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My lost museum: User expectations and motivations for creating personal digital collections on museum websites

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ABSTRACT

The recent development of personal digital collections systems on museum websites has prompted researchers to examine the motivations and expectations of museum visitors as they interact with those systems. Results from an online survey completed by visitors to six different museum websites show that users of personal digital collections systems are primarily motivated by a desire to create simple collections of objects and images, and are less influenced by the more complicated features museums have implemented to encourage user participation. The significance of these findings is explored through a discussion of user expectations and motivations with respect to creating personal digital collections, and an attempt is made to reconcile some of the disparities between the perceptions of survey respondents and the experiences of museum professionals developing and implementing personal digital collections systems.

1. Introduction

The widespread availability of digital collections has transformed the relationship that libraries, archives, and museums have with their users, offering unprecedented levels of access and new opportunities for interactivity. One of the more innovative of these opportunities can be found in the growing availability of personal digital collections systems (also known as "my collection" or "my museum" interfaces) on museum websites, where online visitors are encouraged to create their own personal collections of a museum's online artifacts, returning to view, modify, and interact with them at their leisure (Marty, Sayre, & Filippini Fantoni, 2011).

While museums as diverse as the Musée du Louvre, the Art Institute of Chicago, and the Virtual Museum of Canada offer personal digital collections systems on their websites, the development of these systems has coincided with research showing that they have not been particularly successful in terms of their overall use by online museum visitors (Filippini Fantoni & Bowen, 2007). There is sufficient evidence to argue that the proliferation of personal digital collections systems on museum websites has, more often than not, left in its wake a landscape of "lost" personal museums, as the users of these systems create, and then abandon, their personal collections. These findings have prompted researchers to rethink prior assumptions about user expectations with respect to personal digital collections, and to examine new ways these tools can meet user needs in the online museum environment (Dowden & Sayre, 2009).

2. Problem statement

As museum professionals develop and implement personal digital collections systems on their websites, research data are accumulating that question their effectiveness from the user's perspective. While usage data for these systems can be difficult to acquire, the available data show that the number of people creating personal collections not only represent a small fraction of the total number of visitors to museum websites, but that many of the online visitors who do create personal digital collections never return to look at them again (Filippini Fantoni, 2009).

Given the high cost of developing and maintaining these systems, there is a critical need for research that improves our understanding of user expectations and motivations when using personal digital collections systems on museum websites. Without that understanding, museum professionals risk developing systems that neither meet the needs of their online visitors, nor result in an improved relationship between the museum and its online visitors (Marty, 2007b).

To address this problem, this study presents results from an online survey designed to explore the following research questions:

- How are online museum visitors using personal digital collections systems to create their own collections of museum artifacts?
- What are the motivations of online museum visitors when creating personal digital collections on museum websites?
- What are the expectations of online museum visitors with respect to the features and capabilities of these systems?

Exploring these questions will help museum professionals design, develop, and implement improved systems, while simultaneously

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addressing the need for research on the motivations and expectations of the users of personal digital collections systems on museum websites. The results have implications for all cultural heritage organizations that offer personalization technologies to users. As libraries, archives, and museums develop tools allowing online visitors to create their own personal bibliographies or personal collections, this research will provide guidance to ensure those systems continue to meet user needs and expectations.

3. Literature review

Libraries, archives, and museums have a history of creating personalized online environments that their users can customize according to their own individual needs (Borgman, 2003). Based on extensive research in such areas as personal information management (Beagrie, 2005; Jones, 2007) and social tagging (Bearman & Trant, 2005), these personalized environments are frequently centered around personal digital collections of selected records, objects, or artifacts.

3.1. Personal collections in libraries, archives, and museums

The ability to create personal collections in online libraries, archives, and museums is increasingly common. Personal bibliography tools, for example, allow online library visitors to bookmark specific items, creating a set of digital records that can be saved for later reference and, in some cases, annotated and shared with others. Such tools can be found today in library systems as diverse as PennTags (http://tags.library.upenn.edu/) and MyWorldCat (http://www.worldcat.org/), and in social bookmarking and recommender systems including Amazon.com and LibraryThing.com.

The development of these tools have directly benefited from recent advancements in social bookmarking and social tagging technologies (Trant, Bearman, & Chun, 2007). The Steve project (http://www.steve.museum/), for example, has clearly demonstrated the value of capturing user-generated metadata by encouraging online visitors to tag works of art (Trant, 2009). The project's success illustrates the willingness of the general public to play an active role in distributed knowledge creation, and the development of personal digital collections is a logical next step for those visitors who are already engaged in the collaborative annotation of museum artifacts (the “steve tagger” tool, for instance, allows users to tag works of art while simultaneously creating sets of personal favorites).

Existing social computing tools allow library, museum, and archives professionals to introduce their visitors to social bookmarking without having to develop their own systems or install software on their own servers. Content providers can upload digital images and artifacts to sites such as Flickr, thereby allowing online visitors to create, annotate, and share personal collections using extant technology that is familiar and easy to use. For example, museums and other cultural heritage organizations worldwide have contributed thousands of images from their collections to the Flickr Commons project (http://www.flickr.com/commons/), where users can collect, view, and tag these images for their own purposes (Kalfatovic, Kapsalis, Spiess, Van Camp, & Edson, 2009).

The increasing availability of these tools has helped shape the development of adaptive environments where the entire experience of visitors to online libraries, museums, and archives can be shaped by personalization technologies (Paterno & Mancini, 2000; Silveira et al., 2005). The Metropolitan Museum of Art, for example, provides their users with a “My Met Museum” system, which includes visit planning tools, personal online calendars, newsletter subscriptions, personal links to the Met's online store, and a “My Met Gallery” where visitors can save selected objects from the museum's online collections using a personalized webpage on the museum's website (https://www.metmuseum.org/mymetmuseum/).

3.2. Personal digital collections on museum websites

Personal digital collections tools have become increasingly common on museum websites since they were first introduced in the mid-1990s (Beardon & Worden, 1995; Bowen & Filippini Fantoni, 2004). Museums as diverse as the Museum of Fine Arts, Boston, the National Museum of Australia, and the Tate Online now offer visitors the ability to create their own personal collections of museum artifacts. Visitors to the website for the Fine Arts Museums of San Francisco can choose from more than 80,000 works of art and arrange their selections into virtual galleries. Many systems allow users to create multiple collections, annotate the artifacts in their collections with comments, and share their collections via email or using Facebook, Twitter, and other social networking tools.

Personal collections systems present users with opportunities that go beyond making a simple list of favorite artifacts. Visitors planning a visit to an unfamiliar museum might use personal collection tools to create their own list of must-see artifacts. The J. Paul Getty Museum, for example, encourages its visitors to create collections of their favorite artifacts online, and then create a printable, customized map showing the location of these favorites in the museum (https://www.getty.edu/mygetty/). Educators may use these tools to replace slides and print media within a range of academic settings. The Art Collector tool (http://www.artsconnected.org/collector), developed by the Minneapolis Institute of Arts and the Walker Art Center as part of the ArtsConnectEd project (http://www.artsconnected.org/), provides an excellent example. Teachers can use Art Collector to create a collection of artifacts for their students to view prior to a museum field trip, with annotations explaining why each object is important and how it relates to the class's lesson plans. Even curators applying for jobs in a new museum can use these systems to increase their understanding of the museum's collections, generating their own lists of favorites to highlight in a presentation or interview.

In the age of user-generated content, online visitors of all types are primed to take advantage of the features offered by personal digital collections systems. A recent study showed that a majority of online museum visitors strongly agreed that museum websites should take advantage of the digital environment to present unique experiences that cannot be duplicated in museums (Marty, 2008). In particular, this study showed that the majority of online museum visitors agreed or strongly agreed that museum websites should offer interfaces that can be customized to meet the needs of different online visitors (e.g., virtual tours that adapt to individual interests), as well as interfaces that can record and store personalized information for different online visitors (e.g., personal digital collections of selected museum artifacts).

To take advantage of these new needs and expectations, many museum professionals have adopted personal digital collections systems as a valuable tool that allows them to adapt their online products, services, and information to better meet their visitors' individual needs and characteristics. Thanks to technologies that allow visitors to save information from interactive kiosks and mobile devices while visiting the museum, information bookmarked during an in-person visit can be retrieved later using personalized pages on the museum's website. When well-integrated into the visitor experience, these applications can be powerful tools to facilitate learning, develop personal connections between visitors and content, and extend the visitors' experiences beyond the museum's walls (Barry, 2006; Hsi, 2008; Topalian, 2005).

3.3. Personal digital collections and museum visitors

By orienting visitors prior to a visit and offering opportunities to explore related ideas after a visit, personal digital collections systems can help encourage visitors to become more engaged with the museum visit (Cooper, 2006). Ideally, personal digital collections systems help create a cyclical relationship between museums and their websites, by

encouraging visitors to visit their favorites in person when they can, and online when they cannot (Marty, 2007b). In reality, the success of these systems has been mixed—with the exception of systems designed to meet specific educational needs, the successful integration of these systems into the online museum experience has been relatively limited, thus far (Filippini Fantoni & Bowen, 2007).

Recent studies at the Tate Modern and the Getty Museum, for instance, reveal that the use of personal digital collections tends to be quite superficial, and confined mainly to young people, experts, teachers, students, and frequent visitors (Filippini Fantoni, 2006a). Survey respondents indicated a lack of time and interest as their principal reasons for not using these systems; in addition, many did not feel the need to prepare for or follow up on their visits by bookmarking selected artifacts. Other factors influencing the limited success of personal digital collections systems included a fear of sharing personal information, and difficulties using new, and frequently unfamiliar, information systems (Filippini Fantoni, 2006b).

While usage statistics remain difficult to acquire (the majority of personal digital collections systems either do not save usage data, or the data they do save are insufficient to analyze usage patterns over time), the available data paint a bleak picture. In terms of collections created, the number of people creating personal digital collections is less than one percent of the total number of online visitors to museum websites (Filippini Fantoni & Bowen, 2007), and despite the presence of a small core group of frequent users, such as K-12 students and teachers using these tools in the classroom, the majority of those who do create personal collections never return to look at them again (Filippini Fantoni, 2009). These findings have prompted museum professionals to rethink their assumptions about how these systems should be designed to better meet the needs of their audiences (Dowden & Sayre, 2009).

As the developers of personal digital collections systems return to their drawing boards, rethinking implications, and rebuilding systems from scratch, it is critically important that we improve our overall understanding of the expectations and motivations of the users of personal digital collections systems. Previous studies have raised questions that are particularly important to address, considering the significant financial and intellectual resources required to develop and implement these applications. There is a strong need for more research examining how personal digital collections have been implemented by museum professionals, how they have been used by museum visitors online, and how effective they are at meeting the needs and expectations of museum visitors and professionals alike.

4. Procedures

To meet this need, the researcher developed an online survey that asked visitors to museum websites about their use of personal digital collections systems, their motivations for using these systems, and their expectations when creating collections with these systems. To reach as many participants as possible, the researcher worked with six major museums that agreed to advertise the survey by placing a link to it on the home page of their "my museum" or "my collection" systems. The participating museums were:

- the Museum of Fine Arts, Boston;
- the Minneapolis Institute of Arts/Walker Art Center;
- the Tate Online;
- the Cleveland Museum of Art;
- the J. Paul Getty Museum; and
- the Whitney Museum of American Art.

Users of the personal digital collections systems at these websites who followed the link were taken to a survey instrument that explained the goals of the research, provided a definition of terms, and asked several questions to determine the participants' familiarity with personal digital collections. Respondents were asked to indicate how many personal collections they had created, how many museum artifacts they had added to their collections, how frequently they use personal digital collections systems, and how frequently they visit the collections they create. Respondents were also asked to indicate whether they had created collections on more than one museum website (see Tables 4–7).

Respondents were asked to indicate the extent to which they agreed with a list of statements about their expectations when creating personal digital collections on museum websites. This question employed a five-point Likert scale ranging from "strongly disagree" to "strongly agree," and listed statements such as, "It is important for a museum website to offer a personal digital collection system," and "I find personal digital collection systems difficult to use" (see Table 8).

Respondents were asked to indicate how likely they were to use personal digital collections on museum websites for various purposes. This question employed a five-point Likert scale ranging from "very unlikely" to "very likely," and listed situations such as "identifying favorite artifacts" and "completing educational assignments" (see Table 9).

Respondents were asked to indicate the extent to which they agreed with a list of statements about their motivations to create personal digital collections on museum websites. This question employed a five-point Likert scale ranging from "strongly disagree" to "strongly agree," and listed statements such as, "I am more likely to create a personal digital collection if I have been to the physical museum associated with the online system" (see Table 10).

Respondents were asked to indicate how likely they were to perform specific tasks when using personal digital collections on museum websites. This question employed a five-point Likert scale ranging from "very unlikely" to "very likely," and listed tasks such as "creating new collections," "annotating objects or collections," and "sharing collections with others" (see Table 11).

Respondents were asked to indicate the extent to which they agreed with a list of statements about their interests and goals when creating personal digital collections on museum websites. This question employed a five-point Likert scale ranging from "strongly disagree" to "strongly agree," and listed statements such as "When creating personal digital collections, I typically attempt to create collections that represent a comprehensive list of all artifacts a museum has on a theme" (see Table 12).

Finally, respondents were asked to answer several demographic questions that addressed the types of museum visitors who participated in the study, and the frequency with which they visit museums and museum websites (see Tables 1–3). The results from the survey were processed using SPSS 17 (originally, Statistical Package for the Social Sciences), which generated descriptive statistics for each of the above survey questions.

4.1. Limitations

The use of online surveys with self-selected survey respondents has limitations that directly reflect the difficulties of conducting research and gathering data about online museum visitors (Haley Goldman & Schaller, 2004). Users of personal digital collections systems are essentially anonymous, and obtaining a random sample or acquiring representative data from an online survey of this

Table 1
Museum website origin for survey respondents.

Museum	System	Respondents
Museum of Fine Arts, Boston	My MFA	67 (41.9%)
Minneapolis Institute of Arts/Walker Art Center	Art collector	32 (20.0%)
Tate Online	Personal selection	24 (15.0%)
Cleveland Museum of Art	Personal collection	2 (1.3%)
Whitney Museum of American Art	Learning@Whitney	1 (0.6%)

Table 2
Frequency of museum and museum website visitation.

	Rarely	Annually	Quarterly	Monthly	Weekly	Daily	*n*
How frequently do you visit museums?	5.7% (9)	18.9% (30)	32.1% (51)	26.4% (42)	13.2% (21)	3.8% (6)	159
How frequently do you visit museum websites?	10.0% (16)	2.5% (4)	11.9% (19)	23.1% (37)	40.6% (65)	11.9% (19)	160

population is extremely difficult, if not impossible. In particular, this research method restricted respondents to people who a) were already using the participating museums' personal digital collections systems, and b) chose to answer a survey about their use of personal digital collections on museum websites.

The purpose of this research, however, was not to acquire a representative sample of all users of these systems worldwide, which would be extremely difficult if not impossible, but to reach the relatively small number of museum visitors who are actively involved with creating personal collections on museum websites and interested in explaining why they are using these systems. The results, therefore, shine a valuable light on the mindset of a critical subset of online museum visitors who are not only early adopters of online museum technologies, but also capable of providing valuable input for the developers of personal digital collections systems.

5. Findings

The online survey was administered from May 2007 to May 2008; there were 378 total responses to the survey during this time period. Survey responses were considered valid only if respondents self-identified as having created at least one personal digital collection on a museum website; 181 respondents were eliminated because they claimed to have never created a personal digital collection, while 37 more were eliminated because they did not answer the question about how many personal digital collections they had created. While the researcher considered including an analysis of all 378 results, the fact that the survey questions were designed to be answered only by those individuals who had created personal digital collections meant that including responses from those who had not would have required the researcher to make unwarranted assumptions about how those respondents were interpreting questions about activities they had not actually performed. The results presented below, therefore, are restricted to the 160 survey respondents who self-identified as having created at least one personal digital collection.

5.1. Participant demographics

Each of the respondents who completed the online survey was directed to the study from one of six different museum websites, each using their own personal digital collection system (see Table 1). The inherent unreliability of web metrics for determining visitation rates (Sen, Dacin, & Pattichis, 2006), combined with the inability to know whether any given visitor to the website actually saw the link to the survey, makes it impossible to provide any reliable data about survey response rates beyond this distribution of respondents.

Survey respondents were asked to answer several demographic questions related to their general experiences with museums and museum websites (see Tables 2 and 3). The typical survey respondent visits museums slightly more than four times a year and visits museum websites approximately once a week. The majority of the respondents self-identified as either teachers or visitors, with the remainder evenly distributed between students, researchers, and professionals.

Table 3
Relationship of survey respondents with museums.

	Visitor	Teacher	Student	Researcher	Professional	*n*
Which of the following best describes the relationship you have with museums?	39.6% (63)	25.8% (41)	11.9% (19)	10.1% (16)	12.6% (20)	159

5.2. Survey results

When using personal digital collections systems on museum websites, survey respondents indicated that they generally created only a small number of collections (Table 4), with the majority (77.6%) of the survey respondents saying that they had created only one, two, or three collections (respondents who had created no personal digital collections were invalidated as described above). Individuals who created personal digital collections typically added only a small number of artifacts to those collections (Table 5); nearly one third (29.6%) added between one and 10 artifacts, while nearly two thirds (64.8%) added between one and 50 artifacts in total. A small percentage (14.5%) of the respondents stated that they had added no artifacts to their collections at all; given that it is possible with these systems to create collections without adding any artifacts to them, it was decided not to invalidate these responses.

The majority of survey respondents (56.4%) claimed to use personal digital collections systems relatively frequently (at least once a month); a similar majority (58.8%) visited the personal digital collections they had created at least once a month, as well (Table 6). While a minority of respondents (24.1%) rarely used personal digital collections systems, only 14.2% of respondents claimed that they rarely visited the collections they created. The majority of the respondents (60.4%) had created personal digital collections at only one online museum (Table 7).

When asked about their expectations concerning personal digital collections systems on museum websites (Table 8), the majority of respondents felt strongly that museums should offer personal digital collections on their websites, with 79.9% agreeing or strongly agreeing with this statement. Survey respondents stated that they enjoyed both creating and visiting their personal collections, with 82.6% of survey respondents agreeing or strongly agreeing that they enjoyed creating personal digital collections of museum artifacts, and 79.8% of survey respondents agreeing or strongly agreeing that they enjoyed visiting the personal digital collections they created. In addition, survey respondents did not find these systems overly difficult to use, with only 16.2% agreeing or strongly agreeing that they found personal digital collections systems difficult to use, and 54.7% disagreeing or strongly disagreeing.

When asked how likely they were to use personal digital collections systems for specific purposes on museum websites (Table 9), survey respondents claimed to be more likely to use personal collections systems for the general purpose of creating lists

Table 4
Personal digital collections created.

	None	1	2–3	4–5	6–10	>10	*n*
Approximately how many personal digital collections have you created in total?	0.0% (0)	46.3% (74)	31.3% (50)	10.6% (17)	3.8% (6)	8.1% (13)	160

Table 5
Artifacts added to personal digital collections.

	None	1–10	11–25	26–50	51–100	>100	*n*
Approximately how many museum artifacts have you added to these collections in total?	14.5% (23)	29.6% (47)	18.2% (29)	17.0% (27)	9.4% (15)	11.3% (18)	159

Table 7
Personal digital collections created at more than one museum.

	No	Yes	*n*
Have you created personal digital collections at more than one online museum?	60.4% (96)	39.6% (63)	159

of objects than for specific purposes relating to education, research, or entertainment. Survey respondents were most likely to use personal digital collections systems for bookmarking artifacts while browsing online collections (72.5% likely or very likely to do so), maintaining a personal list of favorite museum artifacts (68.1% likely or very likely to do so), or identifying favorite artifacts prior to a museum visit (63.7% likely or very likely to do so) and after a museum visit (74.1% likely or very likely to do so). Survey respondents were slightly less likely to use personal digital collections systems for researching artifacts for scholarly purposes (66.5% likely or very likely to do so), passing the time or for entertainment (59.2% likely or very likely to do so), or completing educational assignments (52.9% likely or very likely to do so).

When asked about their motivations for creating personal digital collections on museum websites (Table 10), survey respondents stated that they were very likely to visit and modify the personal collections they had created, and that their motivations for doing so were not influenced by the need to login or register to create a collection, the interlinking of personal digital collections systems to computing devices in physical museums, or whether the visitor had already visited the physical museum in person. The majority of survey respondents agreed that after creating a personal digital collection, they were likely to visit that collection in the future (82.6% agreeing or strongly agreeing), and that they were likely to modify that collection in the future (79.7% agreeing or strongly agreeing). In contrast, only 47.1% agreed or strongly agreed that they were more likely to create a personal collection if they had visited the museum associated with the system, 35.2% agreed or strongly agreed that they were more likely to create a personal collection if they were not required to login or register to use the system, and 25.2% agreed or strongly agreed that they were more likely to use a personal digital collection system if they were interlinked with onsite kiosks or handheld computers in physical museums.

When asked how likely they were to use personal digital collections systems to perform specific tasks on museum websites (Table 11), survey respondents reported that they were more likely to spend time finding and adding objects to collections than they were to create new collections, use collections to plan visits, and edit, annotate, or share their collections with others. Survey respondents were most likely to add objects to collections (90.4% likely or very likely to do so) and find recommended or interesting objects (85.9% likely or very likely to do so). Survey respondents were slightly less likely to create new collections systems (73.5% likely or very likely to do so), plan a museum visit (72.7% likely or very likely to do so), or move, edit, or delete objects (74.0% likely or very likely to do so). Survey respondents were even less likely to annotate objects or collections (66.4% likely or very likely to do so) or share their collections with others (55.3% likely or very likely to do so).

When asked about their interests and goals when creating personal digital collections on museum websites (Table 12), survey respondents claimed that they were primarily interested in collecting images of artifacts (74.1% agreeing or strongly agreeing), and creating collections of thematically related artifacts (65.9% agreeing or strongly agreeing). Survey respondents were relatively uninterested in creating collections that represented a comprehensive list of all artifacts a museum has on a theme, with only 28.3% agreeing or strongly agreeing, and 41.0% disagreeing or strongly disagreeing. Finally, survey respondents were split in terms of their interests in using collections for short-term temporary projects, with 38.1% agreeing or strongly agreeing, 32.0% disagreeing or strongly disagreeing, and 29.9% having no opinion.

6. Discussion

At first glance, the results presented above look extremely encouraging. Museum professionals interested in offering personal digital collection systems on their websites can be reassured by data showing that online museum visitors were, on the whole, very positive about the creation and use of personal digital collections. Not only did the majority of survey respondents claim that they enjoyed creating and visiting their collections, but they also claimed that these systems were important for museums to develop and offer online. Perhaps even more encouraging, survey respondents appeared to be self-motivated to use these systems, in that their motivations for creating and visiting their collections were relatively unaffected by new technologies or developments put in place by museums.

As promising as this seems, a closer look at the particulars brings to light a picture that is confusingly, almost disturbingly positive. Specifically, survey respondents claimed to do things that prior research, backed up by current museum experiences, says statistically, few do:

- Survey respondents claimed that they enjoyed creating personal collections, and were very likely to visit them in the future, despite research showing that only a small percentage of online visitors use these systems to begin with, and those who do frequently abandon their collections. Studies at the Getty Museum, for instance, show that only a fraction (less than 3% in 2006) of those who bookmarked artifacts using the GettyGuide system accessed their collections online (Filippini Fantoni, 2006b, 2009).
- Survey respondents claimed that when creating personal collections, they were primarily interested in building collections of images or making lists of objects, and that they were generally not involved with educational assignments or conducting research, despite museum efforts to build systems specifically targeting these audiences. Projects such as Educators Online at the Museum of Fine Arts, Boston, and Learning@Whitney at the Whitney Museum of American Art specifically target teachers and students, and emphasize the creation of collections for educational use (Dowden & Sayre, 2009).
- Survey respondents claimed that when working with personal collections, they were primarily interested in finding new objects to

Table 6
Frequency of personal digital collections use and visitation.

	Rarely	Annually	Quarterly	Monthly	Weekly	Daily	*n*
How frequently do you use personal digital collections systems on museum websites?	24.1% (38)	6.3% (10)	13.3% (21)	28.5% (45)	22.2% (35)	5.7% (9)	158
How frequently do you visit the personal digital collections you have created?	14.2% (22)	9.0% (14)	18.1% (28)	29.7% (46)	25.2% (39)	3.9% (6)	155

Table 8
Expectations concerning personal digital collections systems on museum websites.

To what extent do you agree with each of the following statements?	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	*n*
I enjoy creating personal digital collections of museum artifacts.	1.3% (2)	0.7% (1)	15.4% (23)	49.7% (74)	32.9% (49)	149
I enjoy visiting the personal digital collections I have created.	2.0% (3)	1.3% (2)	16.8% (25)	53.0% (79)	26.8% (40)	149
It is important for a museum website to offer a personal digital collection system.	1.3% (2)	2.7% (4)	16.1% (24)	38.3% (57)	41.6% (62)	149
I find personal digital collection systems difficult to use.	18.2% (27)	36.5% (54)	29.1% (43)	14.2% (21)	2.0% (3)	148

add to their collections, and that they were generally not interested in editing, annotating, or sharing their collections with others, despite museum efforts to develop systems that provide precisely these kinds of interactive features. Systems such as ArtsConnectEd's Art Collector provide detailed tools allowing users to manipulate, group, comment, and share their personal collections online (Marty et al., 2011).

- Survey respondents claimed that attempts to add value to personal digital collections systems by linking them to physical museum visits or handheld devices for use in museums did not have a great influence on their motivations to create personal collections, despite museum efforts to develop technologies providing those exact connections. Visitors to the Tech Museum in San Jose or the Science Museum in London, for example, can use RFID technologies in the galleries to bookmark artifacts and access their selections online after their visit (Filippini Fantoni & Bowen, 2007).

These responses depict a user community with fairly generic motivations and expectations. Their focus was on objects, and their use of personal digital collections was driven by a desire to create lists of objects and images online—perhaps for the purpose of maintaining a collection of favorites, perhaps for identifying artifacts before or after a visit, or perhaps for the fun of collecting. It appears that average users were not very interested in using the special features on which museum professionals developing these systems have expended most of their energy, nor were they particularly motivated by the specialized tools museum professionals have created for specific audiences such as educators or researchers.

6.1. Troubling questions: reconciling results with reality

These findings raise an interesting question for researchers and developers of personal digital collections systems: How do we reconcile the expectations and motivations of survey respondents with the experiences and actions of museum developers?

There are some easy answers to this question, starting with the fact that survey respondents (along with focus group participants, interviewees, etc.) often say they will participate in activities that, when push comes to shove, they rarely find time to do. The Royal Institute of Technology in Sweden, for instance, developed a project to encourage a greater connection between in-house and post-visit museum experiences by asking their visitors to document examples related to the museum's exhibits found in their everyday lives, and send them to the museum via multimedia and text messages. Despite a strong positive reaction from visitors asked whether they would participate in such a project, only one authentic, user-generated message was sent to the museum (Taxén & Frécon, 2005).

Another possible answer stems from the sampling of this study. Many of the tools or features that have been incorporated into personal digital collections systems were designed by museum professionals to be used by specialized groups with specific needs and activities. In a general survey such as this one, those specific needs may be underreported or underrepresented. If specialized audiences want specialized tools, but the average person just wants to create collections of images, then the generic nature of the survey respondents, as well as the fact that the survey cut across multiple museum audiences, may have blurred some of these issues.

The answer could also be that for many, the act of collecting is a sufficiently satisfying activity in and of itself. Creating a personal digital collection online could serve much the same role as purchasing postcards of favorite artifacts from a museum store after a physical museum visit. Even if those postcards end up in a shoebox and are never looked at again, the fun lies with the act of collecting, and just knowing the collection exists can provide satisfaction. From this viewpoint, the purpose of building personal collections, either physically or digitally, is to organize impressions and establish order in the apparent chaos of artifacts; when it's done, it's done, and there is little need to revisit.

6.2. Moving forward: learning from the historical record

While these explanations are all plausible, reality is far more complicated. The time period during which these data were gathered was one of great upheaval for the developers and users of personal digital collections systems on museum websites. Museum webmasters were continually experimenting with new technologies and tools, frequently rolling out newly developed systems to try out new ideas for involving users in content creation. Museum website visitors were trying to figure out how to incorporate these new systems and capabilities into their everyday lives, and how to make them an integral part of the museum visit experience, if at all.

The results presented above crystallize this key moment of uncertainty in the design of these systems and call attention to the historical disconnect between the perceptions of one set of individuals (the survey respondents) and the actions of another (the museum professionals who developed these systems). Preserving this historical record is critically important since the tension between user needs and expectations continues to be a driving force in the design and development of these systems. As current museum professionals endeavor to encourage their online visitors to create new digital

Table 9
Likelihood of using personal digital collections for specific purposes on museum websites.

How likely are you to use personal digital collections for each of the following purposes?	Very unlikely	Unlikely	Neutral	Likely	Very likely	*n*
Bookmarking artifacts while browsing online collections	5.8% (8)	4.3% (6)	17.4% (24)	46.4% (64)	26.1% (36)	138
Identifying favorite artifacts prior to a museum visit	4.3% (6)	13.0% (18)	18.8% (26)	42.0% (58)	21.7% (30)	138
Identifying favorite artifacts after a museum visit	2.9% (4)	10.8% (15)	12.2% (17)	51.1% (71)	23.0% (32)	139
Completing educational assignments	19.6% (27)	5.8% (8)	21.7% (30)	23.2% (32)	29.7% (41)	138
Researching artifacts for scholarly purposes	13.4% (18)	8.2% (11)	11.9% (16)	29.9% (40)	36.6% (49)	134
Passing the time or for entertainment	6.7% (9)	11.1% (15)	23.0% (31)	42.2% (57)	17.0% (23)	135
Maintaining a personal list of favorite museum artifacts	5.1% (7)	7.2% (10)	19.6% (27)	44.9% (62)	23.2% (32)	138

Table 10
Motivations for creating personal digital collections on museum websites.

To what extent do you agree with each of the following statements?	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	*n*
After creating a personal digital collection, I am likely to visit that collection in the future.	0.7% (1)	2.9% (4)	13.8% (19)	55.1% (76)	27.5% (38)	138
After creating a personal digital collection, I am likely to modify that collection in the future.	0.0% (0)	5.8% (8)	14.5% (20)	58.7% (81)	21.0% (29)	138
I am more likely to create a personal digital collection if I have been to the physical museum associated with the online system.	5.1% (7)	18.1% (25)	29.7% (41)	34.8% (48)	12.3% (17)	138
I am more likely to create a personal digital collection if I am not required to login or register to use the system.	5.8% (8)	28.8% (40)	30.2% (42)	27.3% (38)	7.9% (11)	139
I am more likely to use personal digital collections systems if they are interlinked with onsite kiosks or handheld computers in the physical museum.	10.1% (14)	21.6% (30)	43.2% (60)	18.0% (25)	7.2% (10)	139

collections, it is important to identify what works, and to learn from past mistakes, especially when developing systems that may be unfamiliar to the general public.

Over the past few years, the provision of online social computing environments that allow users to tag collections, annotate objects, and otherwise contribute their thoughts to the knowledge base of the institution has changed from a cool toy to a basic expectation. Moving forward—and keeping pace with user expectations—requires a solid understanding of the motivations and expectations of users as they contribute to and create collections of museum data in all contexts. Since this survey was conducted, museum professionals have responded to the rapidly-changing world of user-created content by assessing the best ways to involve their users in the co-creation of digital knowledge; as a result of this process, the development of personal digital collections systems has moved in two different directions.

Some museums have decided it is no longer worth their energies to continue developing their own systems in house, either because of the inherent difficulty of keeping up with changing user expectations, or because they believe their users are better served by taking a different approach. The Cleveland Museum of Art, for example, discontinued their Personal Collection system in early 2010, deciding instead to provide links from each object's record to external social media tools (e.g., Facebook, Twitter, etc.) that allow users to share information about artifacts with their friends using platforms unconnected to the museum. Such an approach acknowledges that many users prefer working within a single particular social media system and are unwilling to deal with separate systems on multiple museum websites (each with their own logins, tools, and interfaces) to create collections spanning the contents of multiple museums.

Other museums have taken a completely different approach, going on the offensive, as it were, to develop new systems with more detailed, more specialized features that target specific audiences. The Museum of Fine Arts, Boston, for example, has taken this approach with its Educators Online project, developed in 2008, which focuses on meeting the needs of educators through specialized tools that allow teachers and students to build personal digital collections, create customized virtual galleries, and develop personalized lesson plans that integrate directly with classroom curricula (http://educators.mfa.org/home). Such an approach acknowledges that when working with particular audiences to involve them in content creation, museums may be better positioned to meet the specific needs and expectations of their users than a generic, one-size-fits-all social computing platform unconnected to the museum.

It is impossible to predict which approach will pay off. Both hold potential, and their adoption and future success will likely depend on the needs of individual museums and the audiences they are trying to reach. While these approaches may differ in principle, they ultimately envision a world where all museums encourage their visitors to become active participants in the co-construction of digital knowledge. There is no question that, in some way, the future of museum–visitor interactions involves the creation of user-generated content using museum data, and this realization can help establish a future research agenda for the researchers and developers of personal digital collections systems.

6.3. Future research: involving users in the co-construction of knowledge

The evolution of personal digital collections systems over the past 15 years is a microcosm in the macrocosm of social computing, illustrating in miniature how museum professionals and visitors struggle with the problems of reconciling expectations and reality. The development and use of social computing tools has resulted in a world of constantly changing expectations, where opinions about the services museums should provide online, as well as how those services integrate into existing computing platforms, are fluid and fleeting. The development of personal digital collections systems is best viewed, therefore, as a continual process of iterative design, where users and developers collaborate to determine the needs of the other.

To meet these changing needs and expectations, museum professionals and developers may need to shift from focusing on the user in the life of the museum to focusing on the museum in the life of the user (Marty, 2007a). An examination of the names of personal digital collections systems developed over the past decade — MyMet, MyMFA, MyGetty, etc. — reveals an interesting mindset where museum professionals invite visitors to create their own personal collections, but only within the confines of the museum's digital walls. By encouraging visitors to move past these restrictions — to break down the museum's digital walls just as online access broke down the museum's physical walls — one can begin to move forward to a better understanding of the role of the digital museum in the life of the user.

Moving forward in this way will require researchers and developers to work on two problems concurrently. First, they will need to examine

Table 11
Likelihood of using personal digital collections to perform specific tasks on museum websites.

When using personal digital collections, how likely are you to perform each of the following tasks?	Very unlikely	Unlikely	Neutral	Likely	Very likely	*n*
Create a new collection	2.9% (4)	5.1% (7)	18.4% (25)	52.9% (72)	20.6% (28)	136
Add objects to collections	0.7% (1)	2.2% (3)	6.6% (9)	56.6% (77)	33.8% (46)	136
Move, edit, or delete objects	1.5% (2)	5.2% (7)	19.3% (26)	45.9% (62)	28.1% (38)	135
Annotate objects or collections	3.0% (4)	11.2% (15)	19.4% (26)	42.5% (57)	23.9% (32)	134
Share collections with others	7.5% (10)	17.9% (24)	19.4% (26)	28.4% (38)	26.9% (36)	134
Plan a museum visit	4.4% (6)	9.6% (13)	13.2% (18)	55.1% (75)	17.6% (24)	136
Find recommended/interesting objects	1.5% (2)	3.7% (5)	8.9% (12)	52.6% (71)	33.3% (45)	135

Table 12
Interests and goals when creating personal digital collections on museum websites.

To what extent do you agree with each of the following statements?	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	*n*
When creating personal digital collections, I am primarily interested in collecting images of artifacts.	0.0% (0)	7.4% (10)	18.5% (25)	51.1% (69)	23.0% (31)	135
When creating personal digital collections, I typically attempt to create collections of thematically related artifacts.	0.7% (1)	14.1% (19)	19.3% (26)	48.1% (65)	17.8% (24)	135
When creating personal digital collections, I typically attempt to create collections that represent a comprehensive list of all artifacts a museum has on a theme.	8.2% (11)	32.8% (44)	30.6% (41)	20.1% (27)	8.2% (11)	134
When creating personal digital collections, I am primarily interested in using my collections for short-term, temporary projects.	5.2% (7)	26.9% (36)	29.9% (40)	30.6% (41)	7.5% (10)	134

how the popularity of tools such as YouTube, Flickr, and Delicious has influenced user expectations about the features and capabilities of personal digital collections interfaces. The design of existing social computing tools, especially those used by millions of people around the world, has significant implications for the development of personal digital collections systems in museums. Visitors will increasingly expect museum-developed tools to function as smoothly, seamlessly, and effortlessly as the other tools they use online daily.

Second, researchers will need to weigh the relative merits of museums developing their own personal digital collections systems against the possibility of museums contributing their digital images and information resources to online social networking tools directly. While this approach may not require the technical expertise required of those creating their own systems, it raises questions of control, copyright, and intellectual property that may prove difficult to address. It is challenging for most museums to compete with the features of systems such as Flickr or Facebook, which come complete with social tagging, commenting, and sharing built into their interfaces. It is even more difficult when one considers the inherent challenge of building systems that cut across multiple institutions and allow users to create personal collections that draw upon the resources of more than one museum.

The future development of these systems depends on the museum professional's ability to involve visitors as active participants in the co-construction of digital knowledge. It is difficult to predict how this will happen or what supporting technologies will be required, but as it becomes increasingly common for users to play an active role in the creation of new knowledge, museum professionals and visitors must work together to determine how people really want to use social computing tools to interact with museum collections in personally meaningful ways. Only in this way can we ensure there are no more "lost" personal museums, and that the museums themselves do not become lost in a sea of social computing.

7. Conclusion

The development of personal digital collections systems in museums stands at a critical turning point in the world of social computing, one that has potential repercussions for all cultural heritage organizations, including libraries, archives, and museums. The very museum professionals who 10 years ago argued, "we cannot put our images online, someone might steal them," are now actively encouraging their visitors to create their own personal collections out of the museum's digital resources, to copy images from the museum's collections for their own personal use, and to create, annotate, and share their own interpretations of the museum's collections and exhibits online.

For many in the museum world, this is uncharted territory. In developing personal digital collections systems, museum professionals have faced numerous difficulties. They have struggled to create systems offering visitors the ability to create personal collections, only to learn that this is something many visitors do not want to do so, and that those who do create collections frequently abandon them without a second thought. They have struggled to offer new features that cater to the specific needs of their users, only to find that they are constantly chasing a moving target, always one step behind their users' changing needs and expectations. They have struggled to compete with commercial systems and applications existing outside the nonprofit museum model, always working to develop new tools and new techniques, only to rethink their goals and abandon their efforts in the face of changing technologies and user needs.

Over the past decade, museums professionals have faced these challenges head on, developing systems that allow their visitors to create personal collections by grouping digital resources in ways that are meaningful to them. By continuing to evaluate and improve these systems, museum professionals have placed themselves at the forefront of research exploring how users can be encouraged to become active participants in distributed, digital knowledge creation. While the future of these systems remains an open question, the contributions museum professionals have made to this field of study cannot be understated. As researchers and developers continue to evolve the next generation of personal digital collections systems, one can be confident that the fruits of their labors will be of great value to those interested in encouraging a closer, personal relationship between cultural heritage organizations and their visitors.

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