

MULTIMEDIA RESEARCH

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**SCIENCENTRAL NEWS
Formative Evaluation
In Maryland Science Center**

Report for
ScienCentral, Inc.



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Research Report No. 07-013
August 28, 2007

TABLE OF CONTENTS

INTRODUCTION	1
METHOD	1
Procedure	1
Maryland Science Center Link Areas	2
RESULTS: LARGE SCREEN VIDEOS	6
Video Appeal	6
Science Content	10
Potential Impact	12
RESULTS: VIDEOS ON HANDHELD DEVICE	13
SUMMARY	15
APPENDIX	17

INTRODUCTION

This formative evaluation gathered feedback from adults in response to 18 short format ScienCentral videos played on large screens in three areas of Maryland Science Center. Additionally, museum visitors reacted to ideas for museum usage of a handheld device. The general goals for the formative evaluation were:

- To determine appeal of large screen video format;
- To assess large screen videos with respect to reactions to the science content;
- To learn which current science topics visitors are interested in;
- To estimate personal impact of viewing large screen videos; and
- To explore uses of a handheld device with small format videos in the museum setting.

METHOD

Procedure

Over an August Friday and Saturday, two researchers recruited adults to view ScienCentral 90-second videos on large screens in each of three Maryland Science Center exhibit areas: TerraLink, SpaceLink and BodyLink. The Link areas are pictured and described in more detail in the following pages.

Within each Link area, at least five male adults and five female adults were asked to view one of six videos and then complete a one-page questionnaire, yielding a minimum of 10 respondents for each video within a Link and 60 respondents in each Link. The final sample comprised 190 adults with an equal gender distribution. The questionnaire included four open-ended questions asking what visitors liked or did not like about the video they viewed, what current science topics they would like to see, and anything else they'd like to tell the museum about the current news video concept. Respondents also indicated their level of agreement or disagreement with 13 statements covering appeal, content, and intention to act further after seeing the video.

During the data collection period, non-recruited adults in the Link areas were observed unobtrusively to determine if they viewed the large screen videos spontaneously.

Additionally, feedback was obtained from adults about visitors' potential use of a handheld device in the museum. A Dell Axim X51 PDA (personal digital assistant) with earphones was preloaded with three 90-second videos, one related to each link area (see photo). One researcher recruited 9 males and 9 females to view one video on the handheld and to read and be interviewed about three written scenarios describing potential use of handhelds in the museum.



Maryland Science Center LINK areas

TerraLink

The photo to the right presents the visitor's view as he enters the TerraLink area. We showed ScienCentral videos on the back left screen, indicated by the arrow.

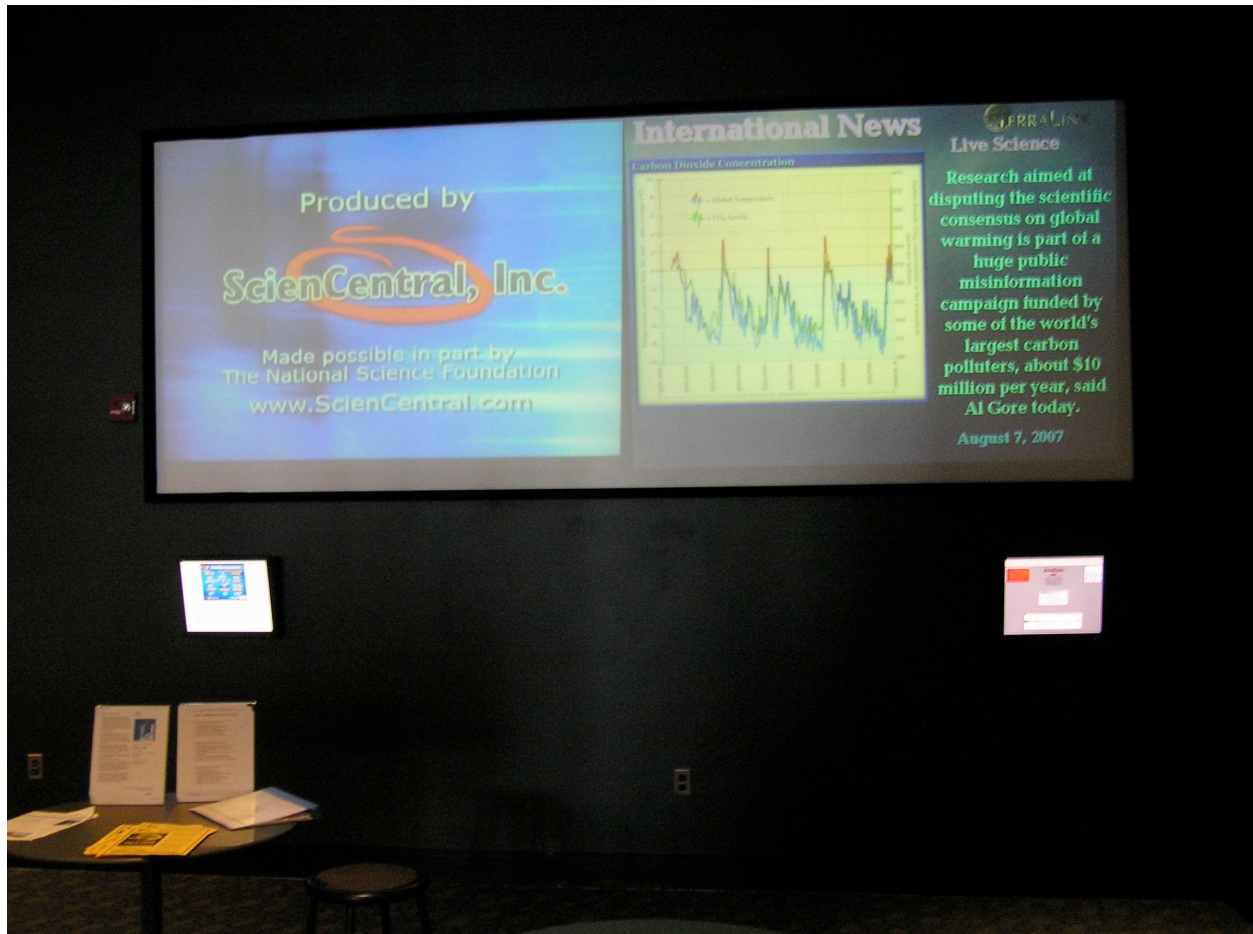
To the right of the entrance is a very popular tornado maker, on which staff member Chris is sitting (see second photo). The arrow again marks our ScienCentral presentation screen.

To the left of Chris are interactive stations (see left photo below). Behind Chris are muted video information stations at eye level (see right photo below). Visitors using any of these stations have their back to the large video screens.

The TerraLink area is off of the first floor lobby and is one of the first areas in which visitors congregate in the morning. During our observations on Friday and Saturday, we did not see one adult spontaneously view the ScienCentral videos. In the crowded area, visitors' attention remained at eye level and below, working the interactives or watching their kids. It's possible that adults were processing the audio alone but unlikely because the area is noisy with the tornado maker and crowd sounds.



In TerraLink, still visuals were rotated on the right-hand screen while ScienCentral videos played on the left side. The typical visitor movement was counter-clockwise: watch the tornado develop, move past it to the left to play an interactive or to the right to view the information screens about weather (hurricanes, current weather). Stopping to view the large screens puts one in the midst of the traffic flow, so people went with the counter-clockwise flow to the other side of the Link. Less often visitors would move clockwise through the area.



SpaceLink

Visitors entering SpaceLink see large screen videos in the back of the room (photo to right). ScienCentral videos were played on the left-hand screen (lighter/yellow arrow) with a repeater screen hanging in the middle of the room (darker/red arrow). Computers occupy the middle of the room and sit under the large screens, so users of most of the computers face the videos. Occasionally, adult users, particularly men, would pause in their computer use to view a ScienCentral video.



To the left of the entrance (middle photo) is a popular play table where kids congregate. Adults would either help the kids, facing away from the video screens, or occasionally they would sit on a bench next to the play table, facing the screens. Sitters tended to watch at least one of the ScienCentral videos.



Also popular was a Mars rover control unit (lower photo). Those interacting here were least likely to view the videos spontaneously.

Visitors would start appearing in this room after noon, with social groups arriving particularly before and after planetarium shows. In our observations over Friday and Saturday, we recorded on average one adult per hour who viewed the ScienCentral videos without being asked to.



BodyLink

The photo at right presents the visitor's view as she enters the BodyLink area. The large video screen is straight ahead (lighter/yellow arrow) with a repeater screen to the left (darker/red arrow). There are no competing video screens, unlike the other Link designs. Interactive activities skirt the walls and occupy the room's center.

A sofa sits in front of the large screen (middle photo). On the left side of the room (bottom photo) is the wet lab entrance where parents sign their kids up for a hands-on experience in an area behind the yellow half-wall.

In our observations on Friday and Saturday, this area was sparsely populated until afternoon, as people worked their way to the far reaches of the second floor. Once here, 3-4 adults per hour viewed the videos spontaneously while they waited their turn to enter the wet lab or while their child was in the wet lab area. On occasion, visitors fell asleep on the sofa.



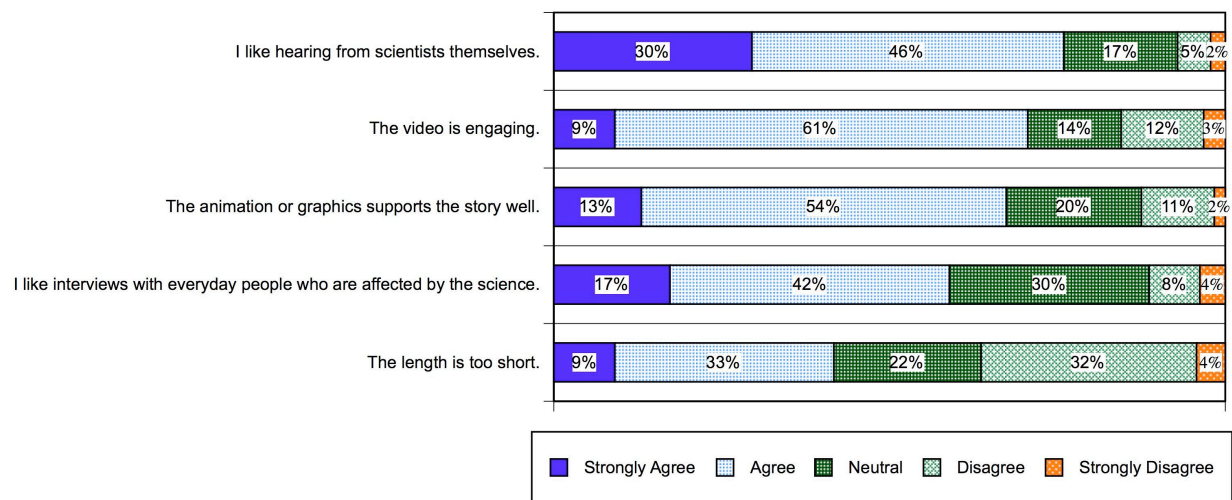
RESULTS: LARGE SCREEN VIDEOS

Video Appeal

The chart below aggregates viewers' ratings of agree/disagree statements related to appeal of the one video they viewed. Viewer responses from the different Links did not differ significantly.

- **76% of viewers like hearing from scientists themselves.**
- **70% feel the video they saw is engaging.**
- **67% agree that the animation or graphics supports the story well.**
- **59% say they like interviews with everyday people who are affected by the science. Significantly more women (67%) than men (51%) like this type of interview.**
- **The sample was split on the length: 42% feel that the length is too short; 22% were neutral; and 36% disagree that the length is too short.**

Percent of Agree/Disagree Responses to Statements about Appeal of Video Viewed (N = 190)



In BodyLink, three of the six videos include interviews with everyday people who are affected by the science (Cholesterol Market, New Hearing Implant, Mother to Child Immunity). These three ‘victim’ videos did not differ significantly in appeal ratings compared with the no-victim videos. In BodyLink, two of the six videos include animation (Brain Disease Drugs, New Hearing Implant). These videos did not differ significantly in appeal ratings compared with no-animation videos.

Viewers in BodyLink tended to agree that the 90-sec length is somewhat too short (mean = 3.3, where 1 is “strongly disagree and 5 is “strongly agree”). In TerraLink and SpaceLink, viewers felt the length was just right (means = 3.0). It’s possible that the quieter setting of BodyLink encouraged viewers to want more information via a longer viewing experience.

What was liked about video

After viewing their 90-second video, visitors were asked to write what they liked about it. These open-ended responses were sorted by keyword and keyphrase into eight categories. The percentage of viewer responses in each category and examples of categories are presented below. **The videos were liked mostly because they are informative. Being interesting, easy to understand and short are also appealing characteristics.**

- 37% liked their video because it is informative; for example:
Informative especially that ethanol takes a lot of energy to produce.
Informative. I did not know about CO2 extractors.
Information about climate that scientists were using could help stop global warming.
Informational about effects to spot bad cholesterol, appreciate as an FYI.
Gave some info about brain diseases and drugs.
Like that it informed pregnant women why it's useful to get a flu shot.
Learned about other solar system, very educational.
Information about next phase of space flights.
Learned that space antenna can be folded like origami, then opened up. I had never thought of it that way.

Those videos that most frequently appear in the 'informative' category include *Green Racecars, Deadly Ocean Burp, Giant Carbon Dioxide Vacuums, Cholesterol Marker, Cancer Scanner, Brain Disease Drugs, Space Boost, Earth's Other Moon.*

- 14% said their video is interesting; for example:
It was interesting to see that China is interested in cleaning up its environment. I've been there and it's awful. The smog is horrendous.
Interesting to know about effect of climate change on grape growing.
Interesting to see how the studies in mice might be applicable to human addictions.
Interesting that other agencies are developing space rockets and equipment.
I'm interested in origami.
Rover has always interested me.

Those videos that most frequently fall into the 'interesting' category include *Wine and Global Warming, Extreme Origami and Mars Rover Survival.*

- 13% liked the video because it is easy to understand; for example:
Topic presented in easy to understand way.
It was straightforward and got right to the point.
Very clear good presentation.
It described the science thoroughly and easy to understand.
Relayed findings in a clear manner.
Video was clear and contained info that children and adults could understand.

New Hearing Implant was noted in this category more frequently than other videos.

- 12% liked that the video is short.
- 9% recalled some portion of the content as what they liked, for example:
Teaching the mice and helping unlearn bad habits.
The connection with rabies and a cure for other conditions.
The technology that makes it possible for one that has hearing issues to hear sounds more naturally.

Idea of space travel for anyone.
The art of origami applied to airbag.

- 7% noted enjoying the images or graphics; for example:
Scenery and photography.
Beautiful pictures of trees.
Titan photos.
Graphics were good.
Pictures of rover.

Those videos for which images or graphics were most frequently noted include *Scientists in Trees* and *Mars Rover Survival*.

- 5% mentioned that the video content is important; for example:
Alternate fuel sources are important.
A lot of important content.
Important that people know the importance of space exploration and how it can help them.
- 4% liked that their video is current news; for example:
It looked at current topics.
Content is very timely.
It is up to date news.

What was not liked about the video

After viewing their 90-second video, visitors were asked to write what they did not like about it. These open-ended responses were sorted by keyword and keyphrase into seven categories. The percentage of viewer responses in each category and examples of categories are presented below. **Most complaints related to difficulty hearing or seeing the videos and a desire for more information.** Only one viewer suggested the addition of captions to address the hearing problem.

- 21% had difficulty hearing or seeing the video; for example:
Scientist difficult to hear as he spoke quietly.
Lady was difficult to understand.
Not too clear as far as image.
Hard to hear and follow.
Noise and activity in the room, hard to focus on video.
Distracted by sounds in room, could not understand audio.
I could not understand what the video is trying to say with all the noise.
Hard to watch because of distractions.
Split screen distracting. When it changed, it took your attention from the video.
- 21% wanted more information or a longer video; for example:
Need more information on how this will be done and how it can benefit rest of world
Not very in depth.
Very short, more info would help
Need more info on global warming.
It was a little over-simplified. It didn't go into detail about the science aspect of it.
Could be more detailed.
Small amount of information covered.
Too short.

Cancer Scanner and *Smart Mice* were videos that most frequently elicited these kind of comments.

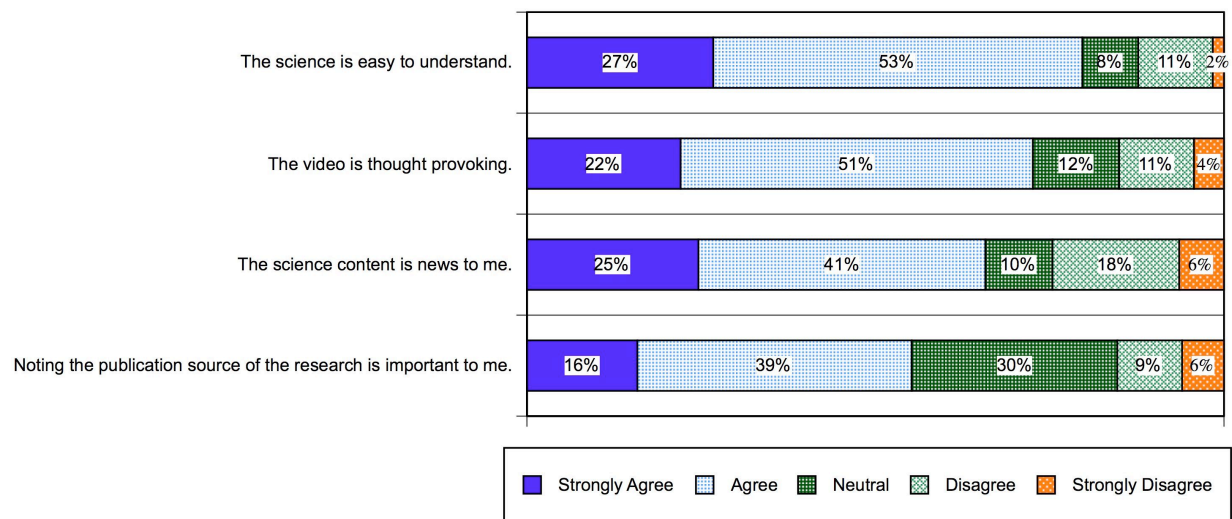
- 6% noted that some videos had poor audio-video synchronization. This was most noticeable in the SpaceLink videos.
- 6% found the video presentation confusing; for example:
Transition to making ethanol from tress was a bit confusing.
Storyline wasn't clear.
Too much jargon.
Too technical.
Needs title, explanatory introduction, no idea what it is about until midway through.
- 5% suggested the addition of graphics; for example:
Could have showed more pictures than him [scientist] talking.
There were few graphics and maps.
Needs more graphics.
Could have more illustrative content.
Show graphics that illustrate what he's talking about, not videos of him [scientist] talking.
- 4% felt that some information was not credible; for example:
Would like to see more evidence.
I don't think I agree with the information.
It assumes manmade global warming is true. It is not.
Theory not convincing.
Unsure whether I agree with the thought process.
- 4% were simply not interested in the topic.

Science Content

The chart below aggregates viewers' ratings of agree/disagree statements related to the science content of the one video they viewed. Viewer responses from the different Links did not differ significantly.

- **80% of viewers think that the science is easy to understand.**
- **73% feel the video is thought provoking.**
- **66% agree that the science content is news to them. Significantly more women (76%) than men (55%) say the content is news, particularly in response to the Space videos.**
- **55% say that noting the publication source of the research is important to them, but 30% have no opinion about this feature.**

Percent of Agree/Disagree Responses to Statements about Science of Video Viewed (N = 190)



In BodyLink, four of the six videos include a journal publication source (Brain Disease Drugs, New Hearing Implant, Mother to Child Immunity, Smart Mice). In SpaceLink, three of the six videos note Discover Magazine as the publication source (Extreme Origami, Earth's Other Moon, Primitive Earth?). These seven videos did not differ significantly in science content ratings compared with the no-source videos in their respective Link areas.

Viewers were asked what kind of current science topics they would like to see in a short video. Listed below are their suggestions and in parentheses are the numbers of responses greater than one. **The largest specific interest is in topics of “global warming and climate change” (12%).**

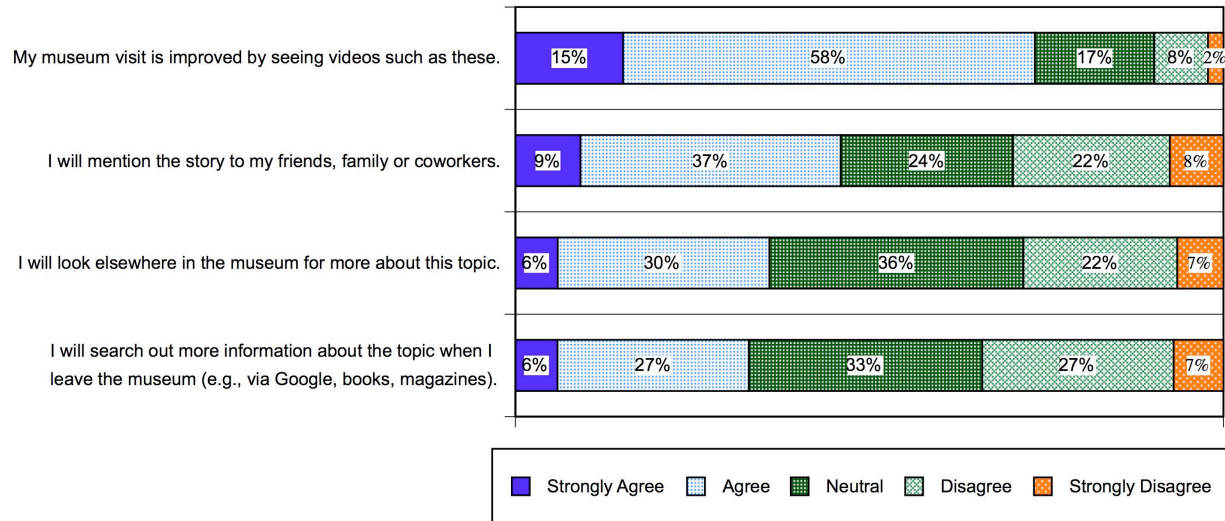
Earth	Space	Body	Other
about earth agriculture (2) alternative fuels/energy sources (6) animal extinction dangers of petrol product wastes earth activity-natural phenomena effect of pollution (3) environmental issues/research (9) global warming/climate change (23) how moons affects oceans and rivers how people can protect environment/go green (5) hurricanes, tornados, volcanoes (2) life under the sea loss of rainforest meteorites seismic activity theories of how changes in earth take place undersea exploration (2) uses for recycled products water conservation weather (3)	actual pictures taken by probes anything nasa related astronomy (2) black holes celestial physics current space research with science and make up of planets history of NASA saturn and jupiter probes space effects on earth space elevator space station space station on mars space travel/ exploration (7) space (6) why pluto is not a planet	anything on gene development behavioral science (2) blocked cardiac arteries brain cancer research (2) current and dangerous/serious diseases/chronic illness (5) effect of mosquito bites evolutionary biology genetic cures health/medical issues (9) heart disease (2) brain function: increase, development, damage (3) joint health laser eye correction, hearing aids limb replacement nutrition/ weight control (2) stem cell research	changes in technology/gadgets (4) bugs (2) different animals dinosaurs engineering (2) every day living how models are made from evidence found more about sound and light more topics out of the mainstream out of the box topics that relate to an exhibit wildlife habitats

Potential Impact

The chart below aggregates viewers' ratings of agree/disagree statements related to the impact of the one video they viewed. Viewer responses from the different Links did not differ significantly.

- **73% of viewers think their museum visit is improved by seeing videos such as these.**
- **46% will mention the story to their friends, family or coworkers.**
- **36% say they will look elsewhere in the museum for more about this topic.**
- **33% agree that they will search out more information about the topic when they leave the museum.**

Percent of Agree/Disagree Responses to Statements about Impact of Video Viewed (N = 190)



RESULTS: VIDEOS ON HANDHELD DEVICE

Three adult males and three adult females near each of the three Link areas were interviewed about handheld usage in the museum (N = 18). Using individual earphones, visitors viewed one 90-second ScienCentral video on the handheld and then read three scenarios about how current science news videos might be used with the device. The three scenarios were presented in different orders to avoid an order effect.

One male and one female (11%) were not interested in any of the scenarios (e.g., “I’m not interested in the concept. I keep up on current news. I don’t use audio tours in museums. I like inter-actives.”).

I.

On entering the museum, you pick up a handheld device **that supplements an exhibit you are viewing with relevant current science news**. The device comes with a video screen and ear-phones. While you are walking through the museum, it identifies your location and presents videos of current events and news that relate to that specific museum area. You can review and fast forward the videos. The video choices change according to where you are in the museum.

40% of visitors, mostly female, chose this scenario. They liked the idea of the device identifying their location and providing additional information related to exhibits (e.g., “Gives you more than what you’re seeing with the exhibit. It’s like at Stop & Shop, they show you what’s on sale as you move through the aisles.”). The few men liked the serendipity of the scenario (e.g., “I like roaming the museum – you roam and learn new things”).

II.

On entering the museum, you pick up a handheld device that **personalizes your museum visit**. The device comes with a video screen, earphones, and a map of the museum. You see a list of video topics and decide which topic(s) you are personally interested in. You choose to watch a short current science news video. Then the museum map directs you to that part of the museum where you can learn more about that topic. You can select items that interest you from the list of videos and map. At the end of your visit, when you return the device, you can sign up to have an email sent to you with information you selected.

40% of the visitors, mostly male, chose this scenario. They like the idea of choosing topics and seeing things they are most interested in (e.g., “see what’s available and choose things of interest in limited time frame”). The majority of choosers of this scenario said that they would not email themselves at the end of their visit.

III.

On entering the museum, you pick up a handheld device that helps you complete a **scavenger hunt** around the museum. The device comes with a video screen, earphones, and a map of the museum. As clues, the device will have teaser videos, like the current news video you saw. Then the map will show you where you need to go in the museum to find answers to the scavenger hunt questions. Once you have the answers, you will go to a special station where a staff member will help you log in and see how well you did.

Only one adult female (6%) chose this as her favorite scenario: “I like scavenger hunts. I arranged one at AMNH in NYC for my boy scouts. Lasted about 2 hours with parents to help.” Most of those interviewed liked the scavenger hunt idea for children but all of these respondents had children or grandchildren whom they felt were too young for this activity (e.g., “good for kids older than mine, gives purpose and structure.”).

SUMMARY AND DISCUSSION

Large Screen Videos

A total of 190 adults viewed one 90-second ScienCentral current science news video on a large screen in one of three Link areas in the Maryland Science Center. Written surveys after viewing collected feedback on appeal, science content and potential impact.

Appeal

Seven out of ten viewers felt that the video they saw was engaging. In terms of video features, 76% liked hearing from scientists themselves, 67% felt the animation or graphics supports the story well, and 59% liked interviews with everyday people who are affected by the science. Women tended to like this latter type of interview more than men; however, three videos with a “victim” interview in BodyLink did not differ significantly in appeal ratings compared with three BodyLink videos that did not include a “victim” interview.

Overall, visitors who were asked to view the short-format videos felt that they were informative, interesting, and easy to understand. One-fifth of the sample, however, noted difficulty hearing or seeing the video, and one-fifth wanted more information or a longer video.

Observations over an August Friday and Saturday revealed that TerraLink is a noisy and crowded area not conducive to spontaneous large screen viewing. SpaceLink’s physical arrangement encouraged more spontaneous viewing, whereas BodyLink’s sofa seating and wet lab waiting time supported the most frequent, but still low, spontaneous viewing. Possibly because of this more conducive viewing setting, BodyLink participants felt the 90-second length was somewhat short, whereas those in TerraLink and SpaceLink felt the short length was just right.

Science Content

Eight out of ten viewers thought that the science was easy to understand, and seven of ten felt the video was thought provoking. Two-thirds agreed that the science content was news to them; significantly more women than men said the content was news, particularly in response to the Space videos. About half of the visitors agreed that noting the publication source was important to them, but one-third had no opinion about this feature. Moreover, seven videos that note a publication source did not differ in science content ratings compared with no-source videos.

Visitors listed many different science topic areas that would be of interest to them in a short video, but the most frequently mentioned was global warming. A full list appears on page 11.

Potential Impact

Three-quarters of viewers thought that their museum visit is improved by seeing videos such as these, but many fewer agreed that they would take actions related to the videos. Less than half would mention the story to friends, family or coworkers. One-third would look elsewhere in the museum for more about the topic or search out more information when they leave the museum.

Note that the results for actions are based on visitor's intentions and may not reflect actual behaviors.

Discussion

The short-videos are enjoyed and understood when visitors are asked to pay attention to them; however, the problem appears to be how to attract and maintain spontaneous viewing when the museum setting does not favor such viewing behavior. Even our recruited participants had their focused attention compromised by museum announcements, noisy visitors, traffic movement through the Links, competing exhibits, and family demands. We cannot modify the environment, so the goal becomes how to modify the videos to improve attraction and holding power. Possibilities include:

- Use non-scroll captioning so the viewer is not entirely dependent upon the audio;
- Add a visual content title before or perhaps continuously at the top of the video as it plays to entice those interested in the topic;
- A 3-2-1 visual countdown prior to starting the video would let visitors know something is going to happen and give them a bit of time to prepare to view. In our evaluation, a ScienCentral still frame separated the videos (see photo on p. 3), but viewers were often not ready for the abrupt opening of the video and missed early content.
- Add a short introduction rather than jumping into the topic immediately; e.g., "I'm Brad Kloza, reporting on a new cancer scanner." A few respondents mentioned wanting to know what the video was about at the beginning.
- Consider a small countdown clock in a corner to let viewers know how long the video is. Visitors may be more likely to commit to viewing if they realize it's a short commitment.

Small Screen Videos on Handheld Device

A total of 18 adults viewed one 90-second ScienCentral current science news video on a handheld device. Participants were interviewed about the appeal of three scenarios describing how science news videos might be used with the device. A small portion (11%) of the sample were not interested in any of the scenarios, and one respondent (6%) was interested in the scavenger hunt. Of the remaining people, half, mostly women, chose the idea of a device that supplements an exhibit. They liked hearing and seeing additional information related to exhibits in that section of the museum where they were located. The other half, mostly men, approved of the personalization concept. They liked the idea of choosing topics and seeing things that they are most interested in. Emailing at the end of their visit was not of interest.

Discussion

The respondent data do not give definitive guidance in terms of the best usage of the handheld at the Maryland Science Center. Although adults liked the supplementary and personalized usage scenarios, most were visiting with children; thus, it seems unlikely that they would choose freely an activity that would take them away from overseeing their children's visit. Even while viewing the handheld video, adults kept glancing away to check on their kid(s). Adults identified the scavenger hunt as something that kids would engage in, but those we interviewed had children/grandchildren whom they felt were too young to participate (8 and under).

APPENDIX

Video Descriptions (available for viewing at www.sciencentral.com)

BODYLINK

Cholesterol Marker

Researchers are developing a new tool in the battle against heart attacks and stroke. They're finding a way to spot dangerous plaque deposits before they can cause medical problems.

Brain Disease Drugs

In a major advance for treating fatal brain diseases, researchers have discovered a way to get drugs into the brain that doesn't involve brain surgery. They borrowed a trick from a deadly brain virus.

New Hearing Implant

Cochlear implants have been around for years, restoring hearing for many deaf people. But a new version promises to improve the quality of what patients hear.

Cancer Scanner

It sounds like something out of Star Trek — a doctor being able to diagnose your disease at the genetic level with a simple scanner. Now radiology researchers find that it can actually be done.

Mother to Child Immunity

We know that vaccinations help a newborn's developing immune system fight off diseases. But as this ScienCentral News video explains, now researchers have found that pregnant women who get flu shots may be kick-starting their babies' immune systems in the womb.

Smart Mice

They didn't mean to create smart mice, but that's what happened when brain scientists genetically altered mice to lack a certain brain protein. The chance discovery could lead to new drugs to treat learning and memory disorders.

TERRALINK

Eco City

Engineers are planning an "eco city" of half a million people that aims to be as carbon-neutral as possible. As this ScienCentral News video reports, they're building it from the ground up in China.

Giant Carbon Dioxide Vacuums

Could giant machines that clean carbon dioxide out of the air be part of the solution to global warming? One company is creating giant carbon dioxide vacuums that might help clean the greenhouse gas out of the air.

Scientists in Trees

What is a construction crane doing in the middle of a forest? It's actually a tree observatory, and the research is giving them clues about many things, including global warming. (Jack)

Green Racecars

One style of car racing is "going green." Indy Car Series racecars are running on 100 percent fuel-grade ethanol. It's part of an effort to drive consumers towards renewable fuels. The process of actually making these fuels needs to be improved before they'll fill up our tanks.

Deadly Ocean Burp

Could a dangerous gas buildup at the bottom of the ocean bubble up and wipe out most life on Earth? According to some researchers, it already has done so; several times. Scientists are worried that global warming is making conditions ripe for another deadly ocean burp.

Wine and Global Warming

If you enjoy a glass of quality wine, climatologists studying the impact of global warming on vineyards have some bad news for you. They report warming may mean up to an 81 percent drop in this country's ability to produce premium wine, and turn some of the cooler spots on the planet into the next century's best wine producers. Scientists studying climate change say that while an increase in average temperatures is a major concern, changes in extreme weather are an even bigger problem.

SPACELINK

Mars Rover Survival

As NASA Scientists worry that a continued dust storm on Mars could doom their twin robotic rovers to power failure, it's easy to forget they were only designed to last 90 days in the first place.

After Earth

While yet another shuttle launch is delayed, this one due to nature, NASA says it is gearing up to for the mission to the moon, Mars and beyond. Some space experts say that for the plan to colonize space to ever succeed, it needs to get across the message that natural disasters and manmade threats to the planet make it imperative for Earthlings to have a backup plan.

Space Boost

Space entrepreneurs who want to fly you into orbit will get their chance to take cargo and crews to the space station when the space shuttles retire. NASA's award of contracts totaling \$500 million to private rocketeers is a boost for a new approach to spaceflight.

Extreme Origami

Most people think origami means making paper cranes. But a former laser physicist is combining origami with technology to not only create beautiful pieces of art, but to design better air bags and medical devices as well.

Earth's Other Moon

We've all heard about the asteroid that wiped out the dinosaurs. But what about the giant impact that created our moon and core?

Primitive Earth?

What can a moon nearly a billion miles from Earth tell us about our own home? The latest images of Titan could point to how life started on Earth and how probable it may be elsewhere.