

University of Michigan Museum of Art  
Digital Dialogue Table

Summative Evaluation Report



July, 2010

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## EXECUTIVE SUMMARY

### Summative Evaluation Report University of Michigan Museum of Art Digital Dialogue Table

The University of Michigan Museum of Art (UMMA) DialogTable is a dynamic digital interactive storytelling and social learning tool located in the Vertical Gallery of the new Frankel Wing. Available on-site to the public during and after gallery hours, it allows multiple users to explore topics and relationships suggested by works of art within UMMA's collections. Some of the activities visitors can participate in at the DialogTable include: watching movies about works of art, artists, and ideas found in UMMA's collections galleries; discovering connections among works from different time periods and places around the globe; creating a collection pool of favorite objects; and finding the location and other basic information about works on view in the collections galleries.

In order to find out more about whether the goals of the Table were met and how visitors benefit from their experiences with the DialogTable, UMMA contracted with Audience Focus to undertake a summative evaluation project. The following questions represent the focus of this summative evaluation: How do visitors use the DialogTable?; How do visitors benefit from interacting with the DialogTable?

Three data sources, using two methodologies were used in this study: Data source 1) Level 1 observations (broad view); 2) Level 2 observations (focused view); and 3) a written survey administered to subjects of the Level 2 observations. Data collection occurred over a five month period, beginning January 2010 and ending early May 2010. Four UMMA interns were recruited and trained by the Audience Focus evaluators to collect data for the evaluation project.

Because the DialogTable is in a public space outside of the Museum's galleries, many people pass through the area on the way to somewhere else. Yet, half of the people passing through the space do notice the Table and, of those, a large majority of them engage with the Table to some degree, suggesting that the Table is successful at attracting and holding visitors' attention. Not surprising, weekend visitors interact more with the DialogTable than do weekday visitors, suggesting that the leisure, more playful mood of weekend visitors are attracted and held by the innovative DialogTable..

Most visitors explored more than one operation during a visit, suggesting that the DialogTable encourages visitors to explore and discover art and artists through many different entry points. Floating objects and movies were the operations used most frequently and very few people created a pool. When visitors did use branching or pools, they did so at a high engagement level suggesting that once people discover these operations they enjoy exploring them. Young adults are more likely to engage with pools and floating objects a higher level than were older age cohorts.

Most visitors could easily figure out how to use the DialogTable or figure it out after a few attempts and very few visitors appeared outwardly frustrated. Even if minor challenges were encountered initially, visitors seemed to persevere and enjoy their interactions with the Table.



Young adults and visitors who are knowledgeable about technology figured out how to use the Table more quickly than older age cohorts and people who rated themselves as less knowledgeable about technology.

Visitors consider the DialogTable a unique experience that sparks their curiosity and they appear to appreciate the different approaches to art and enjoy opportunities to explore and discover on their own. Learning new things received a moderately high rating compared to other benefits related to curiosity, fun, and uniqueness. Given that the DialogTable was designed as a playful experience, suggests that the approach was well-targeted and appreciated by visitors. The DialogTable was not likely to be a major stimulus for people to go see art in the galleries. People tend to come to art museums to see art so they do not need extra stimulus to go into the galleries. Visitors tended to rate the benefit statement related to social interaction rather low, yet, observations suggest that visitors watch each other as a way to learn how to use the table. In addition, people visiting in groups tend to have less frustration related to learning how to operate the Table. It is possible that the way the benefit statement related to social interaction is not properly phrased to capture what observations have revealed.

### Recommendations

It may be possible to encourage visitors to use more operations, like branching and pools, by providing more direct instruction. The easiest, least costly approach would be in the form of large, colorful, photographic instructions on the wall, with as few words as possible. Keeping the design open and playful would also communicate the spirit in which you hope visitors engage with the DialogTable. A more complicated process would be a video flat screen on the wall, cycling through the different operations or to have more tutorial segments that float on the Table itself.

Since the average time spent at the Table was just over five minutes, future additions to stories and movies will need to be brief to encourage wider exploration within the operations. It might be helpful to calculate how long a visitor would have to stay at the table to move through all of the operations at least once. As future content is considered it is recommended that the average time of visit be considered as these segments are designed.

The scope of this study did not include collecting data on visitors' use patterns at the DialogTable during "extended hours." This may be an interesting topic to explore in the future to see if the Table is used in the same ways as observed during museum-open hours.

In the future, as visitors become more comfortable with the technology, it is possible that they will seize the opportunity to explore connections more frequently. Subsequent studies should assess some of the same measures as assessed in this study, particularly the use of operations and the usability scales.



# University of Michigan Museum of Art Digital Dialogue Table

## Summative Evaluation Report

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### INTRODUCTION

The University of Michigan Museum of Art (UMMA) DialogTable is a dynamic digital interactive storytelling and social learning tool located in the Vertical Gallery of the new Frankel Wing. Available on-site to the public during and after gallery hours, it allows multiple users to explore topics and relationships suggested by works of art within UMMA's collections. Some of the activities visitors can participate in at the DialogTable include: watching movies about works of art, artists, and ideas found in UMMA's collections galleries; discovering connections among works from different time periods and places around the globe; creating a collection pool of favorite objects; and finding the location and other basic information about works on view in the collections galleries.

The DialogTable is one component of the much larger three-year Interpretive Project undertaken by UMMA to re-imagine the way that visitors experience the Museum. As part of the larger vision, UMMA hopes to create a museum environment conducive to reflection, teaching, and close looking, while enabling visitors to deepen their experiences through self-directed, layered multimedia interpretation. UMMA has also deployed installation and interpretation strategies that emphasize the visual encounter with outstanding original works of art while fostering connections across media, disciplines, geographies, and cultures. There are three primary tools designed to accomplish these broader goals: exemplary use of traditional gallery texts (panels, labels, maps); "carry cards" (printed cards addressing a theme or idea within a designated collections area); and the DialogTable. Within this context of fostering connections between works of art and lived experience, the following goals were developed for the DialogTable project:



- To allow visitors to discover and explore UMMA's collections through a diverse set of interactions, including narratives and voices that connect objects, people, and ideas.
- To create visual, thematic, and narrative connections between objects in the collections that cross cultural and geographical boundaries, presenting fresh and interesting perspectives.



- To provide a visitor-driven tool for exploring the above connections. The DialogTable is located in the public zone of the Museum in order to make connections between the persons visiting the Commons or programs after hours and the Museum's collections.
- To create an opportunity for social interaction between different individuals and groups visiting the Museum.

In order to find out more about whether those goals are being met and how visitors benefit from their experiences with the DialogTable, UMMA contracted with Audience Focus to undertake a summative evaluation project. The following questions represent the focus of this summative evaluation:

1. How do visitors use the DialogTable?
2. How do visitors benefit from interacting with the DialogTable?

## METHODOLOGY

Three data sources, using two methodologies were used in this study: Data source 1) Level 1 observations (broad view); 2) Level 2 observations (focused view); and 3) a written survey. The Level 1 observation was initiated in order to determine the number of people who stop at and engage with the DialogTable. The Level 2 observation focused on how much and to what degree people use the DialogTable. Visitors included in the Level 2 observation were also asked to complete the written survey. See Appendix A through D for the data collection protocols.



Figure 1: DialogTable Interns (from left to right) Sara Olds, Courtney Graham, Lauren Altschuler, and Brittany Magee

Source of Data	# of People
Level 1 Observation	4,518
Level 2 Observation	359*
Level 2 Interview	309*

\*Not all visitors observed as part of the Level 2 observation agreed to take the written survey – thus these numbers vary slightly

Figure 2: Number of visitors in each sample

collectors piloted the data collection instruments early January; several iterations of the instruments were tested and refined before final versions were implemented.

During the data collection period, the interns collected data on all six days the museum was open to visitors (Tuesday – Sunday). Figure 2 describes the number

Data collection occurred over a five month period, beginning January 2010 and ending early May 2010. Four UMMA interns were recruited and trained by evaluators to collect data for the evaluation project (See Figure 1). evaluators and student data

	UMMA Sept 09 visitation	Level 1 Observation	Level 2 Observation
Tuesday	13%	8%	10%
Wednesday	16%*	1%	2%
Thursday	21%	7%	13%
Friday	24%	45%	33%
Saturday	14%	13%	22%
Sunday	12%	25%	21%

\* This % is slightly skewed as it includes participants to special programs

Figure 3: Distribution of the total sample according to the day of data collection



of people who were observed and/or responded to the written survey. In an attempt to sample percentages of the population that reflect UMMA's normal visitation patterns and to ensure that traffic flow would be consistent enough to maximize data collection times, more data collection segments were scheduled on busier weekend days, than on slower weekdays (See Figure 3).

## RESULTS & DISCUSSION

Following a description of the sample, the Results & Discussion section is divided into two main sections, reflecting the two key evaluation questions: 1) How do visitors use the DialogTable? and 2) How do visitors benefit from interacting with the DialogTable?

### DESCRIPTION OF SAMPLE

#### Gender

Gender was noted on the Level 2 observations and visitors were asked to indicate male/female on the written survey. This data point was duplicated in case some Level 2 observation subjects declined to complete the written survey. Fifty people who were observed did decline to take the survey. The written survey sample was evenly split at 50% female and 50% male.

#### Age

Age range was collected on the written survey. Figure 4 illustrates the age distribution of the survey sample. UMMA's visitor population is primarily made up of young adults, which although understandable for a university campus, is quite different from art museums in general. Keep in mind that this finding is from people who stopped at the DialogTable and may not represent the age distribution of the general UMMA population.

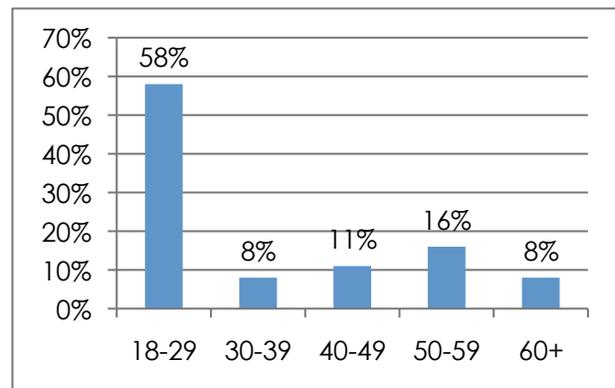


Figure 4: Age distribution from written survey

In order to better understand the role of age in use of the DialogTable, the five age groups were clustered into three "generational" groups, based loosely on the work of John Palfrey and Urs Gasser in the book, *Born Digital* (2008). These generational groupings represent distinct generations as dictated by the availability and use of technology during the lifetime: 1) *Digital Natives* - people under the age of 30 who grew up with technology and do not remember a world without it); *Digital Immigrants* (ages 30- 59) – people whose early years were much less infused with technology, but have adapted and currently use technology in their lives); and *Digital Aliens* (age 60+) - people for whom technology in their formative and young adult years was the radio, television, and 8-track tapes. Not surprising for a university museum, over half of the written

survey participants (58%) fall within the Digital Native range of 18-29 years old. A little over one-third (34%) make up the *Digital Immigrants* and the remaining 8% consists of *Digital Aliens* (See Figure 5).

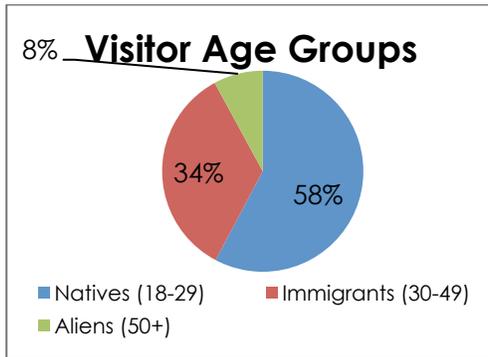


Figure 5: Visitor age groups sorted according to use of technology

One important consideration when clustering age segments in this way is that the digital generation categories were developed according to the year someone was born, and not by his/her actual interest in or use of technology. There are many people born within the Digital Native generation who do not care for and/or use technology, just as there are people falling within the Digital Immigrant or Alien groups that may use technology better and more often than those born as *Digital Natives*. In order to find out whether the sample for this study reflects digital generational trends, analysis was run comparing age group with interest in and knowledge of technology.

On the written survey, visitors were asked to rate on a scale of one through eight (1=Low; 8=very high), their interest in and knowledge of art and technology. When crossing the generational age categories with interest and knowledge ratings an interesting pattern emerges. First consider the distribution of interest and knowledge for the whole sample (Figure 6) where half of the sample claims a high interest (rated a 7 or 8 out of 8 points) in both art and technology, while their knowledge of art is rated lower than their knowledge of technology.

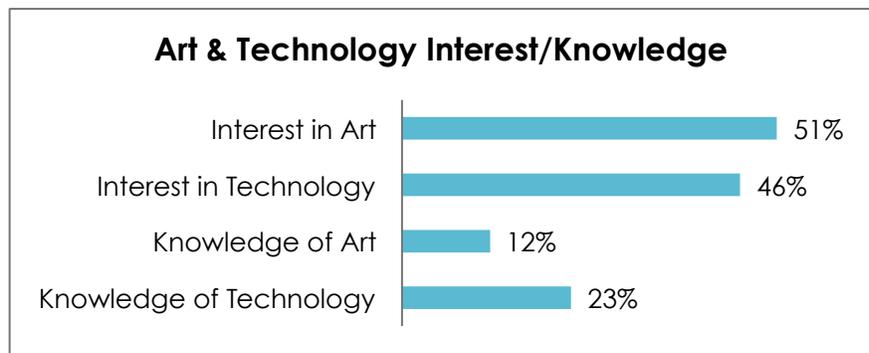


Figure 6: Overall percentage of visitors that rated their interest in and knowledge of art and technology as high.

When the generational age cohorts are cross-tabulated by interest and knowledge definite patterns emerge (See Figure 7). While previous studies in art museum found that visitors typically rate their interest in art much higher than their knowledge of art, as is the case in the UMMA study, around half of the younger cohorts (Natives & Immigrants) rated their interest in art as high (a 7 or 8 on an 8-point scale) while almost three-quarters of the older age cohort (Aliens) rated their art interest as high. The older cohort is also more likely than the younger visitors to rate their art knowledge higher. A reverse relationship occurred in the ratings of technology interest and knowledge. Both younger cohorts were more likely than the older visitors to rate their interest in technology as high. The most interesting finding is the older age cohort's rating of technology knowledge. It is significantly lower than that of the other two age cohorts.

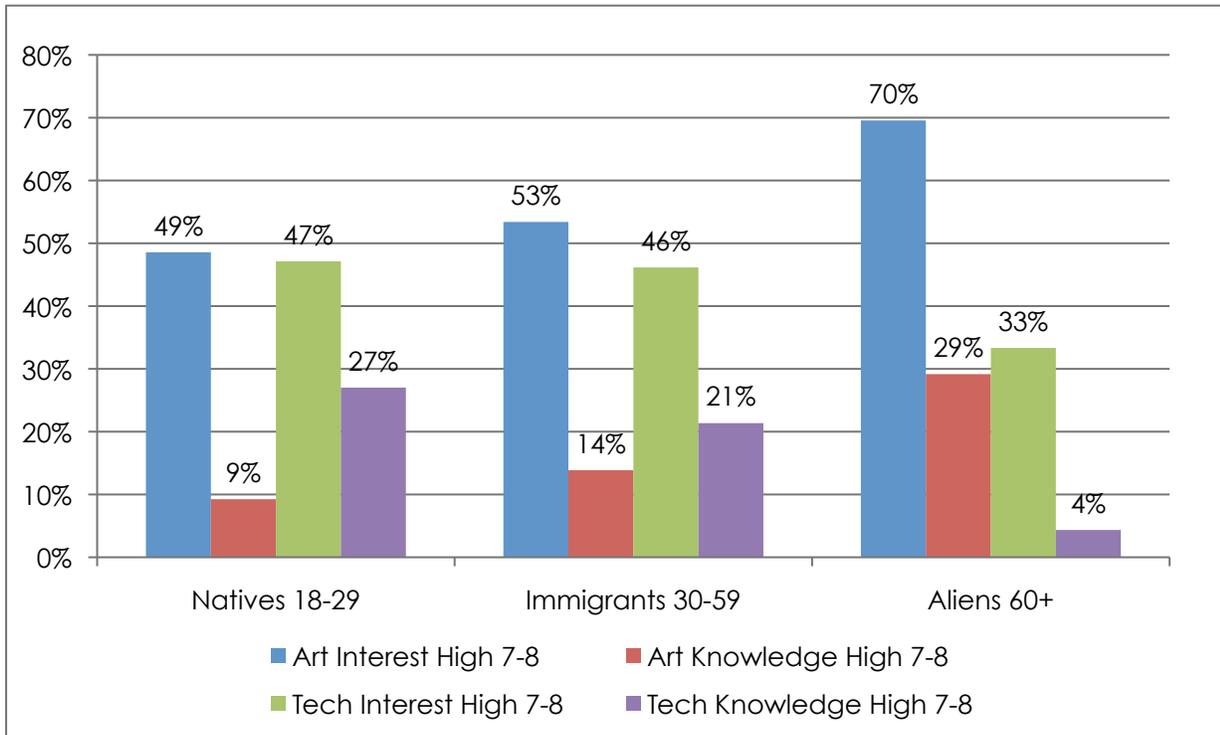


Figure 7: Percent of visitors by generational age cohort rating art and technology interest and knowledge.

### Social Group

As part of the Level 2 observation, data collectors recorded size of social group, or whether the observed person was visiting alone, with one other person, or with two or more people. Slightly over half of visitors (53%) visited the DialogTable with one other person; roughly a third (31%) visited in a larger group of two or more, and the remaining 16% visited alone. Since the DialogTable was designed as a space that supports and encourages social learning, the finding that a majority of people experience it in a social group is encouraging.

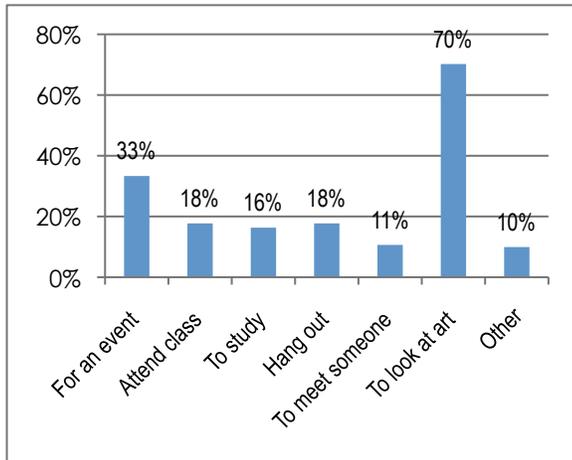
### Association with University of Michigan

DialogTable visitors were also asked on the written survey whether they were current students and/or faculty at the University of Michigan. Just under a third of visitors (30%) were students, and another 9% were faculty. So, while it was not surprising that there were many young adults in the sample, the percentage of 18-29 year olds (58%) compared to the percentage of UM students/staff (30%) is different enough to be interesting. This suggests that many non-UM young people are finding their way to UMMA and the DialogTable.

### Visitation Patterns & Motivations

On the written survey, visitors were asked whether they had visited UMMA since it reopened in March 2009, and if so, for what reason. A little under half of visitors (45%) had visited UMMA in since the reopening which means that the new museum is attracting return visitors. Not

surprisingly, of those visitors who had previously visited UMMA, most said they came to look at art. The next strongest pattern in the data was that of visiting the Museum for an event. The remaining categories were selected almost equally by a much lower percentage of visitors (See Figure 8)



\* Responses do not total 100% as visitors could select as many options as applied

Figure 8: Motivation for previous visits to UMMA

Variables used for comparison in this report

In order to see some differences between the ways different groups use and benefit from the DialogTable, evaluators ran cross tabulations for different variables. Only those variables that showed significant differences were included in this report. Those variables include: age, or digital generation; interest in and knowledge of art and technology; and social group.

HOW DO VISITORS USE THE DIALOGTABLE?

The primary goal of the Level 1 observation was to determine the percent of visitors passing through the Vertical Gallery who stop and engage with the DialogTable. The evaluators drew an imaginary circle around the DialogTable and instructed data collectors to count the number of people who stepped inside that circle and those who did not. Of the 4,518 people observed moving through the Vertical Gallery, roughly half (2,278) did not enter the DialogTable observation circle. Of those people who entered the circle of observation almost all of them (98%; 2,240 of 2,278) at least noticed the DialogTable. Of those who noticed the Table, over half (55%) stopped and engaged with the Table to some degree (See Figure 9).

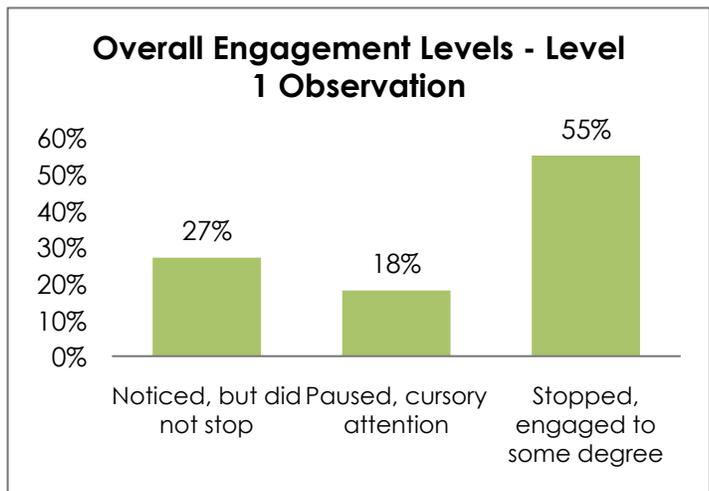
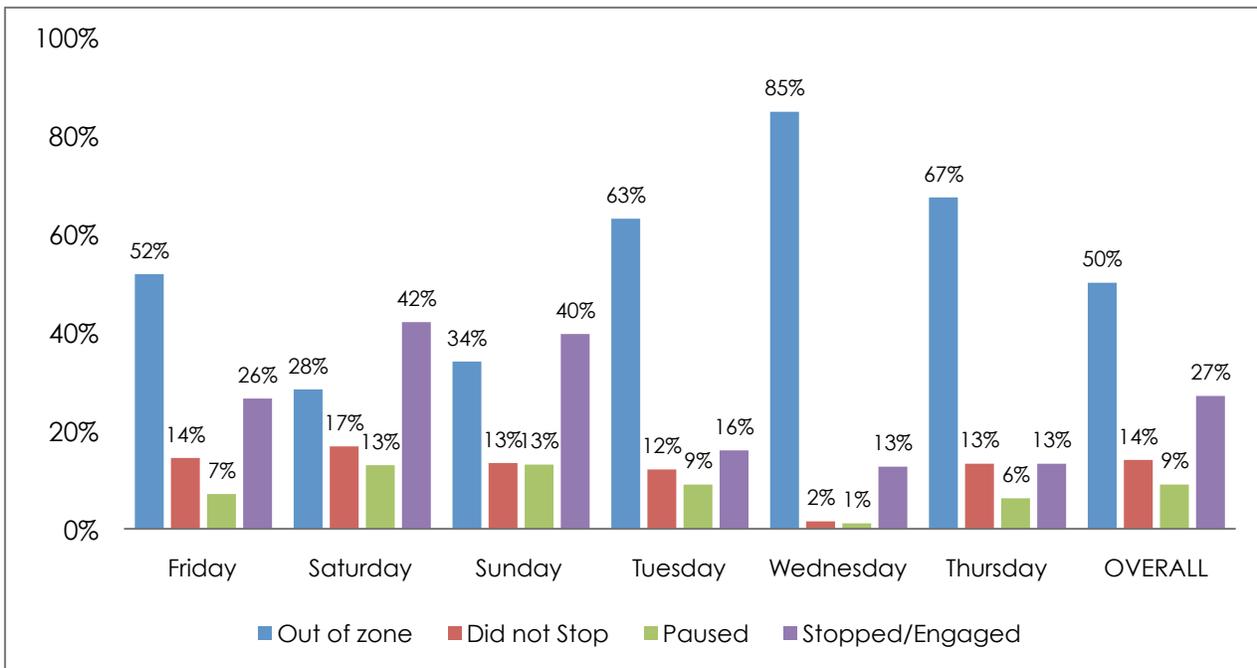


Figure 9 Percentage of people who stopped/engaged with the DialogTable

Just over a quarter of visitors (27%), noticed the DialogTable, but did not stop to use it; another 18% paused at the Table, but did not fully interact. There could be many reasons why some visitors noticed the Table, but did not stop and engage. For example, some visitors may have been passing through the space to get to another appointment or class and just happened to enter the circle of observation. Or some visitors may have interacted with the Table in the past,

and therefore did not stop on this occasion. Without a follow-up interview to find out visitors' motivations for stopping or not stopping at the Table, it is impossible to further explain why some chose to interact and some did not. In any case, that over half of the people who noticed the Table engaged at significant levels is an encouraging result.

Another way to look at the Level 1 observations is to see what visitors' engagement patterns look like throughout the week. (See chart 6). Not surprisingly, there are some significant differences between weekend visitors (Saturday/Sunday) and weekday visitors (Tuesday-Thursday). Overall, visitors passing through the Vertical Gallery on Saturday or Sunday were more likely to pass within the zone of and interact with the Table; whereas, Tuesday through Thursday visitors were much more likely to pass by without taking notice of the Table. Friday



**Figure 10: Percentage of Level 1 visitors that passed by out of zone, did not stop, paused, or engaged with the dialogue table according to day of the week.**

visitors looked more like a hybrid between a weekend and weekday visitor. These findings are not overwhelmingly surprising, as many people work or attend classes during the week and may be using the Vertical Gallery only as a “pass-through” to get from one place to the next. Weekday visitors also most likely have less leisure time to spend and therefore engage less with the table. Weekend visitors on the other hand, seem to use the space differently. Much fewer visitors passed out of range of the Table and those that noticed the table, tended to engage with it at much higher levels than did weekday visitors.

One interesting factor that was not examined in this study was whether visitors passing through the Vertical Gallery during the museum's extended hours from 5pm – 10pm use the DialogTable, and if so, what that interaction looked like. One of UMMA's aims in creating the DialogTable and placing it in the Vertical Gallery was to increase accessibility and attract many visitors to explore and play at the DialogTable, regardless of whether those people also

visit the Museum's permanent collections. For this study, however, all the Level 1 observations were made during lunch hours or in the afternoon (12pm-5pm); only two observations continued slightly into the afterhours, lasting until 5:30pm on a Friday night. In the future, UMMA may want to conduct observations during the extended hours to discover more about whether and how visitors use the Table afterhours.

The Level 2 observations were initiated in order to produce a more in-depth picture of how and to what degree visitors who stop at the DialogTable engage with the operations, as well as the ease at which visitors are able to grasp the technology required to operate the Table.

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## LEARNING THROUGH OBSERVATION

During the pilot testing phase for this study, evaluators and UMMA interns noticed that many visitors watched other visitors at the Table in order to better understand how to operate it. Some visitors watched others initially and then attempted to operate the Table on their own, while others attempted on their own first and then watched others in order to modify and/or confirm their own technique.

In order to find out how prevalent this behavior was at the DialogTable, evaluators noted, in the Level 2 observation, whether the target visitor watched others in order to learn how to use the Table. Of the 351 people observed, over two-thirds (68%) watched how others were using the Table. Of the 42% that did not watch others, ninety-two visitors arrived at the table when no other or only one or two visitors were present at the table. Therefore, it is highly possible that were more people at the table during their visit, some of these visitors would also have observed and/or modeled others' behavior.

Not surprisingly, another factor that influenced whether visitors observed others related to the number of people in the visitor's group. The larger the group, the more likely visitors were to observe others; those who visited alone were much less likely to observe others using the table. Overall, the high numbers of visitors who observe others and model their techniques and behaviors, points to the social nature of the Table. Whether visitors are watching others in order to discover more about how to use the table, or watching others to see what sorts of objects they open and selections they make, it is clear that the nature of the table encourages people to interact with each other – even if only through silent observation.

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## TIME SPENT

To get a better sense of the length of time visitors spend at the DialogTable, evaluators recorded the total number of minutes for each visitor observed. Time spent at the Table ranged from 30 seconds (shortest visit) to 21 minutes (longest visit). The average time visitors spent was 5.4 minutes (See Figure 11).

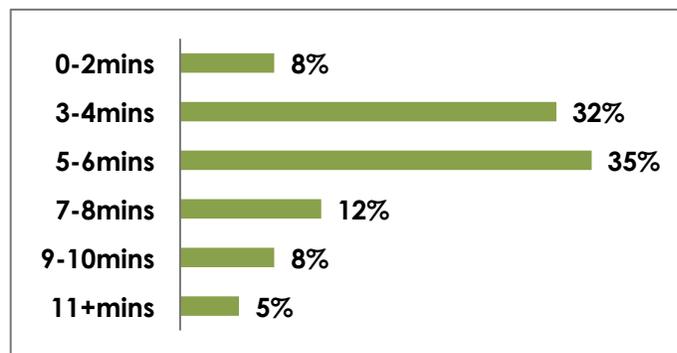


Figure 11: Distribution of time spent at the DialogTable (n=355)



## OPERATIONS: BREADTH (FREQUENCY) OF USE

The DialogTable features a variety of operations or functions that visitors can use to explore information about art and make connections between different artworks and other subjects. Specifically, these operations include:

1. Grasses: an operation that appears as small grass and is organized chronologically – visitors activate and reveal hidden artworks as they wave over grass;
2. Movies: certain artworks are associated with short movies about art, artists and ideas that run approximately two-three minutes – visitors can control the activation of the movies.
3. Floating Objects: rotating artworks float on the table in order to give the appearance of movement and dynamism – visitors can select a floating objects by hovering over the object;
4. Pools: empty pools float on the table for visitors to fill with different objects – visitors create their own collection by placing self-selected objects into their unique pool; pools can be accessed via the UMMA website;
5. Branching: certain artworks are linked visually by connecting lines – visitors can select to follow the automatic connections made between the object they are viewing and another object on the table.

To find out more about how frequently visitors engage with different operations, evaluators counted the number of times visitors used each operation (See Figure 12). Overall, over three-quarters of the visitors used two or three operations during a visit suggesting that when visitors do stop and engage with the Table they explore a range of operations.

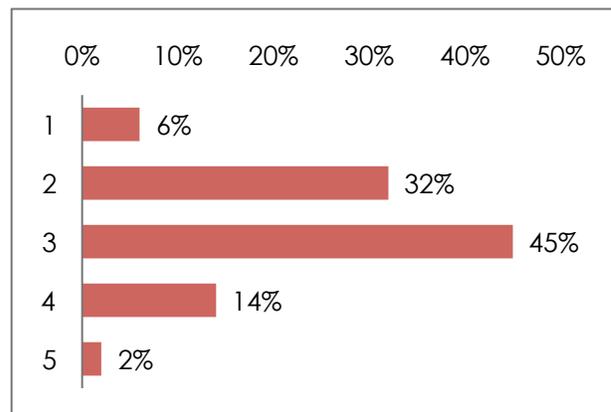


Figure 12: Percentage of visitors who used 1-5 operations

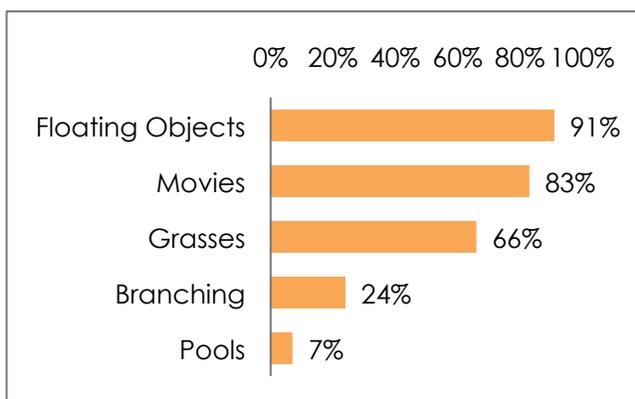


Figure 13: Percentage of visitors who used the operation at least one time during their visit. (n=339)

Evaluators also recorded which operations were used and, some were more frequently used than others (See Figure 13). Almost all visitors who used an operation used *floating objects* and almost all of the visitors operated the *movies*. Two-thirds of the visitors explore the *grasses*. *Branching* was used by about one-quarter of visitors and very few people operated the *pools*.

Visitors may have used the *floating objects* more frequently, as they actually float towards the center of the table and are also constantly in motion, so visitors might

notice them first. Similarly, *movies* are often playing when visitors approach while others are at the table, making that operation more obvious to visitors. In many ways, *movies* are also a sub-feature of the floating objects, so it is not surprising that if floating objects are activated with enough frequency, visitors will also end up activating a movie.

Grasses may have been used less because of their position on the Table. The grasses make up the periphery of the Table and may have been overlooked by visitors. Why visitors used the branching feature less often is not immediately clear. It might be that visitors do not follow the connections because they are still learning how to use Table and they may either miss that they can follow different paths or doing more than one thing at a time is overwhelming. In the future, as visitors become more comfortable with the technology, it is possible that they will seize the opportunity to explore connections more frequently. Finally, very few people used the pools. One reason for this might be that visitors did not notice the pools or did not understand how to use them. Another possibility is that visitors noticed and understood how to use the pools, but simply did not have time or did not prefer to use them. Finding out more about why this finding occurred would require in-depth conversations with visitors about their use of the Table.

The Level 2 observation also captured the total number of times a visitor explored individual operations. For example, some visitors opened several floating objects; whereas, others only opened one and then moved on to another operation or left the Table altogether. When looking at this data, patterns suggest that some operations stimulate multiple uses, whereas others tend to be used only once per visit. Operations that tended to be explored more than once during a visit include *floating objects* (83%), *grasses* (76%), and *movies* (60%). In almost every instance, the *branching* and *pools* operations were used only once during a visit. Given that one of the goals of the DialogTable is to encourage exploration, play, and discovery, it is positive to see that most visitors use their time at the DialogTable to explore many different artworks and make multiple connections via the *floating objects*, *grasses* and *movies*. It is not particularly surprising that visitors who operated the *pools* tend to create only one per visit, as creating a *pool* requires added time and careful thinking. Research into other participatory experiences (in museums and online) has shown that only a very small percentage of people will actually create content; the majority of the users engage in participatory experiences more as observers or critics. The findings from this report further support that research.

## EFFECT OF DIGITAL GENERATIONS ON USE

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When looking at breadth of use through the lens of age cohort (digital generations), very few differences were found. Overall, most visitors attempted to use two or three operations while at the table, regardless of age. One interesting finding is that none of the *digital alien* age cohort attempted to create a *pool*. However, it is important to note that the overall number of *Digital Aliens* observed in this sample is small, so more data is needed to better understand the role of age in relation to the *pools* operation. One possible reason why this group did not use the pools may reflect the novelty of the activity. Programs and activities that emphasize and encourage user-created content, like the *pools*, have only become popular over the past several years. These types of user-generated and feedback driven sites, like Flickr, Pandora, Facebook, and so on, are more commonly associated with *Digital Natives*, and more recently,



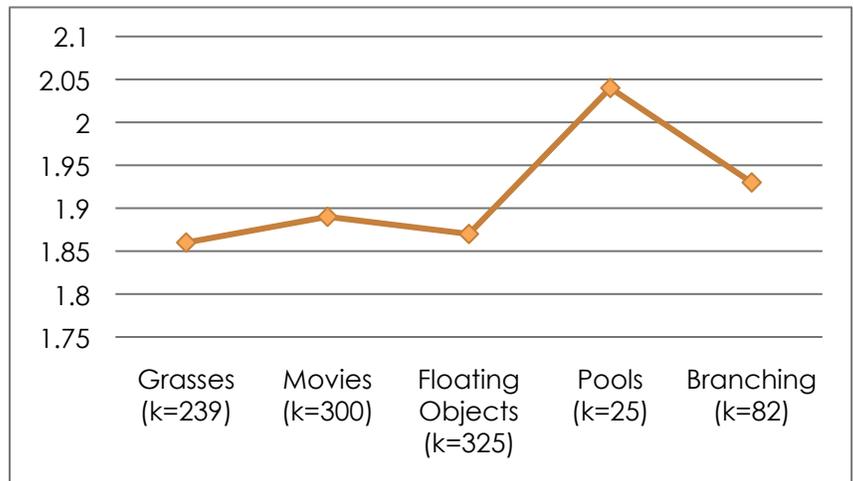
*Digital Immigrants*. Therefore, it not surprising that older visitors may have less interest in and understanding of how to engage with the *pools* operation.

**OPERATIONS: DEPTH (LEVEL) OF USE**

Another goal of the evaluation was to find out more about the degree to which visitors interacted with the DialogTable and its many functions. In order to examine the overall depth to which visitors engaged with each operation, evaluators created a four-point rubric measuring holistic or overall engagement with an operation:

N/A or 0	No attempt; Does NOT engage with operation at all
1	Attempts to open/use function, but does not succeed. Abandons attempt fairly quickly.
2	Opens/uses function with little or no exploration.
3	Easily opens/uses the function. Explores the function broadly (branching and making connections, exploring the function in different ways) and/or in-depth.

The depth at which visitors engaged with each of the five operations reflects a slightly different trend than was found with breadth or frequency of use (See Figure 14). In order to determine depth of use, evaluators ran a weighted mean score, dividing the weighted total of scores by the number of people who used the operation. One interesting finding is while significantly fewer visitors created *pools*, those who did tended to engage with the activity at a high level. A similar trend is seen with *branching*. Visitors seemed to go less in depth with other operations, such as the *grasses*, *movies*, and *floating objects*, despite the fact that these operations were used much more frequently. These findings are encouraging as they support the original intent of the creators in developing each operation. The *floating objects* are brief introductions to the artwork and artists, containing truncated bits of information that are easily digested; the same is true for the *grasses*. It is when visitors choose to go deeper, by following the connections made by *branching* or opening a *movie* that other, richer levels of information are revealed. For those people who want to take their participation with art another step further and create their own connections and collections, the *pools* are available.



**Figure 14: Degree to which visitors interacted with each operation. Chart represents weighted means.**

## USABILITY: LOGISTICS & NAVIGATION

UMMA staff is interested in how easily visitors to the DialogTable can use and navigate the Table. In order to find out more about how the DialogTable functions in terms of usability; evaluators created a four-point rubric to measure the following areas: 1) learning curve, or approximate time it takes visitors to figure out how to use the table; 2) perceived frustration level; and 3) perseverance, or the degree to which visitors abandon or stay with an action. The following represents a brief description of the scale against which visitors were measured.

	0	1	2	3
Learning Curve	n/a	Slow	Moderate	Fast
Frustration level	Very frustrated	Mildly frustrated	Neither frustrated nor pleased	Pleased & encouraged
Perseverance	Abandoned actions quickly	Stays with action briefly; abandons	Stays with action; gets general idea	Stays with action, repeats

Overall, visitors used the Table with a high to moderate level of ease (See Figure 15). Across all three measures, the majority of visitors were observed at a level 2 (moderate) or Level 3 (high). While some visitors did struggle with the learning curve and some displayed lower levels of perseverance, abandoning an operation after a few seconds, a much smaller percentage demonstrated high levels of frustration.

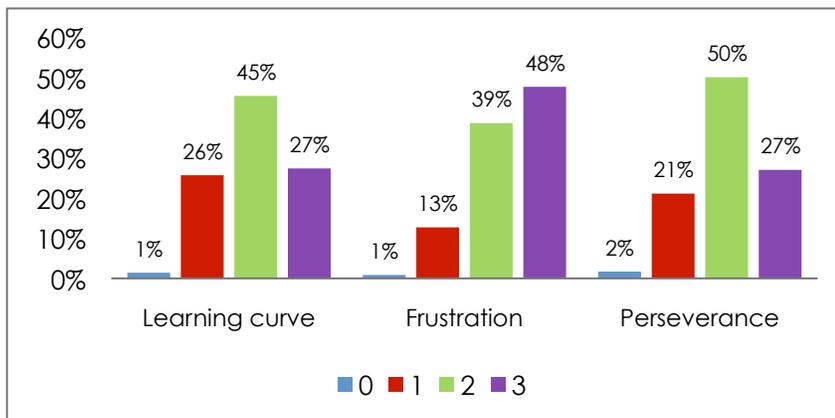


Figure 15: Percentage of all visitors who scored a 0-3 in terms of Learning Curve, Frustration, and Perseverance (n=354)

### EFFECT OF DIGITAL GENERATIONS ON USABILITY

For two usability measures, age appeared to be a factor: 1) Learning Curve - determining the rate at which visitors were able to figure out how to use the table; and 2) Perseverance - determining the degree to which visitors stayed with an action. Age did not influence frustration level.

**Learning Curve:** Not surprising given their exposure to technology, over one-third of *Digital Natives* (40%) were described as being able to quickly figure out how to use the DialogTable.



In comparison, only 17% of *Digital Immigrants* and 4% of *Digital Aliens* emulated the same "quick-learner" behavior. Gesture recognition technology is an innovative and contemporary technology, emerging in cultural institutions like museums only recently. In some ways, the interface used on the DialogTable resembles other motion-responsive technologies, such as touch-screen smart phones and icon-based computer software. These technologies have become ubiquitous over the years, but are probably still more familiar to *Digital Natives* than other generations. While gesture recognition does not function in the same manner as touch-screens as no touch is required, *Digital Natives* would be highly familiar with the notion of manipulating visual images through physical hand movements and dragging and dropping icons to activate information. These skills seem to come as more easily to *Digital Natives* as holding and writing with a pencil does for previous generations.

Perseverance: When looking at perseverance, significant differences did not emerge between *Digital Natives* and *Digital Immigrants*; however, there were significant differences between these groups and *Digital Aliens*. Roughly a third of *Digital Natives* (32%) and a quarter of *Digital Immigrants* (24%) displayed high levels of perseverance, whereas less than 10% of *Digital Aliens* were observed staying with and/or repeating an activity. Why *Digital Aliens* seemed to give up or abandon a task more quickly and easily than younger visitors may have to do with lower levels of familiarity with technology. Perceiving some technology as beyond reach, may lead to lower levels of confidence and the feeling like the tasks will be too difficult to figure out.

## KNOWLEDGE/INTEREST IN ART & TECHNOLOGY

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Knowledge of and interest in technology appears to play a role in most visitors' ability to navigate the DialogTable. Visitors who rated themselves as highly knowledgeable in technology were more likely to quickly ascertain how the DialogTable works than those who rated their knowledge of technology as moderate or low. Close to half (42%) of the high knowledge technology group scored a three on the learning curve scale, versus only 20% of those in the low knowledge technology group.

Tech-savvy and tech-interested visitors also seemed more likely to stay with and repeat an activity (persevere) than were visitors who reported low levels of interest and/or knowledge of technology. While over a third of visitors who rated their knowledge of and/or interest in technology as high also scored a three on the perseverance rubric (38% and 33% respectively), only 20% of visitors who said they had low technology knowledge and 11% of visitors who reported low technology interest scored high on measures of perseverance.

Visitors' levels of interest in and knowledge of art did not appear to be a factor in determining how they scored on any of the usability measures.



## SOCIAL GROUP

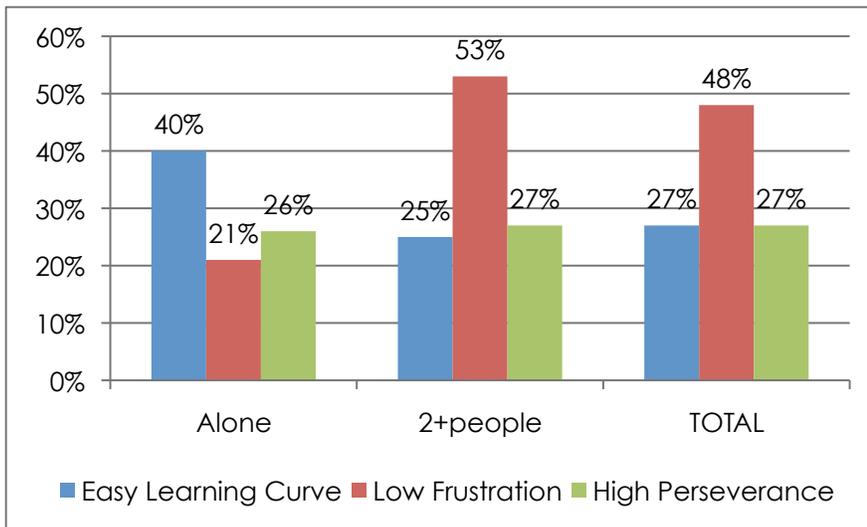


Figure 16: Percent of visitors, by social group, who scored high on usability measures.

Social group did appear to be a factor in how visitors were scored on the usability measures. Visitors approaching and using the Table alone tended to learn how to operate it more easily than those visitors in groups of two or more (Blue bar in Figure 16). Perhaps visitors on their own at the Table are better able to take their time and figure it out. Yet, alone visitors tend to be scored lower on frustration tolerance while learning how to use the Table.

Although visitors using the Table in groups took a bit longer to learn how to use it, they were less likely to exhibit signs of frustration than those using the Table alone (Red bar in Figure 16). Perhaps having other people in the group reduces frustration even though having more people in the group slows visitors down in learning how to use the Table.

There were no differences in usability scores on Perseverance by social group.

## HOW DO VISITORS BENEFIT FROM INTERACTING WITH THE DIALOGTABLE

In order to find out more the benefit of the DialogTable experience, visitors rated a series of benefit statements on the written survey. An initial total of nine benefit statements were created by combining previous research on the ways visitors benefit from interactive experiences in museums with input from UMMA educators on the ways they hoped and/or predicted visitors would benefit. During the pilot phase, these benefit statements were tested with visitors using a card sort method (See Appendix E). In the pilot testing card sort activity, visitors were asked to sort the benefit statements according to level of importance. For instance, visitors sorted each benefit into one of four categories: very important, moderately important, somewhat important, and not important. To ensure that the statements were clear and understandable, visitors were also asked to comment on the wording of the benefit statements and point out any phrases that were confusing and/or did not seem to apply to their experience at the DialogTable. From this pilot testing, evaluators found that a majority of visitors identified most of the benefits as being either very important or moderately important, signaling the statements were appropriate for the types of experiences visitors were having at the DialogTable. Only one of the benefit statements, *I found links between the Table and my personal experience and interests*, was not included in the final written survey, as many visitors found the statement unclear and or did not feel like it was an important benefit. The remaining eight benefit statements were included in the final written survey with only minor adjustments to wording. The final eight benefit categories evaluated on the written survey include:

1. It was fun, enjoyable
2. It was a unique experience
3. It sparked my curiosity
4. It made me want to see art in the galleries
5. I liked interacting with other people
6. I appreciated the different approaches to art
7. I liked exploring and discovering on my own
8. I learned something new

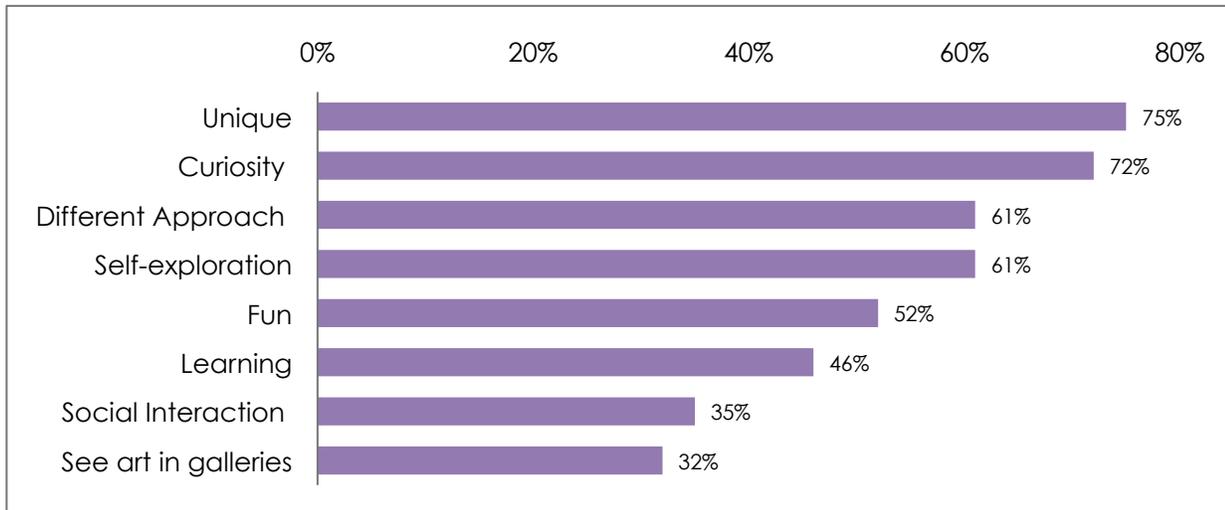
To better identify how visitors felt they benefited most, overall percentages of people who rated benefits very high (a 7-8 on the eight-point scale) were tallied (See Figure 17).

With only a handful of gesture-recognition interactive exhibits in existence, it is not surprising that a strong majority of visitors felt that their experience at the DialogTable was unique. It is highly probable that the novelty of the DialogTable was a factor in sparking visitors' curiosity. As visitors were not interviewed as to what, in particular, stimulated their curiosity, it is not clear whether it was mostly the technology that stimulated their curiosity, or whether it was the content – or a combination of both. Regardless of whether it was the technology or content, the fact that so many visitors reported high levels of curiosity is encouraging, as curiosity is almost always associated with increased levels of interest and learning.

Visitors also felt they benefited from having so many different approaches to art available at the DialogTable and that they were able to explore and discover on their own. Prior research supports these findings in that museum visitors desire to see and do something at the museum



that they cannot do anywhere else and to have choice and control over their learning experiences. Both findings show that the DialogTable is effective in serving as a visitor-driven tool that allows users to explore art and make connections in their own ways and through a variety of approaches and entry points.



\* The overall sample size was n=309 with some variations because of missing data on the following benefits: See art in the galleries n=308; Social interaction n=288; Different approach n=308; Self-exploration n=306)

**Figure 17: Overall percentage of visitors who rated each benefit as very high, or a 7-8 on the eight point scale.**

Having fun and learning were considered important benefits by about half of the visitors. Because most people visit the museum as part of their leisure time they expect to have an enjoyable time and they expect that the experience will be enlightening and educational.

While the benefits *I liked interacting with other people* and *It made me want to see art in the galleries* were rated somewhat lower than other benefits, around one-third of visitors (35% and 32% respectively) did rate these benefits as very high.

There are a few reasons why the benefits of social interaction and stimulus to see art in the galleries were rated lower than the other benefits. It is surprising that the social interaction benefit was rated so low given the other findings that people learned from each other and they were less frustrated when in a social group. Consequently, it is possible that the wording of the statement was not reliable – that visitors did not understand the statement in the way the evaluators and UMMA staff intended for it to be understood. That this statement was left unanswered by twenty-one people suggests that people found it difficult to answer. For example, when looking at the data, people who visited the table alone during times when there were no or very few other visitors almost always left this question blank or rated this measure as a one (or very low). Were this survey to be used in the future, an option for visitors to select N/A might help reduce the missing data.

Another way to look at this finding is to consider the findings on social interaction in the front-end and formative stages of evaluation for the DialogTable. In multiple focus group discussions, participants were asked, in various ways, about the potential of the Table to

stimulate social interaction. The general trend in these conversations was that people were uncomfortable with the idea that the Table might require social interaction among strangers. Although this study found many instances where visitors were “interacting” with each other, familiar friend and strangers, visitors may not see these interactions as related to the benefit statement, “*I liked interacting with other people.*”

The lower rating for the benefit item, “*It made me want to see art in the galleries,*” may have received a lower rating because visitors using the Table might have already viewed art in the galleries that day. Another consideration is that, since visitors to an art museum come predisposed to see art, they might have perceived that interacting with the DialogTable neither strengthened that desire nor detracted from it. Finally, some people may not have had any intention to view art in the galleries that day if they were just passing through the space or stopping briefly to chat with friends; in those cases, these visitors may have been delighted just to have an opportunity to interact with art in a casual and playful manner.

## DESCRIBING EXPERIENCES AT THE DIALOGUE TABLE

In order to capture visitors' own words and feelings about the DialogTable, they were asked to write down a word or phrase that described their experience that day. Two hundred six people answered this question and responses were coded and counted according to seven emerging concept categories (See Figure 18).

Concept Categories	Examples	%	#
<b>WOW!</b>	interesting, intriguing, awesome, cool, fantastic, incredible, amazing, awe-inspiring, engaging	41%	84
<b>USABILITY</b>	frustrating, confusing, hard to use, hard to hear, tricky, challenging, non-intuitive,	21%	44
<b>FUN</b>	fun, entertaining, playful, funky, enjoyable, amusing	19%	40
<b>UNIQUE</b>	unique, innovative, different, creative, never seen anything like it before, futuristic, modern	17%	36
<b>INTERACTIVE</b>	interactive, tactile, hands-on	5%	10
<b>INFORMATIVE</b>	informative, enlightening, learn new facts, great art	4%	9
<b>CURIOSITY</b>	curiosity, makes me curious	1%	3

Figure 18: Counts of descriptors of the DialogTable

Many visitors offered responses that fell into more than one category. For example, people wrote such words as, “interesting and unique” or “frustrating, but fun.” Therefore, these phrases were sometimes split apart and coded into different categories. When looking at overall number of instances a category was mentioned, comments falling under the category of “Wow!” were most frequently written. Many visitors seemed thrilled and excited about the DialogTable, saying things like “awesome,” “rad,” and “out of this world!” The word cloud in Figure 19 illustrates the frequency with which words were used by visitors.





Figure 19: Word cloud illustrating frequency of visitors' words describing the DialogTable.

The next category with many responses was *Usability*, including comments related to how easily visitors were able to use the Table and overall functionality of the technology. Several visitors referred to their experience as “frustrating” or “confusing.” Some of these people, however, added things such as,

“confusing, but cool,” or “initially confusing, but enjoyable,” suggesting that despite the initial challenges in using the technology, the overall experience remained interesting and enjoyable. Reinforcing this idea were are visitor comments explaining that using the Table was only initially frustrating, but after having someone show them how to use it, or by watching others, or figuring it out on their own, interacting with the Table eventually turned into a enjoyable and rewarding experience. Of course, there were still a handful of people who found the Table too challenging or difficult to use. A few people said that while they approached the DialogTable excited, they left disappointed. Often this disappointment

related directly with specific challenges they encountered with the technology, such as low sound levels, lack of instructions, low visibility, and difficulty selecting objects. Two people mentioned that the Table seemed “counter-intuitive” and not “user-friendly” in that they automatically assumed that it was a touch-screen. Finally, one person said that there seemed to be a “low payoff.”

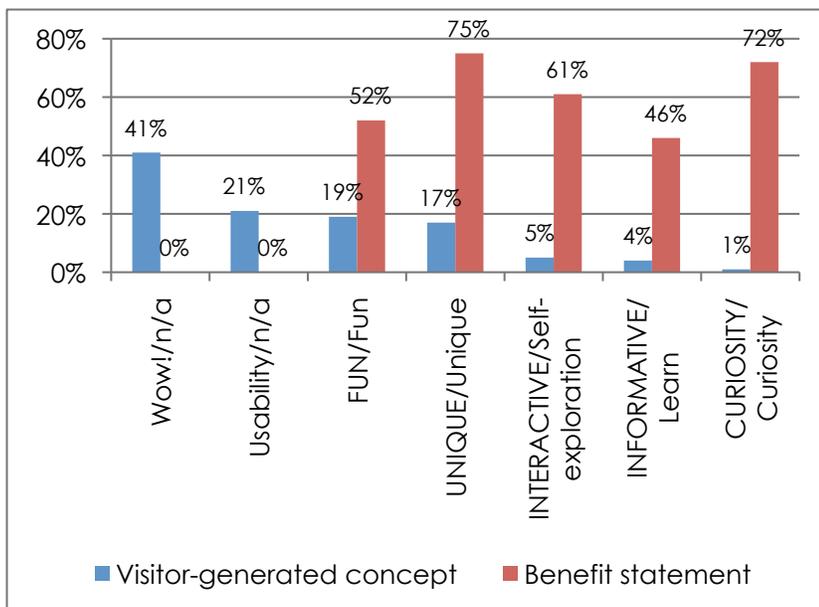


Figure 20: Comparison of visitor-generated words with related benefit statements.

Another category that received many responses was “Fun.” These visitors referred to their experiences at the DialogTable as being “fun,” “playful,” and “amusing.” The

benefit statement “It was fun, enjoyable” was rated as high by 75% of visitors so it is not surprising that words related to the category of fun emerged so frequently (See Figure 20).

Supporting findings from the benefit statements, many visitors highlighted the uniqueness of the DialogTable. Several people explained that they had never seen or done anything similar to the DialogTable in the past, while others used words like “innovative,” “creative,” and “different.” Others pointed-out the “futuristic” qualities of the Table; one person compared the Table to the science-fiction themed movie, “Minority Report.” Finally, the “modern” and “contemporary” nature of the Table was also referred to as a plus. All of these findings suggest that visitors deeply appreciated having the opportunity to engage with something so unique and of the time.

The last three categories received much fewer responses, but still seemed to be important. Ten people described their experience at the DialogTable as being interactive. Some of these people referred to the Table as being “hands-on” or “tactile.” One person said using the Table made her feel like a kid “finger painting.”

Nine people focused on learning when discussing their experiences. These people wrote comments, such as, “it’s an interesting way to learn new facts,” and “it was very informative.” Almost half of the visitors rated the benefit statement related to learning as high, lower than other statements related to curiosity, self-exploration, uniqueness, and fun. This finding supports the DialogTable creators’ intent that the experience not be a traditional learn-new-facts interface. Instead, play, fun, and discovery were more important to the Table development team and, from this data, it appears to be equally important to the visitor.

Finally, three people said that using the DialogTable made them curious. While only three people referred to increased curiosity in the open-ended question, many people rated this benefit statement high, suggesting that while the Table certainly did spark curiosity, the topic was not top of mind by the time they had completed the written survey.

## CONCLUSIONS & RECOMMENDATIONS

### HOW DO VISITORS USE THE DIALOGTABLE?

- When visitors walk by the DialogTable and notice it, a large majority of them engage with the Table to some degree, suggesting that the Table is successful at attracting and holding visitors’ attention.
- Weekend visitors interact more with the DialogTable than do weekday visitors. It is probable that weekend visitors are more likely to be in the museum on their leisure time than people during the weekend who might be passing through on a workday or school day. Therefore, this finding suggests that the Table is successful at attracting the leisure visitor who is more likely to be in a playful mood.
- The average time spent at the Table was just over five minutes per visit; the shortest visit was a few seconds while the longest visit was over twenty minutes.
- Most visitors explore more than one operation during a visit, suggesting that the DialogTable does encourage visitors to explore and discover art and artists through many different entry points.



- Floating objects and movies were the operations used most frequently. These operations seem to work hand-in-hand and are also perhaps the most noticeable and eye-catching operations on the Table.
- Fewer visitors followed the connections made through branching. It might be that visitors do not follow the connections because they are still learning how to use Table and following different paths and/or doing more than one thing at a time seems overwhelming. Another possibility is that some visitors might prefer to focus on or are satisfied with the information they have at-hand.
- Very few people created a pool. It is possible that some people did not notice or understand how to use the pools. Another important fact to consider is that other research into other participatory experiences (in museums and online) has shown that only a very small percentage of people will actually create content; the majority of the users engage in participatory experiences more as observers or critics. Therefore it might be expected that only a small number of users will ever create a pool of their own.
- When visitors did use branching or pools, they did so at a high engagement level suggesting that once people discover these operations they enjoy exploring them.
- Young adult visitors (*Digital Natives*) are more likely to engage with pools and floating objects at a higher level than were older age cohorts.
- Visitors were able to use the DialogTable with a high to moderate level of ease. Most could easily figure out how to use the Table or figure it out after a few attempts and very few visitors appeared outwardly frustrated. Even if minor challenges were encountered initially, visitors seemed to persevere and enjoy their interactions with the Table.
- *Digital Natives* and visitors who are knowledgeable about technology figured out how to use the Table much more quickly than older age cohorts and people who rated themselves as less knowledgeable about technology.

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## HOW DO VISITORS BENEFIT FROM INTERACTING WITH THE DIALOGTABLE?

- Visitors consider the DialogTable a unique experience that sparks their curiosity.
- Visitors appreciate the different approaches to art and enjoy opportunities to explore and discover on their own.
- Learning new things received a moderately high rating compared to other benefits related to curiosity, fun, and uniqueness. Given that the DialogTable was designed as a playful experience, suggests that the approach was well-targeted and appreciated by visitors.
- The DialogTable was not likely to be a major stimulus for people to go see art in the galleries. People tend to come to art museums to see art so they do not need extra stimulus to go into the galleries.
- Visitors tended to rate the benefit statement related to social interaction rather low, yet, observations suggest that visitors watch each other as a way to learn how to use the table. In addition, people visiting in groups tend to have less frustration related to learning how to operate the Table. It is possible that the way the benefit statement related to social interaction is not properly phrased to capture what observations have revealed.



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## RECOMMENDATIONS

### Easing the Learning Curve

It may be possible to encourage visitors to use more operations, like branching and pools, by providing more direct instruction. The easiest, least costly approach would be in the form of large, colorful, photographic instructions on the wall, with as few words as possible. Keeping the design open and playful would also communicate the spirit in which you hope visitors engage with the DialogTable. A more complicated process would be a video flat screen on the wall, cycling through the different operations or to have more tutorial segments that float on the Table itself.

### Pacing Future Segments

Since the average time spent at the Table was just over five minutes, future additions to stories and movies will need to be brief to encourage wider exploration within the operations. It might be helpful to calculate how long a visitor would have to stay at the table to move through all of the operations at least once. As future content is considered it is recommended that the average time of visit be considered as these segments are designed.

### Future Study Recommendations

The scope of this study did not include collecting data on visitors' use patterns at the DialogTable during "extended hours." This may be an interesting topic to explore in the future to see if the Table is used in the same ways as observed during museum-open hours.

In the future, as visitors become more comfortable with the technology, it is possible that they will seize the opportunity to explore connections more frequently. Subsequent studies should assess some of the same measures as assessed in this study, particularly the use of operations and the usability scales.

## References

Palfrey, J. & Gasser, U. (2008) *Born Digital: Understanding the first generation of digital natives*. Philadelphia: Basic Books of the Perseus Book Group.



APPENDIX A: FOCUSED OBSERVATION LEVEL 1 DATA COLLECTION FORM

**Day:**  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday

**Time Block:** Start Time \_\_\_\_\_ End Time \_\_\_\_\_ Total number of minutes \_\_\_\_\_

**Observer:**  Brittany  Courtney  Lauren  Sara

**Level 1: Focused Observation**

OUTSIDE OF ZONE	INSIDE ZONE		
Passed By out-of-zone	Did not stop	Paused, cursory attention	Stopped, engaged to some degree
<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>



APPENDIX B: FOCUSED OBSERVATION LEVEL 2 DATA COLLECTION FORM

**Day:**  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday

Start Time \_\_\_\_\_ End Time \_\_\_\_\_ Total number of minutes \_\_\_\_\_

**Observer:**  Brittany  Courtney  Lauren  Sara

**Sex:**  Male  Female

**Social Group on Approach:**  Alone  With 1 other person  With 2+ other people

Did visitor watch other visitor(s) to learn how to use the Table?  YES  NO

Crowd level when arrived at Table:  None/Few  About ½ full  Almost full

Operations	Use	Holistic Quality Score (1- 2 - 3)
Grasses		
Movies		
Floating Objects		
Pools		
Branching		

Usability: Logistics, Navigation	0	1	2	3
Learning Curve	n/a	Slow – figures some things out, lots of things not	Moderate – figures out by end of time	Fast – figures out with 1-3 attempts
Perceived Frustration level	Seemed very frustrated, discouraged	Seemed mildly frustrated	Seemed neither frustrated nor pleased	Seemed pleased, encouraged
Perseverance	Abandoned actions almost immediately after beginning	Stays with action for a few seconds but soon abandons	Stays with action until gets the general idea	Stays with action, repeating over & over

**Observation Notes**



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## APPENDIX C: LEVEL 2 FOCUSED OBSERVATION: HOLISTIC SCALE RUBRIC

N/A - Does NOT engage with operation at all

1 - Attempts to open/use function, but does not succeed. Abandons attempt fairly quickly.

2 - Opens/uses function with little or no exploration.

3 – Easily opens/uses the function. Explores the function broadly (branching and making connections, exploring the function in different ways) and/or in-depth.



APPENDIX D: WRITTEN SURVEY

Please rate how much these statements describe your experience at the DialogTable:

	Not at all	Very Much
It was fun, enjoyable.	1 2 3 4 5 6 7 8	
It was a unique experience.	1 2 3 4 5 6 7 8	
It sparked my curiosity.	1 2 3 4 5 6 7 8	
It made me want to see art in the galleries.	1 2 3 4 5 6 7 8	
I liked interacting with other people.	1 2 3 4 5 6 7 8	
I appreciated the different approach to art.	1 2 3 4 5 6 7 8	
I liked exploring and discovering on my own.	1 2 3 4 5 6 7 8	
I learned something new.	1 2 3 4 5 6 7 8	

Gender: (Check one)     Male     Female

Age range: (Check one)  18-29     30-39     40-49     50-59     60-69     70+

Have you visited UMMA since it reopened in March 2009?     YES     NO

If yes, check all the reasons that apply:

<input type="checkbox"/> For an event	<input type="checkbox"/> Attend class	<input type="checkbox"/> To study	<input type="checkbox"/> Hang out
<input type="checkbox"/> To meet someone	<input type="checkbox"/> To look at art	<input type="checkbox"/> Other _____	

Are you currently a student at the University of Michigan?     YES     NO

If yes, what is your major/expected major?

Are you currently faculty or staff at the University of Michigan?     YES     NO

If yes, what is your area/department?

How would you rate your interest & knowledge in **ART**?

	Low	Very high
<b>INTEREST in art</b>	1 2 3 4 5 6 7 8	
<b>KNOWLEDGE in art</b>	1 2 3 4 5 6 7 8	

How would you rate your interest and knowledge in **TECHNOLOGY**?

	Low	Very high
<b>INTEREST in technology</b>	1 2 3 4 5 6 7 8	
<b>KNOWLEDGE in technology</b>	1 2 3 4 5 6 7 8	

Write a word or phrase that best describes your experience at the DialogTable today.



APPENDIX E: BENEFITS CARD SORT ACTIVITY USED DURING PILOT TESTING

<p><b>It was fun, enjoyable!</b></p>	<p><b>It was an amazing and unique experience!</b></p>	<p><b>It sparked my curiosity.</b></p>
<p><b>It made me want to go see the real art in the galleries.</b></p>	<p><b>I liked the exchange with other people at the DialogTable.</b></p>	<p><b>I appreciated the different approaches to art.</b></p>
<p><b>I liked exploring and discovering things on my own.</b></p>	<p><b>I learned a lot about art or artists.</b></p>	<p><b>I found links between the Table and my personal experience and interests.</b></p>

