



*Final Report*  
Formative Evaluation:  
Places of Invention Online Map

Submitted to:  
Randi Korn & Associates  
2417 Mt. Vernon Ave  
Alexandria, VA 22301

Submitted by:  
Elizabeth Goldman  
Kim Streitburger  
RMC Research Corp.  
1000 Market Street, #2  
Portsmouth, NH 03801

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## EXECUTIVE SUMMARY

Under a subcontract with Randi Korn & Associates, who conducted a study of the on-site museum exhibit, RMC was engaged to conduct an evaluation of the Places of Invention online map site for the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation. The Places of Invention online map, part of the 3,500 square foot on-site exhibit, was developed as a platform for collecting invention stories related to specific places or landscapes submitted by Smithsonian staff, Smithsonian Affiliations, and visitors to the online map. RMC investigated three key topics related to visitors to the online map:

- I. Test draft and revised guidelines for visitor submissions of invention stories to the online map.
- II. Test navigation and appeal—both visual and content—of the online map.
- III. Compare the numbers, types, and characteristics of published invention stories submitted by visitors through the Exhibit or via the Web.

Due to construction and technical delays, a fourth topic concerning visitor gains in knowledge about and attitudes toward invention, inventors, and themselves as inventive, could not be investigated.

Initially, RMC worked with two focus groups to test the draft guidelines for online visitor submissions. One was with middle school students in a summer program (average age: 12, n=13) and a second with parent-child pairs (n=6) from a relatively affluent university community. Focus group participants viewed mock-ups of the eventual online map and worked on paper versions of the guidelines. Over the course of the exercise they submitted invention stories, recorded comments on the submission process, and participated in a group discussion. Participants raised some issues that were ultimately addressed by Lemelson Center staff, particularly with respect to:

- o Using greater precision with terms such as “place,” “landscape,” “area,” “region,” and “story.”
- o Simplifying guidelines for story submission.
- o Providing anonymity for story submitters.

Both groups found the idea of “Places of Invention” appealing and expressed interest in visiting the site once it was live. Young people and children and the parent-child pairs were more enthusiastic about submitting invention stories to the map than parents, who raised questions about their own authority to document inventions and quality control of submissions. Parents said they were unlikely to spend their parent-child time in submitting stories to the map. Participants also found the prospect of creating videos to accompany their stories daunting and unlikely.

In the second phase of its work, RMC held a third focus group comprising teachers, other adults, and high school students. The map was live for this focus group and after exploring the website, participants completed paper surveys to track how they navigated to the POI map and discussed their sense of the site’s visual and content appeal and the likelihood of their submitting an invention story during a group discussion. Participants expressed considerable enthusiasm for the map and related website materials about the exhibit and additional invention stories. Some participants showed interest in submitting invention stories but also raised questions about what qualified as a good story, their own lack of knowledge about inventions, or their authority to submit credible stories. They also raised concerns about navigating to the map, noting that some steps were not intuitive and also that the Lemelson Center site

has a great deal of interesting content competing for attention. Most of the website architecture was in place by the time a focus group could test the live site, however, and few navigation changes were made.

Google Analytics data collected over the period from July 1 through November 30, 2015, showed that page views of the POI map accounted for slightly more than 1% of all Lemelson Center website views. During that time, the POI map invention story submission form received 202 page views (178 unique page views), reflecting some curiosity or interest in submitting a story. Google data also show that 31 unique visitors submitted stories to the map; their stories formed the basis of the study.

For the study, RMC compared invention stories submitted through the Exhibit and the Website through a content analysis of all 31 published stories submitted through the Web and a random selection of 93 published stories submitted through the Exhibit. Most focused on a single invention. Several distinctions emerged between the two groups of stories.

Although there were far fewer Web-submitted stories (31) compared with Exhibit-submitted stories (321), they generated considerably more content and potential learning opportunities than did a sample of 93 Exhibit-submitted stories. Web submissions tended to be more detailed and substantive, while Exhibit submissions sampled were mostly quite brief, no more than two sentences. Web submissions also more frequently included supporting resources such as illustrations, video, and/or hyperlinks to other websites.

Exhibit-submitted stories—the small percentage that were not nuisance or nonsense entries—required many more editorial notes for clarity, and featured self-inventions far more often than Web-submitted stories. Web-submitted stories also showed numerous inventions related to arts and crafts while Exhibit-submitted stories featured sports and games more.

Because the study period was briefer than anticipated, it is suggested that Lemelson Center staff continue to collect data from online map visitors on knowledge gains and shifts in attitudes and interest toward inventions and STEM generally. Based on the current study, it appears that Web stories have greater value in the sense of more content and visual supports and fewer editor's notes than Exhibit stories, which suggests that the Web-based submission process is less demanding on staff (less sifting, fewer editor's notes) and hence is a better investment of future effort than soliciting stories through the Exhibit. The Exhibit may better serve as an inducement to submit a later story than as a collection point for usable Places of Invention map stories. Notwithstanding the brief period available for studying the submitted invention stories, the POI website appears to have greater potential as a submission site.

## INTRODUCTION

Since its inception in 1995, the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation, part of the Smithsonian Institution's National Museum of American History (NMAH), has established itself as the nation's most comprehensive program on innovation. Its exhibitions have explored topics such as color, toys, and the environment, including a small prototype for Places of Invention: "Hot Spot of Invention"—MIT in Cambridge, MA, during the WWII era.

The central thesis of Places of Invention (POI) is that invention "hot spots" are fueled by unique combinations of creative people, ready resources, and inspiring surroundings. Following on the success of Invention at Play, a traveling exhibit that featured the role of play and curiosity in invention, the POI project was extremely ambitious. Plans included hands-on explorations, public-generated content, and the possibility of an online inventive community. The online Places of Invention map, accessible both through a touchscreen at the exhibit or on the Internet at <http://invention.si.edu/places-invention/map>, was designed as a platform for public-generated content.

Website development and production was slated to end in late Summer 2013. Due to a number of delays, related both to ongoing building construction at the NMAH and technology challenges, the website went live in early Spring 2015. As a result, the RMC evaluators had insufficient time to conduct a summative or impact evaluation of the website's contributions to visitors' new learning and shifts in attitude as originally planned. For that reason, all evaluation work in this report is presented as formative.

## METHODOLOGY

The RMC study explored three phases of the online portal's development:

1. Testing draft and revised submission guidelines—Focus Groups 1 [middle school students] and 2 [families] (n=19).
2. Testing website navigation, appeal, and story submission process—Focus Group 3 [teachers, other adults, and high school students] (n=14).
3. Content analysis of POI map story submissions through the Exhibit and Web portal (n=106, one third of which were Web-submitted stories).

### Phase I

To inform ongoing improvements to the story submission form and process, RMC conducted two focus groups on the map submission guidelines. The first focus group (n=13), held in August 2014, comprised a group of young people similar in age to the target audience (10 and up), recruited through a summer program for youth in Portsmouth, NH. Each student received \$30 for participating. See Appendix A for Focus Group 1 guidelines and protocols. Revised by Lemelson Center staff, the guidelines were tested with another target audience, families in November 2014. Inclement weather reduced the sample from 9 parent-child pairs to 3 (n=6). Each pair received a pizza dinner and \$20. See Appendix B for Focus Group 2 guidelines and protocols.

### Phase II

The website was accessible for the third focus group held in February 2015 (n=14). Participants completed surveys and took part in a group discussion about the visual and other appeal of the website, navigation, and the submission process. In order to record their navigation steps and to collect demographic and attitudinal data, participants worked on paper surveys keyed to specific elements of the Places of Invention website (See Appendix C). Participants received light snacks and \$20 each.

### Phase III

The original plan outlined with Lemelson Center staff and RKA entailed an impact evaluation of visitor learning through the POI map, including a content analysis of story submissions, pop-up surveys to collect real-time user data, and individual surveys or interviews with selected POI website visitors. Phase III sought to understand:

- o The POI map's appeal.
- o Visitor knowledge and or social gains through interacting with the map.
- o The connection, if any, between Exhibit- and Web-submitted invention stories.

The online map went live July 1, 2015. RMC staff analyzed the number and types of stories submitted via the Web (n=31) and randomly selected stories submitted via the exhibit (n=93) over a five-month period from July 1 through November 30, 2015. One pop-up survey on the POI map website solicited information about how visitors arrived at the map and collected some demographic information (n=30); a second pop-up survey, exploring new learning as a result of the map experience and further looks at navigation and overall appeal drew too few respondents to be included in the study.

## FINDINGS

### *Phase I Findings*

#### **Focus Group 1: Adolescents (n=13). Draft POI story submission guidelines**

The focus group was held at New Heights, an experiential and adventure summer learning program for teens in Portsmouth, NH on August 6, 2014.

The majority of student participants were 12 years old (three were older and one younger) entering grades 6 through 9 in September. Seven boys and six girls participated, all recruited through New Heights. Participants included two African American and two Hispanic American students (observed). An adult New Heights associate who worked with some of the recruited students also attended.

Students sat around a long table and were given a brief introduction to the Places of Invention exhibit and interactive website. They were shown an enlarged section of the map in color and each received a handout of the POI overview. Researchers drew their attention to hip-hop, color and sound movies, and new digital products of potential interest to this age group. Students were then asked about their self-identity as inventors (no one so identified) and what they knew about New Hampshire inventions. No one thought of New Hampshire as a place for inventions. “Maybe Hollywood or New York City since they are arts places,” noted one student. Students were then shown illustrations of four native New Hampshire inventions: the gundalow, Concord Coach carriages, Tupperware, and the Segway. All students were familiar with the Segway and most were familiar with the gundalow and Concord Coach when they saw the illustrations. None were aware that Tupperware had been invented in New Hampshire.

Following this brief discussion, students were asked to assume they had received a school assignment to submit a description of a local invention, similar to one of the NH inventions, to the POI website using the POI submission guidelines. Working with a paper version of the guidelines, students were requested to work individually and not discuss their work until a whole-group discussion following the activity, and note any difficulties or questions they had as they filled out the form according to the stated guidelines. Students worked at the task for about half an hour and then discussed their experience with each other and the researchers.

Students had numerous concerns with the form. Highlights of the discussion include:

- Not all students were familiar with the convention of an asterisk indicating a required item and suggested a note explaining this use of the asterisk on the form.
- All agreed that a “help” button with further guidance on how to fill the form out would be a good addition.
- Students had no trouble navigating the drop-down menu or identifying their state.
- Four students raised questions about “place,” describing it as vague. “It could mean a town, city, a school, or even a house,” noted one; another suggested “an example of what they mean.” Another wrote: “What place—my house, my town?”
- Students also expressed confusion about identifying the landscape, noting that “landscape” and “place” mean similar things. Several were uncertain what a prairie was and many assumed “urban” would be one of the landscapes. On request, they noted other landscapes that might be included:

wetland, jungle, and Arctic, reasoning that these landscapes and climates might well prompt inventions. Students also suggested including small images alongside each landscape category.

- Several students were unfamiliar with the word “metropolitan” but guessed correctly that it meant “big city.” Some were also unfamiliar with “rural.”
- The term “region,” in this context, motivated several students to note a fundamental confusion among the terms “place,” “area,” and “region.” All agreed that terms used needed more clarity.
- Students found the guidelines for describing the invention confusing. All 13 agreed that several individual questions were more useful than one big question.
- The use of the plural “inventions” was confusing. Students suggested “invention(s).”
- Change the word “story” or clarify it further. A number of students noted that younger children might interpret “story” as “made up.”
- Six participants expressed confusion about the word “factors” and only one was able to define it successfully as “conditions” that led to the invention. This led to an animated discussion of the kinds of factors that could lead to inventions, such as a river (gundalow), flat and/or large cities (Segway), cobblestones or other rough surfaces (Concord coach), and weather and climate (Tupperware).
- Students found it confusing to have the question about factors followed by one about natural resources. It was suggested to ask about natural resources first and then other factors.
- Eight students said they might upload a photograph; none was enthusiastic about uploading video, noting that the inventions they were writing about took place in the past, there would be editing concerns, etc. Nor was there interest in uploading sound; students said sound without pictures is boring.
- None of the students was familiar with the use of “tags” in this Item, although they recognized “hashtags” when it was offered. Students associated price tags, name tags, the game of tag, etc. with “tags” and did not translate “tags” to a digital context.
- Students expressed concern about including their last names, citing privacy concerns. Some wrote out their full names and then crossed them out during the discussion.

At the conclusion of the discussion, students were asked if they would be likely to explore the POI interactive map once it went live. Twelve of the 13 expressed interest; some said they would explore places they knew while slightly more said they would find sites outside of the U.S. more interesting, mentioning China and Africa in particular.

Students also suggested a “random” button that would take a visitor to a randomly chosen site to explore. Others suggested a search capability that would let them follow up on particular interests such as electronics, space exploration, and household goods.

All students said they would watch videos associated with other places of invention; only two would listen to audio about a place of invention. Students suggested limiting the number of words to be used in telling the “story”—“just cover the basics,” was suggested.

Twelve students submitted invention stories, all chosen from the four presented at the beginning of the activity. All 12 contained their responses to the box on the form and thus some were extremely short.



Two students covered all four NH inventions, with sketchy conclusions, such as “they made people’s lives easier.”

### Focus Group 2: Parent-Child Pairs (n=6). Revised POI story submission guidelines.

RMC Research staff met with 3 pairs of parents and students recruited from the Oyster River Middle School (Durham, NH, home of the University of NH) at RMC offices in Portsmouth, NH, November 18, 2014. (Due to bad weather, of 9 original pairs who had signed up, 3 were late cancellations and 3 were no-shows.

All 3 students were male middle school students. Two were 13; one was under 10. Two students identified themselves as somewhat interested in learning about inventions; one as very interested. All 3 parents were between the ages of 41 and 50 and all three had graduate degrees. Two were female and one was male. They described their occupations as: finance professor, writer, and software developer.

Participants were arranged around a table across from a large video screen and given a brief introduction to the Places of Invention exhibit and website. They were shown a sample POI video as well as a slide show created by RMC with Lemelson Center materials that showed mocked up images of the six exhibits, exhibit artifacts, and the interactive map. To prime participants to think about local inventions, the slide show also included images of four New Hampshire inventions: the gundalow, Concord Carriage, Tupperware, and Segway. With the exception of Tupperware, the other inventions were well known to all participants. Participants were also asked about their self-identity as inventors (no one so identified).

Participants were asked to work in parent-child pairs to complete a paper version of the guidelines for submitting content to the POI map. Although some participants raised questions as they were completing the form, a full discussion took place after all participants had finished the form. In general, Focus Group 2 participants raised more philosophical than procedural questions about the guidelines.

### Highlights of the Discussion

- o One student immediately raised the question of whether the invention had to be real or not and indeed submitted an idea for an invention. The other parent-child pairs described actual inventions—the merry-go-round, invented in Tonawanda, NY, and the snowmobile, invented in Ossipee, NH.
- o The concept of “places of invention” was confusing to two parents, who interpreted “places” as unique settings where creative people go to think, such as treehouses or bathtubs.
- o One parent argued that some inventions, such as the gundalow, were clearly more influenced by specific physical conditions (tidal river) than others: “Silicon Valley is innovative because it’s innovative...Innovation begets innovation.” Another noted that linking geography with invention is not always relevant and many tech inventions derive from a “community of the brain” and noted that the automotive inventions that sprang up in Detroit as more influenced by Henry Ford’s “keystone” invention than by the city’s physical qualities: “Geography was important a thousand years ago, but is less so now.”
- o Asked how they would go about researching an invention, participants noted they would look to Google, The Smithsonian, a museum, or possibly go to a local historical society. All parents expressed concern about time constraints to actually engage in this activity with their child unless it was teacher-driven or on site at the exhibit.

- Participants had no problems interpreting the form; the researchers showed the “live” form on the Web and demonstrated the drop-down feature. Participants noted that the drop down menu in Item 1 needed to be expanded.
- One pair was frustrated by the term “landscape,” arguing that the term at best describes a physical place—not “what it’s like or whether [the place] encourages creativity.” They would have preferred a question about the “mood” of the place—whether the culture is “buttoned down,” like a bank or “relaxed,” like the Google headquarters. Pointing to necessary “intangibles” such as culture and “climate of invention,” cost of living, proximity to universities, and enabling legislation, this parent characterized invention as a product of “knowledge and leadership” rather than of a physical place. They preferred the term “environment” over “landscape.” In a related discussion, participants noted it would be interesting to be able to sort inventions by landscape, such as university settings, environmental factors, and places identified as “healthy places to live.” That said, all pairs indicated a specific landscape (woods, mountains, urban/city) in completing the activity.
- The pair who described the snowmobile suggested it grew out of being “stuck” during winter. They conjectured that the inventor was a tinkerer who cobbled together a new machine out of existing parts, although they left open the possibility that the snowmobile was a collaborative effort. They characterized the snowmobile as safer and faster than snowshoes.
- The pair who described the carousel suggested that the nearby Niagara River may have contributed power and noted that Buffalo was at one time the terminus of the Erie Canal and a large population center where new forms of entertainment would be welcome.
- The pair who described the so-far imaginary invention of a “shell” of solar panels in geosynchronous orbit around Earth cast it as a solution to power needs and pollution, with the caveat that “it would require world peace” to work.
- One parent suggested distinguishing between needs-based inventions (arguably, the snowmobile) and “this is cool!” inventions such as the personal computer, and suggested that need and the human drive to experiment were as important to invention as landscapes.
- One student proposed using icons instead of or in addition to words on the instructions for uploading content.
- Participants seemed generally undisposed to creating videos for the map. Noted one, “if the video is to be made at home [that is, not onsite as the exhibit], no, I wouldn’t do it. I have a life,” adding that unless a video were assigned by a teacher, “I don’t see anyone shooting video” for this. “Life is so full,” a parent said, “the museum is outside regular life. You go, you experience it—and then you are back into your regular life.”
- A parent raised copyright issues—what if someone submitted a video, for example, that included copyrighted material? Would sourcing the material be sufficient? This parent also raised the issue of competing claims, citing the examples of television and stainless steel: “Who will do the fact checking? Who will name the ‘real’ inventor?” Others raised the possibility of someone’s posting a video full of falsities, which would reflect poorly on the Smithsonian, cautioning, “This is the Smithsonian, not Wikipedia.”

## Phase II Findings

### Focus Group 3: Adults (n=14). Places of Invention Website.

RMC Research staff conducted a third focus group to test the navigation and content of the Places of Invention (POI) website February 11, 2015. Fourteen participants took part; all completed surveys. Each participant received \$20 and a light snack. Participant demographics were collected before the focus group began. The greatest number of participants was students and teachers (slightly more students). Other occupations identified were in manufacturing, writing, apprentice, or were not indicated. With respect to education levels, the greatest number of participants was either in high school had college degrees (nearly 80%) while the remainder had graduate degrees. Again reflecting the group's composition, the greatest number of participants were younger than 18 (approximately one third) and between 18 and 25 (slightly less than one third.) slightly more representatives of the age group 26 to 35 attended than did those over 41. Nearly three-quarters of participants identified themselves as very interested in invention' the remained identified as somewhat interested.

Following a brief introduction to the project, participants used computers to access the website. They were asked to begin at the invention.si.edu site (Lemelson Home Page) and proceed to the map, making notes of their navigation paths on a survey form keyed to the different POI pages. After contributing invention stories, real or imagined, to the POI website, participants answered some broad questions about the Places of Invention website, the map, the story submission process, interest "hooks," and whether their interest in invention had increased, decreased, or stayed the same as a result of taking part in the focus group.

Participants were strongly positive about the Places of Invention project and impressed by the "incredible" amount of work that has gone into the website.

### Highlights of the Discussion

- **Overall Design.** Most participants liked the overall design of the site, finding the colors and the use of circles appealing. One or two found the type size on the Exhibition page overwhelmingly large, although most were not bothered by it. About one third of participants felt the website was designed for middle and high school students, based on the bright colors and vibrant design; many younger participants (early 20s) said they also found the colors and shapes appealing. A couple of male participants found it "busy."
- Middle school teachers found the website a useful and intriguing teaching tool, suggesting they might have students collaborate and noting the strong encouragement students would receive if their place of invention story was published on the POI website. A teacher who also serves as a coach noted the possibility of including the wide range of inventions associated with athletics.
- **Navigation Issues.** Many participants found the website difficult and somewhat confusing; one confessed to being "lost;" others noted they were hesitant to explore much because they were not sure how to get back to where they had been.
- Several minimized the size of the website text in order to see as much of the full page as possible, noting, "I want the overview" before specifics. Others agreed, characterizing the navigation as a "never-ending scroll."

- The Lemelson Center home page confounded some participants: “So many different options!” said one. There was a vigorous conversation about scrolling down the page or seeking hyperlinks. For this group, scrolling was not intuitive. Many also read the black bar of buttons along the lower edge of the screen as indication they were looking at the complete page and did not scroll down.
- Among those who did scroll down from the Lemelson home page, having “part 2 of 2” precede “part 1 of 2” was perplexing. Several also noted that when they reached the drawing/tagging section, they assumed they were at the bottom of the page and were surprised to find more content below it.
- Participants suggested that a vertical navigation bar is more intuitive than a horizontal one at the bottom of the screen
- Many did not notice the breadcrumb trail at the upper right of the screen; those who did notice it observed that it was small and hard to read.
- Some found that the Exhibition Overview offered the most context for understanding what the Places of Invention project was about. Others agreed that even after exploring the site, they had an uncertain sense of what POI was about. Several who self-identified as “very linear” had difficulty navigating the website. “There was not a clear goal,” said one, and another said, “I need to know what the primary intention is.”
- Participants also suggested that it would be helpful to have a list of content on the home page, rather than scrolling through content or use the search bar (especially if visitors didn’t know what would interest them at first.) In a related suggestion, some participants suggested grouping content by category or time frame—this was all part of their wish to get a sense of the whole and the varied offerings before immersing themselves in individual stories.
- Participants were also confused by, and hard pressed to explain, the use of “places of invention” as both a project title and specific content related to place. Participants found the stories extremely interesting but had trouble seeing the difference between the stories and the places. Greater distinction would be welcome.
- **Map and Story Contribution.** Creating multimedia pieces for the map elicited strong interest from teachers; some were already involving students in multimedia projects. Teachers were drawn to the map’s “authentic content” and found it easy to conceptualize student assignments based on it.
- A number of participants, however, expressed hesitancy about what they should contribute. They were unclear about what would “qualify” as an entry and questioned whether it should be something they had heard about or something that happened in their hometown, wondering, “How do I fit in?” It was suggested that the site provide specific guidance on what “qualifies” as an appropriate story and clarify that contributing to the map will likely involve research and a return visit.
- Some noted that the website uses a “pretty liberal” definition of invention, while they thought of inventions as “things.” After watching the sample video (Lowell 1), participants wanted to know what the invention in question was. One noted it was as much about “inventing a place” as it was a “place of invention.”
- Two suggested additional content that would be useful to viewers. One, with a research science background, wished for some elaboration of the research findings mentioned on the home page. Another noted that the Crane paper video/story would have been more powerful with a title that

brought in Crane's role in producing America's paper money—"that's something most people don't know and it would have made the Crane story more compelling" to have that information up front.

- Asked about **the relationship between the exhibition and the larger project**, participants were positive about the project as a whole and the idea of a connection between place and invention.
- **Places of Invention Map.** Participants reached the map via the link provided by the Smithsonian team. Slightly more than half found the map "jumpy," moving too quickly, "confusing" and "unsettling." One also found the subtitles too small and the background music "annoying." A few had very positive remarks, such as "I enjoyed the bright colors and was intrigued by the map," "I want to click on one of the dots near [my] hometown," and "I like the placement of map on right and words on [left]."
- One or two participants did not grasp the nature of the map immediately. For instance, one assumed the markers were "locations of the museum," but quickly realized the error. Others understood the purpose immediately.
- Once on the map, participants were enthusiastic about its existence and potential, stressing opportunities to learn from invention stories and strong interest in their local geography and inventions. Some suggested they might use it to learn about an area before visiting or to see what inventions originated in different parts of the world.
- Although adding a story was appealing in concept, many respondents felt they were not qualified, expressing uncertainty about what would qualify as a good story and about their authority to contribute, although in principle they liked the idea of visitor contributed stories.
- The process of submitting a story appeared easy to understand by all participants.
- **Motivations to Return to the Site or Contribute to the Map; Interest in Invention.** Asked what would induce them to return to the Places of Invention website, participants mentioned regular updates (weekly or monthly) by email newsletter.
- Teachers saw value in the map as a virtual field trip.
- Respondents also commented on visual and other "hooks" that would draw them to the site. Regular updates, continued use of arresting graphics and colors, and more nuanced categorization all emerged. One participant cited the negative impact of navigation issues.
- **Contributing to the Places of Invention Map.** Participants appeared to seek more guidance about how and what to contribute. Motivation was conditional on their sense of knowledge and expertise but they also described "an excitement to share." Teachers continued to express enthusiasm for the map as a teaching tool.
- **Increased Interest in Invention.** All participants indicated either increased interest or a reinforcement of existing interest after experiencing the POI website.

## Summary

Participants were extremely positive about the focus group experience and found the Places of Invention website intriguing; many expressed interest in returning to the site on their own. That said, they also raised navigation issues and several expressed a wish that the invention stories were categorized in terms of larger themes in order to make browsing them more easily. Others concurred that some kind of topical grouping would help them home in on their interests.

The Places of Invention project clearly tapped into participants’ attachment to their own local place, and exploring and/or celebrating their “place” through invention was a strong interest. Participants also seemed intrigued by the interactive potential of the site that opportunities for visitors’ comments provide.

Regular updates on content additions or other new materials emerged as a strong factor in motivating participants to return to the site.

**Phase III Findings: Numbers and Types of Invention Stories Published**

A number of invention stories either preceded the official opening of the website or were submitted by Smithsonian staff or Smithsonian Affiliates. These stories are excluded from the present study, which is focused on the visitor experience. During the period from July 1 to November 30, 2015, invention stories submitted to the Places of Invention map numbered 4,942. Of them, 375 were published on the map.

Clearly, most (92%) of all POI story submissions were rejected. Deleted stories were typically incomplete, vulgar, or nonsensical (strings of letters or numbers, juvenile greetings). Lemelson Center staff reported that few, if any, Web stories were rejected. They also noted that some lower quality submissions from the exhibit may have been due to unwieldy touch pads used on site at the exhibit.

Chart A shows the relationship between numbers of submitted stories and numbers deleted.

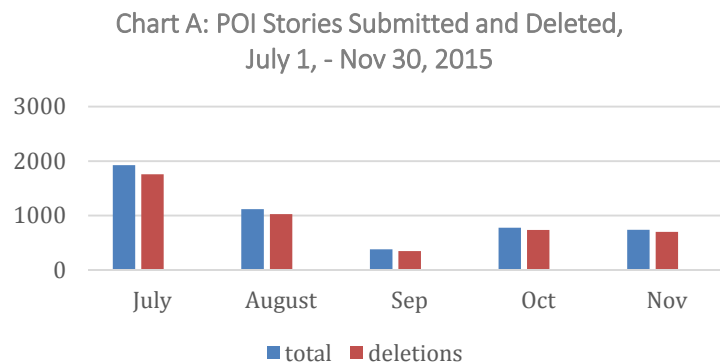
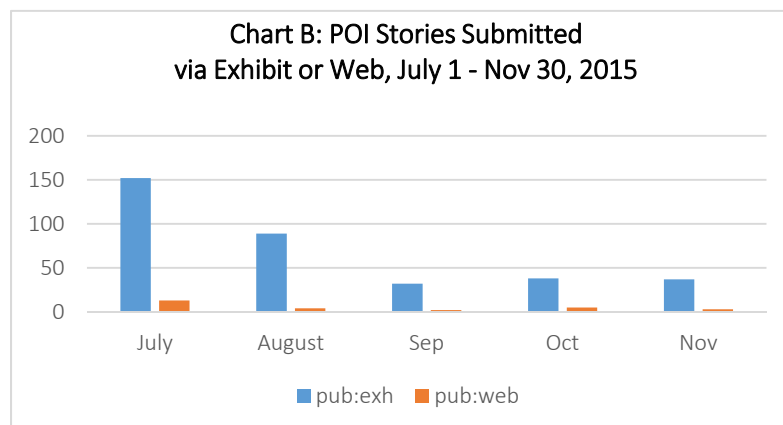


Chart B shows the relationship between numbers of Web stories (pub:exh) and Exhibit stories (pub:web).



Overall, only 8% of stories were submitted through the Web. The greatest number of Web submissions (12%) occurred during October; the smallest (4%) occurred in August.

### Google Analytics

Website user statistics gathered over the July 1 – November 30, 2015 period through Google Analytics were also studied. During that period, the Lemelson Center website <http://invention.si.edu/> received 374, 935 page views (270,544 unique page views) while the POI map <http://invention.si.edu/places> received 5,227 page views (3,908 unique page views), representing slightly more than 1% of overall Lemelson Center website visitors.

Visitors spent, on average, 45 seconds longer on the POI map site than on the main Lemelson site. Map visitors represent about 1% of all Lemelson Center entrances. The map site had a higher bounce rate, 76% than the Lemelson site, suggesting more visitors came and left or went to another page from the map than from the Lemelson site. The map also appears to have had a higher exit rate, 62%, (Lemelson Center site, 42%), suggesting that more visitors ended their Internet session from the POI map page than from the Lemelson Center site.

Visitors to the map website are clearly invited to add a story to the map: a banner at the bottom of map, enhanced by cascading place markers is quite visible. During the period under study, the submission form received 202 page views (178 unique). Google data also show that 31 unique visitors successfully submitted stories to the map. These 31 stories were analyzed for this report.

### Characteristics of POI Map Visitors

In collaboration with the Lemelson Center, RMC designed two pop-up surveys to solicit feedback from online visitors to the Places of Invention website.

A short pop-up survey embedded on the home page of the map gathered demographic information on website visitors as well as information about how they reached the POI map (See Appendix D). A second pop-up survey appeared on a sample (approximately half) of all invention stories to gather information about how visitors navigated the map, made decisions about submitting a story, and rated the website's appeal, in addition to demographic information.

Due to delays, the surveys were installed in mid-November, 2015. For this study, data collection ended in mid-December, although Lemelson Center staff will continue to collect data from these surveys. Data for the current study were drawn from 30 respondents to the short, background survey. The longer survey generated too few respondents to be included in this study.

### Demographic Survey Findings

The short demographic survey found:

- Slightly more female POI map visitors (57%; n=17) than male (43%; n=13).
- Almost three quarters of surveyed visitors were 35 years or older (73%; n=22).
- Survey respondents tended to be highly educated:
  - 80% (n=24) reported having a bachelor's degree
  - Of those respondents, 67% (n=16) also held post graduate degrees.

Based on this small sample, visitors to the Places of Invention map website tended to be well-educated adults; more than half were female.

In response to the question about how they learned of the interactive POI Map, respondents could choose more than one source. Most frequently cited sources were personal recommendations or a prior visit to the POI exhibit in Washington, DC. Table 1 tabulates respondents' reports of how they found the site.

**Table 1: How Respondents Found the Website (total responses: 38)**

Method	Frequency of Mentions
Recommended by friend/family/co-worker	37% (11)
Visited the POI exhibit	27% (8)
Google or other search engine	23% (7)
Smithsonian website (3 cited Tween Tribune)	17% (5)
Recommended by a teacher	13% (4)
Facebook	10% (3)

### Places of Invention Story Analysis

The 31 published Web stories were compared with a random selection of 93 Exhibit stories. Atlas TI software was used to compare patterns between stories submitted through the two avenues. No invention stories submitted, either by Web or Exhibit, generated visitor comments.

Stories were coded by

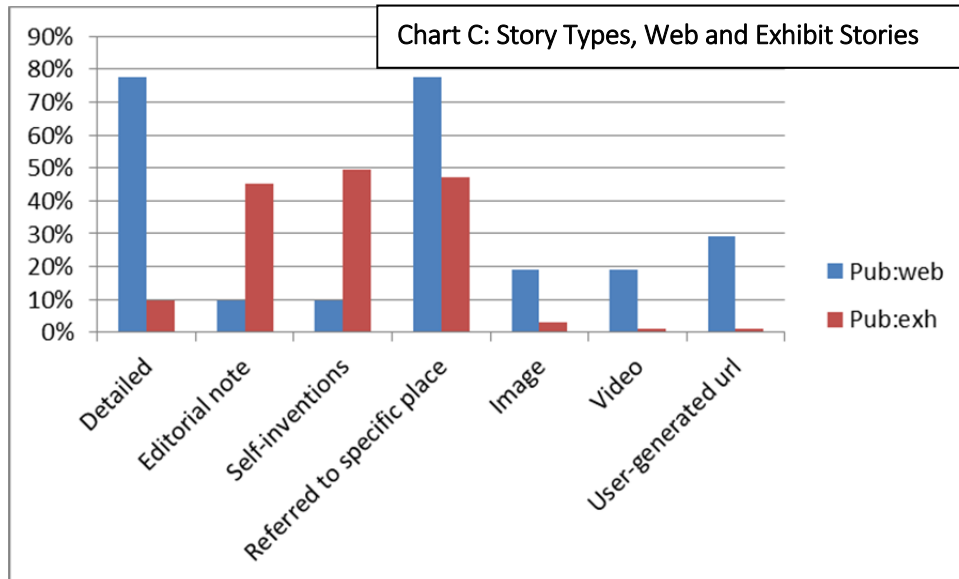
- Type of invention (self or other),
- Aspects of the stories themselves, including:
  - The relative length and complexity of the story,
  - The presence of editor's notes,
  - Reference to a particular place, topography, or setting,
  - Reference to an interior creative space,
  - The presence of imagery or video content, and
  - The presence of a visitor-generated url.
- Category of invention (e.g., transportation, household goods),

Supporting data for the charts and discussions below are found in Appendix D.



## Story Types

Differences between the story types are highlighted in Chart C.



Some key differences between Web and Exhibit stories emerge:

- More Web stories were detailed and complex than were Exhibit stories (77% vs. 10%).
- More Web stories referred to specific places (77% vs. 47%).
- More Web stories contained visual supports (illustrations, photographs) (19% vs. 3%) and videos (19% vs 1%).
- More Web stories contained visitor-supplied hyperlinks (29% vs. 1%).

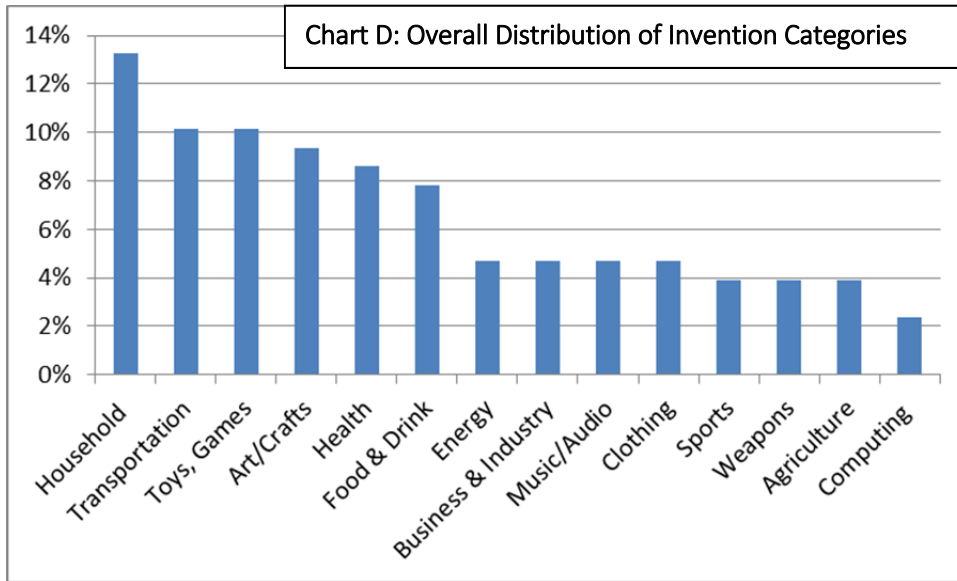
On the other hand,

- More Exhibit stories contained editorial notes than did Web stories (45% vs 10%).
- More Exhibit stories concerned self-inventions than Web stories (49% vs 10%).
- Two Exhibit stories concerned place understood as a creative space (a room, a desk) rather than a geographical place.

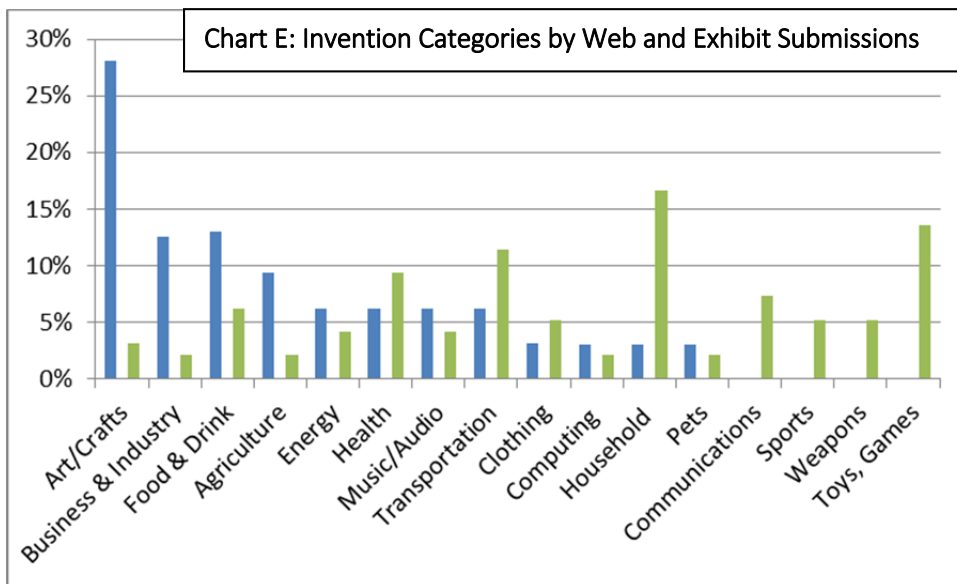
## Invention Categories

Because one Web submission described two inventions and one Exhibit submission named four inventions, the total number of inventions among 124 stories is 128. Overall, inventions appear to have a distinctly domestic flavor, with art/crafts, household, toys & games, and food and drink figuring prominently.

Chart D shows the distribution of invention categories among all stories studied (n=128).



However, there were also sharp differences in invention categories between Web and Exhibit stories. Chart E below distinguishes invention categories by whether a story was submitted via Web or the Exhibit.



Blue indicates web-submitted stories; green indicates exhibit-submitted stories.

The preponderance of arts and crafts invention stories among all stories is now clearly attributable to stories submitted through the Web. Among Exhibit stories, inventions in household items and toys and games were more frequent, followed by inventions in transportation, sports, communications, and health. In addition to arts and crafts inventions, categories in which there was a greater percentage of Web stories than Exhibit stories were business and industry, food and drink, agriculture, and energy. It is also notable that four categories of inventions that showed up among Exhibit stories did not appear among Web stories: toys and games, sports, weapons, and communications.

## Summary

According to the exhibit evaluation conducted by RKA, approximately 1% of all exhibit visitors submitted stories at the Exhibit kiosk. Of 4,942 invention stories submitted, 92% were rejected. Of the remaining 375 stories published, 31 or 8%, were submitted via the Web.

Although more stories were submitted and published from the Exhibit as opposed to the Web, Web stories were far more substantive. They contained more detail, more references to specific places, more visual content, and more hyperlinks to related websites. The stories submitted and published via the Exhibit contained many more self-inventions as well as several references to an interior or creative space, an aspect of “place” than did not occur within Web stories.

Lemelson Center staff observed in late August 2015 that about 150 Exhibit visitors submitted invention stories daily, compared with some 178 unique visits to the online map submission page. Lemelson staff added that far fewer Web stories were rejected than were Exhibit stories and that Web stories were typically of higher quality, an observation borne out by the findings.

## RECOMMENDATIONS

The numbers to date suggest that only a fraction of Exhibit visitors are drawn to adding an invention story and of them, fewer than 10% submitted stories judged appropriate to post on the site. Visitors who submit stories through the Web portal account, in turn, for a small fraction, 8% of all published stories.

However, Web stories appear to be of considerably more value than most Exhibit stories. Because the invention stories submitted by Web convey considerably more content, cite specific places more often, and contain more visual content and hyperlinks to further information, they appear to fulfill the intention of the project more fully than do on-site submissions.

Because Exhibit stories appear to demand more staff time, both in terms of sifting usable from unusable submissions and in terms of composing editor's notes, soliciting invention stories through the Web rather than the Exhibit may be a better investment. The RMC researchers conjecture that unless visitors to the Exhibit are prepared with research or ideas, Exhibit visitors may feel less commitment to crafting invention stories. Indeed, four of the 81 Exhibit stories noted they came from previous school projects, suggesting that visitors may struggle to recall a specific invention story unless it is part of their personal history. Stories submitted through the Web, by contrast, would seem to have required some time and thought to produce, qualities the Exhibit experience may not be conducive to.

Recommendations for continuing to draw Web map visitors and story contributions include:

- o Consider using the Exhibit as a way to pique visitor interest in submitting stories rather than using the Exhibit as a source of invention stories. For example, take-home reminders, such as bookmarks, post cards, or business cards with an engaging reminder to “try this at home” could be available to exhibit visitors. Signage at the map kiosk could also suggest that visitors follow up on their visit by researching a local invention and adding it to the map.
- o Given the strong interest among teachers in the Places of Invention website (and the LC site's 2015 WebAward for Best Education Website), consider targeted outreach to teachers, and more specifically, STEM teachers, at middle and high school levels, stressing the value of the site for student learning and research projects. As Lemelson Center staff prepare an online teacher kit, contexts in which teachers are likely to use invention as a pedagogical “hook”—history, science, engineering, and possibly geography—should be kept in mind. It is also recommended that materials prepared for teachers be aligned with Common Core standards. For example, model lesson plans with explicit links to standards could help teachers conceptualize how they could use the map. Additionally, creating an online platform for teacher dialogue and feedback on using the Places of Invention map with students also merits consideration. Finally, involving some teachers in creating the online kit could generate more specific ideas for using the map, for example, parent-child activities involving contributions to the POI map.
- o Because one in ten visitors appeared to reach the map through Facebook, consider exploiting other Internet channels such as Twitter as a source for story updates, special features, and other prompts to visit the site and submit a story. (While the Lemelson Center has a Twitter presence, POI does not appear to have one.)

- Because nearly one-fifth (17%) of POI map visitors arrived there from the Smithsonian website, and of them, 10% came from the Tween Tribune, consider increasing documentation or emphasis of the Places of Invention map on the Tween Tribune site.
- It is recommended that Lemelson Center staff continue to collect data and seek to answer questions about knowledge gains, shifts in attitude regarding invention and STEM generally, and social interactions stimulated by the Places of Invention map.

## Appendix A: Focus Group 1

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Draft POI Map Submission Form

Discussion Protocol

# DRAFT-POI Map

Invention is everywhere, often sparked by the combination of creative people, ready resources, and inspiring surroundings. Do you know about a place of invention? Is your hometown, workplace, home, or school an inventive place? Share your story!

First, tell us a little about the location of the place . . .

**\*1. Where in the world is this place?**

**\*2. If you answered "United States" above, select the state:**

**\*3. What is the name of the place?**

**\*4. Describe the landscape of this place (you may select more than one answer):**

Mountains

Flat land

Coastal

Woods/Forest

Prairie

Rolling hills

Desert

**\*5. How would you describe this place?**

Rural

Small city

Region

Town

Metropolitan area

**\*6. Now, tell us about the inventions that came from this place and the people who made them.**

**When does this story take place? What factors do you think helped make this a place of invention? Did natural resources, like access to a river, play a role in the invention? Why was creating this invention important to the people in this story?**

7. If you would you like to share photos, videos, or audio clips about this place of invention, add links to them here (for example, [www.myplacephotos.org/invention](http://www.myplacephotos.org/invention)).

Link:

Link:

Link:

8. You can add some tags here (separate tags with a comma).

\*9. What's your name?

10. Sign up to stay in touch with the Lemelson Center about Places of Invention? If so, please enter your email address.

\*11. Please review and agree to the terms and conditions to submit your story.

I agree

Thanks, [firstname]! Your story has been sent to the Map Moderator for approval. Please check back in a few days to see your submission. In the meantime, explore other Places of Invention on the map!

Done

Powered by **SurveyMonkey**  
Check out our [sample surveys](#) and create your own now!





## Places of Invention

### Focus Group 1 Discussion Protocol

1. Go through the guidelines item by item. At each point, what are the guidelines asking you to do?
2. Are there parts of the guidelines that are hard to understand?  
Which parts? What about them is hard to understand?
3. How would you research an invention or place of invention?
4. Would you want to contribute a Place of Invention story in real life?  
Why or why not?
5. Would you be interested in reading about places of invention stories about people had posted on the map? What kinds?

## Appendix B: Focus Group 2

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Revised POI Map Submission Form

Discussion Protocol

**DRAFT-POI Map****Places of Invention**

Invention is everywhere, often sparked by the combination of creative people, ready resources, and inspiring surroundings. Do you know about a place of invention? Is your hometown, workplace, home, or school an inventive place? Share your story!

First, tell us a little about the location of the place.

\*required

**\*1. Where in the world is this place?**

**\*2. If you answered "United States" above, select the state.**

**\*3. What is the name of the town, city, or region?**

**\*4. Describe the landscape (you may select more than one answer).**

Mountains

Flat land/Prairie/Plains

Coastal

Woods/Forest

Desert

Rolling hills

Urban/City

Other (please specify)

**\*5. How big is this place?**

Rural

Small city

Region

Town

Large city

**\*6. Now, tell us about the invention(s) that came from this place and the people who made them. Here are some questions to help you describe the people, place, and invention(s).**

--What was invented?

--Who invented it?

--When was it invented?

--Did natural resources, like access to a river, play a role in the invention?

--Why do you think this invention(s) is important?

7. If you would you like to share photos, YouTube videos, or audio clips about this place of invention, add links to them here. For example:

<http://www.youtube.com/watch?v=I2-dD4WpCrY&list=UUtTJ8Ua2lpfGkF6cPKkf-7A>.

Link:

Link:

Link:

8. You can add some tags here (separate tags with a comma). Tags can be words such as "agriculture," "television," or "automobiles," and may help other people search for and find your story.

\*9. What's your first name?

10. Sign up to stay in touch with the Lemelson Center about Places of Invention? If so, please enter your email address.

\*11. Please review and agree to the terms and conditions to submit your story.

I agree

Thanks, [firstname]! Your story has been sent to the Map Moderator for approval. Please check back in a few days to see your submission. In the meantime, explore other Places of Invention on the map!

Done



## Places of Invention

### Focus Group 2 Discussion Protocol

1. Go through the guidelines item by item. At each point, what are the guidelines asking you to do?
2. Are there parts of the guidelines that are hard to understand?  
Which parts? What about them is hard to understand?
3. How would you research an invention or place of invention?
4. Would you want to contribute a Place of Invention story in real life?  
Why or why not?
5. Would you be interested in reading about places of invention stories about people had posted on the map? What kinds?

## Appendix C: Focus Group 3

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Participant Demographic Survey

PIO Website Navigation Form

Discussion Protocol

**Places of Invention  
Focus Group Survey**

**February 11, 2015**

**Your gender:**

\_\_\_\_\_ male  
\_\_\_\_\_ female

**Your age:**

\_\_\_\_\_ Under 18  
\_\_\_\_\_ 18-25  
\_\_\_\_\_ 26-35  
\_\_\_\_\_ 36-40  
\_\_\_\_\_ 41-50  
\_\_\_\_\_ 51+

**Education level :**

\_\_\_\_\_ in elementary school  
\_\_\_\_\_ in middle school  
\_\_\_\_\_ in high school/high school grad  
\_\_\_\_\_ some college/college grad  
\_\_\_\_\_ graduate degree or above

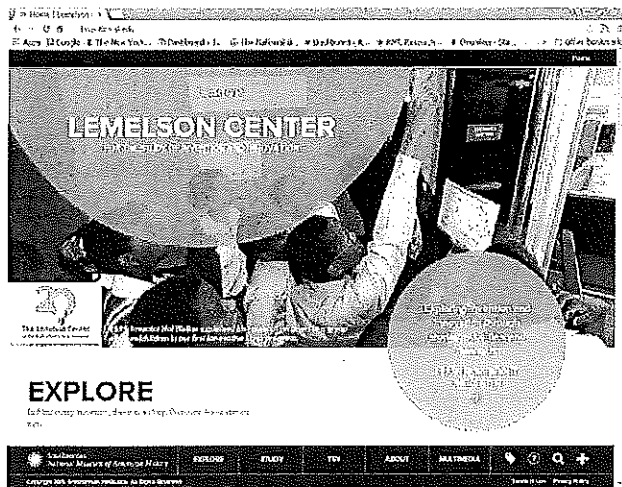
**Your occupation :**

\_\_\_\_\_

**How interested are you in learning about  
inventions and where they were discovered?**

\_\_\_\_\_ Very interested  
\_\_\_\_\_ Somewhat interested  
\_\_\_\_\_ Not at all interested

<http://invention.si.edu/>  
**LEMELSON CENTER HOME PAGE**



What catches your eye first?

Why?

How do you navigate from this page to reach the Places of Invention home page? [please list all steps]

If you scrolled down, please turn to page 2.

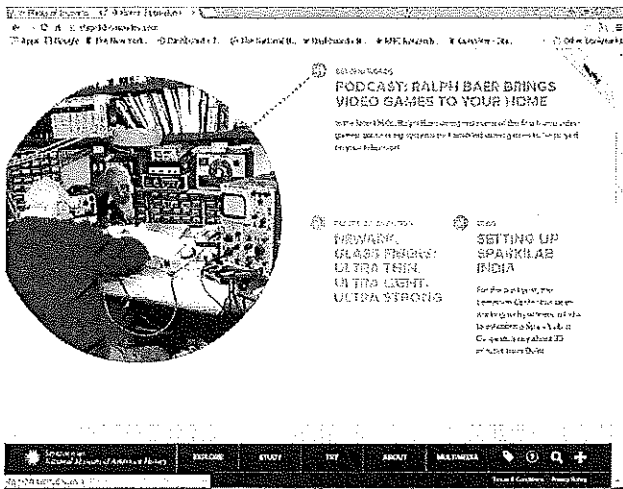
If you clicked **Explore**, what do you choose from the menu?

- Invention Stories
- Places of Invention
- Blog
- Beyond Words

If you clicked **Invention Stories**, **Blog**, or **Beyond Words**, how do you navigate to the Places of Invention homepage?



CONTINUATION (SCROLL) FROM LEMELSON HOME PAGE



What do you do now?

If you clicked **Exhibition Overview**—please turn to **page 3**,

If you clicked **Blog** or **Stories**—how do you understand where you are?

What steps did you take to reach the Places of Invention home page? Please turn to **page 4**.

PLACES OF INVENTION EXHIBITION OVERVIEW

<http://invention.si.edu/places-invention-exhibition-overview>



What catches your eye?

Why?

What did you do next?

If you scrolled down and read, what do you understand you are being told?

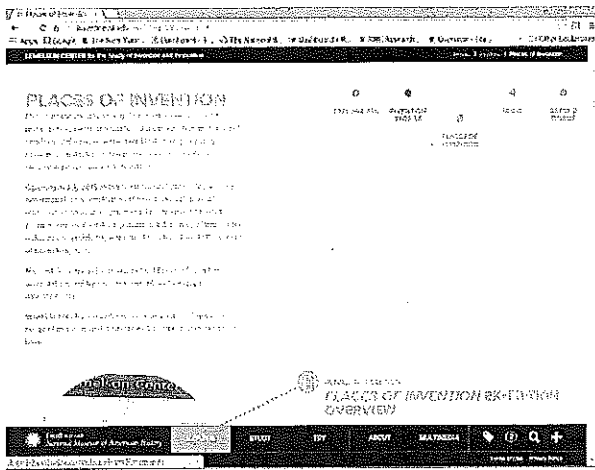
What is the relationship of the Exhibition to Places of Invention?

What is your sense of the project as a whole?

Please turn to page 4.

PLACES OF INVENTION HOME PAGE

<http://invention.si.edu/explore/places-invention>



What do you do here?

If you Read the text: what do you understand Places of Invention is about?

What other information would be useful?

If you scroll down: please go to page 5

If you click an icon, which one:

- EXPLORE ALL
- INVENTION STORIES
- PLACES OF INVENTION
- BLOG
- BEYOND WORDS

What drew you to your choice?

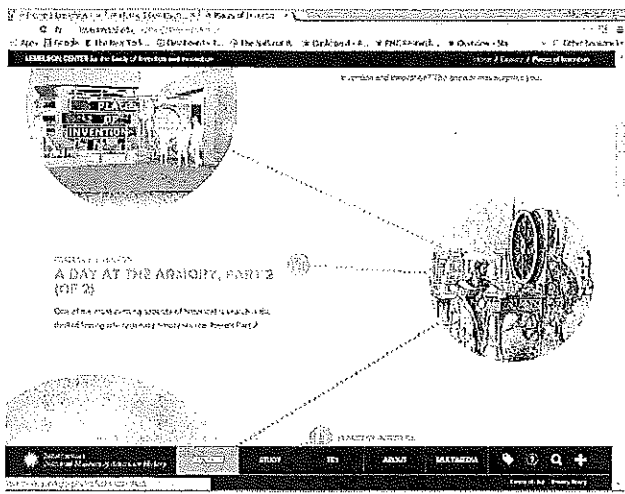
Please click on the word map in the text. When prompted, enter this information:

Username is: lemelson

Password is: 2014silc

And please turn to page 6.

CONTINUATION (SCROLLING DOWN FROM) POI HOME PAGE



As you scroll down, what is your sense of how the elements (stories) are related? What theme do you see?

What do you understand about Places of Invention now? Please turn to page 4.

## MAP



When you reach the map, what is your first impression?

Do you understand what the map is about?

Take 5 minutes to explore one or more map points. We will watch a brief video of an entry.

Would you be interested in contributing the map? Why or why not?

Please click the + sign at the bottom of the map to add a Place of Invention story of your own and turn to **page 7**.

## INPUT FORM

My Place of Invention

PLACES OF INVENTION

Invention is everywhere, often sparked by the combination of creative people, ready resources, and inspiring surroundings. Do you know about a place of invention? Is your hometown, workplace, home, or school an inventive place? Share your *Place of Invention* story!

First, tell us a little about the location of the place.

Where is this story taking place?

EXPLORE STUDY TRY ABOUT MULTIMEDIA

Smithsonian National Museum of American History

The stories won't be saved and there isn't time to research an idea tonight, so please rely on your memory or make something up—feel free to invent!

Using the input form (where the text says, "First, tell us a little about the location of the place"), please take about 10 minutes to tell a place of invention story.

Then please turn to **page 8**.

## **OVERALL IMPRESSIONS**

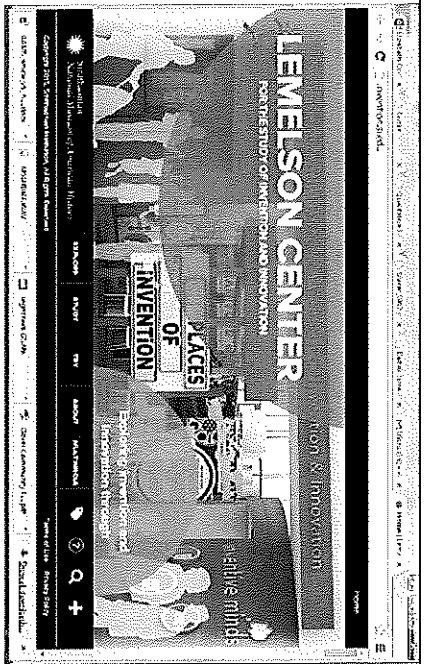
What would motivate you to return to the Places of Invention site?

What would motivate you to return to the map?

What would motivate you to contribute a Places of Invention story?

What kinds of visual or text “hooks” would most capture your interest?

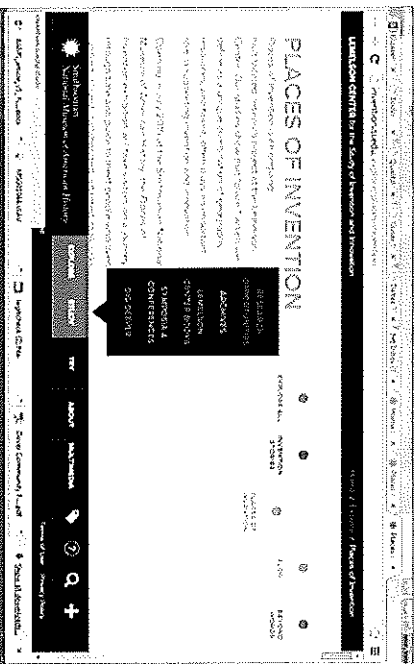
Has your interest in invention increased or decreased as a result of this experience. Please explain.



Main site homepage.  
<http://invention.si.edu/>

1. How do participants find and make sense of the two current POI links A and B? What catches your eye first on this page? \_\_\_\_\_ Why? Where do you click first? [reproduce choices] If you click something other than EXPLORE, go to page XXX. If you picked EXPLORE, which drop down menu did you choose?

Link B, "sneak peek" the main overall POI project landing page.  
<http://invention.si.edu/explore/places-invention>



1. Do they understand what the project is about?
  2. Does the brief language/definition about "place" at the top provide sufficient context for visitors?
  3. Is there other information they would find useful?
- THE PLACES OF INVENTION PAGE
- Where does your eye go first on this page? \_\_\_\_\_
- Do you: \_\_\_\_\_
- Read the text at the left \_\_\_\_\_
- Click an icon \_\_\_\_\_
- Scroll down the page \_\_\_\_\_
- Other \_\_\_\_\_
- read the text at the left or choose from the icons on upper right?
- Text \_\_\_\_\_ icons \_\_\_\_\_



	<p>6. Do they understand how the exhibition [Link A] fits into the larger project [not sure what this quest means]</p>
MAP	<p>7. Are they compelled to visit the POI map?</p> <p>8. Do they understand what the POI map is about?</p> <p>9. Are they interested in contributing to the map? [Hopefully we will have a couple of POI Affiliate videos to show.]</p>
INPUT FORM	<p>10. Ask focus group members [as individuals or in pairs, depending on the participants] to fill out the input form [should be on the site for testing] and submit their stories.</p> <p>11. Discuss the process and</p> <p>12. talk about their motivations.</p>
OVERALL VISUAL/ ATTENTION-CAPTURING QUALITIES OR IMPROVEMENTS	<p>13. Solicit suggestions for making the invitation to contribute clearer and more compelling—</p> <p>14. what kinds of visual or text “hooks” would entice them to explore the map and contribute their own content?</p> <p>15. What might compel them to return to the map?</p>

## Appendix D: Pop-up Surveys

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## PLACES OF INVENTION, POP UP SURVEY 1

1. How did you learn about the Places of Invention interactive map?
2. How old are you?
3. Please indicate if you are [male] [female]
4. What is your highest level of education?



## PLACES OF INVENTION, POP UP SURVEY 2

1. How did you learn about the Places of Invention interactive map?
2. How did you explore the map? Select all that apply:
  - a. Clicked pins in a specific area
  - b. Clicked pins randomly
  - c. Searched for a location
  - d. Searched by subject, keyword, or tag
3. How many invention stories did you read?
  - a. 0
  - b. 1 – 3
  - c. 4 – 8
  - d. More than 8
4. Which invention stories presented new information to you?
5. What words would you use to describe the Places of Invention map?  
Select all that apply:
  - a. Informative

- b. Interesting
  - c. Boring
  - d. Visually appealing
  - e. Inspiring
  - f. Confusing
  - g. Old news
6. Did you submit a Places of Invention story? [yes] [no]
7. If you answered “no” above, please tell us why you didn’t submit a story:
- a. I didn’t have time
  - b. I don’t understand how to do it
  - c. I wasn’t interested
  - d. I didn’t feel qualified
  - e. I don’t know a good story
8. If you did submit a story, did you do any research beforehand?
- a. Yes; I checked the Internet or local library to make sure my story is accurate.
  - b. No; I knew about this invention before.
9. To whom would you recommend the Places of Invention website?  
Selected all that apply:

- a. No one
  - b. A student
  - c. A teacher
  - d. A family member
  - e. A friend
10. How old are you?
- a. Younger than 18
  - b. 18 – 34
  - c. 35-54
  - d. 55 or older
  - e. Prefer not to answer
11. Please indicate if you have
- a. Male
  - b. Female
  - c. Prefer not to answer
12. What is your highest level of education?
- a. Currently a K-12 student
  - b. High school diploma or GED
  - c. Associate's degree

- d. Bachelor's degree
- e. Post graduate degree
- f. Prefer not to answer

## Appendix E: Story Coding Tables

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## STORY CHARACTERISTICS

	Pub:web	n=31	Pub:exh	n=93
Detailed	24	77%	9	10%
Editorial note	3	10%	42	45%
Self-inventions	3	10%	46	49%
Referred to specific place	24	77%	44	47%
Image	6	19%	3	3%
Video	6	19%	1	1%
User-generated url	9	29%	1	1%

## Index of Web Published Stories

WEB PUBLISHED STORIES (n=31) n refers to stories, not inventions										
Name of Invention: <i>Type</i>	Location	Submitted by <sup>1</sup>	Detailed	Ed note	Self	Place	Image	Video	Url	
Air Brakes: <i>Transportation</i>	Pittsburgh, PA	Olivia								
Banking (Mellon): <i>Business &amp; Industry</i>	Pittsburgh, PA	Bill (1 of 2 inventions)	X			X				
Brothers of Invention: <i>Business &amp; Industry</i>	Windsor, CT	Elena	X			X				
Cake Decorating: <i>Food &amp; Drink</i>	Chicago, IL	Desiree	X			X		X		
Cray supercomputer: <i>Computing</i>	Chippewa Falls, WI	Matt	X			X		X		
Didgeridoo: <i>Music</i>	Alice Springs, Australia	Sarah				X				
Fiskars Scissors: <i>Household</i>	Madison, WI	Fiskars	X			X	X			
Fluoridation: <i>Health</i>	Colorado Springs, CO	Matt	X			X				X
Heinz glass food jars: <i>Food &amp; Drink</i>	Pittsburgh, PA	Bill (2 of 2 inventions) <sup>2</sup>								
Hoover Dam: <i>Energy</i>	Hoover Dam, NV	NV State Historic Pres. Office	X			X	X	X	X	
Inflatable Snowshoe: <i>Clothing</i>	Anchorage, AK	Alicia	X			X	X			X
Interchangeable parts: <i>Business &amp; Industry</i>	Windsor, VT	Kris	X			X				
ICE resin jewelry: <i>Art/Crafts</i>	Vermillion, OH	Descriptive	X							
John Deere steel plow: <i>Agriculture</i>	Grand Detour, IL	Neil	X			X				

<sup>1</sup>Names of story submitters are included to indicate (roughly) their age, gender, or institutional affiliation. Family refers to an invention cited by a family member rather than the inventor him or herself.

<sup>2</sup>This second invention was part of a single story, which has already been coded under Banking (Mellon).

WEB PUBLISHED STORIES (n=31) n refers to stories, not inventions

Name of Invention: <i>Type</i>	Location	Submitted by <sup>1</sup>	Detailed	Ed note	Self	Place	Image	Video	Url
Laser-cut stencil: <i>Art/Crafts</i>	Northwood, NH	Michael	X			X			
LED conductive sticker: <i>Art/Crafts</i>	Bellevue, CO	Jill	X						
Liter of Light: <i>Energy</i>	Butler, PA	Johnna		X		X		X	X
Marlette Water System: <i>Agriculture</i>	Washoe County, NV	NV State Historic Pres. Office	X			X	X		
Mining Innovations: <i>Business &amp; Industry</i>	Virginia City, NV	NV State Historic Pres. Office	X			X	X		
Mixed media jewelry: <i>Art/Crafts</i>	Port Townsend, WA	Becky	X		X				
Mod Podge: <i>Art/Crafts</i>	Norcross, GA	Celia	X			X			
Musicians Hall of Fame: <i>Music/Audio</i>	Nashville, TN	Amy	X						X
New art technique: <i>Art/Crafts</i>	Pyramid Lake, NV	Carol	X		X	X			
Newlands Irrigation: <i>Agriculture</i>	Churchill County, NV	NV State Historic Pres. Office	X			X	X		X
Poly-Fil fabric for crafts: <i>Art/Crafts</i>	Danbury, CT	Amy	X			X			
Poutine: <i>Food &amp; Drink</i>	Warwick, Canada	Chris	X			X		X	
Rhubarb pie: <i>Food &amp; Drink</i>	Sumner, WA	Carmen	X			X			
Styrofoam for arts/crafts: <i>Art/Crafts</i>	Ludington, MI	Jim		X					X
Sunscreen: <i>Health</i>	Wittberg, Austria	Kate	X			X			X
Texture cards: <i>Art/Crafts</i>	Cleveland, OH	Delanie							X
Tiger Lion Ultrasound: <i>Pets</i>	Washington, DC	Tod			X	X			
Windshield Wiper: <i>Transportation</i>	Greene County, AL	Avery		X		X		X	

## Index of Exhibit Published Stories

Name of Invention: <i>Type</i>	Location	Submitted By	Detail	Ed note	Self	Place	Image	Video	Url
AC current: <i>Energy</i>	Colorado Springs, CO	Federico		X					
Acura NSX: <i>Transportation</i>	Raymond, OH	Mark		X					
Backsafe: <i>Transportation</i>	Elk River, MN	Ashley (family)	X	X	X				
Backyard roller coasters: <i>Toys, Games</i>	Orlando, FL	Joyce			X				
Barbecue grill guard: <i>Health</i> <sup>3</sup>	Laurel Hollow, NY	Diane			X				
Bissell sweeper: <i>Household</i>	Grand Rapids, MI	Lily		X					
Blind dog invention: <i>Pets</i>	Cochester, VT	Elijah			X				
Bottle cap: <i>Food &amp; Drink</i>	Baltimore, MD	Maddy		X		X			
Boost energy drink: <i>Food &amp; Drink</i>	Riverside, NJ	Melissa				X			
Brain acoustic monitor: <i>Health</i>	Baltimore, MD	Rick	X	X		X			
Brannock foot measurer: <i>Clothing</i>	Syracuse, NY	Janice		X					
Cable cars: <i>Transportation</i>	Medellin, Colombia	Simon		X		X			
Cars: <i>Transportation</i>	Detroit, MI	Heather		X		X			
Chien électrique: <i>Toys, Games</i>	Gatineau, Canada	Laurie			X				
China dinnerware: <i>Household</i>	Geddes, NY	Janice					X		
Country swing music: <i>Music/Audio</i>	Tulsa, OK	Same				X			
Crowdfunding for good: <i>Business &amp; Industry</i>	Nairobi, Kenya	Kyai	X		X	X			
Doodlebug landing craft: <i>Weapons</i>	Burke, VA	Joseph (family)		X	X				
Dynamic laser cooling: <i>Health</i>	Irvine, CA	John Stuart Nelson, MD		X	X	X			
Exosuit: <i>Toys, Games</i>	Fort Collins, CO	Guthrie			X				
Fairy House: <i>Toys, Games</i>	Beirut, Lebanon	Caitlin			X				
First Flight: <i>Transportation</i>	Kitty Hawk, NC	Isabelle		X					
Foam fire retardant: <i>Health</i>	Ft. Lauderdale, FL	Tyler		X		X			
Fotoboek album, décor: <i>Art/Crafts</i>	Leidschendam, Netherlands	Barbara			X	X			
Fried Singaporean noodles: <i>Food &amp; Drink</i>	Hong Kong	Chris				X			
Golf-ball baseball: <i>Sports</i>	Columbus, OH	Peter			X	X			

<sup>3</sup> The "health" category also includes medicine and safety.

Name of Invention: <i>Type</i>	Location	Submitted By	Detail	Ed note	Self	Place	Image	Video	Url
GPS Cattle tracker: <i>Agriculture</i>	Boise, ID	Randy			X				
Gunpowder: <i>Weapons</i>	Beijing, China	Joanne		X		X			
Handblown glass: <i>Household</i>	Wellsburg, WV	Sarah		X		X			
Homemade fruit protector: <i>Household</i>	Baltimore, MD	Jeanine			X				
Homemade motion detector: <i>Toys, Games</i>	Clio, MI	Mequam			X				
Homemade pinball machine: <i>Toys, Games</i>	Grasse, France	Ari			X	X			
Homemade skateboard: <i>Transportation</i>	Barceloneta, PR	Kb			X				
Hover board: <i>Transportation</i>	San Diego, CA	Ron			X	X			
Hubble telescope: <i>Communications</i>	Tucson, AZ	Alex		X		X			
Hybrid corn: <i>Agriculture</i>	Coon Rapids, IA	Mr. Katz				X		X	
Ice cream cone: <i>Food &amp; Drink</i>	St. Louis, MO	Joseph		X					
Idea for robot clothes washer: <i>Household</i>	Conroe, TX	Colin			X				
Idea for educational apps: <i>Communications</i>	Brick, NJ	Haley			X	X			
Idea for medicine inventions: <i>Health</i>	Kearny, NJ	Zach			X				
Idea for removable heels: <i>Clothing</i>	Carrollton, GA	Lilly			X				
Integrated biorefinery: <i>Energy</i>	Edmonton, Canada	James & Melanie		X		X			
Invention desk: <i>Household</i>	Tucson, AZ	Dawn			X				
Iron Giant (sculpture): <i>Art/Crafts</i>	Birmingham, AL	Jessica				X			X
Korean pop music: <i>Music/Audio</i>	Seoul, Korea	Sandara		X		X			
Lego bricks: <i>Toys, Games</i>	Bilund, Denmark	Alex		X		X			
Lego guy: <i>Toys, Games</i>	Tamarac, FL	Canon			X				
Les Paul: <i>Music/Audio</i>	Waukesaw, WI	Ian		X		X	X		
Lightest, strongest mini bridge: <i>Toys, Games</i>	Perth, Australia	Tyle	X		X				
Light-up toy jellyfish: <i>Toys, Games</i>	Newman, GA	Hope			X	X			
Liquid nicotine: <i>Health</i> <sup>4</sup>	Albany, GA	Jason		X	X				

<sup>4</sup> Presented as a healthier alternative to cigarettes.

Name of Invention: <i>Type</i>	Location	Submitted By	Detail	Ed note	Self	Place	Image	Video	Url
Long distance AC power: <i>Energy</i>	Telluride, CO	Rudy		X		X			
Maintain heart beating outside of rabbit: <i>Health</i>	Glen Cove, NY	Stephen (family)	X		X	X			
Mars Rover: <i>Communications</i>	Flagstaff, AZ	Lisa		X		X			
Microprocessor: <i>Computing</i>	Santa Clara, CA	Howard				X			
Modern Rocketry: <i>Weapons</i>	Auburn, MA	Julia		X					
Morse Code: <i>Communications</i>	Poughkeepsie, NY	James		X		X			
Motorized futon: <i>Transportation</i>	Chapel Hill, NC	Rachel			X	X			
MRI: <i>Health</i>	Stony Brook, NY	By		X		X			
Musical backscratcher: <i>Household</i>	Spangdahlem, Germany	Colby			X				
Nail art design: <i>Art/Crafts</i>	Lakewood, CA	Brooklyn	X		X				
Nylon: <i>Clothing</i>	Wilmington, DE	Joan	X			X			
Paper clip pencil carrier: <i>Household</i>	Downers Grove, IL	Andy			X	X			
Pants drying wire: <i>Household</i>	Litchfield, CT	Susan		X					
Penicillin: <i>Health</i>	Glasgow, UK	Caitlin (1 of 4 inventions)							
Pizza: <i>Food &amp; Drink</i>	Naples, Italy	Vittorio		X		X			
Plant watering device: <i>Household</i>	Navarre, FL	Drewisverydum			X				
Poncho: <i>Clothing</i>	Quito, Ecuador	Patsy				X			
Pooper scooper: <i>Pets</i>	Caguas, Puerto Rico	Edwin		X	X				
Quantum light microwave interface connecting computers: <i>Computing</i>	Sydney, Australia	Jason		X	X				
Quipu—Incan record-keeping: <i>Business &amp; Industry</i>	Tupicocha, Peru	Marle		X					
Raincoat <sup>5</sup> : <i>Clothing</i>	Glasgow, UK	Caitlin (2 of 4)							
“Robot” name: <i>Communications</i>	Prague, Czech rep	Ivan		X		X			
Robotic lawn mower: <i>Household</i>	Bedford, MA	Tiff		X					
Self-making bed: <i>Household</i>	London, UK	Sharon		X	X				

<sup>5</sup> This invention was part of a single story, which has already been coded under Penicillin.

Name of Invention: <i>Type</i>	Location	Submitted By	Detail	Ed note	Self	Place	Image	Video	Url
Single trigger shotgun mechanism: <i>Weapons</i>	Meriden, CT	Robert	X	X					
Skaters' board game: <i>Toys, Games</i>	Phoenix, AZ	Dad							
Snowball machine: <i>Sports</i>	Oslo, Norway	Eirik			X				
Soccer ball scoop: <i>Sports</i>	Marietta, GA	Trey			X				
Sound on film: <i>Music/Audio</i>	Auburn, NY	Kim							
Splitting the atom: <i>Energy</i>	Dublin, Ireland	Brenda		X		X			
Sticker dispensing toothbrush: <i>Household</i>	Big Sur, CA	Ari (family)			X				
Stirrup: <i>Transportation</i>	Ulaan Bataar, Mongolia	Jane		X					
Surf's Up: <i>Sports</i>	Honolulu, HI	Zach				X			
Swing Tag: <i>Sports</i>	Atkinson, NE	Dani			X	X			
Tarmac <sup>6</sup> : <i>Transportation</i>	Glasgow, UK	Caitlin (1 of 4 inventions)				X			
Telephone <sup>7</sup> : <i>Communications</i>	Glasgow, UK	Caitlin 4 of 4							
Tightrope walking robot: <i>Toys, Games</i>	Washington DC	Betty			X				
Tiramisu: <i>Food &amp; Drink</i>	Treviso, Italy	Carlotta	X	X	X				
Toaster: <i>Household</i>	Minneapolis, MN	Jack		X					
Towelcase: <i>Household</i>	Dunwoody, GA	Hayne			X	X			
Turtle Submarine: <i>Weapons</i>	Westbook, CT	Micayla (family)		X	X	X	X		
T.V.: <i>Communications</i>	Beaver, UT	Melissa		X					
Vicycle (vise tool): <i>Household</i>	Burlington, NC	Michelle & Maggy (family)			X				
Voice-activated robot: <i>Toys, Games</i>	Lititz, PA	Grace			X				
Waze navigation: <i>Transportation</i>	Tel-Aviv-Yafo, Israel	Israel				X			

<sup>6</sup> This invention was part of a single story, which has already been coded under Penicillin.

<sup>7</sup> This invention was part of a single story, which has already been coded under Penicillin.

### Invention Categories by Web or Exhibit Submissions

	Pub:web			Pub:exh	
Art/Crafts	9	28%	Household	16	17%
Business & Industry	4	13%	Toys, Games	13	14%
Food & Drink	4	13%	Transportation	11	11%
Agriculture	3	9%	Health	9	9%
Energy	2	6%	Communications	7	7%
Health	2	6%	Food & Drink	6	6%
Music/Audio	2	6%	Clothing	5	5%
Transportation	2	6%	Sports	5	5%
Clothing	1	3%	Weapons	5	5%
Computing	1	3%	Energy	4	4%
Household	1	3%	Music/Audio	4	4%
Pets	1	3%	Art/Crafts	3	3%
			Agriculture	2	2%
			Business &		
			Industry	2	2%
			Computing	2	2%
TOTAL INVENTIONS	32		Pets	2	2%
			TOTAL INVENTIONS	96	