

# **Exploring Motivational Factors and Visitor Satisfaction in On-line Museum Visits**

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## **Abstract**

The hardest part about developing an understanding of museum audiences, both physical and virtual, is not understanding who is visiting, but understanding what visitors take away with them from their visit. This paper reports on an on-line survey that explored the latter question by focusing very specifically on issues of motivation. Why do people visit a museum web site, and how do these motivations affect their experience with the site, and the learning or meaning-making that may happen as a result of their visit? By understanding the links between motivation and meaning-making, museum professionals will be able to provide more effective and more enriching on-line experiences for their visitors.

Our research builds on the current research from several different fields:

1. Previous studies of web visitors' reasons for using museum web sites,
2. Current educational research on the factors that influence motivation, including self-efficacy (visitors' perception of their own comfort on the site), task value (how much value they place in visiting that site) and other related issues, and
3. The Contextual Model of Learning, from the museum education field, which is a framework of 12 key factors that significantly influence museum learning.

Based on responses to a pop-up survey placed on educational sections within six museum web sites, we found statistically significant correlations between task value and expectations fulfillment, and between medium mastery and expectations fulfillment. Results from the question on meaning-making were too vague or varied from the open-ended questioning to be linked with the other issues under consideration.

## **Introduction**

Although museum web sites are now ubiquitous, little is known about the actual visits to these sites, the context and motivation surrounding those visits, and ultimately, what sort of meaning visitors make when they visit. We have chosen to focus on motivation and the on-line visit. By understanding the link between motivation and meaning-making, museum professionals will be able to provide more effective and more enriching on-line experiences for their visitors. This study does not purport to construct the definitive theory on the subject, but hopefully serves instead as a starting point for a deeper and richer conversation about learning on-line.

## **Review of Educational Research Terms and Concepts**

### **Intrinsic and Extrinsic Motivation**

In building a theory regarding on-line museum learning, we can draw extensively on educational research in museum and formal environments. This section summarizes some of the educational research terms and concepts that form the theoretical basis for this study.

Motivation has been defined as an internal state that arouses, directs and maintains behavior (Woolfolk, 2001). Some of the influences on motivation are internal, such as enjoyment, curiosity, and personal needs and interests. This type of motivation is called intrinsic motivation. Other influences are outside the self, such as incentives, punishments, social pressure. This is extrinsic motivation. When one is intrinsically motivated to do something, incentives or pressure is not necessary, as the task itself is rewarding (Ibid).

Because both intrinsic and extrinsic motivation can produce the same amount of effort and eventual end result, it can be impossible to distinguish the two from observation. The difference lies in the origin of the motivation—the locus of causality. If the location of the cause is external, the person is being influenced by someone or something else, they have an extrinsic motivation. If the locus of causality is internal, then intrinsic motivation would result. Unfortunately for the researcher, most activities are not wholly extrinsically or intrinsically motivated, but rather stretch across a continuum (Young, 1985). For instance, one might enroll in a particular class because it is required for the degree, yet be pursuing the degree itself for one's own personal interests.

### **Expectancy x Value Theories**

Behaviorists frequently explain motivation in terms of rewards, incentives and punishments. A particular rat may learn to navigate a maze because it is rewarded with food at the end. At the other end of the spectrum, cognitive educational psychologists hold that people respond not to specific conditions or events, but to their interpretations of those events. (Woolfolk, 2001) A person may not respond to a condition such as hunger, when they are so involved in their task they do not perceive being hungry. Csikszentmihalyi (1990) referred to this state of mind as “flow”. This perspective on motivation emphasizes the intrinsic over the extrinsic as important factor in mediating interest and learning.

From these two schools of thought, the behaviorist reliance on the effects of external rewards and punishments and the cognitivist concentration on intrinsic individual motivation, a set of ideas called “expectancy x value theories” have been developed. In *expectancy x value theories*, motivation a function of a person's expectation of reaching a goal and the value they place on that goal. From these theories are derived two important predictors in the study of motivation. “the two most important predictors of achievement behavior:” task value and expectancy (Pintrich & Schunk, 1996).

The first predictor is a person's perceived task value, or “Why should I do this task?” Task value is based on an individual's personal cognitive beliefs and incorporates their goals (e.g. utility of task to achieve goals), values, and interests (Ibid). For example, a questionnaire to assess children's task value may include such questions as, “How useful is what you learn in math?” (*goals/utility*), “For me, being good in math is: not at all important to very important),” (*value*)

and “In general, I find working on math assignments: very boring to very interesting)” (*interest*) (Wigfield & Eccles, 2000).

The second is the concept expectancy (“Am I able to do this task?”) or of self-efficacy, as described by Bandura (1997). Self-efficacy is our belief about our personal competence or effectiveness within a given arena. In the survey mentioned above, the questions for expectancy could be, “How well do you expect to do in math this year?” and “How good would you be at learning something new in math?” (Wigfield & Eccles, 2000). Unlike the concept of self-esteem or self-worth, self-efficacy involves a person’s perceptions of their ability within a certain environment, or involving a certain task. Although related, these two concepts are not directly correlated. It is possible to have low self-efficacy for one area (say playing basketball) yet have overall high self-esteem. Those who have high self-efficacy within a particular area may invest greater effort and set higher goals for tasks in that area. Those with low self-efficacy, such as poor computer skills when using a web site, can become highly frustrated and abandon the effort (Miltiadou & Savenye 2003). Self-efficacy is thus a strong predictor of behavior.

### **Review of the Contextual Model of Learning**

Informed by educational psychology, learning theory, and hundreds of visitor studies, there is now a significant body of literature pertaining to learning in physical museums and other free-choice learning environments. Over a dozen years ago Falk and Dierking formulated a framework for thinking about learning that tried to accommodate much of the diversity and complexity surrounding learning, a framework that at the time was called the Interactive Experience Model. This model has been built upon and refined, resulting in the Contextual Model of Learning. This model posits that there are 12 critical suites of factors, clustered into the three contexts (Personal, Physical & Sociocultural) which individually and collectively influence the meaning-making process of visitors to free-choice learning settings like museums, (Falk & Dierking, 2000; John H. Falk, personal communication), as those. No one factor is dominant, and the interaction of these factors is unique to every individual. The twelve suites of factors are:

#### **Personal Context**

1. Motivation and expectations
2. Prior knowledge and experience
3. Prior interests and beliefs
4. Choice and control

#### **Sociocultural Context**

5. Within group social mediation
6. Facilitated mediation by others
7. Cultural background and upbringing

#### **Physical Context**

8. Advance organizers
9. Orientation to the physical space
10. Architecture and large-scale environment
11. Design of exhibits and content of labels

## 12. Subsequent reinforcing events and experiences outside the museum

Institute for Learning Innovation researchers and others have used this model to frame their recent research. These factors have been shown to be robust and to play out in a variety of unique ways in the physical museum. For instance, factors related to choice and control have emerged as critical variables, with research demonstrating that learning is maximized when visitors have choices about what, when, how and with whom to learn—in other words, learning is enhanced when the learner feels in control of his/her learning. This research has been used to effectively influence practice with museums working to incorporate aspects of visitor choice and control into their exhibitions and programming.

Just as these factors contribute to and influence the visitor experience in physical museums, it is logical to think that they, and perhaps other factors, play a role in virtual museums as well, albeit likely in different ways. Choice and control in a visit to a virtual museum may incorporate some of the same factors as those in a physical visit—the visitors making choices about what they see and do based on their interests, attitudes and prior experiences. Yet the factor of choice and control in virtual settings may also encompass issues of access to software, plug-ins and download times. It is highly possible that some of these factors are not as critical to a virtual environment as they are to physical environments or that there are other suites of variables that emerge as important specifically to such environments. While we are focusing on the first part of the personal context, motivations and expectations, we assume that all of these factors (and perhaps others undescribed as of yet) influence the meaning made from a virtual visit.

### **Review of previous studies of visitors of to virtual museums**

Previous studies generally agree on the most popular motivations for visiting a museum web site. They are (in most common order of popularity) planning a visit, personal interest in the subject matter and/or collections, and school assignment (Ockuly, 2003; Kravchyna & Hastings, 2002; Chadwick et al., 2000; Bowen, 1999; Sarraf, 1999). Similarly, although focusing specifically on-line learning activities (mainly on museum web sites), Schaller et al. (2002) found the top motivators to be “assigned by teacher,” “personal interest” and “professional interest/to use in a lesson plan.”

While these studies mutually support the validity of their findings, the conclusions also reflect the way the researchers framed the question. Kravchyna and Hastings (2002) for instance asked respondents, “What is the purpose of your visit” but framed each possible answer in terms of information-seeking: “To find information about recent exhibits, to find information about special events in the museum, to find additional materials for the research needs, to find information how to contact museum staff.” Ockuly (2003), Chadwick et al. (2000), and Schaller et al. (2002) anticipated a wider variety of motivations, including “to learn about art for personal enrichment” and “personal growth.” Bowen (1999) includes “it’s fun and interesting” as one of the three main motivators.

Of these studies, only Ockuly’s attempted to evaluate visitors’ task success or failure. He found that 80% of respondents reported that they had found what they were looking for, while another 10% were “just looking” without a specific task objective. Sarraf (1999) found that 61% of on-line museum visitors had their expectations fulfilled.

## **Survey Goals**

Our goal for the survey was to record visitors' motivations for the site visit in order to be able to compare our results and complement the above mentioned studies. We also hoped to go further and explore possible correlations between how much value people place on a task, their mastery within the domain format (use of the Internet), their original motivation, and their expectation fulfillment. Although we could hypothesize a number of possible relationships between the variables involved in on-line meaning-making, our approach to the research here was more an exploratory in nature rather than hypothesis testing.

## **Methodology**

### **Survey Instrument**

The survey was designed to appear within a particular section of a web site, rather than in the site at large. We hoped to capture individuals that could be looking at the site for a content-based reason, excluding the large numbers of people who visit a virtual museum for the hours and admissions of the physical site, or to order from the museum shop. Our interest was in focusing on people who not only have a task, such as planning a visit, but have the possibility of finding something on this site that is meaningful to them in and of itself.

The survey itself consisted of 10 questions, including basic questions on teacher or student status, age, and previous site visitation. In the interest of not over-burdening the user, only two open-ended questions were asked. We also asked visitors to categorize their reasons for visiting the site (original motivation), a question about how important it is the visitor that they find what they were looking for (task value), the degree to which their expectations were met, and their comfort level with the Internet (self-efficacy). As noted in the educational research cited above, people who have a high sense of the value of the task, or those that believe they are competent within a particular domain have a different motivational orientation than those who would believe otherwise.

The first open-ended question asked was "What did you find on this site that was interesting/useful to you?" This was intended to get at visitor meaning-making without asking directly about learning or meaningfulness. By separating this question from the one on original motivation, we hoped that visitors would feel they could give two separate answers, e.g. the first being why they originally came to the site; the second being what they found that was meaningful to them once they got there. The second open-ended question immediately followed a scaled response about whether their expectations were met. This question allowed the visitor to express how the site had or had not met their expectations.

The surveys were implemented using two variations on a standard pop-up window format. Flash-based sites consisted of just a single HTML page, so the pop-up appeared when visitors quit or left that page, making the process unobtrusive and effective. Most of the study sites, however, consisted of many individual HTML pages. We made an introductory pop-up page to appear on the home page, explaining to users that we wished them to answer some questions at the end of their site visit. The pop-up then went behind the main browser window while the user explored

the site. As users could enter the site via any page and there was no clear exit page, we also programmed every page to trigger the pop-up window so it appeared behind the main browser window. In this way we hoped to expand the potential respondent pool to all visitors. Clicking on an exit link (to the institution's home page or other sections of the site) brought the pop-up survey to the foreground again, prompting users to respond to it. Many users undoubtedly used other means to leave the site (by typing in a new URL, for example), but given technical limitations of browsers and computers, we hoped our system would capture a reasonable percentage of visitors.

### **Sample**

The surveys were placed on the web sites of an art institute, a natural history museum, a historic site, a zoo, a history center and a maritime museum, in order to sample a wide range of content material. The physical locations of the participating sites ranged across the Midwest, South and East Coast.

1. Minneapolis Institute of Arts: *World Myths & Legends in Art*  
[www.artsmia.org/world-myths/](http://www.artsmia.org/world-myths/)  
An interactive reference site based on a museum slide curriculum, recently updated and expanded with more images and interactivity, at an Art Museum, this site has been on-line since 1996 and averages 30,000 unique sessions (visitors) monthly, mainly secondary school teachers and students.
2. Brookfield Zoo: *In Search of Ways of Knowing Trail*  
[www.brookfieldzoo.org/pagegen/wok/index.html](http://www.brookfieldzoo.org/pagegen/wok/index.html)  
A Flash-based role-playing game about the ecology and cultures of an African Rainforest, designed for 8-14 year old children and their families. It has been on-line since July 2000.
3. Bell Museum of Natural History: *On the Prairie*  
[www.bellmuseum.org/distancelearning/prairie/](http://www.bellmuseum.org/distancelearning/prairie/)  
An interactive reference site with a simulation game about prairie restoration, this site was designed for a museum distance learning program for middle school students. It has been on-line since late 1999 and averages 28,000 visitors monthly.
4. Colonial Williamsburg: *Mapping Colonial America*  
[www.history.org/history/museums/online\\_exhibits.cfm](http://www.history.org/history/museums/online_exhibits.cfm)  
A Flash-based interactive reference site about cartography and exploration, politics, and war in the colonial era, it is based on a museum exhibit and curatorial research. It launched in November 2003 and averages 4,000 visitors monthly.
5. Atlanta History Center: *Curriculum Resources*  
[www.atlantahistorycenter.org/teachers/html/resourceshome.htm](http://www.atlantahistorycenter.org/teachers/html/resourceshome.htm)  
A teacher reference site. Although this site has been live for over a year, the Center web site at large is being redesigned, and thus the site is not heavily used or advertised.

6. Mystic Seaport: Voyages: *Stories of America and the Sea*  
[www.mysticseaport.org/discover/do-voyages.cfm](http://www.mysticseaport.org/discover/do-voyages.cfm)

An interactive reference on-line exhibit, this site contains images and interpretive text.

The survey remained on the sites from December 10<sup>th</sup>, 2003 to January 9<sup>th</sup>, 2004, with the exception of the Atlanta History Center and Mystic Seaport sites, who ran the survey from December 31<sup>st</sup> to January 9<sup>th</sup>. Our intention was to capture several audiences during the span of the survey. Knowing that several of the sites were heavily used by teachers and students, we wanted to capture data from time periods when school was both in session and out of session.

### Limitations

One of the most difficult aspects of museum web site evaluation is the lack of useful methodologies. On-line surveys in particular suffer from a low response rate that introduced strong self-selection bias where many studies may be considered unreliable. The response rates for this survey were 2.5% for World Myths, 1.5% for On the Prairie, and 2.8% for Mapping Colonial America. (Server stats were not available for In Search of the Ways of Knowing Trail.) These are extremely low response rates by written survey research standards, but typical for on-line surveys (Ockuly, 2003; [www.webpoll.org](http://www.webpoll.org)). Despite this weakness, we felt that there was benefit to researching motivation over a variety of web sites, and the only practical method for such a preliminary study was to use an on-line survey.

Data gathered on the Atlanta History Center and Mystic Seaport sites comprised less than 1% of the total sample for this study and were thus excluded from the sample to prevent bias.

### Results & Analysis

Based on the nature of sites we had available for this research, our expectation was that students and teachers would make up a significant proportion of the visitation to the sites. That assumption held true, as overall 54% of those surveyed were students and 24% were teachers. Brookfield Zoo's site had even greater numbers of students, over 63%. The main exception to this trend was the Colonial Williamsburg site, of which 13% of visitors were students and 15% were teachers. Interestingly, people in every age category, including over half of those over the age of 65, described themselves as a student. This implies that the term "student" was taken in the broadest possible sense, encompassing graduate students and/or those taking non-degree-seeking community classes, such as a genealogy class. For the rest of the variables such as task value under study, whether someone was a student or not had no statistically significant impact on their answers.

**Table 1: Proportion of Teachers and Students**

	Teachers	Students
Minneapolis Institute of Arts: World Myths & Legends in Art (n=751)	23.8%	53.3%
Brookfield Zoo: In Search of Ways of Knowing Trail (n=266)	25.2%	63.5%
Bell Museum of Natural History: On the Prairie (n=103)	27.2%	52.4%
Colonial Williamsburg: Mapping Colonial America (n=46)	15.2%	13.0%
Overall (N=1166)	23.9%	53.6%

\* Individuals were allowed to classify themselves as both a student and teacher if they wished, to accommodate those who might fulfill both roles.

Over one-quarter of the total visitors were between the ages of 11 and 18. Nearly one-fifth of the visitors were between 30-49, perhaps due to the teacher visitation, or other unidentified factors. Again, Colonial Williamsburg’s Mapping Colonial America emerged as the exception, in that the majority of those site visitors were over the age of 50.

**Table 2: Age Distribution**

Site	5-10	11-18	19-29	30-49	50-64	65+	No Answer	Totals
Minneapolis Institute of Arts: World Myths & Legends in Art (n=751)	2.0%	27.7%	14.0%	19.4%	10.0%	5.6%	21.3%	100.0%
Brookfield Zoo: In Search of Ways of Knowing Trail (n=266)	11.3%	36.5%	7.5%	15.8%	6.0%	5.3%	17.7%	100.0%
Bell Museum of Natural History: On the Prairie (n=103)	4.9%	26.2%	6.8%	15.5%	4.9%	5.8%	35.9%	100.0%
Colonial Williamsburg: Mapping Colonial American (n=46)	0.0%	6.5%	15.2%	28.3%	43.5%	6.5%	0.0%	100.0%
Overall (N=1166)	4.3%	28.7%	11.9%	18.6%	9.9%	5.6%	20.9%	100.0%

To assess self-efficacy (in this case, medium mastery) visitors to all of the sites were asked to rate their comfort level on the Internet, with 1 being very uncomfortable to 7 being extremely comfortable. These visitors felt very comfortable within the Internet medium, with the mean rating at approximately 6, and nearly half (49%) of the visitors selecting 7, indicating a high sense of confidence in using the Internet.

**Table 3: Medium Mastery (Comfort Level on the Internet)**

Site	1	2	3	4	5	6	7	No Answer	Totals	Mean
Minneapolis Institute of Arts: World Myths & Legends in Art (n=751)	3.6%	1.6%	2.1%	7.5%	8.5%	14.0%	47.8%	14.9%	100.0%	5.92
Brookfield Zoo: In Search of Ways of Knowing Trail (n=266)	3.0%	1.1%	2.3%	4.5%	10.2%	15.8%	51.5%	11.7%	100.0%	6.07
Bell Museum of Natural History: On the Prairie (n=103)	7.8%	1.9%	1.9%	7.8%	3.9%	11.7%	37.9%	27.2%	100.0%	5.53
Colonial Williamsburg: Mapping Colonial American (n=46)	2.2%	0.0%	2.2%	4.3%	6.5%	4.3%	78.3%	2.2%	100.0%	6.47
Overall (N=1166)	3.8%	1.5%	2.1%	6.7%	8.4%	13.8%	49.0%	14.8%	100.0%	5.95

Site familiarity is one factor that could influence both the original motivation to visit any particular site as well as the expectations for that site. One might expect that site familiarity would lead to a higher level of met expectations and/or a leaning towards particular types of motivation (say searching for information because the user already knows this site has a great piece on legends). On average, approximately 16% of the visitors to these sites were repeat visitors and as this left small cell sizes we did not attempt to correlate familiarity with other factors at this time. The sites with higher percentages of student visitors tended to have lower repeat visitation, possibly because they came to the site as part of schoolwork rather than personal interest.

**Table 4: Site Familiarity**

Site	Have you visited this web site before?		
	No	Yes	No Answer
Minneapolis Institute of Arts: World Myths & Legends in Art (n=751)	82.0%	12.6%	5.3%
Brookfield Zoo: In Search of Ways of Knowing Trail (n=266)	77.8%	19.2%	3.0%
Bell Museum of Natural History: On the Prairie (n=103)	63.1%	24.3%	12.6%
One Colonial Williamsburg: Mapping Colonial American (n=46)	76.1%	23.9%	0.0%
Overall (N=1166)	79.2%	15.6%	5.2%

Social group composition within a visit to a physical museum site plays an enormous role in the nature of the visit, the learning that occurs, how one relates the visit to the other facets of life, even the decision to visit the museum itself. Solo visitation to museums, zoos and aquaria does occur, but it is much less common than a visit made social groups of one sort or another. It is a commonly-held tenet in museum web site work that there are far more solo visits in the virtual world than in the physical world. We suspected that our study here might show greater numbers of group visits than other museum web studies due to the large numbers of students, who could be visiting the site from the classroom or media lab. This held true, as over a quarter of the overall visitors were visiting with others.

Almost three-quarter of the web site visitors (73.7%, n=805) were by themselves when they visited the web site, while more than a quarter (26.3%, n=287) operated the computer in the presence of another person or other persons. For those visiting with others just over 40% were visiting with their class or selected members of their class. Another 23% (of those visiting with someone) were visiting with family members and 21% with friends.

**Table 5: Social Grouping (N=258)**

My Class	41.1%
Family	22.5%
Friends	20.9%
Other	7.0%
Librarian	4.3%
Work Colleagues	4.3%

Total	100.0%
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We asked visitors to categorize why they came to this site during this visit, and gave them a limited range of options to choose from, as well as an “Other” choice if their reason did not fit one of the categories. The possible reasons for visiting we listed included:

1. Planning/thinking about a trip to the museum (“Planning trip,” in table below). Despite the fact the survey was not placed at the site’s home page, our previous experience had suggested that visitors who are planning a visit to the physical museum do explore content material to prepare them for their visit.
2. Searching for specific information about [domain content of each site inserted here] (Searching for info). This choice covered students, teachers and others who were seeking particular content (as opposed to browsing or surfing web sites).
3. Teacher told me to “do” this web site (Teacher assigned). This choice was intended to get at students who had been assigned this site, as a formal homework or class assignment, or more informally suggested by the teacher. The phrasing was left vague to include those students who were supposed to simply experience the site rather than generate any specific outcome (homework, report).
4. Looking for teaching resources or activities (Teacher research). Many teachers search the web for useful resources and sites to enhance their teaching.
5. Thought it might be an interesting site to explore (Looked interesting). This choice was offered for curiosity-driven visitors, including those who had happened upon the site on their own, as well as those that heard about this site in some other way (personal recommendation, browsing the web, etc.).from someone else. These visitors might be said to be looking for something fun or “cool” to do.

**Table 6: Why did you come to this site today?**

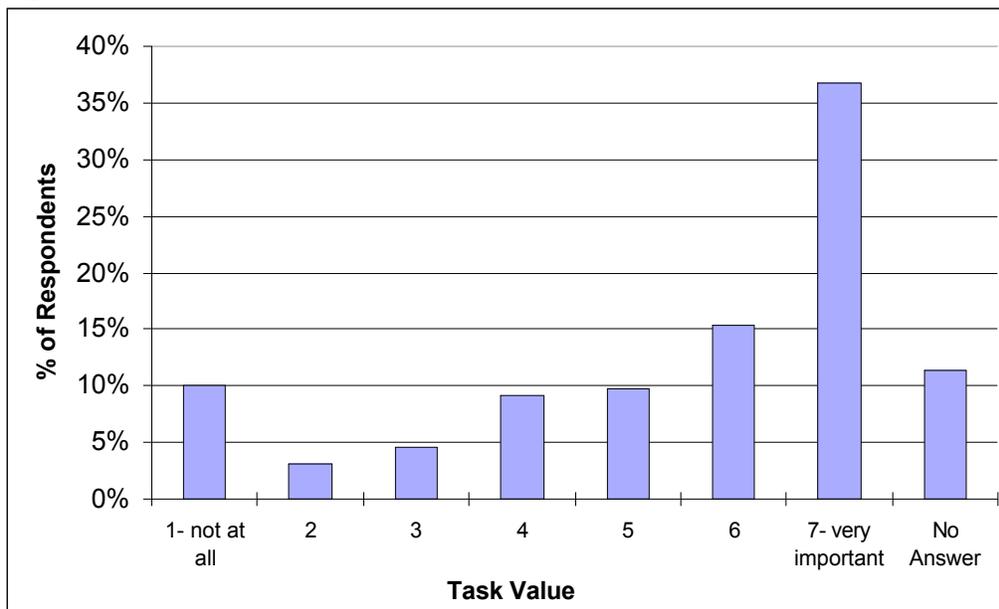
Site	Planning trip	Searching for info	Teacher assigned	Teacher research	Looked interesting	No Answer	Other
Minneapolis Institute of Arts: World Myths & Legends in Art (n=751)	2.9%	26.6%	6.0%	12.9%	17.6%	14.5%	19.4%
Brookfield Zoo: In Search of Ways of Knowing Trail (n=266)	2.6%	4.5%	36.1%	17.3%	18.8%	13.5%	7.1%
Bell Museum of Natural History: On the Prairie (n=103)	4.9%	10.7%	24.3%	9.7%	9.7%	28.2%	12.6%
Colonial Williamsburg: Mapping Colonial America (n=46)	23.9%	26.1%	0.0%	17.4%	23.9%	0.0%	8.7%
Overall (N=1166)	4.3%	20.4%	14.0%	13.6%	17.3%	14.9%	15.5%

Searching for information about content emerged as the top original motivation (20.4%), following by visitors who thought the site might be an interesting place to explore (17.3%). As

this survey was not placed at the top level of the each web site, but within a particular content area in hopes of capturing the motivations of those visiting the site at a deeper level, there were fewer participants stating that their original motivation in visiting was to plan for an upcoming trip. This contrasts with previous research mentioned above, which was performed at the whole site level, where trip planning was one of the primary motivations for visiting a site.

Within this distribution there was variability by site. For example, the Brookfield Zoo site is a Flash- based interactive game, so visitors were unlikely to state that they were entering the site to gather information. Only Colonial Williamsburg's site saw a substantial number of visitors who came for trip-planning purposes but stayed long enough to explore the on-line exhibit, possibly because these respondents were mainly older adults pursuing personal interests in travel and learning. (With this and other survey questions, the “no answer” percentages are roughly inversely proportional to the average age of site visitors, highlighting the challenges of surveying youth.)

**Figure 1: Task Value Distribution Chart**



Note: Task Value was rated on a 1-7 scale with 1 being not at all and 7 being very important.

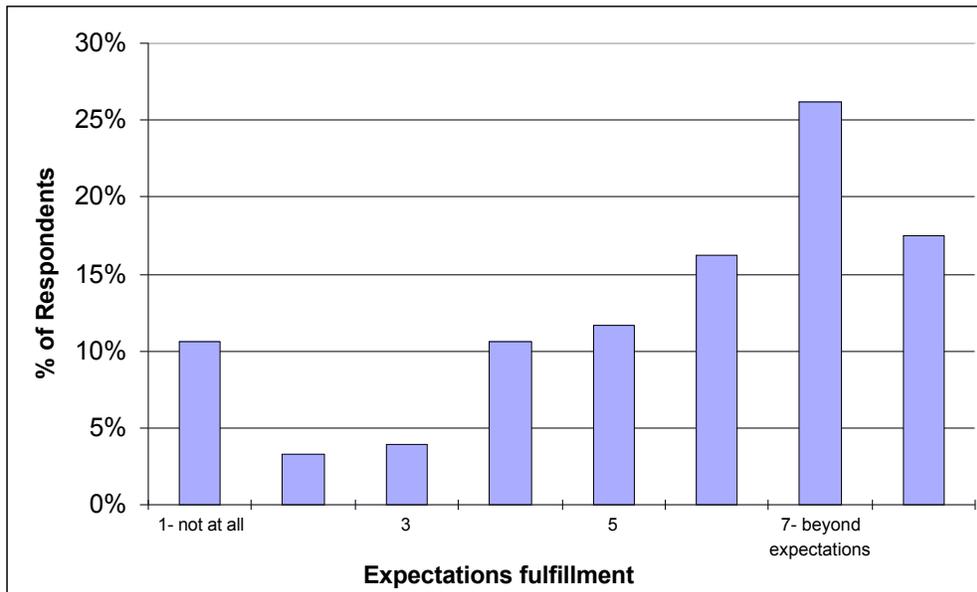
**Table 7: Task Value Mean**

Site	Mean
Minneapolis Institute of Arts: World Myths & Legends in Art (n=751)	5.24
Brookfield Zoo: In Search of Ways of Knowing Trail (n=266)	5.11
Bell Museum of Natural History: On the Prairie (n=103)	5.13
Colonial Williamsburg: Mapping Colonial America (n=46)	5.43
Overall (N=1166)	5.21

Visitors felt that the task at hand was moderately to highly important to them, with an overall mean of 5.22 on the 7 point scale. There was no statistical difference in the task value means from site to site ( $p > .091$ ).

To our surprise, task value did not correlate with the visitor’s original motivation with any statistical significance (low to moderate correlation, *eta* at .180). We had imagined that visitors with certain motivations, such as teacher-assigned students, might have lower task value because they are more likely to lack personal interest in the subject, but the data does not support this hypothesis, nor any other correlating these two factors. Motivation, of course, is a complex matter and our survey certainly does not examine it in any depth. We recommend further investigation with more sophisticated probing of individual motivation drawing conclusions one way or another.

**Figure 2: Expectations Fulfillment Distribution Chart**



Note: Expectation fulfillment was rated on a 1-7 scale with 1 being not at all and 7 being beyond my expectations.

**Table 8: Expectations Fulfillment**

Site	Mean
Minneapolis Institute of Arts: World Myths & Legends in Art (n=751)	4.39
Brookfield Zoo: In Search of Ways of Knowing Trail (n=266)	5.13
Bell Museum of Natural History: On the Prairie (n=103)	4.44
Colonial Williamsburg: Mapping Colonial America (n=46)	5.65
Overall (N=1166)	4.64

On average, visitors did tend to feel that their expectations were fulfilled. All of the sites had a mean rating of better than 4 (4 was the mid-point on a seven point scale), for an overall mean rating of 4.64. We do not know whether or not to consider these ratings to be high or simply average, having few satisfaction rates of museum web sites to compare to, other than the 80% task success rate mentioned above (Ockuly, 2003) or the 61% in Sarraf’s study (1999) that had their expectations fulfilled.

Of the sites tested, World Myths has the lowest fulfillment mean, probably (based on respondent comments) because the art-oriented focus of the site stymied some who were searching for myth-centric information. However, although there was some low correlation between the site and the strength of the expectation fulfillment ratings (*eta* at .178), the correlation was not statistically significant. The two Flash-based sites averaged the highest fulfillment among these sites, which might spur some intriguing hypotheses linking expectations and content presentation. It would be interesting to test this possibility with sites that have more similarities.

When looking at the other variables under consideration here that might be correlated with expectation fulfillment, it seems that increased self-efficacy, or confidence using the Internet would increase how one's expectations might be fulfilled on the thought that those that are (or at least perceive themselves to be) more proficient are ultimately more satisfied. Upon analysis, the data here show that there is a statistically significant difference—as medium mastery increases, expectations fulfillment does in fact increase. However, even though this finding was statistically significant, the correlation was in fact fairly low (Spearman's Rho at .206). This does not preclude that perhaps actual competence in the medium (Internet use) is still a factor in expectation. This finding must also be tempered with the knowledge that overall medium mastery was very high, noting in the tables above that over 60% of the participants rated themselves as 6 or 7, where 7 was extremely comfortable using the Internet.

Interestingly, expectations fulfillment and task value showed statistically significant parallel movement, meaning that as task value increased the likelihood of having one's expectations increased. This was a moderate correlation (Spearman's Rho at .302), but intriguing all the same. One interpretation of this finding would be that when a person places more value on finding specific information (higher task value) that they may work with a site until they are able to fulfill those expectations.

Expectation fulfillment was moderately correlated with the visitor's original motivation but not in any statistically significant way (*eta* at .213). Thus, the reason that brought a visitor to a site did not correlate or impact on their satisfaction with the site. Here too, we feel this is evidence of the large numbers of factors unrelated to the motivation focus in this study could influence a visitor's ultimate satisfaction with a site.

## **Meaning-Making**

One of the key pieces of this study was to look at the meaning individuals made from their visit. As this study was an initial study in the topic matter that encompassed a variety of sites, we choose to ask people an open-ended question about what they found useful or interesting about the site. The results were unfortunately too diverse to provide useful correlations to the other variables here. This finding was frustrating, but ultimately should not be surprising given the numbers of factors involved. In the results, individuals commented on everything from the usability of the site, to just naming content pieces, to explaining why that content was personally relevant to them. For instance, people said that the maps were the most useful part of the site, but we don't know if that was for an emotional connection, personal research, or practical value. Due to this limitation, we did not cross meaning-making here with any of the other variables, but instead are presenting our list of top category choices, the beginnings of a rubric, so that in any

future research one could use these choices for a closed-ended on-line survey question and further explore these relationships.

The possible question and categories for future research that did result from this analysis included:

I found something that was meaningful to me on this site and it was meaningful to me because:

1. I had fun,
2. I learned something new about (content),
3. I liked seeing certain objects/images,
4. I can use it as a teaching resource,
5. It helps me with my research,
6. I have a personal interest/emotional connection to this material.

## **Conclusions**

In summary, in this study we explored a variety of factors related to motivation and the on-line museum visit. Although there were several variables that had moderate correlation with each other, the only factors that had statistically significant correlations were task value with expectations fulfillment and medium mastery with expectations fulfillment. In exploring meaning-making itself, the results from the open-ended question were too vague or varied from the open-ended questioning to be linked with the other issues under consideration.

Certainly, this study suffered from limitations such as the low response rate. It would be desirable to replicate this study or a study under slightly different conditions for a number of reasons. First, to explore whether the relationships that might have been detected were masked by all of the other variables in the mix. Second, if possible, to see how a heightened response rate would impact these relationships. Third, we are biased to believe that the sites under consideration here were “a cut above” the average museum web site, possibly narrowing the range of reported fulfillment. By pursuing this site study with a greater variety of sites (in terms of fulfillment potential) or within a single site (for more in-depth probing of visitor meaning-making), one could get a clearer picture of the issues at hand. Fourth, future studies examining the same factors but using a different methodology might go further: Face-to-face interviews or even telephone interviews may be able to establish the long-term impact of an on-line museum visit. Of course, such methods would require a large incentive in order to induce people to give up their personal information on-line and time for an interview. We recognize these and other substantial challenges that must be overcome to obtain a nuanced understanding of visitor motivations and meaning-making, but only by doing so can we design more engaging and effective on-line learning experiences.

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## **References**

Bandura, A. (1997). *Self-efficacy: The Exercise of Control*. New York: Freeman.

Bowen, J., Ed. (1999). *Time for Renovations: A Survey of Museum Web Sites*. Museums and the Web, Selected Papers from Museums and the Web 1999. Pittsburgh, Archives & Museum Informatics.

Chadwick, J., John H. Falk, and Brigitte O'Ryan. (2000). *Assessing Institutional Web Sites*. Council on Library and Information Resources. Consulted on February 6, 2004. <http://www.clir.org/pubs/reports/pub88/appendix2.html>

Csikzentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper Collins.

Falk, J. H., & Dierking, L. D., (1992) *The Museum Experience*, Whalesback Books, Washington, D.C.

Falk, J. H., & Dierking, L. D. (2000). *Learning from museums*. Walnut Creek, CA: AltaMira Press.

Kravchyna V., and S.K. Hastings. (2002). Informational Value of Museum Web Sites. *First Monday*, volume 7, number 2 (February 2002), Consulted on February 9, 2004. URL: [http://www.firstmonday.org/issues/issue7\\_2/kravchyna/index.html](http://www.firstmonday.org/issues/issue7_2/kravchyna/index.html)

Miltiadou, M. and W. C. Savenye (2003). Applying Social Cognitive Constructs of Motivation to Enhance Student Success in Online Distance Education. *Educational Technology Review*. Vol 11(1).

Ockuly, J. (2003). What Clicks? An Interim Report on Audience Research. Museums and the Web Annual Conference, Charlotte, NC, Archives & Museum Informatics.

Pintrich, P. and D. Schunk. (1996). *Motivation in Education: Theory, Research & Applications*. Englewood Cliffs, NJ: Prentice-Hall

Ruohotie, P. and P. Nokelainen. (2003). Practical considerations of motivation and computer-supported collaborative learning.. In *Global Peace Through The Global University System*. Ed. by T. Varis, T. Utsumi, and W. R. Klemm. Hameenlinna, Finland: University of Tampere.

Sarraf, S. (1999) A Survey of Museums on the Web: Who Uses Museum Websites? *Curator* Vol. 42(3)

Schaller, D.T., S. Allison-Bunnell, M. Borun and M. B. Chambers. (2002). How Do You Like To Learn? Comparing User Preferences and Visit Length of Educational Web Sites. Proceedings of MW2002.

How to Conduct a Web Survey. Consulted on February 9, 2004. <http://www.webpoll.com>

Wigfield , A. and Eccles , J. S. (2000). Expectancy–Value Theory of Achievement Motivation *Contemporary Educational Psychology* 25, 68–81.

Woolfolk, A. (2001). *Educational Psychology, Eighth Edition*. Boston, Allyn and Bacon.

Young, R. (1985). Encouraging environmentally appropriate behavior: The role of intrinsic motivation. *Journal of Environmental Systems*, 15(4), 281-292.

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