

INTERACTIVE TECHNOLOGIES ON ART MUSEUM WEBSITES

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Abstract

This report investigates how American art museums have adopted interactive technologies on their websites. The use of such technologies brings to the forefront a tension regarding authority over visitors' experience of and interpretation of art both in person and online. Interactive tools on 15 art museum websites were coded as enabling one of three types of interaction: human-to-computer, human-to-human and human-to-content. Human-to-computer interactive features were most prevalent on museum websites, followed by human-to-human and human-to-content interactive technologies respectively. The findings demonstrate a tension between the goals of art museums in wanting to engage visitors in co-creation of meaning about art on the one hand and wanting to maintain their traditional authority over that meaning on the other. The report concludes by offering recommendations for how museums can use interactive technologies more effectively in order to maintain their role as centers of social and cultural life.

Keywords: museum websites, interactivity, interactive tools, content analysis

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Introduction

Museums have a long and rich history, dating back to Ancient Greek temples dedicated to the Muses, patron goddesses of the arts in Ancient Greece (Alexander & Alexander, 2008). The temples often held collections of art and precious objects both in Ancient Greece and throughout the Middle Ages. During the Renaissance and the Age of Discovery, collections reflected people's knowledge and belief about the world. The 'cabinets of wonder' or 'cabinets of curiosities' of the 16th and 17th centuries were the encyclopedic collections of objects that were comprised of multiple artifacts of natural history, geography, ethnography, religion and art (Mauriès, 2011). The rooms where these objects were held were considered microcosms of the world in themselves (Mauriès). The combination of objects in the room served as the basis for the interpretation of the world that the objects represented (Alexander & Alexander). The concept of a gallery as a series of long hallways developed at the same time.

Museums as individual collections began to evolve into public collections in the late 17th century, when the First University Museum in Basel and the Ashmolean Museum in Oxford opened (Alexander & Alexander, 2008). Two of the largest contemporary museums, the British Museum and the Louvre, opened in the third quarter of the 18th century, though only after the French Revolution of 1789 did the Louvre become more accessible to the public (Alexander & Alexander). Since that time the museum tradition spread around the world (Alexander & Alexander). Gradually museums evolved into social institutions with large exhibition spaces and diverse responsibilities while still retaining the very idea of object representation from older prototypes. With the development of computers in the second half of the 20th century, art museums started adopting new technology in order to digitize their collection catalogs (Parry,

2007). The Internet and the Web allowed museums to develop a digital presence constituting other aspects of museum practices.

The adoption of internet technologies has led to the emergence of a tension involving authority over meaning-making and communication. Museums are making a conscious effort to make themselves more open to visitors and to enhance visitors' participation in the co-construction of meaning about art (i.e., the “inclusive museum”) (Bautista, 2009; Chandler, 2010). In some respects, this attempt at inclusion cedes control over meaning-making to visitors and opens up multiple channels of communication. However, the shift of attention from the object per se to the experience of this object leads to the decentering of museum authority (Hein, 2000; Weil, 2002). Museums risk weakening their authority by adopting practices that create spaces for alternative interpretations which may contest established meanings of their collections (Hein; Liu, 2009). Among those practices is the adoption of new media, especially in the form of interactive technologies, which provides visitors more control over their experience (Marty, 2011). As a result, museums may be hesitant to adopt interactive technologies that heighten visitor inclusiveness but could potentially erode their authority.

By means of interactive technologies museums create online environments that shape how visitors experience museums and their collections. The decision to adopt or not adopt interactive technologies points to a tension between the desire to maintain traditional meaning-making authority over visitors' experience of art and a desire to be more inclusive. This tension is partly rooted in the degree to which museums facilitate interaction among users and between users and museum officials regarding museum functions and museum collections of artwork.

The purpose of this report is to investigate the tensions between democratic and authoritative approaches to the online museum experience by examining the way art museums

use interactive technologies on their websites. Museums constantly redesign their websites, incorporating new interactive technologies that can aid in attracting more visitors and enabling visitors to engage in further exploration of museums and their resources. Understanding how art museums use interactive tools sheds light on the tension between being open to the audience through active communication and attempting to maintain their status quo. It also provides a way to develop recommendations for website design that are responsive to museums' evolving functions.

The following section reviews pertinent literature on the museums, their definition, functions, their adaptation of technology, development of websites and museums' pursuit of interactivity will be presented. Next, the methodology of the study will be explained. The final sections provide a description and discussion of findings.

Review of Literature

Generally speaking, museums are understood as places of study and repositories of objects (Alexander & Alexander, 2008; Vergo, 1989). As Hein (2000) notes:

The word "museum" is commonly understood to denote a collection of entities held to have sundry intrinsic worth but whose value is greatly enhanced by the act of gathering and preserving the discrete items as a totality in one place. (p. 3)

However, this understanding of museums overlooks how they act as communication phenomena (Hooper-Greenhill, 1994). On one level, museums are rhetorical sites (Armada, 1998; Zagacki & Gallagher, 2009). For example, Armada argues that memorials and history museums shape public understanding of the past. On another level, museums are spaces where communication occurs among visitors, works of art, and museum officials. Communication occurs not only as visitors interpret the pieces of art but also as museum officials communicate with visitors.

Hooper-Greenhill emphasizes the communicative nature of museums, drawing a parallel between museums and mass communication systems. Museums use multiple tools and media, such as explanatory texts, multimedia kiosks, interactive panels, and now digital and mobile technologies, to frame visitors' experiences. Starting from the label accompanying the artwork, visitors' experiences are shaped in certain ways. In sum, museums can be seen as sites of messages and as rhetorical acts themselves.

This way of understanding museums as sites of ongoing communication and meaning-making opens up questions regarding authority over meaning, direction of communication, and content of communication. Instead of viewing museums simply as repositories, we can understand them as being constituted by a collection of texts authored by multiple parties – curators, artists, visitors, and others – who construct meaning and the museum experience as a whole. This constitution raises questions about museum functions and communication features associated with those features.

Functions of Museums

Museums have multiple interrelated functions (Alexander & Alexander, 2008; Hein, 2000). They include collecting, conserving (preserving), researching, exhibiting, educating, being a cultural center, being a social instrument (Alexander & Alexander; Hein). These functions shape what museums do as well as what museums are.

Alexander and Alexander (2008) identify collecting as an instinctive drive that has certain meaning for the collector, including physical security, social distinction and the joy of chasing valuable objects. Throughout the Middle Ages monasteries were cultural and social centers that not only preserved collections of manuscripts but also served as centers of arts (Belting, 1994). In the 15th to 17th centuries, collections of noble families were famous,

including the Medici family and Charles I of England, with many of the artworks from those collections finding their way into contemporary art museums (Alexander & Alexander). The act of collecting is at the very core of the idea of the museum. Museums collect objects and information about those artifacts, including collection management information, physical descriptive and artistic, historical and/or scientific contextual information (Alexander & Alexander, 2008). Museums accompany their collections with documentation that includes objects names, identification numbers, locations inside the museum, and history of acquisition and deaccession. Museum curators act as researchers collecting historical information about objects.

Collecting is closely related not only to conservation practice but also to the research function of museums. Museums collect information about items they acquire as they attempt to classify and catalog objects. Historically museum research traces back to the Mouseion of Alexandria that was founded by Ptolemy Soter around the 3rd century BC and was destroyed in the 3rd century AD (Alexander & Alexander, 2008). Now research is an essential part of curators' responsibilities.

Along with collecting art objects and research, museum officials work to preserve and conserve these artifacts – a function not embraced until the 20th century (Alexander & Alexander, 2008). Before that, museum officials were not all that interested in the conservation and restoration of artwork. Conservation techniques were significantly advanced in the 20th century along with the development of science and technology. Now conservation has become an integral part of museum practice, with large museums having special departments of conservation.

Whereas professional conservation of artifacts is a relatively new museum responsibility it stems from one of the most traditional museum tasks of object representation. Its roots also go deep into the history of Ancient Greece and Rome and carry through to the Renaissance. As Hein (2000) asserts, museums have shifted their emphasis from preservation and study to “dramatic delivery,” making design and spectacle central elements of museum practices. Exhibitions serve as instruments for shaping public memory through the process of interpretation, which “encompasses how museums communicate their message(s) to the public” (Alexander & Alexander, 2008, p. 258). The assumption that objects are historically important relics that serve as means to learn about the past and the present guides museum practice. The emphasis on materiality and historicity of objects “has established a paradigm in which the physical object, and what it can reveal to us through sensory, archival and socio-cultural investigation, is privileged over all other ways of approaching objects in museums” (Hogsden & Poulter, 2009, p. 269). Representation of an object within the museum setting entails the interpretation of its meaning involving sensory perceptions as well as interpretation through the profound research accomplished by curators.

The role of exhibitions is especially significant in contemporary museums. Through exhibition and “semiotics of display,” museums enhance visitor engagement with objects. Exhibitions function as instruments through which the relationship between an individual and the historical past is constituted within the museum. An object functions within the museum setting through visitors' interaction with it. Encountering an object that is represented in the space with other objects enables making connections between those objects with the aid of accompanying labels and information boards. Through this process, visitors construct meaning about history and cultural values (Hewitt, 2011; Preziosi, 2009; Taborsky, 1981).

An exhibition serves as a main tool for conveying the museum's authority (Skramstad, 1999). As repositories of authentic objects and providers of information relevant to these objects, museums assert their authority over art and its meanings to the public. Additionally, the selection and display of artwork reinforces curators' authority to determine what is or is not art and to judge what artwork is worthy or unworthy of display. Representations of objects shape public perception both aesthetically and historically, making museums the authoritative power that prescribes a certain type of behavior or attitude. As Duncan (1995) argues, "To control a museum means precisely to control the representation of a community and its highest values and truths" (p. 425). An exhibition is a form of narrative about the past, present and future that introduces visitors to the particular perspective (Preziosi, 2009). It is by means of exhibitory practice that museums become sites of public memory and therefore shape societal beliefs about history, culture and aesthetic.

Exhibition also serves as educational function. Most of the older American art museums started with the primary focus of educating people and training craftsmen and artists (Gardner, 1965; Weil, 2002). This function was gradually recognized as one of the primary concerns of museums on the government level such that "by the mid-1980s education was called the 'spirit' of the museum" (Hein, 2000, p. 116). The educational function of the museum is becoming increasingly more important (Hein; Weil). Any object in the museum can become a lesson in itself through the stories attached to it. Narratives associated with objects shape visitors' perception of those artifacts (Hein; Preziosi, 2009). Exhibitions are saturated with the layers of text making objects and exhibition rhetorical sites. It is through assemblages of objects that museums tell stories of the past and cultures. The concept of museums as cultural centers stems from educational orientation of the museums.

Museums' social function is interrelated with their educational tasks. Since the time museums opened their doors to the general public, the idea of public service has gradually risen as one of the central businesses of museums. Traditionally, museums have functioned as authoritarian institutions that had the task “to 'raise' the level of public understanding, to 'elevate' the spirits of visitors, and to refine and 'uplift' the common taste” (Weil, 2002, p. 196). Around the beginning of 20th century, museums' attention shifted “from being about something to being for somebody,” involving greater concern with the ability to perform public service. The main change for museums in this context was towards inclusiveness, from a privileged group to general public. Hewitt (2011) suggests that an important component of contemporary museums is a social system constructed through objects and visitors.

As mentioned above, most of the functions evolved along with changing museology and philosophical thought. The change in the ways museums saw their tasks and the role in society led to the changes in their forms and operation. The development of the Web provided an opportunity for museums to bring their relationships with visitors to a new level.

Adapting to Changing Expectations

Research in museology points to significant changes in museum practices resulting from societal, technological and philosophical changes. The significant increase in the number of museums after World War II, new economy-related aspects of museums' functioning and the increased professionalization of museum personnel led to a greater concern with the educational character of museums (Weil, 2002). The perception of museums evolved from the notion of a collection for a collector to the idea of collections for public service. This change in perspective reinvigorated the populist dimension of museum practice and resulted in understanding visitors as active participants and co-creators of museum experience (Anderson, 2004; Simon, 2010;

Vergo, 1989; Weil, 1999). Today museums are quite concerned with engaging visitors not only in the processes of learning and acquisition of information but also in interacting and interpreting the pieces of arts.

While adapting to societal changes, contemporary art museums also attempt to maintain their traditional roles as centers that establish aesthetic standards, facilitate learning and preserve cultural and historical heritage (Bautista, 2013). One way that museums have attempted to continue to carry out their evolving functions is to utilize technology as a means to connect with visitors and to encourage people to visit. As technology rapidly evolves, museums face a challenge to keep up with its speed. Therefore, museums continue to explore new technologies as means to attract a more diverse audience (Bautista, 2013; Falk, 2009).

Museums' Adaptation of Technology

The history of museums' use of computer technology traces back to the 1960s. In the late 1960s museums started thinking about how to systematize their growing collections (Parry, 2007). Parry connects the interest of museums in computers with the need to catalog enormous amounts of information about collection items. Museums began to follow in the steps of libraries by using special programs for collection management.

With the development of the World Wide Web in early 1990s, museums began to develop an online presence. The potential of the Web to make collection databases available for museum professionals, scholars and students provided new opportunities for museums. At least 20 "pioneer" museums were online in 1994 (Bearman & Trant, 1999). The internet presence of the museums was quickly considered to be a necessary component of their contribution, and the influential conference "Museums and the Web" began its annual meetings in 1997 (Bearman & Trant; Parry, 2007). First generation websites represented museums in the form of electronic

catalogs of collections relying on traditional exhibition formats. Today, the notion of the digital database as the representation of collection is at the heart of virtual museums. The original desire to make collection information accessible in the form of a catalog is noticeable even in current websites, which have been redesigned multiple times since the creation of the first models. The ability to surf and search the collection appears to be extremely important in the online setting providing visitors with the ability to browse the catalog using a variety of search fields classifying the artworks by chronology, region of production, or style. Using the language of web design navigation and interactivity became essential elements on user online experience.

Interactivity as a Characteristic of Digital Media

Interactivity is a characteristic that is often used by researchers in the fields of marketing and communication studies to distinguish between the internet and earlier communication technologies (McMillan et al., 2008; Reinhard, 2011; Sundar, & Kim, 2005). Liu and Shrum (2002) define interactivity as “the degree to which two or more communication parties can act on each other, on the communication medium, and on the messages and the degree to which such influences are synchronized” (p. 54). Likewise, Tse and Chan (2004) argue that interactivity can be defined as “a form of communication (1) that is two-way and real time, (2) that involves human-computer interaction via a computer-mediated environment such as the internet, and (3) in which the responses and behavior of both parties will affect their future responses and behavior” (pp. 369-370). Both definitions identify three types of interactivity: user to computer, user to user, and user to message. These two conceptualizations of interactivity are useful for the present study because they highlight how interactivity influences the communication process facilitated and regulated by websites. The degree to which websites utilize interactive technologies can shape the extent to which users can communicate with each other and with

representatives of the website's organization, as well as what types of content can be exchanged on the website using the technologies provided.

Scholars often distinguish between actual and perceived interactivity, where actual interactivity refers to the structural characteristic of the medium (Manovich, 2001) and perceived interactivity is determined by user responses and assessments of website interactivity (Liu, 2003). Similar to these two types of interactivity researchers study interactivity either through the lens of user experiences (Liu), or as process of utilization of interactive technologies (Rafaeli & Sudweeks, 1997). Moreover, some scholars determine interactivity based on the number of features or tools that enable users to engage in interactions with one another and with communication medium (McMillan et al., 2008).

Most scholars agree that interactivity is a multi-dimensional construct. Liu and Shrum (2002) identified three dimensions of interactivity: two-way communication, synchronicity and active control. The first dimension, two-way communication, refers to "the ability for reciprocal communication between companies and users, and users and users" (Liu & Shrum, 2002, p. 55). Synchronicity represents "the degree to which users' input into a communication and the response they receive from the communication are simultaneous" (Liu & Shrum, p. 55). The third dimension, active control, is "characterized by voluntary and instrumental action that directly influences the controller's experience" (Liu and Shrum, p. 54).

In respect to dimensions and the degree of interactivity Chung (2008) identifies three levels of interactive features. Medium level interactive features rely solely on the technology to allow users to exert control and are considered the lowest level of interactive features. With respect to the present study, these features can include video downloads, photo galleries, bookmarks, and e-mailing article options. Human-medium interactive features allow partial

human-to-human communication such as expressing one's opinion. These features provide the opportunity for users to share information on social networks and express their opinion, but the technology does not usually allow for the simultaneous message exchange. Lastly, human interactive features facilitate user-to-user mutual communication and are considered as higher levels of interactivity. They include different text and video chat options, message boards, and require more effort from the user side. Approaching interactivity from a feature-based perspective, one of the studies synthesizes previous literature and represents a flexible measurement tool that can be used to assess website interactivity at the time of rapidly changing technology (McMillan et al., 2008).

Examining interactivity of museum websites can shed light on the ways how museums communicate their image as institution to their audiences. Interactive technologies shape online visitors' experience with digital museums. The types of interactivity promoted by websites can influence the degree of engagement between visitors and museums. The type and overall level of interactivity can also indicate how museums approach their online audiences.

Technology Adaptation by Museums to Promote Interactivity

As stated earlier, museums are active consumers of new technologies, creating websites and incorporating new technologies in their exhibition spaces. On a general level, museums have become more complex institutions: the range of technology applications includes use of audio guides, multimedia kiosks, digital panels, websites and mobile applications. The general move of websites from being mere reflections of museums towards incorporating interactive tools resulted from the overall transformation of museum functions and associated practices (Hein, 2000; Parry, 2007). Museums seek to make their websites inclusive to account for diversity of their visitors, who can be both members of local and global community (Bautista, 2013).

New online platforms offer many opportunities to extend the visitor experience beyond physical and temporal boundaries (Barry, 2006; Falk & Dierking, 2008; Marty, 2008). The digital space becomes an independent arena, opening a new possibility for the audience to become a part of a bigger discourse about art. Responding to a need to shift to increasingly interactive, participatory sites that are more engaging and visitor-centered (Soren & Lemelin, 2004), museums have begun to incorporate a larger variety of information-providing features, thereby reconstituting the entire idea of visitor experience (Bautista, 2013). Along with digital collections, museums have started to provide information about in person visits, current exhibitions, curators, collection managers and more. The growth of museums' online presence has led not only to a larger amount of information but also to greater flexibility for the visitor to interact with art content. One such project is the Art Babble, which was launched by The Indianapolis Museum of Art in 2009 (Bautista, 2013). The site provides a collection of videos about art from several partnering museums, as well as the opportunity for users to leave comments and share their impressions and thoughts. Art Babble is another step towards two-way communication rather than one-way communication between the museum and the public. Interestingly, the website is an independent platform, not part of the museum website itself. Nonetheless, through the development of new interactive features on Art Babble, visitors are able to engage more with artworks and the museums linked to the project.

Museums' web presence creates new possibilities to foster learning in the museum by offering multiple learning experiences, creating spaces for ideas exchange and encouraging more open communication with visitors (Liu, 2009). Most of the world's largest museums successfully incorporate different interactive tools or actively use social media sites. Five case studies of American museums – Indianapolis Museum of Art, Walker Art Center, San Francisco Museum

of Modern Art, The Museum of Modern Art in New York and The Brooklyn Museum – provide several examples of museums' experience with digital technologies (Bautista, 2013). The museums upgraded their websites and their digital technology, creating interactive experiences for online visitors.

Moreover, new technologies have resulted in an entirely new type of museum information professional who have become a kind of mediator between museum curators and collection managers and any technology-related problems and tasks (Marty, 2006). Along with the growing number of museum information professionals the expansion of the museum brought the change in the roles of the museum professionals. The museum role has expanded to encourage ongoing conversations with audiences, contributing to visitors' constructive learning (Liu, 2009). Thus, the educational sectors of museums acquired more importance.

Nonetheless, despite the number of museums that can be considered on the front lines of the museum exploration of digital sphere, the majority of museums have been slow in their adoption of new communicative strategies (Bautista, 2013; Soren & Lemelin, 2010). Traditional websites simply provide the type of information that would not require any participation on the part of a visitor. Parry (2007) suggests that the logic of the database is embedded within museums' management of their collection: “At present, the museum's notion of 'collection' is not only structured to accommodate the tools of automation, but is imagined (and frequently presented to its publics) as a database” (p. 56). This idea has implications for adoption of interactive website tools as well as communication between visitors and museums. Museums tend to use their websites as one-way communication tools rather than as a space for the dialogic exchange of messages. The vast majority of museums use their websites to give information about exhibitions or contact information, essentially using those websites as databases for information (Capriotti &

Kuklinski, 2012). This use of websites promotes one-way communication that has little space for interactive opportunities that are evident elsewhere on the Internet and on social media.

The development of independent online platforms poses additional challenges for museums. The most recent debates sprang up around the Google Art Project (Beil, 2013). On a very general level, the project is a model of a digital museum, comprising different museum collections from around the world to provide an opportunity for visitors to have virtual tours via Google street view technology, search through the collections, create their own collection and much more. This might create other challenges for the development of digital museums are expected to compete with similar projects for their online audiences.

Chandler's (2010) analysis of TheMoMAproject points to shifts in visitors' museum experience provided by the use of interactive technologies. Launched in 2006, TheMoMAproject is dedicated to displaying works exclusively from the Museum of Modern Art on Flickr (Chandler, 2010). The project focuses on visitors' impressions of the museum as communicated through photographs of artwork made during on-site visits. According to Chandler, the project shifts the focus from the meaning constructed at the level of the artwork to the meanings constructed through the process of viewing the artwork and the context in which it is viewed. The project enhances the experience of viewing and extends the museum visit by creating complementary relationships between the site and the museum itself. This project therefore can serve as an example of technology creating a virtual circle (Barry, 2006). The question emerges about the possibility of incorporating more engaging practices on museum websites. Although TheMoMAproject is an independent alternative space on Flickr, the museum website communicates the information from the institution's perspective (Chandler; 2010). Thus,

alternative sites can create spaces that provide visitors with more interactive experiences and open communication.

Some museums are beginning to incorporate interactive features on their websites to accommodate visitor expectations and keep up with alternative sites. However, doing so can problematize the traditional roles and functions of museums. Specifically, adopting interactive technologies can challenge museums' authority over how art is defined and displayed and can reposition visitors not simply as consumers but as active co-creators of art. Thus, the adoption of interactive technologies on museum websites can signal the extent to which a museum is embracing the idea of the interactive museum or viewing visitors as simply consumers of museum content. Therefore, this study aims to understand how art museums use interactive technologies on their websites and to analyze overall interactivity of their websites.

Method

Data Selection

This study presents a content analysis of 15 American art museum websites. Guided by the assumption that the audience that visits museums on-site is in many instances the same audience that visits museum websites (Marty, 2008), websites were selected on the basis of visitor attendance figures of the physical museum. The most visited American art museums were identified from data provided in the report of world museum attendance figures by The Art Newspaper for 2013 (Gopnik, 2014).

Content Categories and Coding Procedure

The study utilized the interactivity assessment tool developed by McMillan et al. (2008) which provided a framework for the content analysis of websites through the interactive features used by website designers. This example fit the purpose of the present study focusing on art

museum websites in order to analyze the use of interactive technologies. McMillan et al. (2008) acknowledged the difficulties associated with the content analysis of websites that often changed their content, design and a set of interactive tools. Thus, the researcher aimed to develop a tool that would be flexible enough to account for the fluidity of an online setting. McMillan et al. provided a coding scheme, used in the present study, that allowed for estimation of overall interactivity of websites and did not depend heavily on the specific set of interactive tools (see Appendix). Thirteen scholars, who previously studied interactivity, validated the coding scheme that was accomplished with the high level of agreement between experts and the authors of the study (McMillan et al.).

McMillan et al. (2008) conceptualized interactivity as a three-dimensional construct comprised of human-to-computer, human-to-human and human-to-content interactivity. The researchers categorized features of human-to-computer interaction as three different coding categories: navigation, action and transaction. For all of three categories the scholars further distinguished between standard and more personalized interactive tools. The features of human-to-human interaction were divided into two categories of those that allow organization-to-individual communication and those that facilitate individual-individual communication. For both categories of human-to-human interactivity the scholars identified features that allow real-time (synchronous) communication and those that most likely occur with a time lag (asynchronous). Customization features and features that enable site visitors to add content are the two categories for the dimension of human-to-content interactivity. Each type of feature could appear either on the museum's home webpage (level 1) or after a single click (level 2).

In the present study, interactivity of websites was evaluated by counting the number of types of interactive tools used on the websites. Interactive technologies on museum websites

were coded by three types of interactivity: human-to-computer, human-to-human, and human-to-content. Each of those types was further categorized according to the coding scheme, provided by McMillan et al. (2008). First, each type of interactive tool on the opening page was classified according to the type and category of interactivity. For example, a menu bar was coded as one type of interactive technology that enables standard navigation. Then, the researcher used every link found on the title page to access other pages. New types of interactive tools that did not appear on the opening page were coded as additional interactive features at level 2. If the link on the opening page clearly indicated the presence of interaction, it was coded as a separate type of interactive feature. For instance, the “contact” link on the opening page indicated human-to-human interaction and therefore was coded as level 1 interactive technology. Contact forms that appeared on the following page were also coded for the same type of interactivity at level 2.

Findings

In the 15 websites coded, an average of 51.9 total interactive features were found per site. The total number of interactive features varied from one art museum website to another, ranging from 27 to 79 features. As shown in table 1 there was a general decrease in the total number of features between the most frequently visited art museums and less frequently visited museums. Table 2 provides a summary of the prevalence of the basic types of interactivity on the first level and second level pages of the website.

Human-to-computer interactivity was the dominant type of interactivity on these websites, with the average of 43.9 features per site. The opening pages contained an average of about 16 types of features of human-to-computer interaction and second level pages included an average of 28 additional types of tools. Human-to-computer was the most complex form of interactivity, with features divided into those that were standard for all visitors and those that

were personalizable and changeable by the user. In addition, interactive tools promoted navigation, action or transaction. Table 3 shows the distribution of different categories of human-to-computer interactive features on the art museum websites. Overall the total number of standard features was slightly bigger than personalized features. Standard features were dominant on the opening pages when compared with personalized ones, whereas personalized tools were found more often at level 2.

Table 1. Number of Interactive Features on Art Museum Websites

<u>Museum</u>	<u>Human-to-computer</u>	<u>Human-to-human</u>	<u>Human-to-content</u>	<u>Total</u>
Metropolitan	58	9	5	72
National Gallery of Art	52	12	2	66
MoMA	37	8	4	49
Getty, Los Angeles	52	9	2	63
FAMSF, San Francisco	25	7	0	32
Art Institute of Chicago	44	7	4	55
LACMA, Los Angeles	39	4	2	45
SAAM/Renwick	69	7	3	79
Guggenheim, New York	51	4	1	56
National Portrait Gallery	36	3	1	40
Houston Museum	36	4	2	42
Seattle Art Museum	24	3	1	28
Hirshhorn Museum	25	2	0	27
Philadelphia Museum	45	5	3	53
Freer and Sackler	65	6	1	72
Total	658	90	31	779

Table 2. Types of interactivity by level

<u>Interactivity</u>	<u>Human-to-computer</u>		<u>Human-to-human</u>		<u>Human-to-content</u>	
	<u>Level 1</u>	<u>Level 2</u>	<u>Level 1</u>	<u>Level 2</u>	<u>Level 1</u>	<u>Level 2</u>
Frequency	236	422	31	59	4	27
Average	15.73	28.13	2.07	3.93	0.27	1.8

Table 3. Human-to-computer interactivity

<u>Categories</u>	<u>Level 1</u>	<u>Level 2</u>	<u>Total</u>
Navigation/Standard	110	90	200
Navigation/Personalized	37	137	174
Action/Standard	11	42	53
Action/Personalized	45	70	115
Transaction/Standard	29	70	99
Transaction/Personalized	4	13	17
Total	236	422	658

Human-to-human interaction and human-to-content interaction features were used far less frequently in comparison with human-to-computer interactive tools. An average of six human-to-human interactive features were found on art museum websites with an average of two features on the opening pages and around four tools on the second level pages. All the sites included some sort of “contact” link at level 1. Additional contact information that appeared at level 2 included contact forms, emails of different departments, forms to schedule an appointment and forms that provide an opportunity to ask question and send feedback.

Websites were coded for two types of human-to-human interactivity – individual-to-individual and individual-to-organization interactivity. As illustrated in table 4, there were more individual-to-organization interactive features than individual-to-individual features. Human-to-human interactive features were further coded in terms of the time of communication exchange as either asynchronous when the likelihood of getting an immediate response was relatively low and synchronous that suggested high expectation for an immediate response. On all the websites coded there was only one website with an interactive feature that implied the opportunity of live time message exchange. The rest of the features offered the form of asynchronous

communication between a user and museum professionals or curators and between a user and other individual (most common forms of the latter were options to send an email or a postcard).

Human-to-content interactive features were least common on the websites. An average of two features were found per site with almost no features appearing on the opening pages and an average of 1.8 features available at level 2. This type of interactivity comprised posting to twitter timeline that appeared on the website page, posting comments, viewing different language version of the website page.

The features of human-to-content interactivity were broken down into the tools that allow users to customize content of the Web page or add content. Following the same pattern as in the previous categories, interactive tools were found more often on the second level pages (the total of 4 features found at the opening pages on all the websites and total of 27 tools at level 2 pages). Moreover, the options that permit users to contribute to the website content did not appear on the opening pages at all. At the same time there were 18 interactive tools on all the websites that allowed visitors to add content on second level pages of the websites in comparison with the total of 9 customization features.

Table 4. Human-to-human interactivity

<u>Categories</u>	<u>Level 1</u>	<u>Level 2</u>	<u>Total</u>
Organization/Individual Synchronous	1	1	2
Individual/Individual Synchronous	0	0	0
Organization/Individual Asynchronous	24	48	72
Individual/Individual Asynchronous	6	10	16
Total	31	59	90

Discussion

This study sought to understand how art museums use interactive technologies on their websites and to assess overall interactivity of their websites. The analysis revealed greater prevalence of human-to-computer forms of interactivity than human-to-human and human-to-content forms of interactivity. This finding is consistent with previous research assessing interactivity features of websites of medical institutions (McMillan et al., 2008). The similarity of the distribution of the types of interactive tools can indicate an overall established scheme of website design that is widely used. Almost all the websites had a similar design for the opening pages with only few exceptions. This observation suggests that art museums follow common and established web-design trends in their creation of online spaces. But adopting design models that were created for corporate websites museums can foster the same communication attitude towards audiences, where online visitors are considered simply consumers rather than co-creators. Regarding the traditional functions of museums as cultural, educational and social centers as well as contemporary social forums, there is a disconnect between the goals of art museums and the representation of these museums online. On the one hand, museums pursue a unique experience for visitors both hoping to engage them and actively involve them in art interpretation. On the other hand, museums approach visitors as relatively passive consumers of their resources.

The use of various types of interactive features reflects how museums perform their functions online. To some extent art museum websites mirror the on-site museum visit. Museums use their websites similarly to their buildings, where the opening website page functions as a gate introducing website users to the paths of museum exploration. The findings

suggest that opening web pages function as an entrance with the primary task of directing the user. Many of the other types of interactive technologies appear on the following pages where the user has a bit more control over his/her experience. The abundance of navigation features allows users to browse the content of the website, searching various information or digital collection database similar to the ways on-site visitors explore museum exhibitions. Online exhibitions and 3D tours increase visitors' sense of presence (Sundar et. al., 2012). The opportunities to download a file, send an e-mail or a postcard, and buy museum store product aim to give users access to the resources that the museum possesses.

Museums give their visitors a certain degree of control over their website experience as suggested by the utilization of personalized human-to-computer interaction and human-to-content interactive features. Customization options and the ability to add content to the website imbue a sense of agency and control (McMillan et. al., 2008). Nonetheless human-to-content interactive tools are extremely sparse on the coded websites in comparison with standard features, meaning that visitors' website experience is still quite limited and restricted. That implies that even though there is a change in museum practice towards inclusiveness from a privileged group of connoisseurs to general public, museum websites reflect the image of a museum as authoritarian institution that has primary control over visitor exploration of visual arts. Web pages can be characterized by increased interactivity between the users, computers, content and organization. The ability of users to engage with content might be considered one of the primary means of enabling users to explore the potential of a new communication medium. The lack of the human-to-content interactive features on the art museum websites suggest that museums are either still in the process of learning and accommodating to the new technology or reluctant to give up control over their role as meaning-maker.

Museums tend to resist granting control over the museum experience to visitors (Bautista, 2013; Kidd, 2011; Parry, 2007; Sundar et al., 2012). Traditional museums structure visitors' experience and establish aesthetic standards (Duncan, 1995). Traditionally it is the museum, not the visitor, who possesses the expertise necessary to interpret and create meaning attached to artworks. Exhibition works as a tool to shape audience's perceptions and beliefs about art and history. Similarly to that, art museum websites attempt to structure user experiences online, thereby reflecting that resistance to granting control.

Almost all of the interactive features on the websites expose users to traditional one-way communication, where museums' role is to enlighten their audiences. Higher levels of interactivity include tools that promote mutual communication between users (Chung, 2008). The lack of those tools on the art museum website suggests that museums do not facilitate mutual communication with their audience, considering visitors as passive recipients of the messages that art museums try to disseminate.

It seems that museums prefer to keep their websites as more representative authoritative structures while giving control to the visitors through external, but connected social networks. On the websites the social media icon links and share buttons were essential interactive elements. This finding aligns with Marty 's(2011) observation that museums to utilize social network platforms rather than develop some of the interactive features on their own websites. The difficulties museums face in developing their own tools can be one of the major reasons of such trend (Marty, 2011). Economic burdens of designing and redesigning the websites and low visitor engagement in the exploration of advanced options that museums provide expose museums to the new challenges. In these circumstances utilization of existing social networks appears easier and sometimes more effective.

The fact that museums often refer online visitors to social networks for the opportunity to exchange opinions with other visitors and comment on different artworks is noteworthy. The website itself, without connection with outside platforms, provides users with options promoting interaction between organization and individual. An online visitor can acquire abundance of information directly from the websites, therefore engaging into the process of educating oneself about the museum and its collections using various available resources. Museum websites provide an opportunity for users to send a question, a comment, or feedback to museum professionals. But most times, visitors' possible reactions and impressions from artworks do not have any place on the official websites. This disconnect reinforces a gap between museums as institutions that set high aesthetic standards and their visitors. Museum websites clearly reflect museums' task of educating their audiences but maintain the distance between a close group of experts and general public.

Simultaneously human-to-human interactive features aim to promote an exchange between a museum and a visitor therefore fulfilling social function of the museum. The fact that museum websites offer basically no tools that would facilitate real time communication evidences a limitation that users can experience online compared to on-site visits. Whereas on-site visits are often related to the socialization with friends (Falk, 2009), online visits are restricted in their ability to substitute that experience. The same refers to the direct communication with museum curators and lecturers.

While the lack of the tools enabling synchronous communication is concerning, it is not surprising. First of all, there are technological difficulties involved in the development and design of the interactive tools. One of the questions that arises from the past literature and analysis of website interactivity relates to the question of when the level of interactivity is high

enough for the website to be interactive. Although it is reasonable to assume that higher interactivity is better for the accomplishment of museums' goal to attract and engage visitors, it may lead to potential problems. An abundance of different interactive features can overwhelm website visitors (Bautista, 2009; Sundar et. al., 2012). For example, the combination of 3D tours and live chat can create a conflict between the navigability and interactivity tools on specific aspects of user experience. Whereas 3D tours give a visitor the opportunity to satisfy the desire for the physical proximity, live chatting can be distracting in the environment that asks for continuous interaction with it (Sundar et. al., 2012).

Furthermore, museums may want to keep their websites as complementary to the on-site visit. Art museums, as many other not-for-profit organizations, face an economic challenge of sustaining themselves. In order to do that they maintain marketing departments that help museums attract larger audiences. It might be a natural process that the on-site museum offers a visitor significantly larger variety of experiences than its online representation. Despite the opportunities granted by the characteristics of the new communication medium, websites are used as a marketing tool more than as means to involve visitor in the active process of co-creation of meaning about art.

Social media can potentially help museums to explore the questions that museums are concerned with their visitors – the tensions between public and private experience, personal and communal pasts, singular narratives and multiple viewpoints, subject and object, interpretation and representation, history and public memory (Kidd, 2011). At the same time, online communities that exist on social media around museums create an aura of interactivity without promoting deep valuable engagement: “Without such alignment, museums run the risk of alienating, frustrating, appropriating or dis-empowering through the very media whose rhetoric

of democracy, community and inclusion they have found so seductive” (Kidd, p. 73). Control over the museum is closely related to the control over the representation of community (Duncan, 1995). If museums are to maintain their role as centers of social and cultural life, they can do so only if they promote the ideas of democracy and participatory visitor culture as the foundations of online museums' practice.

Practical implications

The analysis of the use of the types of interactive features revealed several potential areas of improvement for website developers. These areas for improvement involve all three forms of interactivity.

With respect to human-to-computer interactivity, this study found that standard features are dominant in comparison with personalized. And although the difference between the types of interaction is not large, most of the personalized features of art museum websites relate to different registration and membership options as well as various options to search the collection, events, other museum information and filter the search results. Some of the museum websites include interactive games or interactive activities but they are not the most common type of personalized interaction. Incorporating more games and opportunities for the visitors to explore art using online tools can benefit museum websites. If museums want their visitors to try the games and projects fostering interpretation of artworks, museums can incorporate invitations to explore art via those projects on the opening pages. Some of the museums, such as Metropolitan museum in New York, include links on their new projects on the website title page, but this is not a common practice among majority of the art museums. Moreover, interactive games for visitors mostly invite them to explore art individually. Projects enabling some form of communication exchange are sparse. Gradually developing features that allow visitors to become

more active co-creators of meaning can aid museums to build connections between individuals' interactive experiences making websites a type of online hub.

Regarding human-to-human interactivity art museum websites can benefit from the tools that would enable their users have real time communication with museum professionals. Whereas several previous studies mention live chat options (Bautista, 2013; Sundar et. al., 2012), present analysis did not reveal any such options on the analyzed websites. Even with regard to museums' presence on social networks, their websites can be improved with more tools facilitating an exchange between a museum and a visitor. Museums theorists often discuss the notion of inclusive museum that embrace multiple voices and provoke visitor to participate in the process of knowledge creation. If museums are to embrace this ideal their websites should reflect the change.

The move towards inclusive museum can be achieved through the features that enable human-to-content interactivity. As mentioned above customization options and ability to contribute to website content imbue the sense of agency and empowerment. Therefore, museums can incorporate more features that would help attract those visitors who might be interested in self-expression, including the representation of a twitter timeline on their web pages and opportunities to comment on blog posts. The presence of human-to-content interactive tool on art museum website can in itself help to reduce the gap between the museum and its audience. Likewise it may aid conveying an image of museums as being open to the public and willing to engage in a dialogue.

Sundar et al. (2012) argue that website designers should be careful in incorporating interactive features. The researchers suggest that website design should be goal-driven and that interactive tools should be used in accordance with the purposes attached to them, with the

thorough consideration of the combination of those tools and their characteristics. Present analysis reveals that overall interactivity of the website might benefit from balancing the combination of different interactive technologies in respect to the functions of museum websites. Marty (2008) suggests that website visitors are mostly the same audience as museum visitors. But websites provide a unique opportunity for museums to reach audiences that don't have physical ability to visit the museum. Hence, museum website is the only opportunity for those visitors to engage in the exploration of art. And if museums recognize and embrace their role in the global community, they can continue to develop the unique features that would help to create a community of engaged visitors that will sustain museums in future.

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Appendix

Coding form

Human-to-computer interactivity:

Navigation/Standard (Tools that can not be customized)

- Number of menus/submenus
- Number of different types of text links (e.g. in body copy, in side bar)
- Different types/blocks of graphic links (buttons, banners, pictures)
- Number of scroll/drop-down box features
- Number of check boxes/radio button features
- Site map
- Other standard navigational tools

Navigation/Personalized (Tools that allow for personalized navigation)

- Number of different search functions
- Number of different selection functions (e.g. show list of diseases)
- Number of different sorting functions (e.g. sort doctors by specialty)
- Other personalized navigation tools

Action/Standard (tools that require action, but aren't personalized)

- Number of different games/activities
- Other action/standard

Action/Personalized (actions that change based on user input)

- Number of registration options (e.g. for sweepstakes, become member)
- Number of different survey/poll options
- Virtual tours
- Other action/personalized

Transaction/Standard (transactions that are the same for all users)

- Order a physical item (e.g. book, brochure, map)
- Order digital item delivered online (e.g. newsletter, screen saver, RSS feed)
- Other transaction/standard

Transaction/Personalized (transactions unique to the users)

- Order customized information (e.g. report based on personal symptoms)

Customized product (e.g. personalized t-shirts)

Other transaction/personalized

Human-to-human interactivity:

Organization/Individual Synchronous

Number of opportunities for “live” chat/support

Other organization/individual synchronous communication tools

Individual/Individual Synchronous

Number of opportunities for live chat/messaging among site visitors

Other tools for synchronous communication between individuals

Organization/Individual Asynchronous

Number of different types of e-mail links (staff, webmaster, etc.)

Number of different feedback/contact forms (not using e-mail to send)

Other tools for asynchronous organization/individual communications

Individual/Individual Asynchronous

E-mail/send site info to friend (total number of different types of links)

Send virtual post card (code for each type of virtual postcard – not each one)

Other tools for asynchronous communication between individuals

Human-to-Content interactivity:

Add Content

Opportunities to add textual material (e.g. calendar items, sign guest book)

Opportunities to add “other” materials (e.g. post photos, post music)

Customize Content

Number of opportunities to customize text (code all language options as one)

Other customizing (e.g. change background)

Other Interactivity

Identify any other interactivity features that don’t seem to fit in any of the above categories.

Operationalizations of constructs from McMillan et al. (2008)

1. *Human-to-Computer Interaction* – Features that enable interaction with the computer but do NOT facilitate communication with another person and do NOT contribute to or customize the content of the site.
2. *Navigation* is the “baseline” that makes Web sites function and allows users to find their way among various elements of the site.
3. *Navigation/Standard* – Use this category to code features that offer users options for how to navigate among the content. Menus, hyperlinks, buttons, and banners are clearly navigational tools. Things such as “clickable maps” and “drop down boxes” that offer users options for which part of the site they want to explore are also standard. Tools that help the user navigate through long and/or complex copy are also standard navigation (e.g. a “top of page” button)
4. *Navigation/Personalized* – These are navigational tools that give the user more control. For example, a search function would be personalized because it allows users to type their own search terms.
5. *Actions* allow users to give information to the computer but do not result in a purchase or other clearly transactional exchange.
6. *Action/Standard* – code here actions that offer users a “set” of options that are the same for all users. For example, online surveys and polls would be standard because all users answer the same questions. Also tools such as “print this page” and “bookmark this page” are standard actions.
7. *Actions/Personalized* – These are actions that respond to specific information provided by the user. For example, login and registration activities would be personalized because the computer requires specific information that must be provided by the user.
8. *Transactions* mean that the individual will receive something that has been requested through the Web site but is often delivered outside of the site itself.
Transaction/Standard – this category is for “unchangeable” items such as a book, brochure, or e-mail newsletter.
9. *Transaction/Personalized* – these transactions allow the individual to customize what he/she wants. For example, requesting a report based on a set of symptoms is personalized because the individual indicates specific information needed.
10. *Human-to-Human Interaction* – Features that enable people to communicate with other people.

11. *Organization/Individual Synchronous* – Code here any tools that allow communication between the organization and the individual in “real time.” This could include live customer support, etc.
12. *Individual/Individual Synchronous* – Code here any tools that allow for “real time” conversation among visitors to the site. This could be an IM function, for example.
13. *Organization/Individual Asynchronous* – This is the most common form of H2H interaction. It includes “contact us” forms, e-mail links, etc. As per the general rules, multiple e-mail addresses in a “contact us” section would be coded only once. But if there are different types of contact information, they would be coded separately.
14. *Individual/Individual Asynchronous* – Any tools that allow for “lagged time” two-way communication among site visitors. Examples include the option for e-mailing content to a friend, sending a virtual postcard to a friend, etc.
15. *Human-to-Content Interaction* – Features that allow the user to “engage” with content.
16. *Add Content* – Typically features that add content also have some elements of human-to-human interaction, but they go further by allowing the user to contribute content that others can see. For example, sending a “virtual postcard” would be human-to-human interaction because the message goes only to the intended recipient. But signing an online guest book would be human-to-content because anyone who visits the site can see the information. Try as much as possible to code the “type” of content that sites allow to be added. There may be some overlap, but code what is dominant. For example, sites might allow users to post “scrap books” of their experiences. The dominant content type is probably photos although there may be some text in captions for those photographs.
17. *Customize Content* – Typically features that customize content have some element of human-to-computer interaction in that they are often related to navigations and/or actions performed at the site, but they go further by allowing users to change the actual appearance of the site. For example, an interactive map that allows the user to select a geographic area of interest is a navigational element. But if the user can choose to limit the site so that it ONLY shows information about one geographic region that would be a change to the content of the site. Generally, most customizing will probably be to text. But note if other elements can also be customized. For example, changing screen backgrounds would be another type of customization.

18. *Other Interactivity* – Use this category for anything that seems to fit the general category of interactivity, but can not be captured by any of the other categories. Provide a detailed description of the interactive feature.