies, allowing users to encounter multiple perspectives around the object. In this regard, we find the initial prototype of Blobgects to be a very successful failure -- while it is dissatisfactory as a standalone system, the reactions we gathered from users indicate a clear path forward to further developing digital museums that
focus on making Web 2.0 capacities present while concurrently working actively to include tags and comments by relevant voices to provide context to the object in the form of a set of diverse perspectives.

Our study was designed to compare results between two different user populations: a group of masters-level students in the Department of Information Studies at University of California, Los Angeles (US), and a group of Inuit high school students at Inukshuk High School in Iqaluit, Nunavut Territory (Canada). Both these groups are representative of the types of 'expert communities' interested in museum objects and their representation in catalogs, in that each maintains a distinct but important connection to the objects presented online, whether as part of cultural education of traditional objects from one's community (Inukshuk) or as an object that must be shared with the public, and in particular museum studies professionals, via a cultural institution (UCLA museum studies students).

Each of the two user populations was divided into an experimental group and a control group. The experimental groups interacted with the fully-functioning Blobgects system (see Figure 1), which displays a tag cloud, or a set of hyperlinked descriptive terms which are used for navigation and access to groups of objects (e.g. clicking on "ivory" would bring up all objects with the term "ivory" in their catalog entry). This group could also search the system via a 'simple' search from the home-page, or from a separate 'full search' page. The experimental group was also allowed to add comments to entries if they wished. Importantly, the Blobgects tag cloud, rather than being user-generated as is the case for many Web 2.0 tagging sites like Flickr and del.icio.us, was instead derived from terms found in the actual museum catalog records-- by doing this, we hoped to examine whether a system identical to the CUMAA's standard catalog system, in terms of the basic metadata provided, would prove superior if it allowed for Web 2.0 capabilities (in this case, navigating the Blobgects system via tags).

The control groups in both locations were presented with an identical version of Blobgects, with the key differences being that this version did not feature the tag cloud or commenting capability, but only displayed the three broad category terms as hyperlinks from the main page ("photograph", "document", and "object"), restricting users to directly interact with the catalog alone, and making searching the primary mode of accessing objects in the system. This 'control' system presents the same functionality and content as Cambridge's existing online catalog, but via an interface that is designed to resemble the experimental version.

Because part of the research study was meant to explore whether participants were interested enough in the items that they were engaging with to bookmark them for future exploration, participants were also encouraged to make use of the social bookmarking site del.icio.us during the study (http://del.icio.us). Del.icio.us, a web-based bookmarking utility that allows users to tag sites with one-word descriptors, also allows those tags to be shared with other users. Del.icio.us is one of several sites that Blobgects allows users to directly tag or link to (others include digg.com, Technorati, StumbleUpon, and Bloglines). Tagging was not provided within Blobgects, though it could have been, as we felt it was important to limit the test to see if the 'raw' catalog entries would be sufficient to encourage further tagging within the Web 2.0
community. It could be argued that tagging within Blobgects would have better tested this premise, which may be a fair criticism. However, we felt that, as a preliminary study, we wished to minimize the possible variables.

Study Participants: UCLA Information Studies Department and Inukshuk High School

The study involved collecting four types of data across the two populations (UCLA and Inukshuk) and both experimental and control groups. Data gathered included participant observation, questionnaires, use logs, and focus groups. The questionnaires asked about individualized perceptions participants had of the system and solicited their input around digital museums. The focus groups were semi-structured and group administered, assisting the researchers with assessing the level of relevance related to feedback from the questionnaire. Finally, the use logs allowed the researchers to corroborate the data gathered from the questionnaires. While the Inukshuk students did not formally participate in use logs and focus groups because of time and organizational limitations, participant observation and informal conversations with those students are integrated into the findings below.

The UCLA portion of the study was administered to eighteen masters-level graduate students in Museum Informatics in the Department of Information Studies on 21 May 2007. The students were randomly separated into the experimental and control groups. In a pre-test questionnaire, this group indicated daily web usage, including a familiarity with well-known Web 2.0 sites like YouTube, MySpace, and Wikipedia. Also, the UCLA group indicated somewhat frequent museum attendance as well as some familiarity with museum websites and online museum catalogs. During the study, the students were asked to interact with the system for just over an hour, and they were asked to log the actions taken and their impressions of the system. Some examples of actions that students taken were: 1) tagging interesting items to del.icio.us, 2) conducting simple or full searches, or 3) posting comments to specific objects. After the designated time had elapsed, the users were asked to complete a second questionnaire, which focused on specific actions the user had taken with the system (e.g.; "Did you tag any objects to del.icio.us?") and other impressions they had of the Blobgects system. After a short break, each group of users then participated in a one hour focus group session, which was taped and then transcribed.

Additionally, with the leadership of Ericka Chemko, Project Manager at the Inuit Heritage Trust, a similar evaluation of Blobgects was administered to two classrooms of Computer Lab Students at Inukshuk High School on 15 May 2007. In the pre-test questionnaire, the students at Inukshuk indicated frequent to daily web usage, and not as much familiarity with popular Web 2.0 sites as their counterparts at UCLA. They also indicated much less frequent museum attendance, and almost no familiarity with using online museum catalogs. While the data indicates that the Inukshuk students found the survey itself confusing at times, the majority of them completed the entire questionnaire although few left any comments. This seems to be a result of an educational system that does not particularly encourage debate or discussion, according to Chemko and her colleagues. Students indicated they were used to navigating websites with high quality graphics, and the lack of such in Blobgects may have contributed to the difficulty Chemko noticed the students remaining interested in the website for the allotted time period. However, the students could still see the value in the site as a potential
research tool, particularly if Inuit material was tagged according to community-relevant categories so that it could be more easily accessed and searched as a group.

The study was conducted carefully with these two different populations because of our (and the museum's) sense that the digital collections around Arctic communities would be useful and of interest to both aspiring information professionals (UCLA students) and local communities (the Inukshuk youth). However, as shall be later explained, even with these communities, unbridled Web 2.0 capabilities are potentially useful to the two populations, but only if a set of foundational expert voices are included to help orient the objects. We therefore propose the point that digital museums must build their Web 2.0 outreach capacities alongside a careful solicitation of relevant expert voices that extend beyond a museum standards committee but not to everyone.

Data, Interpretations, and Analyses

This section brings together and interprets the observational, questionnaire, focus group, and use log data. The data reveals that the experimental version of Blobgects as it currently exists is not a superior system to the regular online catalog at CUMAA. This is the case, the data indicates, because of the lack of contextual information present in the current catalog entries, transferred as is to the Blobgects system, which would provide a key point of departure around which multiple perspectives about objects can be generated. As students were interacting with very particular collections that lacked descriptions that non-specialists could understand, they concluded that the system did not give them enough foundational knowledge around which they could further interact with the objects. This was true for both populations. The Inukshuk students did not consider themselves highly familiar with the objects; neither did the UCLA students have much knowledge about the provenance or circulation of the objects to which they were exposed, in both cases stifling the participants' ability to productively use the blogging or tagging capabilities and participate fully in a discussion about the objects. Despite these issues, the experiment does show that engaging students to interact with this system provides useful insight into how a digital museum can work to represent and share the voices of distributed expert communities around cultural objects, through uses of diverse tags and ontologies. This finding is validated by the data presented below and is important for future digital museum system design.

Accessing Relevant Objects and Learning From Them

Our data indicate that identifying and deeply engaging with digital objects was challenging for many users. Our intention for the Blobgects system was to test if accessing objects through their catalog entries only, and through tagging and commenting on those entries, made it easier and more meaningful for users to interact with objects. Given that, these results emphasize the importance of integrating an interpretive framework into the digital catalog, in other words a basic context and plain language description of an object. Doing this would allow users who are not museum experts to contextualize the objects they are viewing, and from there, they can more easily enter into the discussion about objects.

[Place Figure 3 here]
Figure 3 indicates that the UCLA experimental group was able to access objects through use of the tag cloud, while the Inukshuk group was further disoriented by the tags and disabled from accessing objects via the experimental interface. This is likely because the current tags are drawn from specialist museum metadata present in the Cambridge online catalog, meaning that a tag-based interface not built around locally relevant categories and ontologies would further alienate distant communities of users from deeply engaging with the objects and sharing their own contextualizations within their communities. The UCLA users, on the other hand, are slightly more familiar with museum-specific terminology and so had a marginally easier time navigating the system.

Users expressed dissatisfaction with how informed they were about objects they interacted with after using the system, with the majority of users across groups and locations choosing "not very informed," as shown in Figure 4. It is not surprising that users found both the experimental Blobgects system just as uninformative as the control version, since in the focus groups, several users stated that they had to leave the system entirely to look up unfamiliar words that were used in the tag cloud (such as "toggle" or "baleen"). Despite the fact that the UCLA students had an easier time navigating and accessing objects as indicated in Figure 3, neither group was particularly informed by the vocabularies used in the existing tag clouds and object descriptions, shown in Figure 4. Furthermore, participants' responses showed us that they did not find the experience of accessing objects to enrich their actual understanding of objects.

Focus group and observational data indicate that this was because the metadata presents very little of the cultural context for the objects the students interacted with, making them accessible but not useful for learning and deeper engagement.

As discussed below under Images, users consistently found both systems did not demonstrate the relevance of the tags provided. If a user only has titles and specialist descriptions to get a sense of what some object is, and those titles and descriptions are skeletal, 'dirty', or written in expert jargon, users will have little to no sense of what it is they are accessing, and so identifying relevant objects becomes exponentially more challenging. An interface to which users can contribute is no substitute for a diverse and meaningful context for the objects. The following exchange from the UCLA experimental focus group session demonstrates this point:

*Researcher*: So the bone records are useless not because you are not that interested in bones, but because the records themselves...

*Participant A*: They're all anonymous. It's hard to understand how each bone is different from the other bones. It's just 'cause they don't have titles, I guess. They have ID numbers.

*Participant B*: But that doesn't mean anything to the user. ...Each record needs either a really succinct title, a photograph, or if they had clear origins I guess, that would be a distinction between bones. There were a lot of bones.

Overall, these results clarify the importance of designing digital museums for accessibility to a wider public. The usual metadata held by museums is of little relevance to most people— it is specialist data and not generally descriptive. However, knowing what makes up a useful description or account is a difficult task, since different communities need different accounts and even different forms of accounting. Digital museums need to develop mechanisms by which their collections may be talked about by many diverse groups of users. Once a user gets
to the objects they are interested in, the system needs to provide the narratives and accounts that point the user beyond the local to broader collections and accounts. This is even the case when one presents the digital objects to non-lay populations, such as museum studies students (UCLA group) or the population from which the objects originated (Inukshuk).

*Tags and Concepts*

Because the tagging functionality offered by the Blobgects system is somewhat innovative within museum systems, how useful and applicable tagging is to museum online access systems was an important consideration for our study. For the most part, users expressed a positive interest in the potential for tagging related to providing access to museum objects, despite the numerous criticisms for how the system actually functioned. We found a remarkable disparity between what users thought about tags and their potential usefulness, and how the experimental Blobgects integrated the tagging capability. This has helped the research team consider the design of Blobgects' future successors.

The responses to the post-test questionnaire show that a significant factor is the familiarity users have with tagging or commenting in general, prior to interacting with Blobgects. The experimental group of UCLA students demonstrates a greater familiarity with the Web 2.0 capabilities of tagging an object to del.icio.us and making comments on objects, although not all students chose to use these functions of the Blobgects system, as shown in the responses to the questions listed in Table 1. Still, neither was pleased with the system's lack of contextual tags or information to engage them in their initial experience of the object.

[Place Table 1 here]

When compared to the results presented in Figure 3 about whether students were able to access objects of interest, the few users who did use the tag cloud to navigate the Blobgects system were not necessarily able to access objects that they were interested in or found relevant. Additionally, it is important to note that the majority of UCLA students stated that the comments function was only "a little" useful. Similarly, although no Inukshuk students used the comments function, there was not a clear indication of their perception of its usefulness. The disparity between the potential usefulness of tags and their actual usefulness within the current Blobgects system is also revealed through the following comments from a UCLA user on their post-test questionnaire:

*I like the concept of user tagging (and the comments feature) but feel like they are more useful for visual records. Comments could be great if they are made by people who have seen the object and can add info that wouldn't be apparent to someone viewing the record (even if the record was done well).*

Even though users could add information about objects, they needed some sort of starting point in order to feel drawn into contributing. In some respects, including a concise, authoritative expert account of an object might be viewed as 'seeding' the potential field of responses – it is clear that users felt that the Blobgects system lacked a common point of reference where they could begin engaging with the objects they were viewing. These reflections would have to be multiplied, so that diverse audiences could connect to the objects in ways that were meaningful to them (e.g.; an "Inuit" account, a "classroom" account, and more).
In response to being asked about their opinions about whether their own 'tags' would help them re-access the objects on the Blobgects system, many users seemed skeptical, as shown in Figure 6.

[Place Figure 5 here]

Only 2 out of 18 users in the two UCLA groups said both "no" to being able to access objects of interest (the first question on the questionnaire) and "yes" to thinking they would be able to re-access objects using their own information, which indicates that the UCLA users are not really answering "yes" because they thought it would make a task easier that they originally found difficult. In other words, it does not appear that users of the experimental system are interested in re-accessing these objects once they had used the system to find objects of interest. Otherwise, we would have likely seen more users tagging items to del.icio.us in order to find them later (arguably, one function of social bookmarking is to go back and find interesting things that you have looked at before).

Another factor to consider are the possible motivational differences between initial access, re-access, and contributing to the system. What this means is that users who value one activity over another probably view tagging differently and will participate in tagging in different ways. Furthermore, when the sparse use of del.icio.us we observed is compared with the relatively favorable discussions of the potentials of tagging for cultural heritage systems that we encountered during the UCLA focus groups, it seems that Tagging, in theory, seems to be a good idea, and the qualitative data shows that users like the idea of tagging but are skeptical of its particular usefulness and their own ability to contribute meaningfully to the system. It is clear from these results that Tagging is generally seen as a good idea, but that, in practice, it is secondary to the motivation of the user to engage with the objects in the first place. Users have to be motivated to engage with objects, they have to feel that their contributions are welcome in the 'official' system, and they must be given meaningful points of reference from which they can begin having a discursive conversation about objects.

Images

The data indicates an earnest desire for images amongst the user groups. Blobgects, at this initial stage, was designed intentionally to not have images, to test the response to a system without images to see the role of the traditional catalog entry and limited tags. We will certainly get some criticism from many for this intentional omission, as all museum professionals know that images are important. However, most museum professionals also assume that catalog entries are meaningful, and it was necessary to separate the two to see whether this second assumption was true. However, across the board, users wanted to see images tied to the records in the system. The data indicates that the materiality of an object's image presents a possibility for deeper engagement with diverse users, independent of the specialist catalog and existing tag language.

The post-test questionnaire offered two opportunities for users to leave comments about how the system worked, and nearly every single user in both locations made a comment asking for images. According to our data, including images into the system would inspire more detailed
and widespread tagging and discussion. Numerous users at both UCLA and Inukshuk indicated that the lack of images was directly related to their lack of interest in tagging. One commented:

Without images or good descriptions of the objects, I felt very hesitant to do any tagging. My tags were often very general or were words lifted from the catalog records, which hardly seems like a useful way to tag. I like the concept of user tagging (and the comments feature) but feel like they are more useful for visual records.

Several factors may be involved in why images of objects enhance understanding in the context of a museum online catalog. First of all, images enhance understanding and opinions about the relevance of objects, and images pique interest in the objects that are brought up in a search. Most importantly, far more so than tagging, images allow the user to make up their own mind about what the object is and its relevance to them, or their group. The power of Flickr and YouTube are that they do not add much in the way of metadata to their entries. The items there speak for themselves, as much as anything can, and circulate via discussion rather than static description. What this results in is a powerful argument in favor of images associated with collections for all users.

**Expertise and Experts**

The discussion thus far has briefly touched on the important issue of expertise and its relevance in the context of the design of museum catalog access systems. It is clear that cataloging metadata is overly specialist and too narrow. The difficulty that users had in finding interesting objects and determining relevance from their searches indicate that both versions of the Blobgects system are insufficient. Moreover, the data has revealed that users of the experimental Blobgects system expressed limited confidence in their ability to contribute meaningfully to the object descriptions in the MAA database, either through tags or comments.

The current Blobgects system is not easy for novice users because the users need to be familiar with the terms used as tags, which are currently taken from the existing catalog entries. A participant in one of the UCLA focus groups said, "The descriptions – I noticed that many of them were vague, such as 'baleen.' I didn't know what that was, I had to look it up on Google." In addition, the scope of the collections represented on Blobgects is difficult to determine at first glance, as evidenced both by the use logs and by the following comments from the focus group sessions:

My initial problem was I don't know that much about the anthropological field or archaeology in general, so I had a really hard time just trying to think of search terms to begin with. On the home page it has the link to the museum home page, so I looked at that first. And then I also clicked on the collections icon to help me get an idea about what this site was actually about.

The issue of expertise also extends to a second issue: the users' perception of themselves as a part of a larger group of users–contributors and the perception of their ability to contribute meaningfully to the system. Users who want to tag also would like to have something insightful to offer that is not already represented, meaning that it is important to create a mechanism to make authorship visible within the system, at least with particular types of users. These results are supported by comments made in the UCLA focus group sessions:
Because I've looked on some of those things like Steve.museum, and I got all excited – 'ooh, I'm gonna tag some things,' and then I don't know, umm... 'building'? I didn't have anything to say – my guess is that everybody else is tagging the exact same thing – maybe they should only tag things they understand?

Finally, our data reveals that users felt that contributions of 'other users' would enhance their ability to learn about the objects present in the Blobgects system, from which we can conclude that the system as it exists is not conducive to learning. Figure 6 shows the responses to the questions: "Would information from other users have helped you learn about these objects further?" and "If so, how much?"

[Place Figure 6 here]

As discussed above, the users wish the contributions from experts to still be articulated in a manner that is informative to relative novices. This finding is supported as well by a comparison of responses to the follow-up question "How much? [would information from other users improve your experience with the system?]" Several participants from both groups said that contributions from "other users" would be helpful either "significantly" or "to a large degree."

What is clear from the results is that regardless of familiarity with tagging and navigating search systems, the Blobgects users we tested requires a variety of 'expert' accounts which provide a deeper context for the objects. A multi-vocal account, such as is provided by social tagging software, may begin to provide that sort of context, especially if the social group also happens to be familiar enough with the objects at hand to contextualize as they contribute. It is not a simple matter of more tags, but rather appropriate tags. The status quo of tagging practice rarely offers the opportunity for any indication of authorship or the characteristics of the tagger which causes them to be interested in tagging.

**Key Lessons and Future Research**

Blobgects was designed to explore how people access and make sense, or not, of museum catalog entries online -- catalog entries from the now standardized catalogs that are required of museums. To this end, the study was focused on exploring how people would engage with catalog entries, in their relatively pure form, in a format that was familiar to most, but that was unfamiliar to the catalog – that of the blog. The experimental system intentionally did not include images as it was decided that this would complicate the understanding of how people engaged with the catalog idiom. The study therefore focused on how certain features of access, tagging and commenting might impact the means by which users engaged with catalog entries for digital objects. The most interesting outcome of this study was that the main feature of the Blobgects system, the ability to tag and to comment, had little to no effect – existing museum catalog metadata are simply too specialized to engage diverse publics and 'expert' communities. However, the study also reveals the importance of issues around the roles of narrative, dialog and image to contextualize the objects, independently of catalog descriptions, and the potential in enabling users to move beyond definitive accounts. It also suggested that the many Web 2.0 and grassroots tools of personalization and local description are not very useful without these complementary means of contextualization. More specifically, we observe the following conclusions from this study:
The power of narratological tags: In the rich, diverse, dynamic nature of cultural knowledge production we continue to create systems that mediate our interactions and preserve our practices that are static, still focused on retrieval questions that are displaced from practice and active engagement. Even though the presence of social web software (Web 2.0) has opened up positively our categories from meta ontologies, within the domain of multicultural systems and publics these systems fall short of actually sharing knowledges according to the contexts in which they are produced. The systems ad hoc are dis-embedded, and we find in our study a possible solution to re-weave systems and cultures: that of narratological tags, stories that integrate with categorical social web indices--tags, around images.

Diverse users with diverse inputs add meaning to the online catalog: Diverse inputs are often ambiguous relative to a descriptive perspective. Diverse expert communities add to these objects with concepts, images, and contextual information that may not be easily explanatory of the object for a lay person. Yet this ambiguity represents the reality of diverse perspectives toward objects, and these ambiguities provide potential for inductive discoveries around the objects. As more diverse users add to the digital object, the context of these seemingly ambiguous perspectives begins to become clearer and stimulate further insight.

Tagging must fit within a discursive conversation: We found that this process works within the online catalog system when it is embedded within a discursive conversation, a conversation between different social contexts and actors who have a connection to the object being presented. Diverse tags can serve as a mechanism by which the objects can stimulate new interactions between expert communities, and between museum visitors and expert communities. The tag is therefore not the exhaustive representation of the object but the conduit for interaction between users and a deeper sharing of context behind the object.

The power of images: Digital objects and digital museums may stimulate this cross-cultural dialog when images are presented. Our experiment uncovered evidence that users are interested in interacting with, browsing, and retrieving objects via images and not just textual categories.

Blogs versus tags: Participants are largely uninterested in status quo tagging systems around digital objects, but the presence of the tagging system stimulates a reaction amongst participants to share diverse reactions that are not merely categorical and descriptive around the object. Participants are interested in presenting social contexts, conversations, narratives, and images around the object, a process that may emerge more closely from a "blogging" framework rather than a "tagging" one.

It is clear from these findings that the now popular transfer of museum exhibitions and catalogs online has not been accompanied by the necessary critical examination of the extended use that these online resources envisaged. The transfer of these long-standing modes of presentation to a new media require a critical assessment of the means and the content necessary to make them meaningful and useful to a greatly extended audience. This study is but a step in that direction. We can, however, identify three key issues that have arisen from this study that would benefit from further research:
1. That some form of contextualization is needed for users to make sense of what an object is and how it is useful or meaningful. We do not refer here to the usual museum descriptions and classifications. These do contextualize the objects, as does any classification, but they are far too specialist to be of much use, even to other specialists. The evident expectation of images is telling here, not simply for the user to visualize the object, as is often assumed, but because images allow the user to both contextualize the classifications and expert accounts offered by the museum, and to provide the user with a means to make the object meaningful through their own expertise and understandings.

2. That simply providing Web 2.0 interactions, such as tagging and commenting, is not enough, but requires a much more careful consideration of the presentation of the objects and, more importantly, the presentation and multiplicity of expert classifications, descriptions and accounts. It was clear from the responses of both groups that tagging or commenting alone was not very interesting. It was not clear from the study as to exactly why, but we may speculate from the focus groups that one reason may be that they could not 'make sense' of what the objects were in their terms. This should, in theory, have been the role of tagging and commenting, but without any means of locally contextualizing the object, but for the provided museum classifications and descriptions, the objects were seen as confusing and without meaning.

3. Finally, there was a strong desire from all groups for access to more and deeper expert accounts. This was surprising to us, especially as it seems to contradict the other findings. However, in light of the other two issues above, this may not be that surprising. We feel that the issue here is not so much a desire to absorb the expert accounts, to simply know and acknowledge the expert's voice, but to access an authoritative account to give sense to the user. This sense, as any educator knows, has to be made in their own terms, but they have to start somewhere. The results of this study suggest, strongly, that users are not interested in accessing an object simply to speak about it in their own terms – as is assumed by many grassroots approaches, but that they are interested in developing an understanding of an object through narratives and dialogues with others, especially 'experts'.

Clearly, much future work remains in the creation of digital museums that can engage in diverse knowledge communities and their multiple ontological contexts by which they express their relationship to digital objects. The next phase of the study shall be to explore, more directly, how access to multiple online accounts of the object, through images, narratives and discussions, provides deeper access to the object than mere catalog-based entries. This shall use new web applications to present museum objects through a richness of descriptions and narrative accounts (visual, textual, audio) and make secondary, and customizable, the tools of access and local ordering.

We end this paper with not so much a conclusion as a postscript. The Blobgects study brought to prominence several issues that have always been there, but have been largely overlooked-- particularly the need for information in narrative form and which acknowledges the significance of context. This suggests two major stages of access, which exist in the standard museum context, but are largely overlooked when these presentations are transferred to the Web.

The first stage is the importance of understanding how to present digital objects to multiple expert publics. Though this was not a study of semantics, we do feel that semantics are not, in themselves, a useful way forward. Semantics, and the Semantic Web, start from the
assumption that understanding arises from a logical and universally accepted grammar and terminology, at some level. The data from this study shows the counter-productivity of a singular account of digital objects. Instead, we contend that understanding requires a consensus from those doing the accessing that the information is useful and meaningful. It is not hard to encourage access to information if a person, or group of people, already know that they need that information. They already have a context for access and for seeking and contextualizing information about that subject. Our argument is that the relevance of the object arises not from the semantic designation of the object, or from its role as an illustration of some definitive story, but from a local use or intention. The data from this study suggests that this can be provided by engaging the user with media-rich representations of the object, via images, accounts, videos of use, and diverse classifications, through which they can make sense of the objects in relation to their own needs, uses and understandings. However, the context of these rich representations, these museum descriptions, must be made apparent. It is through this dialog with diverse images, accounts, descriptions, etc., that others can begin to construct a meaningful understanding of these objects. It is also through this process of understanding that others can begin to expand these understandings.

The second stage is, once a connection has been established, how do you enable others to use this information? Museums in particular, and collecting institutions in general, must consider this important question. Museums see their role as broadcasters, institutions that provide the public with definitive and authoritative statements about the objects they hold, often casting the public as a consumer. Further use must be a central concern of how museums engage with other users of our information.

The usual response to this need has been to create interfaces to the information. Much of Web 2.0 operates on this assumption, with some real success. Provide users with a platform for interaction and use, and leave them to do it. Does this mean that museums should be developing Web 2.0 applications? Probably, but not only. Web 2.0 offers a space for exploring the power of appropriation and re-use of digital objects. This must be extended in considering abilities to contextualize and engage local and vernacular accounts of digital objects from diverse expert communities. Future research shall continue to probe these critical issue and enable digital museums to serve as environments that support the generation and representation of knowledge in, by, and for diverse communities.

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References


