Lafayette Technology Clinic

May 2017 Final Project Summary & Design Proposals

Alexander Slayton, Frank Besson, Collin Albershardt, Rebecca Bender, Lauren Wisniewski, Michelle Jennings, Dan Bauer PhD, Nancy Waters, PhD, Larry Malinconico, PhD, In Conjunction With

Da Vinci Science Center, St. Luke's Health Network, Lafayette College and the City of Easton

http://static.lakana.com/mara-wfmz-media-us-east-1/photo/2016/11/29/DaVinci%20Rendering%201_1480437302434_5026626_ver1.0_640_360.jpg

Project Summary

This Tech Clinic has been charged by its clients -- the Da Vinci Science Center and St. Luke's University Health Network -- to explore development of potential exhibits for a new Da Vinci Science City to be located in the Lehigh Valley, specifically on the south entrance to downtown Easton. The focus is broadly on health science and health education at a scope and scale that expands upon and complements the current Da Vinci Science Center and encompases the mission of St. Luke's University Health Network. The goal of this project is to envision exhibits that are at once intimate and impressive, engaging and thought provoking, and that will galvanize visitors of all ages--children, young people and adults--to explore their interests consistent with iconographic vision of Leonardo da Vinci.

Executive Summary

Since August 2016, our Team has undertaken to explore, broadly and with specificity, ways to meet our clients' charge. Our initial efforts were two-fold: assessing strengths of the current Da Vinci Science Center and exploring architectural and infrastructural elements we thought desirable to consider incorporating in the new Da Vinci Science City.

After early wide-ranging brainstorming sessions, we systematically visited an array of museums and venues within the Lehigh Valley and beyond, noting limitations we saw as well as ideas worth pursuing. Our approach relied on using Synectics©, WiseDecider© and other project management tools at all stages of our work.

To strengthen and expand our reach of audiences, we examined survey data from other studies, executed our own questionnaires, developed prototypes of ideas, and tested them in targeted focus groups. We also consulted with specialists in healthcare and technology development for input and feedback. Throughout we sought to refine and revise specific exhibit plans around a unifying theme that evoked exciting and immersive engagement with the target audience.

This report presents our collective findings and recommendations to date for Exhibit Ideas that run the gamut from health care perspectives in the past through to the most contemporary applications using science, technology, engineering, art and mathematics. We welcome your questions, comments and feedback

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The Technology Clinic

The **Technology Clinic** is an interdisciplinary course at Lafayette College in Easton, PA. Conceived in 1986, Tech Clinic has provided opportunities for small groups of select, highly motivated students—usually five or six from all four College divisions—and faculty mentors, to collaborate in solutions to real-world problems raised by clients who are professionals and community partners. Prior clinics range from patented devices for clearing woody debris from major waterways to entrepreneurial action plans for local boroughs. This student-centered and community-focused engagement results in a variety of experiences, skills and perspectives that contribute to an innovative and authentically interdisciplinary course.

Team Members

Frank Besson (‘18) is a junior mechanical engineering major from Scotch Plains, NJ. Currently president of the Engineers Without Borders campus student group, as well the Lafayette Ice Skating club, Frank is involved on campus in many ways. He hopes one day to graduate from Columbia's architecture program.

Michelle Jennings (‘17) is a senior at Lafayette College majoring in International Affairs and minoring in Economics. She focuses on Latin American and Development Studies within her major. Hailing from Chatham, NJ, Michelle lived abroad for a semester in Buenos Aires, Argentina, studying Argentine history and immigration. She is co-President of the Hispanic Society of Lafayette, a member of the campus rugby team, and serves on the Center for Community Engagement Steering Committee.

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Team Members

Collin Albershardt (‘17) is a senior from Castle Rock, CO who is currently studying economics, with a concentration in finance. He is a co-captain of the Lafayette Football Team, and a representative from the football team to the Student Athlete Advisory Committee for the NCAA. In his free time Collin likes to hike, exercise and read about prototype automobiles.

Rebecca Bender (’18) is a junior Government and Law major from Brooklyn, NY. She serves as president of the Women’s Club Basketball Team, captain of the Lafayette College Equestrian Team, works as an Intramural Supervisor for Recreation Services and is an Orientation Leader. Her interests include competitive equestrian competitions and interning for Brooklyn Sports & Entertainment.

Team Members

Lauren Wisniewski (‘19) is a sophomore from St. Johns, FL. She is pursuing a double major in Psychology and Philosophy with a minor in Religious Studies. Currently serving as an Admissions tour guide, she is a member of the Philosophy Club, Chair of the Advising Committee for the Marquis Scholars and Fellows Society, and also serves on the Leadership Team for the Disciplemakers Christian Fellowship.

Alexander Slayton (‘18) is a junior from Rhinebeck, NY, studying mechanical engineering and health sciences. Among his activities on campus, Alexander is a member of the sax quartet Casual Sax, the pep band, the club soccer team, and serves as secretary for Delta Tau Delta. At home he volunteers as an EMT for a local fire department. He plans to attend medical school after graduating from Lafayette.

Team Members

Dan Bauer is a long-time resident of the Easton area, who has lived in highland Peru, Ethiopia, and southern Mexico. He began his studies in engineering and, after completing a degree in Journalism and a stint in the Peace Corps, completed his PhD in Social Anthropology. The Lafayette College Technology Clinic, which he founded, combines these interests.

Nancy McCreary Waters joined the Biology faculty in 1985 as an ecologist with a stint at US Army Corps of Engineers. She teaches ecology, general biology, environmental biology and writing-intensive courses. Her most recent Tech Clinic was facilitating Trout Farm II. She has mentored more biology and health-professions students than she can count, and has graced the Lafayette stage in *Evita*, *ThreePenny Opera*, *Hear Me Roar*, and *Shakespeare Cabaret.*

Lawrence Malinconico is the Director of the Lafayette College Technology Clinic Program and a member of the faculty in Geology and Environmental Geosciences. As a volcanologist, his research and teaching run him among the Galapagos, Ecuador, Italy, Mt St Helens, Hawaii, the Himalayas, Central America, the western US and closer to home the Appalachians.

Team Members

Below, from left to right,Collin Albershardt, Rebecca Bender, and Frank Besson

Above, from left to right, Alexander Slayton, Frank Besson, Collin Albershardt, Rebecca Bender, Lauren Wisniewski, and Michelle Jennings

Impressions of the Current Da Vinci Center

Observations:

- Its hallmark? Consistent active engagement with interactive activities throughout the entire Science Center!
- Central location of main attraction establishes cohesive science experience.
- Initial ‘wow-factor’ translates easily into direct manipulation.
- Laudable range of linguistically accessible exhibits promotes culture sensitivity.

What Makes An Effective Exhibit?

Immersive!

- Move visitors from a role as passive viewer into an actively engaged participant to create exciting and noteworthy memories.

Challenges?

- Requires durable exhibit components!
- If reliant on docents, flow may be managed.
- Investment in technology may be extensive.

Examples:

- Allow a child "be a doctor" and treat their friend/care-giver by taking their pulse and checking their blood pressure.
- Have patrons "become a patient" while lying on an operating table to be "scanned" or being "triaged and transported" in an ambulance.
- Let attendees "be a singer" and analyze *their* vocal chords while performing rather than just showing them information.

What Makes An Effective Exhibit? Personal Reflections

"I really enjoyed my time at the Newseum. What made it especially cool was how interactive it was; at one point they had me pretend I was a news reporter and perform a skit in front of a camera. It was awesome."

- Julia Ciciarelli (2019)

"I really enjoyed my time at the Newseum. This museum is really interactive and engaging.I really liked how they examine the media. It is so important to understand the media throughout time and how its lens has evolved."

- Nessa Prempeh (2017)

"I loved the Picasso Museum in Barcelona because of the use of open space. My favorite part was the outdoor section."

- Jaclyn Moses (2017)

"Personally, the WWII museum in New Orleans was one of my favorites because of the 4D experience they create. In one of their exhibits, they made me feel like I was walking through the middle of a snowstorm!"

- Matt Deorocki (2017)

Impressions and Findings: Museum Visits

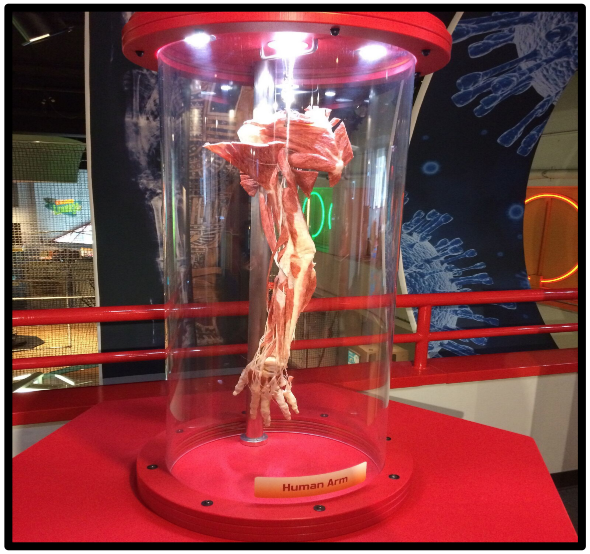
Connect with knowledgeable resources and incorporate them throughout the venue, e.g., the Koshland Science Museum used local graduate students to engage visitors with exhibits more fully. Volunteers enable visitors to ask questions that go beyond to support return visits.

Framing an exhibit in different ways can either engage and enlighten or deter and frighten. The “Infection Connection” at Liberty Science Museum was catchy to draw visitors to the area, yet the ‘creepy’ factor was unable to sustain attention

Partnering with industry and community services expands reach of exhibits to users. A noteworthy example was the tagged InstaGram® posts emblazoned on displays at the National Geographic Museum.

Impressions Continued…

Continually inquire about visitors' experiences. The National Geographic Museum asked for commentary on virtually every exhibit. Feedback became integral to exhibits with displays ranging from tangible chalk boards, to iPads® and even Instagram®-inspired "like" buttons.



Tactile and sensory focussed exhibits generally attract and hold attention of patrons, yet need not be complicated. The Liberty Science Center employed simple mechanical technology to measure how long visitors could hold a pullup.

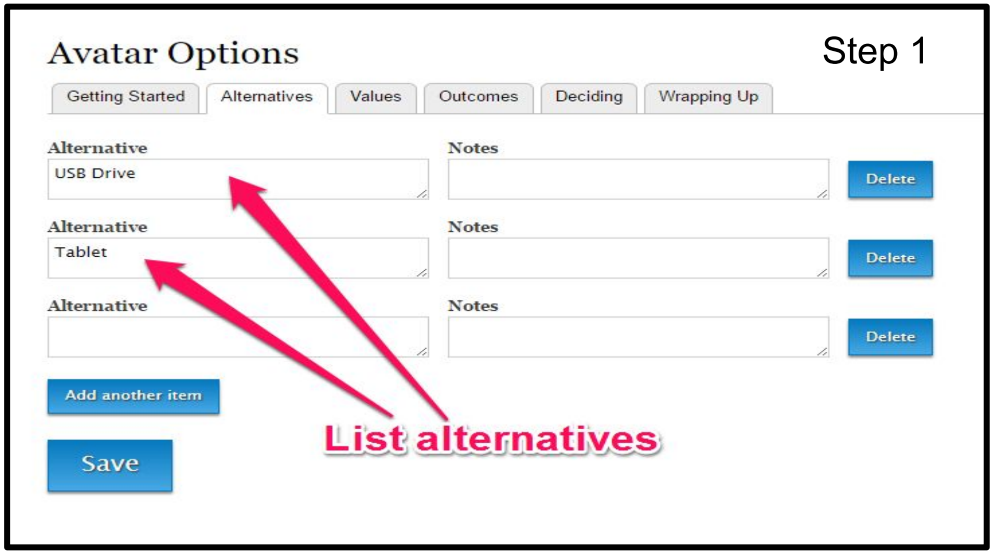
But a caveat: initial visual appeal alone may not sustain engagement. Some exhibits with 'wow' factor display may *look* interesting, but lack of a palpable element and ability to impact the user fail to retain visitor interest.

Wise Decider® Software

- This online program facilitates complex decision-making processes.
- It incorporates a wide array of values and assists in articulating and organizing both overt needs expressed by clients as well as latent ones we identify.
- We use Wise Decider® as a tool for logical and thorough examination of the myriad elements that enter into decisions among competing values.

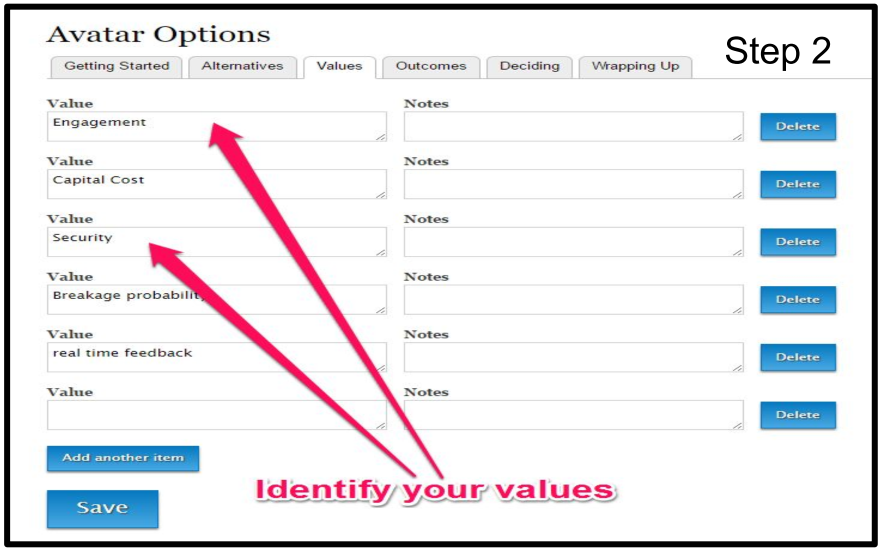
https://lh3.ggpht.com/J0bXCpKYqKXoX-27ofoBXMHE119t38McT-KkUy7aykrXx5kn4jXZpSuJdEbOaUtpJA

Using Wise Decider ®



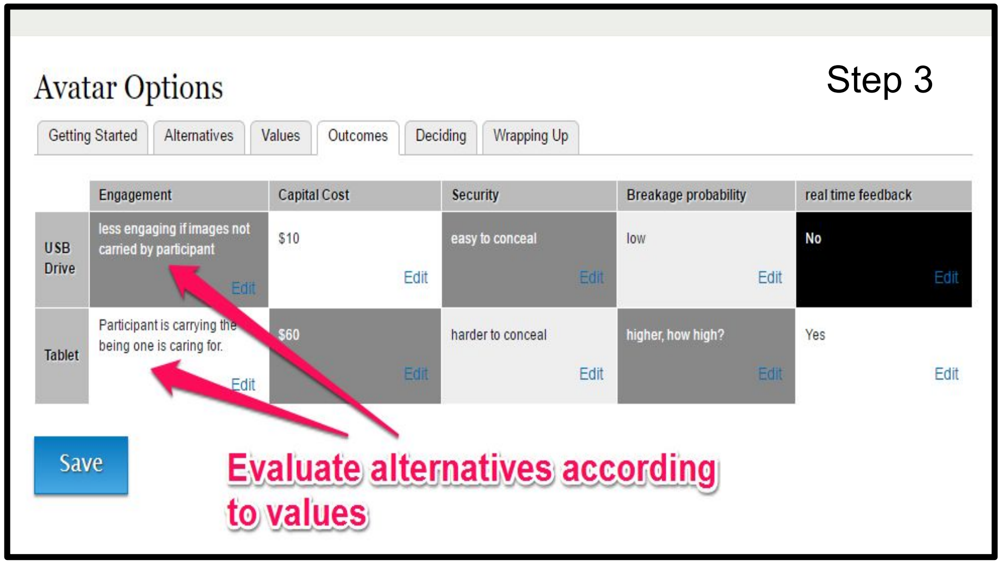
Alternative	Notes
USB Drive	
Tablet	

List alternatives



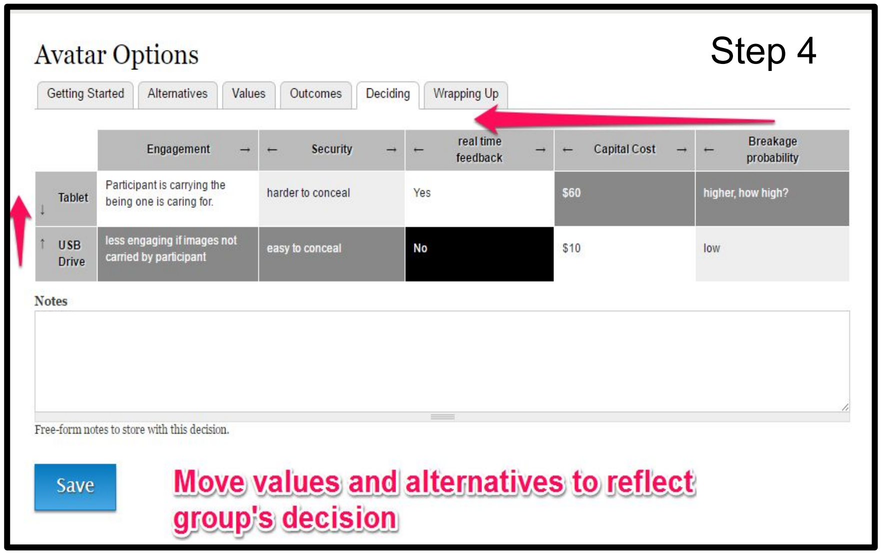
Value	Notes
Engagement	
Capital Cost	
Security	
Breakage probabilit	
real time feedback	

Identify your values



	Engagement	Capital Cost	Security	Breakage probability	real time feedback
USB Drive	less engaging if images not carried by participant	$10	easy to conceal	low	No
Tablet	Participant is carrying the being one is caring for.	$60	harder to conceal	higher, how high?	Yes

Evaluate alternatives according to values



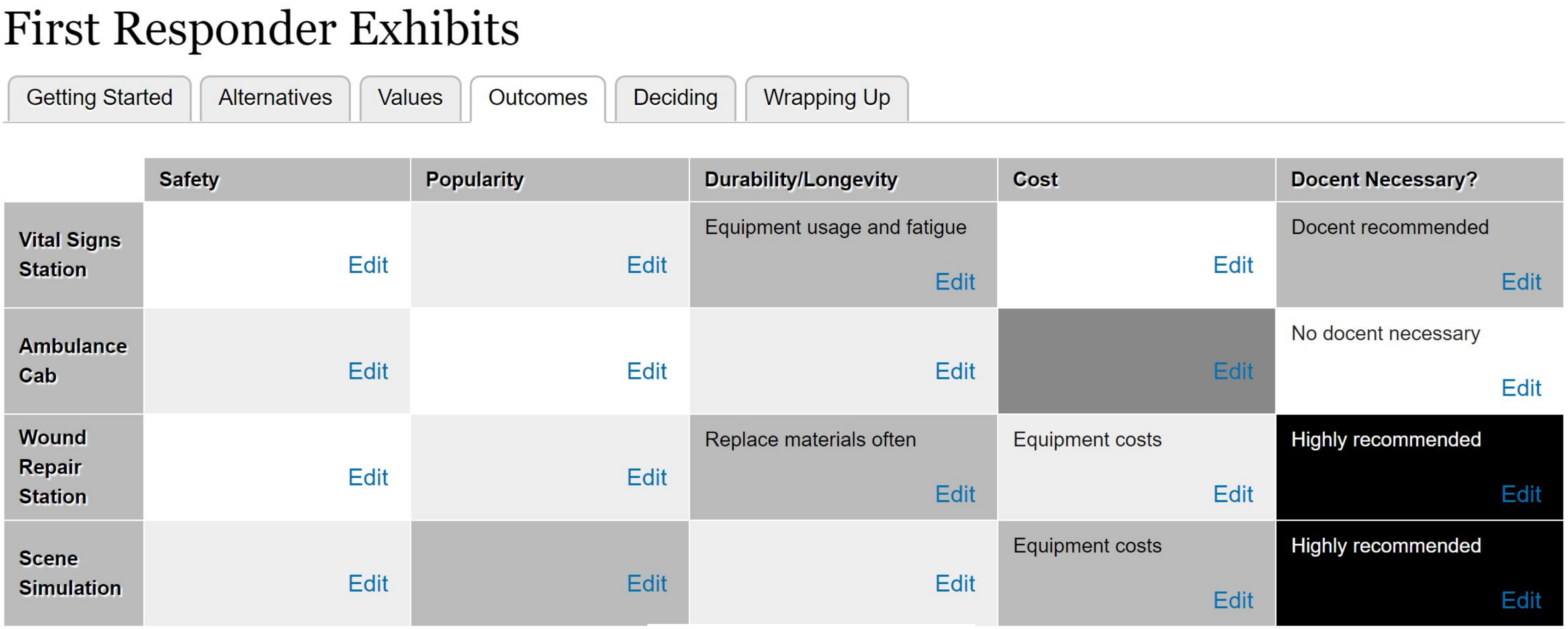
	Engagement →	← Security →	← real time feedback →	← Capital Cost →	← Breakage probability
Tablet ↓	Participant is carrying the being one is caring for.	harder to conceal	Yes	$60	higher, how high?
↑ USB Drive	less engaging if images not carried by participant	easy to conceal	No	$10	low

Notes

Free-form notes to store with this decision.

Move values and alternatives to reflect group's decision

Example: Using Wise Decider® to Analyze First Responder Exhibit Properties



First Responder Exhibits

	Safety	Popularity	Durability/Longevity	Cost	Docent Necessary?
Vital Signs Station	Edit	Edit	Equipment usage and fatigue Edit	Edit	Docent recommended Edit
Ambulance Cab	Edit	Edit	Edit	Edit	No docent necessary Edit
Wound Repair Station	Edit	Edit	Replace materials often Edit	Equipment costs Edit	Highly recommended Edit
Scene Simulation	Edit	Edit	Edit	Equipment costs Edit	Highly recommended Edit

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http://cdnll.hopkinsmedicalproducts.com/images/xxl/Vital-Signs-Kit-Pulse-Oximeter.jpg

http://barbieknoop.files.wordpress.com/2010/05/bandage_crop.jpg

Immersive Outreach in Easton

- Seeking to connect the Da Vinci Science City to other venues in Easton, we think community members are more likely to be engaged with and supportive of museum events, and thereby appreciate the value that the Science City adds to all customers, community-wide.
- By inviting other venues to sponsor or participate in exhibits or classes at the Da Vinci Science City, our clients can foster long term partnerships, connect locally in schools and families, and establish a supportive enriching environment.
- To test this, our Technology Clinic Team engaged in a Healthy Kitchen class currently offered at the Easton Public Market. This particular experience was among our early exhibit ideas!

Healthy Kitchen Class - Easton Public Market

The Goal?

- A teaching/learning environment that finds fun in food through healthy choices and preparation skills.
- A possible approach that uses a diverse menu changing with seasons and interest, e.g., Cinco De Mayo, Gluten Free Foods, farm to table cooking, safe food preservation and canning.

https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjpzaGy6MfTAhVN8GMKHaS6D6YQjRwIBw&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3Da7yrkvJgdWI&psig=AFQjCNEprQRirDDU_k3i_0OvEHWqHy7tCg&ust=1493491728014113

Healthy Kitchen Class - Easton Public Market

The Outcomes?

- Safety #1: A burner is NOT required! Plenty of foods can be assembled for kids to take home, e.g., pickles, dips!
- Safety #2: Using gloves when cutting; sanitizing surfaces.
- Sound science is easy! Understanding microbes and their impact on human health and nutritional processes!
- Added note: Foods that take a lot of effort to make might be more appealing to kids who learn kinesthetically, e.g., solid motor skills and knife work in hand-crafted sauerkraut.

http://www.katestrong.com/blog/wp-content/uploads/2015/04/Dollarphotoclub_74097592.jpg

Consultants: Shailendra Yadav: Innovator and Entrepreneur in Technology and Healthcare

A medical systems engineer at Phillips who designs wearable medical technology, Mr Yadav provided insight how an array of technology devices can augment our exhibit plan. Some examples:

- Sensors that monitor patient anxiety by detecting electrical impulses to different parts of the brain: can they be used to engage visitors and transform participants?
- Simple touch pad versus wearables versus room-based monitors for vital signs, chronic heart failure, COPD, and respiratory problems.

Continued: Shailendra Yadav...

Practical Considerations:

- Comfort-level of clients for wearables?
- Are simple touch pad sensors less engaging?
- Can wearables transform the patron’s experience from passive to active role-player?
- Are there industry partners to assist with development of consumer-directed applications?
- Can we define what motivates people to embrace change?
- How do motivations vary by target population?
- Are solutions functional but still appealing?

Don’t forget feasibility analysis on product development:

...is there a market?

Consultants: Physician Input

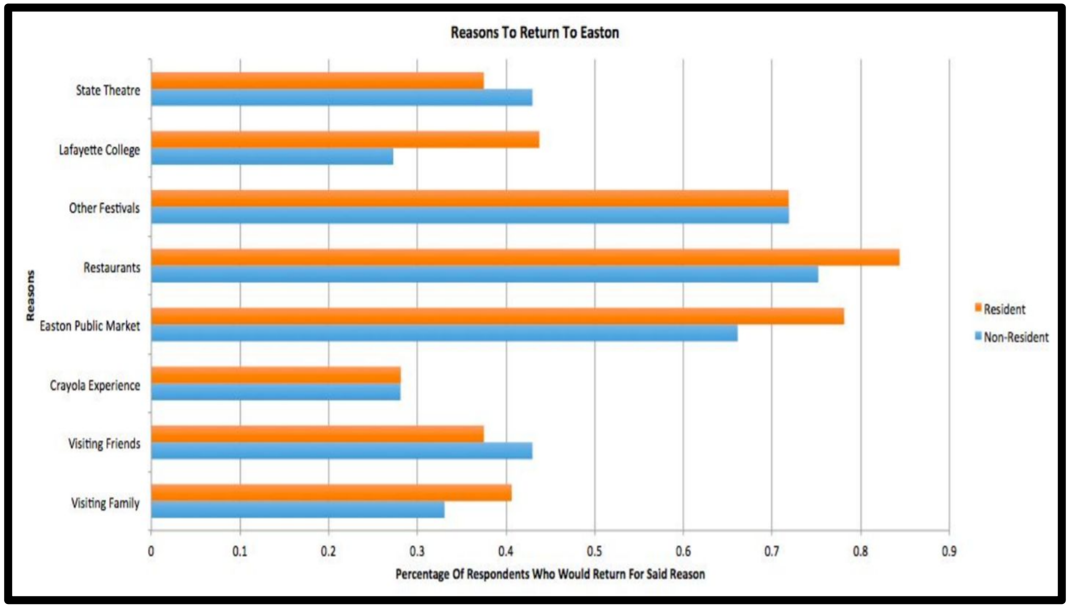
- Interviews with primary care providers in Family Medicine as well as Preventative Medicine and Community Health
- Prevalent diseases in our community: heart disease, diabetes, COPD, asthma, obesity, variety of mental health illness especially in teens
- Prevention! Small lifestyle changes, Setting a good example
- De-stigmatize mental health, incorporate throughout each exhibit
- Practical considerations: decreasing screen-time for children, balancing budgets and health diets, establishing early outreach and education programs
- What physicians think their patients NEED to know…
- ***Immunization is safe & effective***
- ***Cancer screening is valuable & helpful***
- ***Regular checkups prevent disasters***

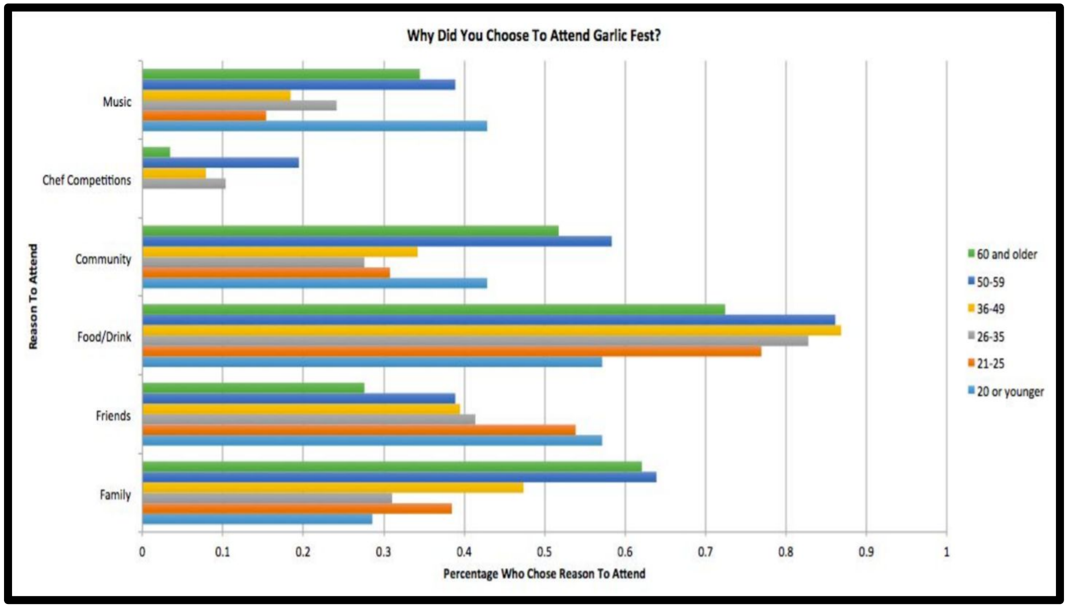
...ALL require access to and coverage for basic medical care!

Focus Groups: Target Populations

- Garlic Festival and Bacon Festival, Easton PA, 2016: numerous respondents, wide age span, broad socioeconomic classes and crossing geographic ranges.
- Biology 102, Lafayette College, 2017: ~100 1st year college students,
- Lehigh Valley Mall, Whitehall, PA, 2017: encounters with individuals and families on a broad spectrum of socioeconomic classes
- Center for Community Engagement Steering Committee, Easton PA, 2017: assemblage of City of Easton and Lafayette College community partners; self-selective
- Easton Public Market, 2017: targeting parents with children ages 4-8
- Easton Area Community Center, 2017: targeting children ages 10-18

Data and Findings: Garlic/Bacon Festivals 2016





Access to data courtesy Lafayette College Professors Shulman and Ruebeck and student researchers…

Findings?

- Visitors find Easton safe during the day. Some voiced safety concerns for overnight stays.
- Principle attraction? FOOD! Quality restaurants are abundant
- Added plus? The ARTS! Unique city, theatre venues and College events all viewed favorably.

Data and Findings: Biology 102

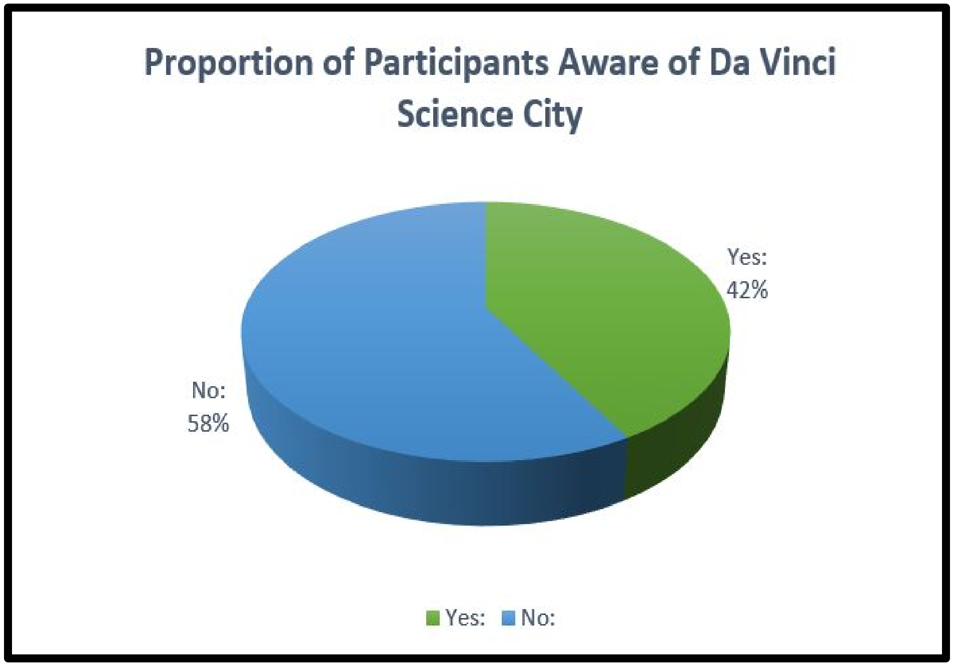
- Large (n=98) sample size; less heterogenous participant population
- Reactions to proposed Ambulance Exhibit?

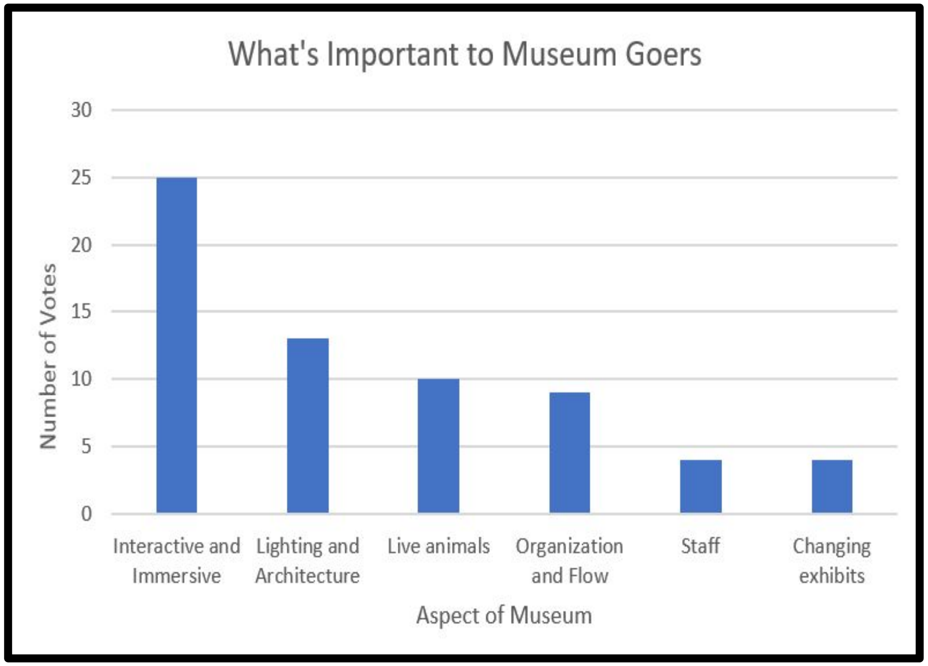
  8 responses suggested featuring sample EMT equipment

  10 responses suggested simulating the role of an EMT in an emergency situation
- Reactions to proposed Healthy Cooking Exhibit?

  27 students would attend classes on dorm meals and/or cooking on a budget

  8 students suggested classes on how to make foods we already love healthier





Data and Findings: Lehigh Valley Mall Focus Group

- Participants: Sunday afternoon mall-goers
- Adults with no children or only children <1 year old had not visited the Da Vinci Science Museum in Allentown.
- Frequent expressions of confusion conflating the Lafayette College Expansion Project in Easton with the proposed Da Vinci Science City in Easton.
- Additional Takeaway?

Malls provide activities to occupy time, including retail, lounge areas and interesting scenery. They share with museums commonalities of providing something for everyone and diverse attractions to meet varying target populations

Data and Findings: Center for Community Engagement Steering Committee (CCE) Focus Group

Participants: Community leaders plus Lafayette College staff/students

Findings:

- Make museum and exhibition space feel like a community and incorporate local business owners into the conversation.
- Healthy cooking kitchen should include community engagement through recipe creation and consideration of popular foods, regionally available produce, and respect for ethnicities within the community.
- Mental health is a key component to overall health and would be valuable to be included as an element in all exhibits.
- Include all age groups in any unifying theme for exhibits...a virtual presence or mascot should appeal to children and adults alike
- Leverage the high popularity of the Easton Farmer’s Market as a connection, partner and social venue

Data and Findings:Easton Public Market Focus Group

Participants: young families, adults with children ages 4-8

How to incorporate parents and kids?

- Multiple levels of interaction
- Hands on activities

Exhibit suggestions from kids:

- How does your own body work?
- Design your own animal avatar (dinosaur)
- Scavenger hunts

Other appealing aquariums/museums visited?

- Please Touch Museum
- DA VINCI Science Center
- Camden Aquarium
- Lehigh Valley Zoo
- Allentown Arts Museum

Data and Findings:
Easton Area Community Center Focus Group

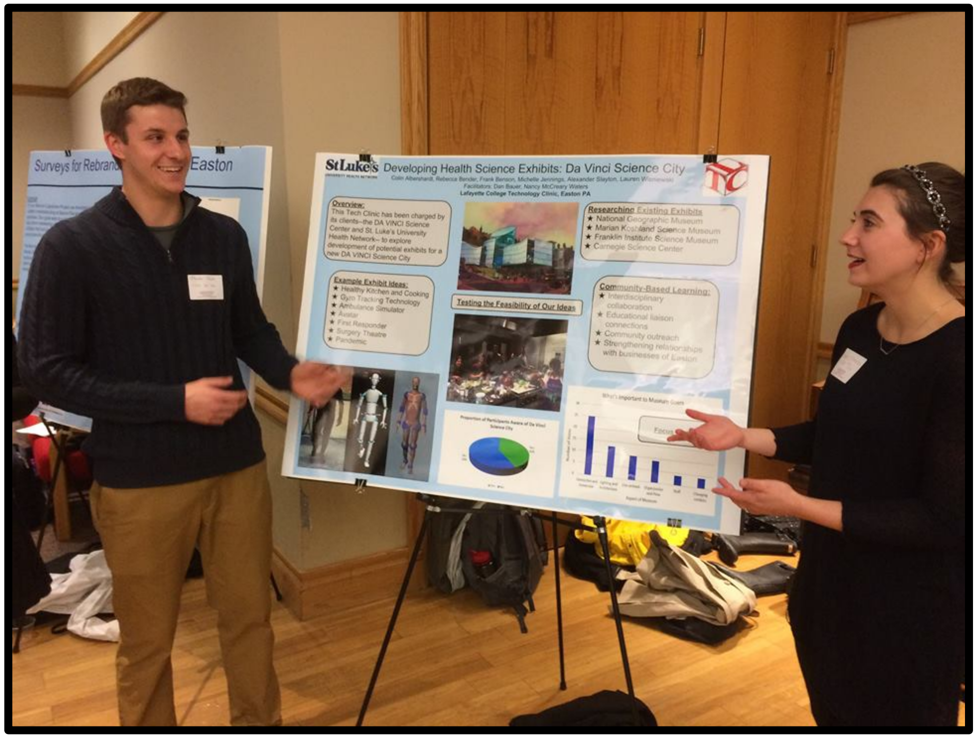
Participants: kids and teens ages 10-18

Findings:

- Enthusiastic about an interactive exercise section where they could try out different activities such as sports, climbing walls, dancing, etc.
- Favorable response to the Avatar mascot; interested in bringing the Avatar home with them and be able to return with it to the museum
- Consider multiple options for Avatars...different animals, images, designing your own perhaps?
- Why not have an exhibit on how vocal chords work for those interested in singing?
- Any possibility of Including a virtual dissection?
- Excited about history of medicine and of medications...could this be a draw for interest in medical careers?

Community Based Learning and Research Expo Feedback

- Community members were excited about Da Vinci's partnership with Lafayette.
- Some individuals seemed confused by and conflated the Da Vinci Science City and Lafayette College's new Integrated Science Center.
- There was a strong emphasis on and support for the presence of an aquarium.



Above, left to right, Alexander Slayton '18 and Lauren Wisniewski '19

Possible Exhibit Ideas

- Epidemics
- Health Professions Education
- First Responder Exhibits
- Ambulance Simulation
- Surgery Theatre
- Concussions
- Healthy Kitchen/Cooking
- Gyro-Tracking Technology
- Fitness Center

What brings it all together?

- **The Da Vinci Avatar**

The Place for Mental Health and Wellness?

Throughout and Within All Exhibits!

http://www.reilycenter.com/wp-content/uploads/mentalhealth.png

De-stigmatizing mental health by incorporating mental wellness into each exhibit within the health sciences

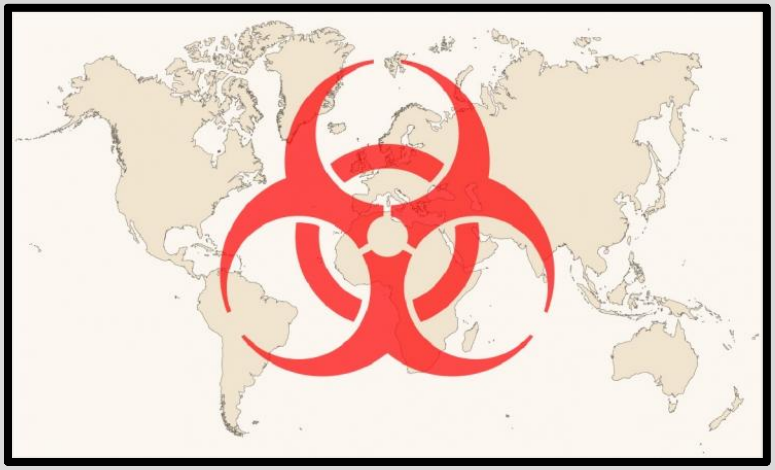
Examples?

- Avatar management: Include mental health into the overall Avatar score to link mental health with physical well-being.
- Fitness tracker: Explain the benefits of exercise for your mood.
- Healthy cooking classes: Highlight the power of food and address mental health illnesses related to food
- Concussions: Connect the frustration of suffering a concussion with the importance of rest for recovery
- Exercise area: Include meditation venues, and yoga classes.

Epidemics: A Game of Life or Death

Proposal? Formulate a game in which visitors can stop a pandemic by learning how germs and disease spread. Studying epidemics (and their cures!) becomes interesting, educational and enjoyable.

- In a site visit, we met with an employee of the Centers for Disease Control and Prevention, who is currently developing vaccines in the case of a biological attack against the United States
- Suggested included games that how diseases can easily spread from one person to another, despite the fact that you have only made contact with one or two persons.



https://coursera-course-photos.s3.amazonaws.com/8e/843ecf485e4a40259959487a21660b/infectiousdisease-MOOC.png

Health Professions Education

Exhibits that encourage interests in health professions

  Embrace the diversity of health care delivery, i.e., nursing, physicians, EMT, phlebotomist.

“How To” Exhibit

  Engaging instruction on performing basic health assessments including: vital signs, blood pressure, pulse.

Supplemental Classes

  CPR courses? speaker visits?.

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First Responder Exhibits

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https://static01.nyt.com/images/2013/12/04/us/AMBULANCE-2/AMBULANCE-2-master1050.jpg

Benefits

- This hands-on exhibit would allow kids and adults alike to experience an ambulance from the inside. Demonstrations, such as checking vital signs, could be done in the ambulance and would educate groups of students on lifesaving skills.
- This exhibit would evoke the effective and successful Mack Truck exhibit in the current Da Vinci Science Center

Challenges

- To insure visitor safety, this exhibit would require monitoring and safety precautions.
- This exhibit would require maintenance and investment in current technology and state-of-the-art responder protocols.

http://mediad.publicbroadcasting.net/p/wrvo/files/styles/medium/public/201503/Ambulance_PennState.jpg

http://www.macktrucks.com/~/media/images/article%20media/davinciexhibit.ashx?as=1&la=en

Ambulance Simulation

http://www.emsr.org/images/large-pulse-check.jpg

What do EMT's and First Responders do?

- An exhibit, a class, or both.
- Learn about EMTs, Advanced EMTs, Paramedics.

Engage Users in Patient Assessment.

- Vital Signs: Pulse, Blood Pressure, Respiration rate, PulseOx.

Explain Basic Life-Saving Support.

- Use an AED, Administer CPR, Deploy an Epipen.

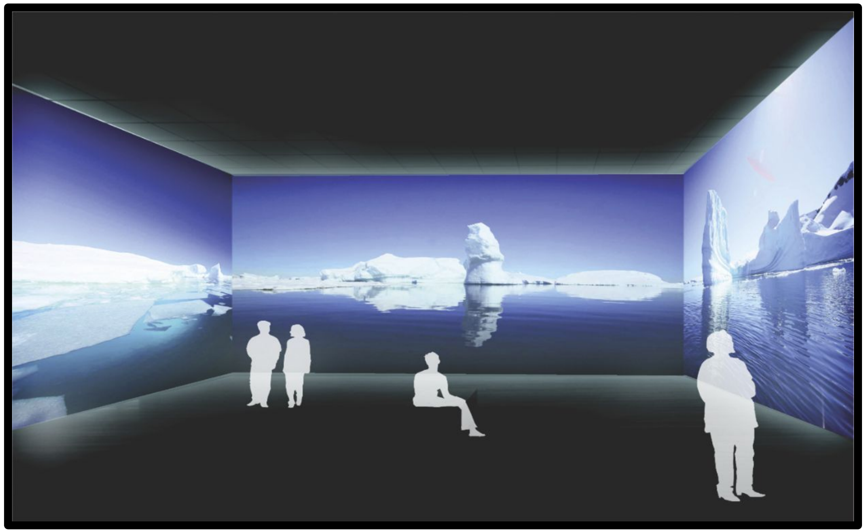
Enable Users to recognize serious warning signs.

Assist Users in learning what to do and where to go for help.

Surgery Theatre

Elements of Surgery Theatre Exhibit:

- A live or prerecorded surgery could be projected onto walls to recreate a true surgery theatre experience.
- Allowing visitors to choose footage of a surgery they experienced, or that of a loved one, will elicit empathy.
- While all children may not relate to a specific surgery, but will likely be fascinated by elements in the makeup of the human body.
- Finally, it could be educational for all ages. Advances in modern medicine, technology, and new medical treatment modalities exhibit broad appeal.



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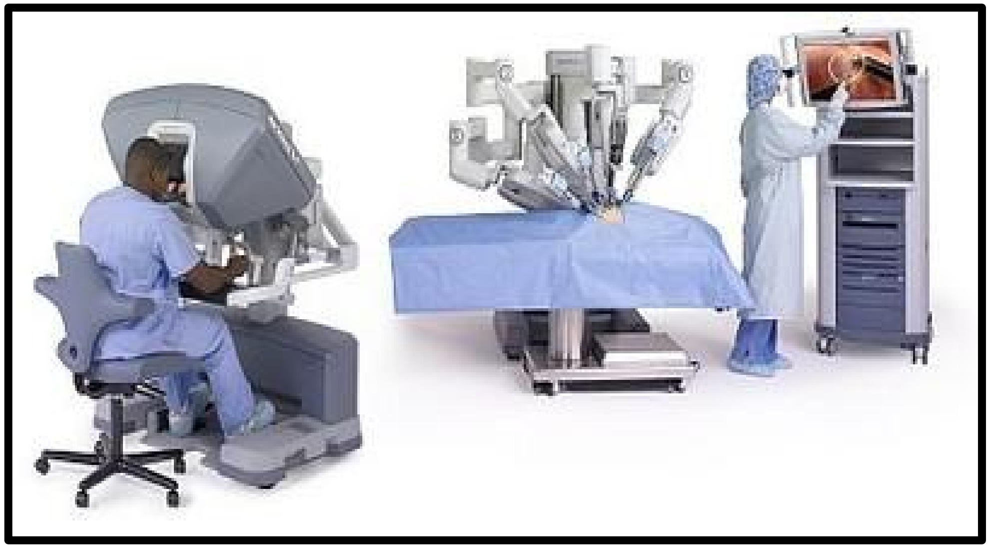
http://www.massgeneral.org/News/assets/images/050313simulation1.jpg

Surgery Theatre Continued...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https://www.acvs.org/sites/default/files/features/feature1_0.jpg

Added Considerations:

- Some parents may not appreciate the ‘gore factor’ of invasive surgeries, especially those with small children. This might be offset by the appeal to youngsters of that same gore factor!
- The length of surgery may impede exhibit flow. Extensive editing of footage may be necessary rather than streaming an entire process.

Simulation: Be a Surgeon Today

- A simulation or virtual surgery may enable visitors to transform themselves and “be a surgeon” for a day in a virtual hospital atmosphere.

Concussions

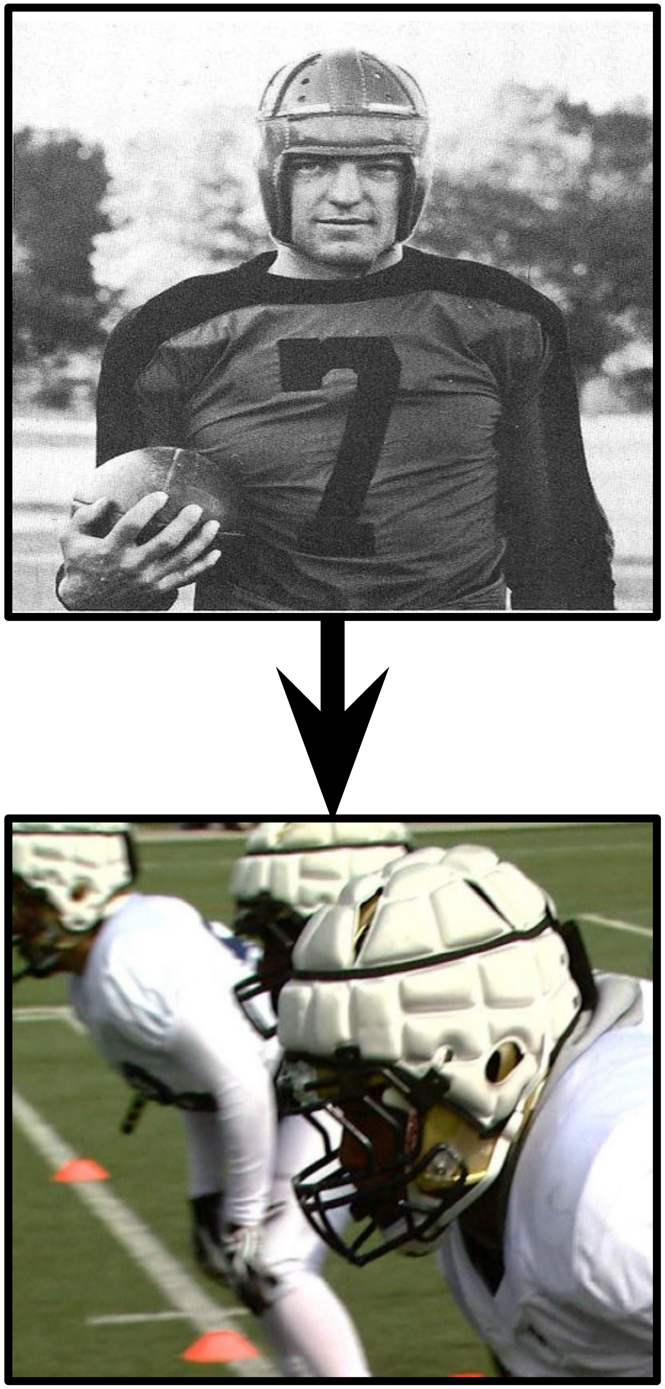
Why Concussions?

- Playing sports is second to only car accidents as leading cause of traumatic brain injury in 15-24 year olds...and often go undetected or unreported.
- This, coupled with general lack of knowledge about negative effects of concussions, can lead to long-term brain damage for young athletes.

The Exhibit

- An initial interactive screen demonstrates internal physiological responses to a concussion happening
- Dangers that ensue with continuance of play will scroll across the screen.
- Interactive demonstration shifts to how baseline concussion testing works.
- Engineering designs for current helmets can indicate how protective technology continues to evolve..

http://static.flickr.com/116/296868889_6169b39780.jpg



http://bf19d0142b960c98204c-6849f9022b05f72b83236695aa4e9a0a.r50.cf2.rackcdn.com/uploads/articles/2016/431097/concussion_p3.jpg

Healthy Cooking Classes

- A chef leads students and families in ways to make healthier meals as well as pick healthier ingredients.
- Classes can be offered for a variety of different age groups.
  - Children can learn about alternative healthy snacks
  - Parents can learn to cook healthy foods on a budget
  - College students can learn about making healthy foods, with minimal ingredients
- Induction stovetops may be used in order for safety in the kitchen.

https://goo.gl/images/7pWhWZ

https://goo.gl/images/Y28gQo

Healthy Cooking: Continuing with Competition!

- After the initial educational session, the teacher can spice things up by creating a competitive “cook off”.
- Children and families might “cook-off” against each other while using healthy foods and alternatives in order to make the most nutritious and tasteful foods. Alternatively, families might join forces on a cooking team in a team setting among other museum guests.
- These competitions can be judged by how healthy the foods are, how tasty the foods are, how easily the foods were prepared, how many local ingredients were used...and more!
- Prize offerings could range from discounts at the Science City gift shop or subsequent visits. Alternatively, gift certificates to local healthy foods vendors in Easton PA could promote healthy cooking and beneficial business relationships with local health food stores.

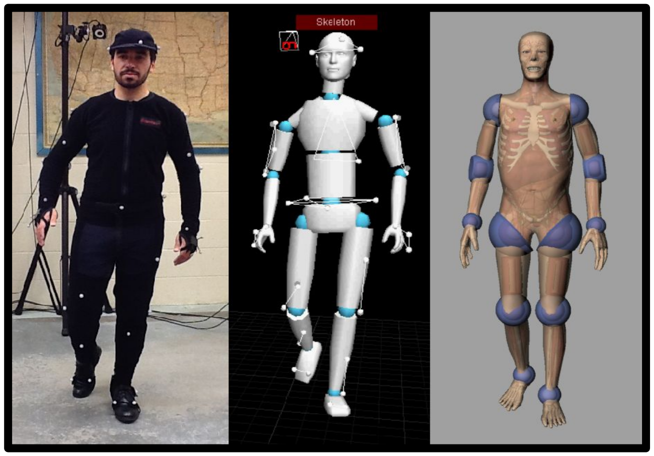
Exhibit Enhancement: Gyro-tracking Technology

What is the appeal?

- Gyro-tracking technology is becoming a popular feature in museum, art, and health exhibits in a variety of forms.
- As a general conception, gyro-tracking is a technology that maps an actor’s movements in real time and projects them. Additionally, the technology is adaptable, and can project the actor’s movements in the context of different settings (i.e., a soccer field or a classroom).

The Exhibit

- Gyro-tracking allows for museum-goers, specifically young kids to participate in an exhibit in a physical and interactive way by encouraging movement, thereby fostering an extended duration of engagement with the exhibit.



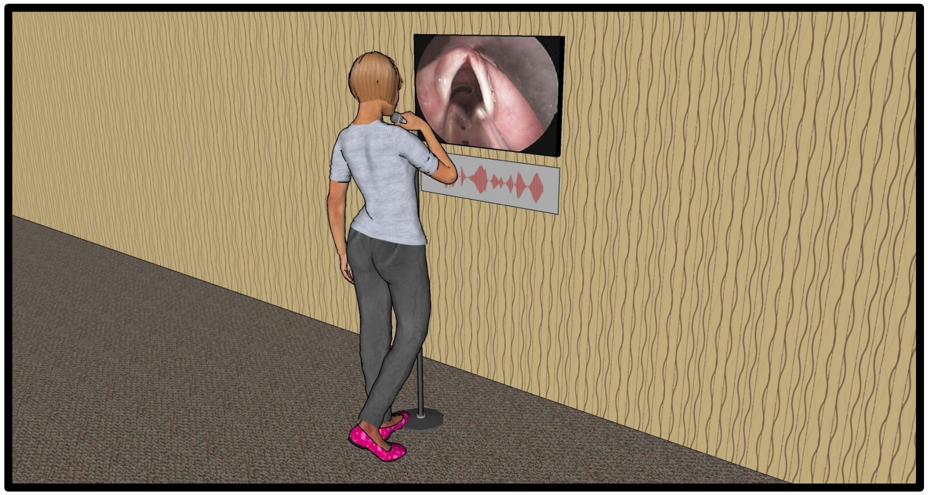
https://commons.wikimedia.org/wiki/File:Motion_Capture_with_Chad_Phantom.png

https://i.ytimg.com/vi/tyiuocPvUes/maxresdefault.jpg

More Applications of Gyro-tracking...

Facilitates interactive immersion with exhibits; users can visualize their body movements and tangibly alter the exhibit outcome by shifting from passive viewer to active user.

- Employ the Vitruvian Man/Woman theme as exhibit templates
- Measure activity of muscular movements
- Track vocal chord changes with singing, yodeling, whispering
- Permits real-time engagement

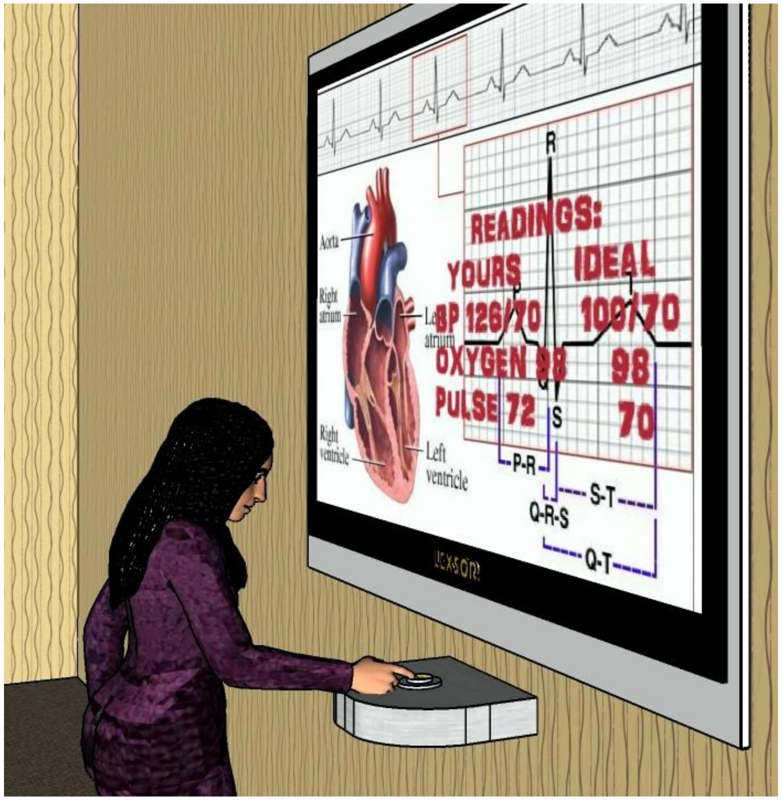


Technology Choices Up Close and Personal: “Wearable” versus “Touchable”

Wearables elicit high impact factor on individual visitors, but may slow down museum flow or require docents. *Touchables* use smartphone technology to display visitor data as the exhibit itself!

http://cdnll.hopkinsmedicalproducts.com/images/xxl/Vital-Signs-Kit-Pulse-Oximeter.jpg

http://lh3.googleusercontent.com/VKqY0hwegfjUkv7qBKf9dPdvktT6yqw7J1WfaYjY5XhVBMfZBcj2kHCzSCx6OfETMQ=h310



Fitness Tracker

Why

- Increased appeal, accessibility and popularity of portable and online health monitoring methods.
- Fitness trackers focus exhibits on the User, and permits friendly competition among different Users.

Benefits

- Can aid in demonstrating effects of sports exertion on heart rates and assist in cultivating safe monitoring practices.
- Coupled with fitness centers (sport, dance, yoga, etc.) the technology could establish competition between Users in different venues or within the same activity center.

Challenges

- Explaining fitness outcomes that are complicated may be challenging.
- Retaining small devices may be an issue.

https://tctechcrunch2011.files.wordpress.com/2016/09/vivofitjr-header.jpg?w=700

https://img.grouponcdn.com/deal/dPJCS6VmsBvcw3R52e4a/Dn-976x576/v1/c700x420.jpg

Fitness Centers

- Opportunities to engage in physical activities; blow off energy!
  e.g., Rock climbing, Trampolines, Dance
- Potential break-place for parents with active kids.
- Proximity to eating areas should be considered.
- Inspired by the Highmark SportsWorks exhibit at the Carnegie Science Center, Pittsburgh PA.

https://s-media-cache-ak0.pinimg.com/originals/79/3b/a0/793ba096f409a76cdff678f7f1de890c.jpg

http://northshorekid.com/sites/default/files/styles/post_photo/public/events/sterlingy_rock_wall.jpg?itok=K4YIOq3s

The Da Vinci Avatar Experience

- Conception: Visitors employ an Avatar to accompany them throughout the Science City
- Transferable beyond health exhibits to industry and environment displays

Benefits	Challenges
● The Avatar concept is highly adaptable and extendable to most other exhibit concepts. ● Allows cohesiveness among exhibits, creating a central theme. ● Immediately engages and personalizes the experience for every Visitor. ● Allows Visitors to learn how to be healthy without feeling as if they are being nagged.	● Utilizing this technology could generate congestion and flow at exhibits, especially when touring large groups. ● By making Avatar scores part of displays, Visitors may feel insecure about their specific performance compared to other participants. ● Feasibility of enabling the Avatar technology to go beyond Da Vinci Science City

http://www.dietsinreview.com/diet_column/wp-content/uploads/2013/07/Virtual-Reality.jpg

http://icdn1.digitaltrends.com/image/british-museum-samsung-ar-640x640.jpg

The Da Vinci Avatar Experience

- Market research: Preference for animal avatars over customizable human or neutral avatars.
- Possibilities include koalas, bears, unicorns, tigers
- Avatars could exhibit a scalable range of health and wellness; compete among different exhibits, be saved to an electronic account
- Encourages return use and repeat visits!

Reactions to the Da Vinci Avatar Experience?

- Responses were overwhelmingly positive among all focus groups to the idea of an Avatar unifying all exhibits.
- Input from the Easton Area Community Center included developing a Da Vinci Avatar app that permits your Avatar to return home with you and continue health explorations.
- Physicians from St. Luke’s Health Network were enthusiastic! They thought the Avatar was a simple, effective way for museum-goers to understand how everyday actions impact overall health.
- Members of the CCE Steering Committee were excited at the potential of the Avatar to encourage museum-goers to return for multiple visits.

Unexpected Takeaways

- Mental Health: Is there a way to utilize these exhibits to remove stigmas associated with mental health?
- Connecting with expert consultants: By interacting with local experts, we gained more personal insight into how the Da Vinci Science City could impact the community.
- Clarification between expansion and Da Vinci Science City: An area where clarity and leadership is needed: Building the Da Vinci Science Center in Easton as Lafayette College unveils an Integrated Science Center and expansion initiatives leads community residents to be confused and concerned about projects and any connections.
- Special Needs Populations: Braille and multilingual labels, ADA accessibility, and hearing support will enrich the museum experience.
- Sanitizers: Perhaps minor, but exhibits about health can often make people feel unclean, the investment in sanitizer stations is a must!
- Feedback Centers/Opportunities: makes guests feel valued.

Pre-suasion: A Valuable Operational Principle?

In seeking ways to unpack audience responses, both in focus groups and as a part of assessing science museum exhibit impacts, we employed the marketing technique described as Pre-suasion by Ciardini (2016) in his book by the same name. Examples?

Visitors may become more engaged when they shift roles from passive Observer to Participant, or move from Viewer to the more emotionally powerful Actor, so::

- "Life Saver" - EMT exhibit
- "Caregiver" - Avatar experience
- "Patient" - Vital signs exhibits and experiences
- "Participant in History" - Vitruvian muscle map experience
- "Singer" - Vocal Chord demonstration
- "Potential Victim" - Contagious disease exhibits
- "Scientist" - Carnegie microviewer

Small symbolic means can be used to emphasize these roles, such as:

- Gloves or hand sanitizers - Contagious disease displays
- Professional microphone - Vocal chord demonstration
- Avatar's health appearance - cooking, snacks, pastimes, etc.
- Engineering display and exhibit equipment to appear as a facsimile of actual functional equipment - durable microviewer that looks like a microscope

Overarching Principles and Summary

The hallmark of a successful, sustainable health sciences exhibit is exciting, immersive transformative engagement that works on multiple levels for an array of target audiences. Achieving this is no minor feat. Using a variety of approaches and multidisciplinary tools, our Team remained open to variable input and different perspectives.The unifying thread articulated here for the Da Vinci Science City is the Avatar experience. Infused with creativity yet simplicity, the Avatar captures the essence of personalized health by blending the familiar and comforting with technology that is at once contemporary and exciting. The Avatar cajoles guests to experience Da Vinci Science City in multiple ways, and extends their visit well beyond the confines of the facility. Our recommendations reported herein truly, “run the gamut from health care perspectives in the past through to the most contemporary applications using science, technology, engineering, art and mathematics.” We hope you agree!

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- Easton Area Community Center
- Easton Public Market
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