



REPORT

# *Change Your Game / Cambia tu juego* Summative Evaluation

PREPARED BY

Kera Collective

FOR

Lemelson Center for the Study of Invention and  
Innovation at the National Museum of American History

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# Change Your Game / Cambia tu juego

## Summative Evaluation Report



### PREPARED FOR

Lemelson Center for the Study of Invention and Innovation at the National Museum of American History

<https://invention.si.edu>

Washington, DC

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### IMAGE CREDITS

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# Table of Contents

<i>Table of Contents</i> .....	3
<b>01 Executive Summary &amp; Discussion</b> .....	<b>5</b>
<i>Executive Summary</i> .....	6
<i>Kera Collective's Key Findings with Discussion</i> .....	7
<i>References</i> .....	14
<b>02 Study Background</b> .....	<b>15</b>
<i>About the Study</i> .....	16
<i>About the Exhibition</i> .....	19
<b>03 Findings: Walk-in Visitors</b> .....	<b>20</b>
<i>Visitor Characteristics</i> .....	22
<i>General Thoughts on Invention and Innovation</i> .....	23
<i>Skills or Qualities of an Inventive or Innovative Person</i> .....	23
<i>Personal Reflections on Invention and Innovation</i> .....	25
<i>Overall Reactions to the Exhibition</i> .....	26
<i>Use of Interactive Activities</i> .....	28
<i>Relating to Stories about Invention and Innovation</i> .....	32
<i>Changes to Thoughts about Invention and Innovation</i> .....	33
<b>04 Findings: Youth Visitors</b> .....	<b>34</b>
<i>Visitor Characteristics</i> .....	35
<i>General Thoughts on Invention and Innovation</i> .....	36
<i>Relating to Stories about Invention and Innovation</i> .....	46
<i>Skills or Qualities of an Inventive or Innovative Person</i> .....	47
<i>Changes to Thoughts about Invention and Innovation</i> .....	47
<b>05 Findings: Visitors with Disabilities</b> .....	<b>49</b>
<i>Visitor Characteristics</i> .....	50
<i>General Thoughts on Invention and Innovation</i> .....	51
<i>Overall Reactions to the Exhibition</i> .....	52
<i>Use of Interactive Activities</i> .....	54
<i>Representation of People Living with Disabilities</i> .....	57
<i>Relating to Stories about Invention and Innovation</i> .....	58

<i>Changes to Thoughts about Invention and Innovation</i> .....	59
<b>06 Findings: Latinx Visitors .....</b>	<b>60</b>
<i>Visitor Characteristics</i> .....	61
<i>Overall Reactions to the Exhibition</i> .....	62
<i>Use of Interactive Activities</i> .....	62
<i>Reactions to Bilingual Nature of the Exhibition</i> .....	62
<i>Relating to Stories about Invention and Innovation</i> .....	64
<i>General Thoughts on Invention and Innovation</i> .....	65
<i>Changes to Thoughts about Invention and Innovation</i> .....	66
<b>07 Appendix .....</b>	<b>67</b>
<i>Appendix A: Walk-in Visitor Interview Guide, CONTROL</i> .....	68
<i>Appendix B: Walk-in Visitor Interview Guide, TREATMENT</i> .....	68
<i>Appendix C: Visitor Characteristics, Walk-in Visitor Interviews, Control and Treatment Sample Comparison</i> .....	72
<i>Appendix D: Youth Audiences Group Interview Script and Worksheet</i> .....	75
<i>Appendix E: Visitor with Disabilities Contextual Inquiry Session Script</i> .....	80
<i>Appendix F: Latinx Visitors Cued Interview Guide</i> .....	85

# 01 Executive Summary & Discussion



## Executive Summary

*Change Your Game / Cambia tu juego*, which was funded by a National Science Foundation (NSF) Advancing Informal STEM Learning (AISL) grant #2005404, was an ambitious project to develop a STEM exhibition for the Smithsonian's National Museum of American History with embedded research into visitors' exploration of inventive identity. This report presents the results of the summative evaluation by Kera Collective, evaluators experienced in studying visitor experiences in museums. Kera Collective (under the name Randi Korn & Associates, Inc.) evaluated two previous exhibitions of the Lemelson Center at NMAH, both funded in part by NSF (*Places of Invention*, grant # NSF DRL-1010776, 2010-2015) and (*Invention at Play*, grant # NSF ESI-0125417, 2002-2005) and conducted a process evaluation for this grant.

### Summative Evaluation Methodology

The evaluation used qualitative interviews and inquiries to collect firsthand experiences from walk-in visitors to NMAH as well as four priority audiences for the exhibition and/or the Smithsonian—females ages 10-17, African American males ages 10-17, persons with disabilities, and self-identifying Latinx visitors.

### Kera Collective's Key Findings

Five key findings emerged for Kera Collective, described at length in the discussion that follows:

- 01** The curation of the exhibition was commendable in its identification of stories that represent many different people and sports.
- 02** The exhibition design was welcoming and accessible to walk-in visitors and some priority audiences (youth 10-17 and Latinx visitors) but not individuals with disabilities.
- 03** The novelty of considering invention in relation to sports and games provided points of entry to inventive identity exploration in terms of ontological-epistemological beliefs within audiences' role as a museum visitor.
- 04** Beyond ontological-epistemological beliefs, the evaluation results are indeterminate about how the exhibition affected audiences in other areas of identity exploration.
- 05** The evaluation raises questions about inventive identity to be considered along with the research findings for further exploration.

## Kera Collective's Key Findings with Discussion

In the following discussion, we elaborate on our five key findings with respect to the goals of the summative evaluation, which are to understand:

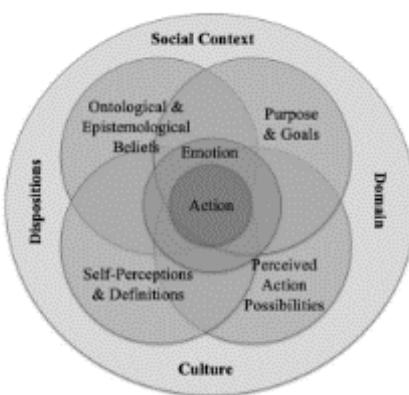
- Whether and to what extent the exhibition helps visitors explore their **inventive identity**.
- **Aspects of the exhibition that help** visitors explore their inventive identity.
- **Barriers** that prevent visitors from exploring their inventive identity.

As noted in the NSF-proposal, this project was conceived to advance knowledge about the roles museums can play in activating STEM-related inventive identities. The project was built upon research from the National Research Council (2009) that points to the importance of and interest in identity exploration within STEM, but a lack of frameworks and tools to develop and assess identity exploration. In this project, the team aimed to investigate inventive identity exploration in relation to the Dynamic Systems Model of Role Identity (DSMRI) model developed by educational psychologists and project researchers Avi Kaplan and Joanna K. Garner. While Kaplan and Garner will address the research questions posed in the NSF-proposal, as the evaluators, Kera Collective has sought to bridge our knowledge.

We have operationalized components from the DSMRI into the impact measures:

- Visitors will describe the effect of invention in their lives (Ontological-Epistemological beliefs)
- Visitors will practice invention processes in the exhibition (Perceived Action Possibilities)
- Visitors will identify a problem to solve through invention (Purpose & Goals)
- Visitors perceive themselves as inventive (Self-perceptions & Definitions)

Together, these four impact measures serve as indicators for evaluators to identify how inventive identity exploration manifests among visitors.



*Dynamic Systems Model of Role Identity (DSMRI), Kaplan & Garner, 2017*

01

**The curation of the exhibition was commendable in its identification of stories representing many different people and sports.**

The museum worked intentionally to provide opportunities for a broad range of visitors to find personal relevance in the exhibition. From alpha prototyping with youth and individuals with disabilities, participants responded positively to the variety of topics, people, and sports; and they felt the exhibition storytelling was inclusive (RK&A/Kera Collective, 2021). Further, the exhibition team took recommendations in these early prototyping sessions to further diversify storytelling to show representation of Asian Americans, children, and an even broader variety of sports that represent women (Kera Collective, 2024; RK&A/Kera Collective, 2021). The exhibition team took care to ensure wide representation throughout the exhibition, from the selection of objects and photos to video production, interactive development, and more.

The summative evaluation findings indicate that visitors recognized and appreciated the compelling and diverse selection of stories. For example, walk in-visitors enjoyed the “modern” design that introduced them to a variety of sports both that they were fans of and familiar with to sports they were less familiar with. By comparison, youth named many specific stories, people, and objects that prompted them to think about their personal experiences (e.g., the Jogbra “makes my life better now”) or the personal experiences of others (e.g., the Flex-Foot “Cheetah” prosthesis provides opportunity to race). Individuals with disabilities also named specific stories, people, and objects that prompted them to think about their personal experiences, such as to Shawn Springs, who one person knew in high school, and Lance Armstrong, about whom another worked on a documentary. Note that individuals with disabilities found personal relevance outside the disability stories—an important reminder that their identity is multifaceted and that prompting personal relevance goes beyond representation.

Some visitors commented that they wanted even more in-depth storytelling. For example, a few said the stories felt truncated and were interested in more information. Kera supports the project team’s choices about the breadth and depth of the storytelling and think it is positive to have sparked visitors’ curiosity to ask for more in-depth information.

02

**The exhibition design was welcoming and accessible to walk-in visitors and some priority audiences (youth 10-17 and Latinx visitors) but not individuals with disabilities.**



**“** [I think about] when grandma was younger, and they rejected her because she was a girl. She was passionate about it [joining a sports team]. [What made you think of this?] The one in the back [referring to Title IX and Jogbra stories] Add girls in the sport. More people defend girls getting in now. Now it’s different than when [grandma] was a girl.  
—Youth participant **”**

In addition to walk-in visitors, the study focused on understanding the experiences of four priority audiences for the exhibition and the Smithsonian: females ages 10-17, African American males 10-17, persons with disabilities, and self-identifying Latinx visitors who speak Spanish.

Both youth audiences 10-17 responded positively to the exhibition and its design. Several enjoyed the interactives, found personal relevance in the exhibition, and engaged critically with the exhibition. Overall, the exhibition did not present particular barriers to youth engagement or understanding. For example, when responding to questions about what they did not like or found confusing, the responses demonstrated their critical thinking about the exhibition content—such as disappointment at the treatment of women in sports, curiosities about gender testing and gender segregation in sports, and a shattered backboard which was something they didn't know could happen and sparked a lot conversation! Further, they had suggestions for how the interactives might be improved for them, but again, it did not present any substantial barrier to their experiences in the exhibition.

Likewise, Latinx visitors who speak Spanish also responded positively to the exhibition, particularly the bilingual exhibition design. These visitors appreciated the treatment of Spanish text alongside English, but they particularly praised the museum for the accuracy of the Spanish translation—contrasting their positive experience at NMAH to experiences elsewhere where translation was inaccurate, poorly edited, or the Spanish text treated them in a way that felt othering.

Unfortunately, individuals with various disabilities struggled to access the exhibition, an issue that the project team recognizes and has been working to remediate since opening. Moreover, individuals with disabilities hoped the stories told in the exhibition would go beyond physical disabilities to represent the broad range of disability experiences. These individuals observed that the exhibition represented many mobility differences (the Quickie wheelchair and various prosthetic limbs in the exhibition), but not what they considered more invisible disabilities, such as neurodiversity. The results suggest that, if a priority audience, the project team would want to better specify what they mean by individuals with a disability, so people are not working on assumptions but more specific audience profiles. And, if they truly want to prioritize individuals with various disabilities, they must budget and plan accordingly to include individuals with a variety of disabilities from the outset of the project and be prepared to respond to their needs in the exhibition development process.

## 03

### **The novelty of considering invention in relation to sports and games provided points of entry to inventive identity exploration in terms of ontological-epistemological beliefs within their role as a museum visitor.**

The exhibition revealed to visitors how invention applies to sport—a novel idea some had not considered before. Since the exhibition was first proposed, the NMAH team wondered whether “sports” might be an entry point or a turnoff (RK&A/Kera Collective, 2019). Yet, regardless of whether a visitor identified as a sports person or not, they seemed to be able to connect to and find relevance in the exhibition because sports and games are so widely part of people’s everyday lives—whether prominently so or not. We think the way the exhibition team presented sports and their efforts to

represent such a wide diversity of people and sports (Key Takeaway 1) contributed greatly to successfully making sports an entry point to inventive identity exploration.

The evaluation findings suggest that the exhibition was successful in supporting some visitors' exploration of the ontological and epistemological beliefs component of the Dynamic Systems Model of Role Identity (DSMRI) developed by the project team researchers Avi Kaplan and Joanna K. Garner (Kaplan and Garner, 2017), which Kera Collective operationalized as the impact measure: Visitors describe the role of invention in their lives (Ontological and Epistemological Beliefs). For example, the quote on the right is one example. The adult visitor—though admitting they don't think about things like helmets much—recognize that the exhibition helped them see the effect of invention in the world. These types of sentiments emerged across audiences, such as an individual youth who recognized that invention can be small changes and a group of youth who could not believe that the image of the shattering basketball backboard was real because that has never been an issue in their lifetime because of design and material developments.

“

When you don't think about it much, stuff like the helmets are kinda surprising. You don't think about how it's safe, since we've had it for such a long time. But seeing that cross section you can kind of appreciate that like—"Wow! We don't have to bash our heads together while we play. It hurts less, yay!" **You just don't appreciate it since it's something we're used to seeing around us our whole lives.**

—Adult visitor

”



## 04

**Beyond ontological-epistemological beliefs, the evaluation results are indeterminate about how the exhibition affected audiences in other areas of identity exploration.**

In the NSF proposal, Kera had operationalized DSMRI components into the impact measures (see page 7). However, the evaluation results are indeterminate about how the exhibition affects audiences within three areas of the DSMRI: perceived action possibilities, purpose and goals, and self-perceptions or definitions. It is important to parse these conclusions out by audience, specifically walk-in visitors versus youth priority audiences:

### Walk-in Visitors

In the evaluation, we asked walk-in visitors who had not visited the exhibition (control) and those who had visited the exhibition (treatment) about their associations with and interest in invention and innovation as well as their perceptions of the skills or characteristics that they think inventive or

innovative people practice. The control and treatment groups responded similarly, suggesting that the exhibition did not affect walk-in visitors' Self-Perceptions or Definitions. Further, the interview data do not indicate exploration within Perceived Action Possibilities and Purpose & Goals based on how they reported experiencing the exhibition.

Having studied museum visitors for years, Kera is not surprised that walk-in visitors' inventive identity exploration was not expansive. In their prototype research, Kaplan et al. (2023) emphasized the need for scaffolds to support inventive identity exploration. The challenge for museum practitioners is to scaffold experiences for individuals in an unfacilitated free-choice environment. That challenge is amplified when considering visitors to the Smithsonian's and Washington, DC in general because they often visit multiple museums and cultural sites in a limited amount of time. As such, the interactives were designed for the realities of the Smithsonian visitor. The interactives were intentionally designed to prevent crowding (i.e., designed to discourage long dwell times, offering more than one station and/or providing space for visitors to observe another person using the interactive). This tension emerged in the project team's reflections in the process evaluation, with museum practitioners recognizing the limitations of a free-choice learning experience, particularly in Smithsonian museums (Kera Collective, 2024).

#### Youth 10-17 Years

Among the two priority audiences—females 10-17 and African American males 10-17—there are potential indicators of exploration into inventive identity beyond ontological-epistemological beliefs, particularly in relation to their experiences at the interactive activities. For example, the evaluator observed within the group visits and in the group interviews that youth debated heatedly about issues at the Fair or Foul interactive (suggesting exploration of Perceived Actions Possibilities). Further, even when youth were describing something they didn't like about the Drawing Board interactive, responses demonstrated creative thinking and engagement in the problem (suggesting exploration of Purpose & Goals). Moreover, while we did not have a control and treatment comparison, it is positive that about half indicated that they felt like they were somewhat more inventive than they thought they were before seeing *Change Your Game / Cambia tu juego* (suggesting exploration of Self-perceptions and Definitions).

However, these positive findings are in the context of youth visiting as part of an organized group for the study, within the context of a semi-facilitated or guided experience, followed by a group interview and payment to the youth. For these reasons, it is hard to determine whether these same youth experiences can be replicated in a truly free-choice learning environment. However, it does affirm that the interactive activities as designed have the potential to support broader inventive identity exploration.

#### Consideration for Free Choice Exhibition Audiences

From Kera's perspective, we believe the interactive activities were carrying too much of the weight in scaffolding visitors toward inventive identity exploration related specifically to the DSMRI's role-related components of Purpose & Goals and Perceived Action Possibilities—particularly for walk-in visitors but likely for all audiences in a truly free choice environment.

We know the median time spent in the *Places of Invention* exhibition that occupied the same footprint prior to *Change Your Game / Cambia tu juego*, was 6 minutes 30 seconds and the overall thoroughness of use was low (RK&A/Kera Collective, 2015) — underscoring the time crunch of an average Smithsonian visitor. While we did not collect timing and tracking data for this summative evaluation, using the *Places of Invention* evaluation as a proxy and considering walk-in visitors self-reported use of interactives (55% used at least one/45% did not use any), these data points emphasize the limitations of being able to scaffold a free-choice experience.

We think the exhibition team was prudent in repeating messaging across the exhibition in different formats—in label questions, videos, and interactives—in addition to what we outlined in Key Takeaways 1 & 2. Yet, we think an unfacilitated exhibition experience in a Smithsonian museum is going to have difficulty scaffolding visitors toward inventive identity exploration related specifically to the DSMRI’s role-related components of Purpose & Goals; Perceived Action Possibilities; and Self-Perceptions.

## 05

### **The evaluation raises questions about inventive identity to be considered along with the research findings for further exploration.**

As evaluators experienced with museums and informal learning settings, Kera has interpreted the results through this perspective. One value of this project is that our interpretations can be considered alongside the researchers’ findings that interpret the results through an educational psychology lens. While Kaplan and Garner’s parallel research has not yet been analyzed or reported, Kera perceives a few areas for further investigation beyond the scope of this summative evaluation.

- **Will visitors who experienced shifts in ontological-epistemological beliefs see transfer of those beliefs into other non-museum roles? In what ways?** As discussed in Takeaway 3, we think the evaluation reveals evidence that visitors experienced shifts in ontological-epistemological beliefs in their role as a museum visitor, being better able to describe the role of invention in their lives. As such, Kera wonders whether this shift “sticks” with visitors as they engage in other roles in their everyday lives.
- **Will visitors who experienced shifts in ontological-epistemological beliefs be more likely to experience other aspects of the DSMRI in another role and context? (i.e., long-term effects).** As discussed in Takeaway 4, we think the evaluation does not provide evidence of inventive identity exploration in other components of the DSMRI within their role as a museum visitor. However, we wonder whether their experience in the exhibition might prompt long-term effects and explorations in other DSMRI components within their everyday lives. For instance, Kaplan et al. (2023) observed in their prototyping research that ontological-epistemological beliefs presented a barrier to some people’s self-perceptions. For example, beliefs about inventors being exemplary, geniuses, and revolutionary seemed to stymie inventive identity exploration. Thus, with visitors having demonstrated some shifts in preconceptions, are they primed to expand their identity exploration.
- **Would we see similar results if we explored visitors’ inventive identity exploration had this exhibition been presented in another museum or informal learning context?** As noted in Key Takeaway 4, Smithsonian visitors are unique. Had we studied visitors seeing this exhibition at a

Smithsonian Affiliate or another museum outside Washington, DC—museums with longer dwell times and thus, more time for self-reflection—how might visitors experience the exhibition? This curiosity emerged in the project team’s reflections in the process evaluation, with museum practitioners recognizing the limitations of a free-choice learning experience, particularly in Smithsonian museums (Kera Collective, 2024).

These are just initial considerations to be considered along with the research findings and the project team’s reflections.

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## 02 Study Background



## About the Study

Kera Collective was contracted by the Lemelson Center for the Study of Invention and Innovation (Lemelson Center) at the National Museum of American History (NMAH) to conduct a summative evaluation of *Change Your Game / Cambia tu juego*, which was funded by a National Science Foundation (NSF) Advancing Informal STEM Learning (AISL) grant #2005404. The goal of the summative evaluation is to **understand visitors' experiences in *Change Your Game / Cambia tu juego***, particularly as related to visitors' perceptions of their inventive identity. The Lemelson Center will use the insights from the summative evaluation to make design and interpretation decisions for future exhibitions at NMAH and to potentially remediate aspects of the *Change Your Game / Cambia tu juego* exhibition. The findings will also be shared within the NSF AISL community to promote accessible informal STEM experiences.

## Objectives

The overall goals of the study are to understand:

- Whether and to what extent the exhibition helps visitors explore their inventive identity.
- Aspects of the exhibition that help visitors explore their inventive identity (e.g., language that promotes connecting invention to self, welcoming tone, stories that are relatable).
- Identify any barriers that prevent the exhibition from helping visitors explore their inventive identity

## Methodology

We used qualitative methodologies to collect data from walk-in visitors to NMAH as well as from four priority audiences for the exhibition and/or the Smithsonian.

1	Females 10-17 years	<b>Exhibition</b> priority audience: Girls 10-17 are a priority audience named in the NSF grant. They participated in formative evaluation for the exhibition and were recruited as part of the <a href="#">Boys and Girls Club of Greater Washington</a> for the summative evaluation.
2	African American males 10-17 years	<b>Exhibition</b> priority audience: BIPOC youth 10-17 are a priority audience named in the NSF grant. They participated in formative evaluation and were recruited as part of the <a href="#">Boys and Girls Club of Greater Washington</a> for the summative evaluation.
3	Persons with disabilities	<b>Exhibition</b> priority audience: Adults with disabilities are a priority audience named in the NSF grant. In collaboration with Access Smithsonian, they participated in formative and summative evaluation.
4	Self-identifying Latinx visitors	<b>Smithsonian</b> priority audience: Latinx millennials and their families living in the DC, Maryland, and Virginia (DMV) were identified as a priority by the Smithsonian after the grant was awarded. As such, the exhibition is fully bilingual English-Spanish, so we actively recruited Latinx visitors, which was not initially part of the evaluation plan.

We coordinated with two university educational psychology researchers when working with the exhibition priority audiences.

### WALK-IN VISITOR INTERVIEWS

Interviews encourage people to share their opinions of and the meaning they make from experiences in their own words. For this study, we conducted a total of 106 interviews with an independent random sample of NMAH walk-in visitors, divided into two groups:

- **Control Group (n = 51):** Visitors to NMAH who *had not visited the Change Your Game / Cambia tu juego* exhibition; they were mostly recruited in the corridor linking the central area of NMAH's Constitution Ave entrance to 1 West.
- **Treatment Group (n = 55):** Visitors to NMAH who were recruited immediately after visiting the *Change Your Game / Cambia tu juego* exhibition.

The control group is used as a baseline or control by which to measure the impact of *Change Your Game / Cambia tu juego*. For both samples, English-speaking NMAH visitors who are age 18 years and older and visiting alone or in a social group were eligible to participate in an interview; children could also participate with the consent of their guardian.

Interviews were approximately 15 minutes in length and were conducted on weekends and weekdays in May-June 2024. After inviting visitors and gaining their consent, a trained data collector read questions aloud and typed visitors' responses on an iPad; no audio recordings were made. Visitors then completed some demographic questions and were gifted a *Spark!Lab* pencil in exchange for their time. See Appendix A-B for the Control and Treatment group interview guides.

#### GROUP INTERVIEWS WITH YOUTH AGES 10-17

Group interviews convene a small group of people to discuss a topic under the direction of a skilled moderator. The moderator encourages interaction among participants and ensures the conversation remains on topic. Group interviews are especially valuable because their social nature allows participants to build off and respond to one another. This approach was not planned as part of the grant proposal, but NMAH and Kera determined it a beneficial approach given that it reduces the burden on youth and the partnering organization.

We conducted 3 group interviews with youth ages 10-17, recruited in partnership with the [Boys and Girls Club of Greater Washington](#) (BGC GW), which encompassed the two priority audiences, females 10-17 and African American males 10-17. Participants were from one of three clubs:

- [FBR Club @THEARC](#), which provides youth development programming to children living in Ward 8, a community in Southeast Washington, DC
- [Jelleff Community Center Club](#), one of the original club locations serving youth in Washington, DC's Georgetown neighborhood
- [Murraygate Club](#), located in Alexandria, Virginia within the Murraygate Village Apartments and largely serves youth who live within that apartment community.

Group interviews took place on Fridays in July-August 2024 (one club per Friday). Each group interview lasted approximately 90 minutes and had between 13-15 participants. The moderator began with a few introductory questions and then invited youth to visit *Change Your Game / Cambia tu juego* and take notes to record their experiences on a worksheet to jog their memories during a group discussion to follow. After their visit, the moderator asked the groups open-ended questions about their experiences in the exhibition. A second moderator was present to take notes and help facilitate discussion as needed. As a thank-you for their time, NMAH provided each club with free transportation to and from

the museum as well as lunch upon arrival; the evaluator also gave each participating youth a \$50 Visa gift card. See Appendix D for the Youth Group Interview script and worksheet.

### CONTEXTUAL INQUIRY SESSIONS WITH PERSONS WITH DISABILITIES

Contextual inquiry is an ethnographic method that involves field observations and interviews with a small sample of visitors to understand their behaviors and experiences. It is especially useful for uncovering how individuals' needs and preferences for visiting an exhibition vary.

We conducted contextual inquiry sessions over 3 weekdays with a total of 9 persons with disabilities, recruited in partnership with [Access Smithsonian](#) and the Lemelson Center. Between 2-3 individuals participated in each session. In each session, we invited participants to visit *Change Your Game / Cambia tu juego*, going wherever they would like in the exhibition while talking out loud to share their thoughts, opinions, and curiosities along the way. We provided visual descriptions of the exhibition in sessions with people who are blind or have low vision. After their visit, we conducted a short interview to ask participants some reflective questions about their exhibition experience. The evaluator facilitated the sessions, took notes, and provided each participant a \$50 Visa gift card. See Appendix E for the Contextual Inquiry Session Script.

### CUED INTERVIEWS WITH SELF-IDENTIFYING LATINX VISITORS

Cueing is a strategy to prompt people to do or use a particular experience. Cued interviews are useful when you want to ensure that a specific audience experiences something new that they might not have realized is available to them, including visiting a new exhibition.

We conducted 6 cued interviews with self-identifying Latinx visitors to NMAH; all prospective participants were screened to ensure they spoke Spanish. All interviews were conducted in either English or Spanish (participant's preference) and took place on June 22, 2024, during NMAH's bilingual *Fenómeno Latino* festival. After inviting visitors and gaining their consent to participate, a trained bilingual data collector asked visitors to explore *Change Your Game / Cambia tu juego* on their own and then return for an interview about their experiences. The data collector took handwritten notes to record participants' responses. The data collector provided each participant a \$50 Visa gift card as a thank-you. See Appendix F for the Latinx Visitor Cued Interview Guide.

## Analysis & Reporting

Interviews and contextual inquiry sessions result in qualitative data. In analyzing their notes, the evaluator identifies meaningful patterns and themes. Findings are presented from most- to least-frequently occurring. Throughout the findings, quotations (edited for clarity) illustrate visitors' thoughts and ideas as fully as possible. When describing the findings, this report uses qualitative data terms such as "most" and "several," as is appropriate for the sample size and the type of data collected. Proportions, such as one-half or one-third, are used where appropriate. Descriptive language is intended to provide readers with a sense of general trends.

## About the Exhibition

*Change Your Game / Cambia tu juego* opened in March 2024 and is on view in the Jerome and Dorothy Lemelson Hall of Invention and Innovation at the National Museum of American History. This 3500-square-foot bilingual English-Spanish exhibition, funded in part by the National Science Foundation (NSF) and designed in partnership with Roto, explores the central role of invention and technology in sports from an unexpected perspective: who invents for sports and why? According to the exhibition's website, the exhibition "spotlights how the motivations of diverse inventors, athletes, and technologists have changed how we play historical and contemporary sports, with the additional intention of empowering visitors to identify themselves as inventive problem solvers who can become "game changers" in their daily lives."

*Change Your Game / Cambia tu juego* has 6 areas of exploration:

- A **Starting Line** that introduces the exhibition
- Four **Motivation Zones**, each highlighting a core motivation for invention in sports—achieving a **Competitive Edge**, promoting **Health and Safety**, facilitating **Fairness and Accuracy**, and enhancing the **Fun and Accessibility** of sports to diverse participants, and
- An **End Zone** that asks visitors to explore how they are game changers.

Hands-on, interactive activities throughout the exhibition challenge visitors to engage directly and creatively in the inventive process while considering the broader impacts of those innovations, both inside and outside sports.



## 03 Findings: Walk-in Visitors



Kera Collective conducted 106 interviews at the National Museum of American History (NMAH) in May and June 2024 with two samples of walk-in visitors: a control sample of 51 visitors who had not visited the *Change Your Game / Cambia tu juego* exhibition and a treatment sample of 55 visitors who had just visited the exhibition. The participation rate was 61 percent.

In the interviews, both samples were asked general questions about invention and innovation, and the treatment sample was also asked about their exhibition experience. On the following pages, findings from questions asked of visitors in both samples are presented together, followed by findings from questions that are unique to the treatment sample.



## Visitor Characteristics

Below we highlight visitor characteristics from both the **control** and **treatment** samples, including age, gender, race or ethnicity, residency, and NMAH and Spark!Lab visitation.

- **Age:** Visitors ranged in age from 18 to 77. The median age across samples is 38 years.<sup>1</sup>
- **Gender Identity:** Just over half identified as women and nearly half identified as men. A few identified as non-binary, and one preferred not to disclose their gender identity.
- **Racial Identity:** Most identified as White. A smaller proportion of visitors identified as Asian or Asian American, Hispanic, Latino, or Spanish, Middle Eastern or North African, or Black or African American. Only a few identified as Native Hawaiian or Pacific or American Indian or Alaska Native.<sup>2</sup>
- **Residence:** Most reside in the United States; of these, a few were local to DC, Maryland, or Virginia. International visitors were from Argentina, Brazil, Canada, Germany, Scotland, the Netherlands, and the United Kingdom.
- **NMAH Visitation:** Nearly three-quarters were first-time visitors to NMAH.
- **Spark!Lab Visitation:** **Spark!Lab is the Lemelson Center's invention education studio, located adjacent to the *Change Your Game / Cambia tu juego* gallery.** Most **treatment visitors** did not visit *Spark!Lab* or have an interest in visiting, and a few had not visited but planned to visit. A few said they had visited *Spark!Lab* during their visit, and two planned to visit again before leaving the museum.

Note that we did not ask visitors to identify whether they or someone in their group identified as having a disability.

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<sup>1</sup> Not all visitors provided their age.

<sup>2</sup> Visitors were able to self-identify as multiple races and/or ethnicities.

## General Thoughts on Invention and Innovation

Visitors in both the **control** and **treatment** samples were asked what comes to mind when they think about invention and innovation, and how interested they are in these topics.

### What Comes to Mind

In both samples, ideas that rose to the top for visitors when they think about invention and innovation were **inventions that changed society, creativity, and historical inventors**.

- **Changing society:** Most visitors mentioned past inventions that greatly changed society (e.g., electricity, the lightbulb, the cotton gin) or newer technologies that they use in their daily lives (e.g., cellphones, computers, television).
- **Creativity:** Many discussed creativity and how it can be a driving force for invention and innovation. For example, one thought about how people have applied unique and creative thinking to existing products, like using AVON lotion as mosquito repellent. Some also saw using creativity to push invention and innovation to support society and help make life easier.
- **Historical inventors:** Several named famous historical inventors—such as Nikola Tesla, Thomas Edison, Alexander Graham Bell, or Henry Ford—but no modern inventors.

### Interest in Invention and Innovation

In both samples, most were interested in innovation and invention, while a few were not.

- **Have an interest:** Most visitors said they were either very interested or somewhat interested in invention and innovation. Some mentioned how they engage with innovations, such as following news related to innovations in different fields (i.e., medical, transportation/automotive, video games, AI), and others shared their interest in being early adopters of new technology, like buying the latest iPhone on release day.
- **Little to no interest:** Only a few said that they were not very interested or not at all interested in invention and innovation. These visitors often noted that they felt intimidated by technology or were uninterested in “keeping up” with technology trends and did not actively seek out information or news about inventions or innovations.

“

I think about how I was a 90s kid with a slow, crappy computer at home—I thought was the coolest thing ever. Now, **as an adult, the computers are smaller and a billion times smarter.** I just think of **all this stuff that's gotten so advanced in just a few years** and how many versions of even just my iPhone I've had.

—Control sample visitor, age 29

”

## Skills or Qualities of an Inventive or Innovative Person

Visitors in both the **control** and **treatment** samples were asked what skills or qualities a person has when they are being inventive or innovative.

- **Creative and open-minded:** Across both samples, most visitors said that people who are inventive or innovative are creative or must have a sense of curiosity. Some also thought of people who think “outside the box,” and their ability to “see things differently” allows them to think in new, innovative ways.
- **Think ethically:** In the **control** sample, many said people who are inventive or innovative must research and understand what society needs rather than try to make something that does not fulfill a current need or may cause harm. Several said these people must employ empathy and ethics when creating something. One mentioned J. Robert Oppenheimer as an example of someone who should have thought more empathetically during the creation process. They shared, “What’s the point of feeling so guilty *after* you’ve invented [the atomic bomb]?”
- **Intelligent:** In both samples, many said that inventive or innovative people are smart. For example, one said, “You need mental agility.” However, some noted that inventors cannot rely on their intelligence alone and should possess “soft” skills like being detail-oriented, good communication, and able to work with others.

“

Smart, out-of-the-box thinking. Not afraid to reconsider how we do things and ask, ‘Are we doing this the best way we can?’ Ideally, they’re **trying to serve the world to make it better and not just trying to profit.**

—Control sample visitor, age 21

”

## Personal Reflections on Invention and Innovation

In both the **control** and **treatment** interviews, visitors were asked if they could think of any ways they are inventive or innovative in their own lives. Responses were again similar across samples.

- **At work:** Most adult visitors thought about ways they are inventive or innovative in their careers. Several spoke about using creative problem-solving skills or other “soft skills,” such as teamwork and dealing with clients. A few said thinking innovatively or being inventive at work is so woven into their daily lives that it was hard to think of unique examples.
- **Hobbies & favorite pastimes:** Many thought about their hobbies (e.g., gardening, creating art or music). Several of these visitors used cooking as an example and talked about their love for experimenting in the kitchen.
- **At school:** Several youth visitors mentioned school projects or activities. For example, one former high schooler used innovative planning methods to organize a student pen pal program with nursing home residents during the COVID-19 quarantine. A few parents also talked about their elementary or middle school-aged children applying innovative thinking to their schoolwork, like science fair projects.
- **Raising kids:** A few talked about their experience as parents and described how, when raising children, they constantly must come up with solutions or ideas to support their children’s growth and happiness. One said, “You have to ‘invent’ yourself every day as a woman, and if you have kids or family, you are constantly finding who you are and finding ways to navigate life, your identity.”
- **Using AI:** Several mentioned using new AI technologies, like ChatGPT, to help them streamline work assignments, schoolwork, or personal projects (e.g., planning vacation itineraries, generating journaling prompts) as innovative and inventive. One said they use AI to help them save time and “write funny titles” for their college assignments.

“

In my work in electrical, **there always something wrong and I have to find a way to fix it or work around it.** On a day to day basis, when you’re doing this stuff all the time it doesn’t seem so innovative just because you’re used to doing it over and over.

—Control sample visitor, age 40

”

## Overall Reactions to the Exhibition

### Interesting or Enjoyable Aspects

**Treatment** visitors were asked if there was anything they found interesting or enjoyable about *Change Your Game / Cambia tu juego*.

- **Fresh and modern design:** Many enjoyed the exhibition's "futuristic" and "modern" styling (e.g., vivid colors, neon lighting, sans serif font). A few said they liked that the exhibition felt and looked different compared to what they're typically used to seeing at museums; referring to both the NMAH and others. One shared, "I liked how modern it looked, it's a nice design contrast to some of the other exhibits I've seen before here [at the NMAH]."
- **Engaging and thought-provoking interactives:** Many mentioned using or watching someone else use the digital interactive elements (e.g., Swimsuit Designer, Drawing Board) as something they enjoyed or found interesting. For example, one group talked about how they had fun working together to design swimsuits using the Swimsuit Designer. One visitor also shared, "I've been [to the NMAH] before, and I think this exhibit really is a good change for the better with how interactive it is."<sup>3</sup>
- **Sports history:** Many enjoyed seeing the history of sports they are fans of or learning new information about sports they were less familiar with. For example, several talked about their love for specific sports (baseball, football, skiing) and their excitement at seeing history they were previously familiar with or lived through.
- **Objects:** A few also liked that they could touch some of the sports objects, such as the footballs and tennis rackets, throughout the exhibition. One shared, "I thought it was cool to actually touch something. I always like it when there's models—tactile stuff." A few were also glad to see historical and modern mobility aids (wheelchairs, prosthetics) featured in the exhibition. One said, "I liked the emphasis on accessibility. The fact that people innovate to make sure people can play regardless of physical ability, gender, etc., I thought that was nice."
- **Bilingual text:** A few praised the inclusion of Spanish text and labels and were glad that more visitors will get to experience the exhibition in their native language.

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<sup>3</sup> Further information about the interactives is on page 27.

## Least Favorite or Confusing Aspects

Treatment visitors were also asked if there was anything they disliked or found confusing in the exhibition.

- **Nothing:** Nearly two-thirds said they did not find anything confusing or difficult to understand.
- **Confusing wayfinding:** A few found it difficult to figure out the implied direction or “flow” of moving through the exhibition. One said, “I couldn’t tell if there was a set path.”
- **Unsure about the message:** A few said the exhibition lacked a message and an “overarching narrative.” For example, one said, “[the exhibit] wasn’t clear immediately at first what it was about,” and another similarly didn’t realize the exhibition so heavily featured sports from the introduction area alone.

“

The only thing I didn’t like was the flow of “some things here, some things there” throughout the exhibit. The **information was a little scattered around** in the layout.

—Treatment visitor, age 41

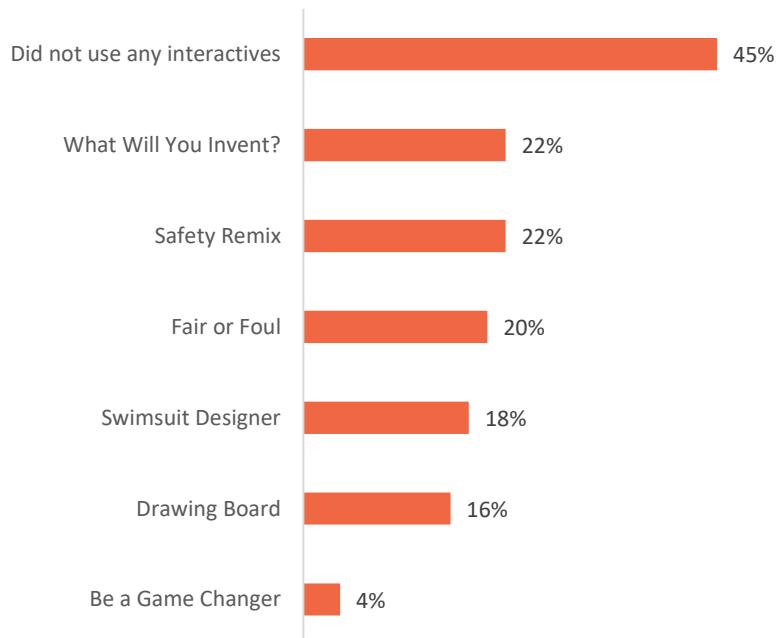
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## Use of Interactive Activities

**Treatment visitors** were asked which interactive activities they used while visiting the exhibition. More than half of visitors used at least one interactive activity, but each individual interactive activity was used by less than one-quarter visitors. The most-used interactives were *What Will You Invent?* (22%) and *Safety Remix* (22%), followed by *Fair or Foul* (20%), *Swimsuit Designer* (18%), and *Drawing Board* (16%). The least-used interactive is *Be a Game Changer* (4%).

Almost half (45%) did not use any of the interactives. When asked why, these visitors often said they wanted to move through the museum quickly, they were simply uninterested in trying interactives, or someone else was using the activity and they didn't want to wait.

Interactive Use Among Treatment Visitors (n = 55)



On the next few pages, we detail what visitors enjoyed about each interactive activity and if there was anything they found confusing or disliked about it. They are listed in order of frequency of use.

See Appendix G for a description of each interactive activity.

### What Will You Invent?

Visitors liked the chance to flex their creativity and think about inventing new things, having gained some inspiration from what they had just learned about sports innovations and inventions. One called this activity “simple and fun.”

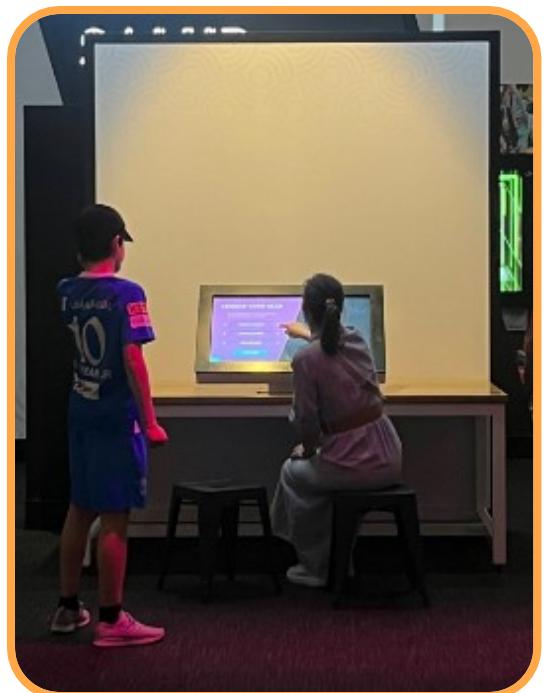
A few visitors mentioned that, while they enjoyed reading responses from previous visitors, they didn't feel compelled to write their own; one shared they “don't like to write, but still took time to read.” Another visitor said that the station was out of paper to write on, and so they did not have a chance to participate.



### Safety Remix

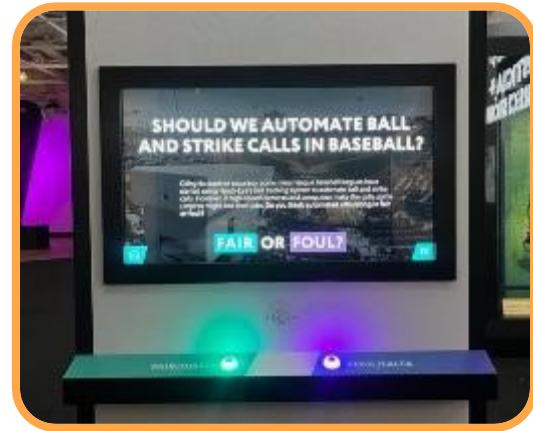
Visitors said this interactive was “funny,” “charming,” and all-ages friendly. One parent, who was visiting a second time with their family, said their children (5 and 7 years old) did not use the interactive during their first visit because it did not draw them in visually; she added that both children are early readers and the interactive’s text may have intimidated them. In another interview, a teacher shared, “Even if [kids don’t] understand the text, they might still get something out of it.”

A few parents said they weren't interested in participating and preferred watching their children use it rather than using it themselves. Two groups felt that the interactive was “a little lengthy,” and one said they wished they could have seen their “score” at the end.



## Fair or Foul

Visitors liked voting on different topics and sharing their opinions in a poll. One pair of adults said the activity sparked a good discussion between them, and another visitor shared, "This was my favorite stop because it provoked some thought." Some talked about how they enjoyed seeing past visitors' opinions compared to their own, even if they disagreed with them. However, two said that seeing some past visitor opinions left them feeling "a bit disheartened."

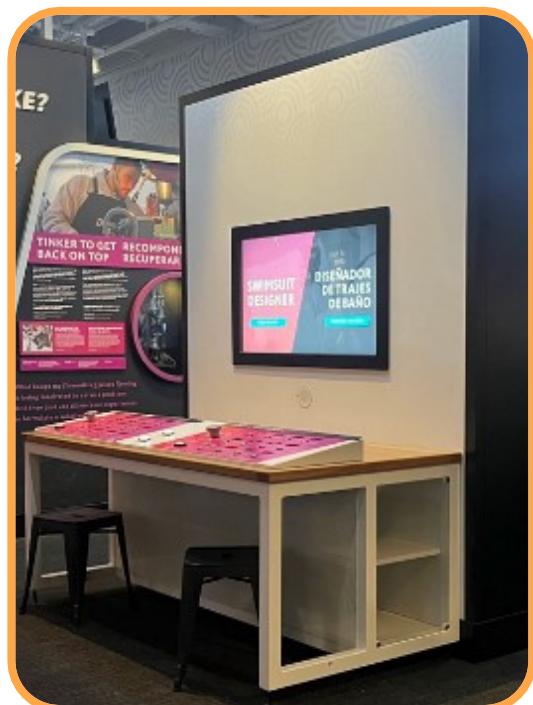


A few liked that the activity asked questions about ongoing events, with multiple specifically mentioning the inclusion of transgender athletes in gendered sports discourse; one said, "The stuff on trans athletes was good since it's a current debate." One wished they could have provided explanations for their answers.

## Swimsuit Designer

Visitors often said it was fun to work together as a group to design the swimwear and see their designs "come to life" on the screen. They also called the interactive easy to use and "all ages friendly." One visitor enjoyed the tactile experience of feeling the actual fabrics, while another expressed surprise at being able to touch the materials for the swimsuit they were designing. One family group returned for a second NMAH visit because of their 5-year-old's request to play "the swim game" with their father, who had missed the previous visit to the NMAH.

One visitor said they had trouble working the display screen and accidentally made the screen move "too fast." Another said they couldn't use it because the screen was frozen.



### Drawing Board

Visitors said the activity was “fun,” and one said it gave “room for creativity.” Another shared, “We goofed off with it for a bit, but we figured it out. We [made] a fun promo about hockey.”

Two groups found the interactive hard to understand and confusing, and one added, “Maybe if we had longer to tinker with it, we would get it, but we didn’t end up completing it.” One visitor felt there were not enough resources or objects to make their drawings and added that their partner’s station did not work at all. One parent said the interactive did not hold their child’s attention for long, and another said their child had trouble drawing on the screen.



### Be a Game Changer

While only two visitor groups used this interactive, they both liked that the activity connected visitors to the idea of “being inventive ourselves” and that it was “nice to talk about” themselves. Both groups said it was easy to use and understand.



## Relating to Stories about Invention and Innovation

Treatment visitors were asked if they could relate to any of the stories in the exhibition about people being inventive or innovative.

- **Could relate:** Almost half said they could relate to the stories, and most of these visitors were athletes themselves or enjoyed watching sports. For example, one cyclist liked seeing the content about Lance Armstrong and performance-enhancing drugs because they remembered “watching all that stuff unfold.” Another was glad to see the wheelchair because it reminded them of their friend who uses one.
- **Could not relate:** Nearly half said they did not find the stories relatable. Most of these visitors responded with short answers of “not really” or “not particularly.” One said they couldn’t relate because they’re “super not sporty,” and another said they did not really care about sports compared to “everyday people” and felt a lack of connection to the stories.
- **Could not relate but still interested:** A few visitors felt that they did not relate to any of the stories but were glad to see certain themes or topics shared in the exhibition (e.g., women in sports, the Joggbra, transgender athletes playing sports, and fairness). One said, “Even if I didn’t relate to them, I like to learn about them. It’s a feature, not a flaw.”
- **Did not see the stories:** A few said they couldn’t answer because they did not stop to read or watch any of the stories. One explained, “I’m not a stop-and-read-plaque person, so I didn’t really read the stories.” None of these visitors mentioned viewing the videos.

“

**The whole sports theme was relatable.** We’re sports people, athletic people as a family. In my own life—I was a goalie, and they’re making changes in the gear we use, the protective gear for it. They’re making the padding lighter, making it smaller on the knees but bigger on the chest, **figuring out more what people need.** So that’s cool to see.

—Treatment visitor, age 21

”

## Changes to Thoughts about Invention and Innovation

Treatment visitors were asked if their experience in the exhibition had made them think differently about what it means to be inventive or innovative than they had before visiting *Change Your Game / Cambia tu juego*.

- **Content impacted previous understanding:** Most visitors could identify areas of the exhibition that challenged what they previously knew about invention, innovation, and their relation to sports. Almost a third said they had been surprised or “hadn’t really considered” that certain objects we’re used to seeing and using (e.g., sports bras, helmets, mobility aids) had to be invented. One said, “I just take it for granted.” Many were also surprised by the sports history and how so much innovation has taken place over the last 30+ years (e.g., skiing gear and equipment, football designs, athletic wear, mobility aids).
- **No change:** Less than a third said they did not think any differently about invention or innovation than they had previously. Several of these visitors also previously said they could not relate to the stories on invention and innovation or admitted they did not read enough of the exhibition text to give a strong answer.

“

When you don’t think about it much, stuff like the helmets are kinda surprising. You don’t think about how it’s safe, since we’ve had it for such a long time. But seeing that cross section you can kind of appreciate that like—‘Wow! We don’t have to bash our heads together while we play. It hurts less, yay!’ **You just don’t appreciate it since it’s something we’re used to seeing around us our whole lives.**

—Treatment visitor, age 23

”

## 04 Findings: Youth Visitors



Kera Collective conducted three group interview sessions with youths from four different Boys and Girls Clubs of Greater Washington (BGC GW) to engage with the priority audiences females aged 10-17 and African American males aged 10-17. Overall, we spoke with 43 participants over three sessions, which included time spent independently in the exhibition as well as the following group interview. Findings include data from the group interviews as well as written responses that participants included on their worksheets while in the exhibition.

## Visitor Characteristics

All participants are youth who are part of the Boys and Girls Club of Greater Washington (BGC GW). Additionally:

- **Age:** Most participants ranged in age from 10-17 years old.<sup>4</sup>
- **Gender Identity:** About half of the participants identified as women and half as men, with one choosing not to self-identify.
- **Residence:** All reside in the United States, specifically in DC and northern Virginia.
- **Racial Identity:** Most identified as Black/African American. A few indicated other racial identities, including American Indian or Alaska Native, Asian or Asian American, Hispanic, Latino or Spanish, Native Hawaiian or Pacific Islander, and White.
- **NMAH Visitation:** Just over half were visiting the Smithsonian's National Museum of American History for the first time, and just under half had previously visited NMAH.

Note that we did not ask youth visitors to identify whether they identify as having a disability.

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<sup>4</sup> One participant was nine and one was 19.

## General Thoughts on Invention and Innovation

Before visiting *Change Your Game / Cambia tu juego*, we asked participants what comes to mind when they think about invention and innovation, as well as how interested they are in these topics.

### What Comes to Mind

Ideas that rose to the top for participants when they think about invention and innovation were **creativity, changing society, and open-mindedness**.

- **Creativity:** Several participants said that they think about creativity and being “able to think of new stuff.” A few added that they think about being artistic and “making things.”
- **Changing society:** Several participants spoke about invention and innovation pertaining to useful things, solutions, and/or ideas. Others thought about “things that make the world better” or things that “everyday people” can use to make their lives easier, like a “sign or a door.” A few shared examples of objects and people they consider innovative (e.g., Leonardo da Vinci, George Washington Carver’s agricultural innovations, and Alexander Graham Bell’s telephone). A few participants in one group noted that inventions could be better versions of things that previously existed (i.e. not developed from scratch). Another group debated whether each model of the iPhone “counts” as an innovation.
- **Open-mindedness:** A few also thought about open-mindedness because “you need to be open to ideas,” especially if you run into unexpected challenges that require you to change course and consider different possibilities. One suggested this can come up especially when collaborating with others who may have ideas that are different from yours that cause you to “change direction.” Another added that they often change their mind in the middle of making art to respond to new ideas or materials.

### Interest in Invention and Innovation

Each of the groups was roughly evenly split between participants who were more interested or less interested in innovation and invention.

- **Have an interest:** Those who said they were interested in innovation and invention were able to give examples of ways they innovate in their everyday lives. Examples ranged from making things like art and clothing, learning how to do self-maintenance (e.g., hairstyles, make-up), engineering and tinkering (e.g., building with Legos, creating virtual worlds on Roblox, designing car parts out of clay).
- **Little to no interest:** A few said that, while they were interested in innovation, they didn’t feel “passionate” about it or spend a lot of time *doing* innovative things. For example, one commented, “I like to think about things and think about how to change stuff, but I don’t really do it actively or think I’ll pursue it.”

## Overall Reactions to the Exhibition

After visiting *Change Your Game / Cambia tu juego*, we asked participants to share what they found interesting or enjoyable about the exhibition, what parts of the exhibition were confusing or if there was anything they did not like, and their thoughts on the interactive activities.

## Favorite Aspects

Participants mentioned a few favorite aspects of the exhibition, including the interactive activities, sections of the exhibition that relate to their personal experiences, and other objects. The Use of Interactive Activities section below will review participants' ideas about the interactive activities in more detail, while the list below focuses on other aspects that participants enjoyed.

- **Sections that relate to personal experience:** Several mentioned sections of *Change Your Game / Cambia tu juego* that relate to their different personal experiences. For example, a few girls liked the section about Lisa Lindahl's "Jogbra" because they appreciated seeing women athletes represented in the history of sports and creating things that "make my life better now." Others enjoyed the tactile shoe area and comparing the materials to their own shoes. Still others referenced sections that featured equipment that they use in sports they play or enjoy, such as swimming, skateboarding, football, baseball, and track.
- **Objects that show evolution over time:** Several liked objects that show the evolution of sports gear; one liked being able to "see older equipment and you can compare them to the current tech and equipment of modern sports." Another noted that the sliding mitt he uses for baseball is "so different" from the one in the Health and Safety section, referring to the latter as an "oven mitt." Still, another noted the evolution of skateboards, and another appreciated how much skis have changed in material and shape since the 1950s.
- **Other objects that stood out:** A few mentioned other objects that stood out:
  - **Flex-Foot "Cheetah" prosthesis:** A few liked Van Phillips's prostheses. One said learning about the prosthesis was "very nice because a prosthetic is giving someone another chance at life, a better one."
  - **Seeing authentic artifacts:** A few were surprised to see "real" NFL footballs and MLB baseballs, referring to the objects in the Fairness and Accuracy section. They appreciated seeing them, explaining that they also play those sports.
  - **Quickie Sports Wheelchair:** Two enjoyed the Quickie sports wheelchair; one said that they had seen it before on TV, so it was "cool" to see it in person. Another was impressed that it was made from hang glider materials.

## Least Favorite or Confusing Aspects

Like the last section, anything that was confusing about the interactives will be discussed in the following section, which will cover all responses to each of the interactive activities. Below is a list of other things that youth participants did not like or found confusing about the exhibition:

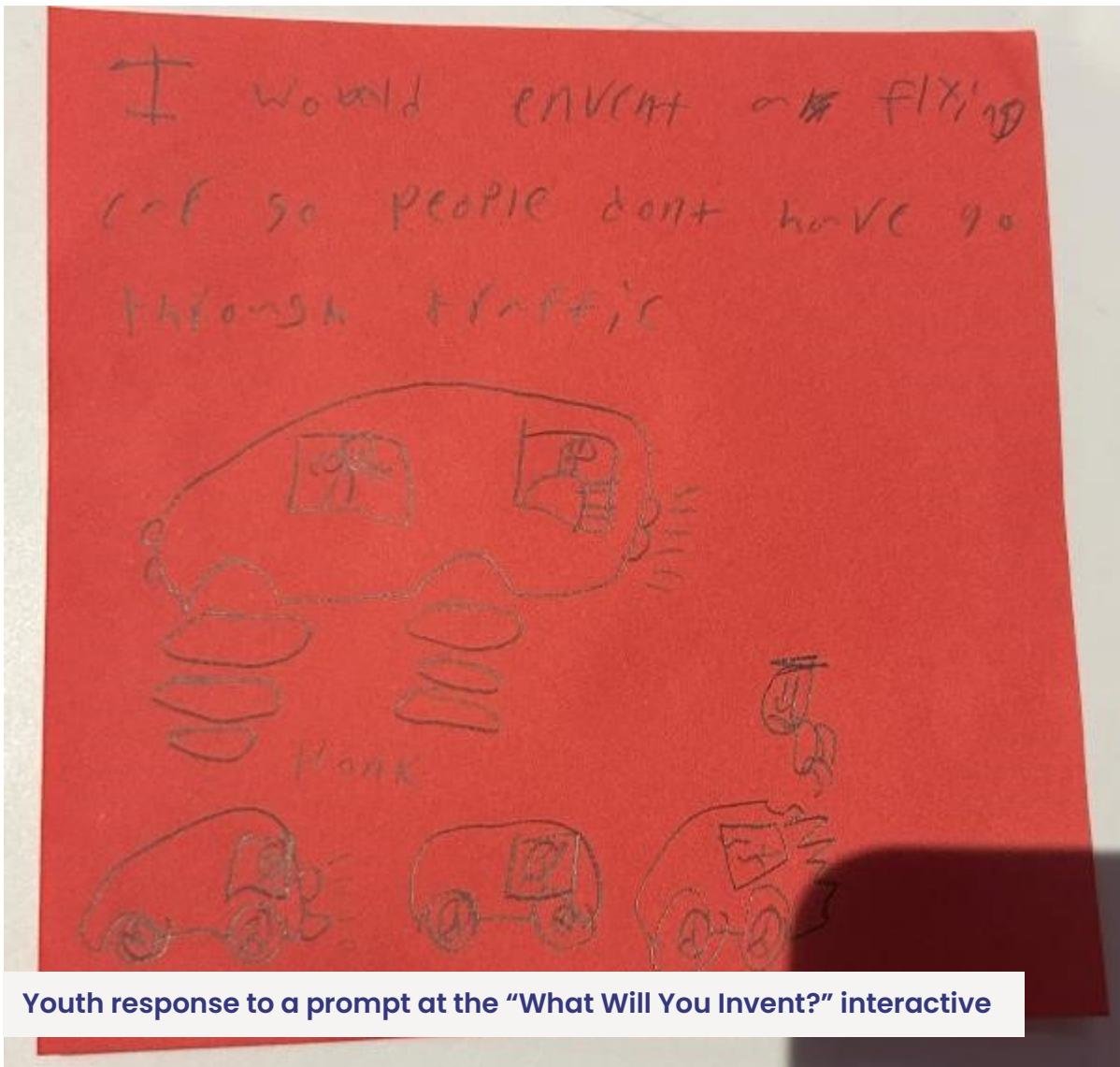
- **Treatment of women in sports:** Several girls were confused by and disappointed to learn about the historical treatment of women in sports. A few had questions about why women were excluded from certain sports for so long. A few were particularly confused that it was ever a question that women would require a unique type of bra for playing sports.

- **Gender testing:** A few had lingering questions about the gender testing section, like whether gender verification is fair and if some sports necessarily need to be segregated by gender.
- **Shattered backboard:** In one group, several were surprised by the photograph of the shattered backboard. A few were confused that anyone would be strong enough to do that in the first place, and others were confused about what was happening in the picture; it seemed that they did not connect the photograph to the flexible breakaway basketball rim that was invented to prevent this from happening, or they did but were still confused about the connection.

## Use of Interactive Activities

We asked youth to try and use at least one of the interactives. Most participants tried at least 4-5 of the six activities, choosing to spend more time with those they found engaging. In general, participants thought they were **fun, encouraged creativity, and presented multiple perspectives and options to respond to and play with**. As one put it, “I like how you get different scenarios and you get to show what you would do in that situation.” We report on interactive activities in the order that most youth used them. See Appendix G for interactive descriptions.

On the next few pages, we detail what participants enjoyed about each interactive activity and if there was anything they found confusing or disliked about it. They are listed in order of frequency of use.



Youth response to a prompt at the “What Will You Invent?” interactive

See Appendix G for a description of each interactive activity.

## Swimsuit Designer

Nearly all participants used this interactive, and several returned to it during their visit.

### What they liked:

- **Trial and error:** Most tried out different combinations to determine which would be fastest in order to win. The timed function also encouraged quick decision-making and multiple attempts to experiment.
- **Fun to do as a group or alone:** We observed that while most participated in a pair and competed against each other (often with a few others watching), others enjoyed working alone.
- **Tactile:** A few liked touching the different swimsuit materials because it helped them make decisions about which would be fastest.
- **Opportunity to design:** A few also liked exploring the multiple options available to them. A few were surprised by the “amount of stuff” (i.e., decision making around design) that goes into making a swimsuit perform well.



### Confusing or disliked:

- **Mechanics:** A few had trouble figuring out how to toggle each of the options and seemed to think you needed to push the buttons or spin the wheel to make the animated swimmers “go.” While most resolved these issues after a few tries, a few remained frustrated.
- **Guesswork:** Most who used this interactive did not read the text that appears at the end of the race. The few who did have trouble using the information to make an informed decision for their next try; one asked, “How do you know what’s fastest?” implying confusion about guessing again based only on the information about your last combination.

“

At first you didn't know the fabric wasn't strong enough or too tight. **I thought it was cool [that] people have to think about it** for swimmers.

—Youth participant

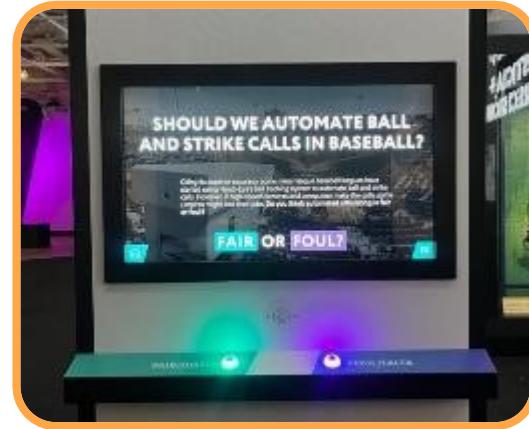
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## Fair or Foul

Most participants used and liked this interactive.

### What they liked:

- **Thought-provoking:** Most liked being able to think about complicated prompts and develop their own opinions. Several continued to debate some of the scenarios in the group interviews; a few felt quite passionate about some of these issues (e.g., concern over umpires losing their jobs to the Hawk-Eye tracking system, the importance of ADHD medication for athletes who need it). In one group, the ambiguity of some of the prompts inspired a compelling conversation around how you know which is the “right” choice in these situations.
- **See others’ votes:** Several liked being able to compare their opinions to other visitors because it “shows different opinions and how they relate to your own.” Another compared the activity to a Kahoot quiz, “but with no right or wrong answer.”



### Confusing or disliked:

- **Not enough time:** Several felt rushed and that they didn't have enough time to fully read and make sense of the prompt before the activity timed out.
- **Confusing prompts:** A few others said some of the prompts were confusing and hard to understand; for example, one felt confused that the pork burrito question was included at all (it “shouldn't even be a question”) and another felt that the gender testing question required more context than what was provided to make a choice.

## Drawing Board

Most engaged with this interactive, though some for longer periods of time than others.

### What they liked:

- **Respond creatively to unusual scenarios:** Most were entertained by the unusual scenarios suggested by the activity (e.g., basketball with heavy weights on a volcano) and had fun thinking of ways to accommodate the different challenges. One said it “makes me think about things in a new way,” and another said it was “cool to figure out how to do things in unusual places.” For example, one designed floating bases in space, and another designed lots of cones in order to block a ball from going into the street while playing soccer on a sidewalk.



### Confusing or disliked:

- **Uncertain how to respond:** While some were able to respond creatively to the prompts, we also observed several who felt uncertain about how to respond and/or offered limited design interventions in their scenarios. For example, one drew goalposts for soccer in outer space with gloves and decided that was all that was needed. Another drew bowling pins for bowling in hot lava wearing earmuffs and added a bridge only when prompted by the facilitator to consider how to navigate the lava.
- **More icon options:** A few suggested that the activity include more icons, feeling that some of them weren't always useful depending on the prompt; this may be because they didn't feel as comfortable drawing.

## What Will You Invent?

Most read the different ideas that were included in the case; several answered the prompts to consider an issue they would invent for and/or an invention that would address an issue they are passionate about.

### What they liked:

- **Solving problems they care about:** Those who drew inventions created things to address problems and make life easier. For example, a few thought of housekeeping inventions, like a clear refrigerator, or a meal prep robot. Another had an idea to design a flying car so people could avoid sitting in traffic, which resulted in a discussion with others sitting around the table about how to make it safe (e.g., how will people not crash into each other? How to make sure you don't fly too high and escape gravity or too low and hit the ground?). Another thought about a Vision Pro that's contact lenses instead of glasses, because lenses are more "convenient"; it comes with settings to open different apps that are controlled by blinking (e.g., blink three times and Google Maps will come up).
- **Responding to others' ideas:** A few also enjoyed responding to the ideas that were already displayed, appreciating those that address familiar issues. For example, one liked seeing the idea about an app that determines if brands are ethical or not, because she cares about ethics in fashion. Another liked an idea to create a volleyball net that adjusts to be fair for every player no matter their height because volleyball is her favorite sport.



### Confusing or disliked:

No one indicated anything they would improve about this activity.

## Safety Remix

Two-thirds of participants engaged with this activity; we observed that most who spent time here spent only a couple of minutes.

### What they liked:

- **Creative and critical thinking:** A few appreciated that the activity made them think about how you might employ different gear for different sports. Another liked thinking about how to make an activity “better” through safety gear.
- **Activities relatable:** A few thought that being able to choose between two activities they could relate to (snowball fight and skateboarding) was fun. One mentioned that he is a skateboarder and was able to pull from his experience to make decisions about what gear to choose.
- **Built-in humor:** A few had fun playing with the options and getting silly choosing some unlikely options, like the knight’s armor for a snowball fight.



### Confusing or disliked:

- **Wanted “complete” sets:** A few were frustrated you couldn’t choose a full set of matched items, like a complete snowboarding outfit, or a complete knight’s armor.
- **Too few options for sports:** A few wanted more options than just skateboarding or snowball fighting, feeling they had little experience with either.
- **Boring:** One thought it was boring, and another said, “There really isn’t much to do.”

“

I saw how different types of gear work and that you have to use the right amount of gear. **You need the right type of gear**—you can’t play football in a big coat; you need the face blocker for the snowball fight. It was good to see what worked for what thing.

—Youth participant

”

## Be a Game Changer / Your Inventive Portrait

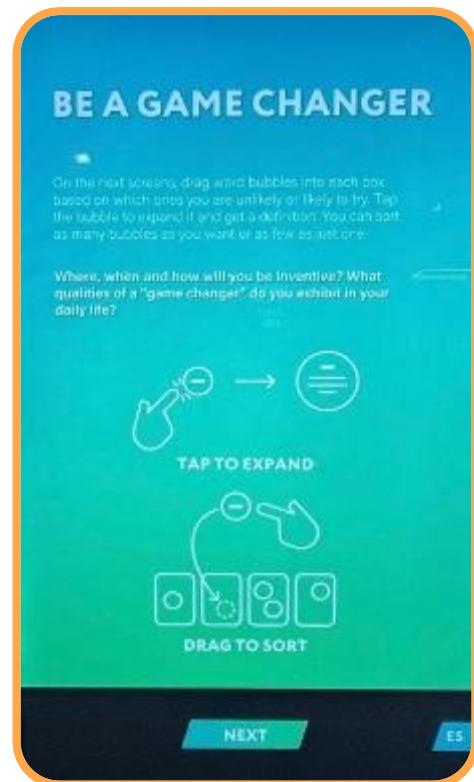
Roughly half of the participants engaged with this activity, although several watched others participate. While fewer participants chose to engage with it than other interactives, those who did enjoyed it.

### What they liked:

- **Made me think**: Several said that they liked thinking about themselves and choosing which qualities were most and least like them. One commented, “This made me think about myself and talk about things I like.” Another said, “I liked the process of thinking about myself.”
- **Word cloud**: A few liked the word cloud at the end; one elaborated that it “gives you a portrait of who you are.”
- **Definitions**: Two liked that if you lingered on a word, it would give you a definition.
- **Observing others**: We noticed several participants watching each other make their choices and commenting on their selections. Those participating didn’t seem to be bothered by this, although it may be worth considering how answers might have differed without an audience.

### Confusing or disliked:

- **Roles**: One was confused about whether the activity was asking if, for example, they are currently a parent or if they could be a parent in the future.



## Relating to Stories about Invention and Innovation

We also asked if youth felt they could relate (or not relate) to the stories about people being inventive and innovative in *Change Your Game / Cambia tu juego*. Stories that participants related to most were ones about women and disabled athletes.<sup>5</sup>

- **Women athletes:** A few girls related to the stories about women overcoming exclusion from sports. One “it was cool that female athletes didn’t wait for someone to make [a sports bra], they did it themselves.” Another told the group about her grandmother, who used to tell her stories of when she was young about how she was not allowed to play softball with the boys, despite being very good at it.
- **Overcoming disability:** A few appreciated the different examples of prosthetics and mobility devices as well as the stories about the people who made them and why. For example, one mentioned they liked reading about Van Phillips “because I liked how he wanted to help others and himself.” Another enjoyed learning about Mike Schultz because “when something is a barrier or challenge, they persevered through that to find a solution.” Others liked learning about Marilyn Hamilton’s wheelchair for similar reasons.

“

[I think about] when grandma was younger, and they rejected her because she was a girl. She was passionate about it [joining a sports team]. [What made you think of this?] The one in the back [referring to Title IX and Jogbra stories] Add girls in the sport. More people defend girls getting in now. Now **it's different than when [grandma] was a girl.**

—Youth participant

”

<sup>5</sup> One group (FBR) had difficulty responding to this question; it’s possible they spent more time with the interactives than reading the exhibition content because they were directed to spend time with at least one interactive while independently exploring the exhibition. In the next two groups we specified that they should spend time with at least one interactive, watch one video, and read one story in each section.

## Skills or Qualities of an Inventive or Innovative Person

After visiting *Change Your Game / Cambia tu juego*, we asked youth what they thought are skills or qualities a person has when they are being inventive or innovative. In order to hear from each person, the facilitator asked each participant to name a quality or skill. Ones that rose to the top across all three groups were creativity, determination, and intelligence.

- **Creative:** Many suggested qualities related to being creative, artistic, and imaginative. A few elaborated that you need to be creative to “figure things out in unique ways” and imagine new ideas. A few also said that being artistic helps you draw or design an idea that can later be made by you or someone else.
- **Determined:** Several also named qualities related to determination, patience, and perseverance. They explained that you need to be patient in case “it doesn’t go your way at first” and determined to transform an idea into something real (“when something pops into your head and you have to keep thinking about it to make it real”).
- **Intelligent:** Several also suggested qualities like “intelligent” and “smart.” One added, “If you weren’t smart, you wouldn’t know how to make something.”
- **Courageous:** Several named qualities like courage, independent thinking, and “not being afraid to think outside the box.”
- **Collaborative:** A few said that you need to be collaborative, a team player, and flexible enough to work with different people.
- **Open-minded:** A few named open-mindedness and flexibility. One explained that you need to be “open to different outcomes.”
- **Empathetic:** A few said that an inventive person is empathetic because you need to be “open to thinking about other people and ways to make things better.” Another added that “some people solve their own problems and others think of problems other people face to solve.”
- **Hard working:** A few said that an innovative or inventive person is hard working and “rigorous”; one explained that hard work can include “lots of research.”
- **Types of inventors:** A few suggested types of inventors or innovators, like designers and architects because their designs can be replicated, as well as construction workers because they are able to “actually make things with their hands.”
- **Other qualities:** Other qualities that participants suggested include outgoing (in order to “get the word out” about your invention), passionate, competitive, believer, and joyful (referencing different stories from the exhibition about athletes with disabilities who “didn’t become depressed” and innovated ways to overcome their challenges).

## Changes to Thoughts about Invention and Innovation

Finally, youth were asked how, if at all, the exhibition made them think differently about what it means to be inventive or innovative differently than they did before visiting.

- **Inspired to innovate:** About half indicated that they felt like they were somewhat more inventive than they thought they were before seeing *Change Your Game / Cambia tu juego*, but had difficulty elaborating why. One said that they “feel like I can invent things I’m passionate about.” Another who thought of themselves as an artist said they now feel like playing sports can count as a type of inventiveness too.
- **Fewer personal connections to innovation in sports:** While half agreed they felt more inventive, others felt about the same as they did before seeing the exhibition; one elaborated that they felt that they learned a lot about innovation in sports, but it didn’t inspire them to change their mind about how inventive they feel they are.
- **Inventions can solve big and small problems:** A few changed their minds about what inventions can entail; for example, one said they originally thought that inventions were “gadgets,” but now he is “thinking about what you can help solve.” Similarly, another commented that inventions don’t have to be “something super big”—they can be simple too.
- **Innovation for good and bad:** A few were also surprised to learn that innovation could be implemented for positive reasons, like being a more competitive athlete (“people invent to win at things”) and to prevent cheating, but also negative reasons, like cheating through drug use (“athletes use different drugs and stuff to cheat”).

“

[Invention and innovation] **doesn't have to be something super big**, like solving world hunger or creating a flying car to count as innovation. It can be something as simple as a new sole of a shoe."

—Youth participant

”

## 05 Findings: Visitors with Disabilities



Kera Collective conducted contextual inquiry sessions with 9 people with disabilities. In each session, participants visited *Change Your Game / Cambia tu juego* while talking out loud to share their thoughts; we also interviewed them afterward so they could reflect on their exhibition experience.

On the following pages, findings are presented together, with trends unique to participants' disability identity underscored where applicable.

## Visitor Characteristics

All participants are people with disabilities who live in DC, Maryland, or Virginia. Their disability identities vary and sometimes overlap:

- Two are adult females who are **blind**, and another is an adult female with **low vision** who experienced vision loss later in life. All use a white cane to aid with independent navigation, and one also has a guide dog.
- Two are adult females with **Multiple Sclerosis (MS)**, a chronic condition which affects the central nervous system. They also identify as "MS advocates."
- One is a nonbinary high school senior who has **Attention-deficient/Hyperactivity disorder (ADHD) and who is autistic**. Their mother joined them to serve as their "communication partner;" they often talked with each other instead of directly to the facilitators.
- One is an adult male who is **autistic with high support needs**. He was accompanied by an Access SI staff member who knew him well and could help him communicate. He spoke in short phrases and took frequent breaks to refocus.
- One is an adult female who is **dyslexic and who has ADHD**. She is also an Army veteran.
- One is an adult female over age 65 who is **neurodivergent and who uses a walking cane to aid with mobility**.

## General Thoughts on Invention and Innovation

Before visiting *Change Your Game / Cambia tu juego*, we asked participants whether they see an overlap between themselves and a person who is inventive or innovative.

- **Strong overlap:** Just over half of participants saw a strong overlap between themselves and an inventive or innovative person, often due to their disability/disabilities. One blind participant, for instance, said people with disabilities are “the original problem solvers,” and another talked about how she is constantly problem-solving as a neurodiverse person, which made her stand out among her neurotypical peers when she was in the Army. A few others said they are inventive because they are creative and analytical thinkers.
- **Some overlap:** About half said they see some overlap between themselves and an inventive or innovative person, though were more hesitant to claim this identity. Two said they are not technologically oriented (“I wish I knew more about engineering”) so often struggle to turn their ideas into reality. Another said, when they think of invention, they think about people who build technology (something they do not do), so “it depends on your definition of inventive.”

“

**100% overlap for me, because being neurodiverse, our minds are always in the imagination.** Constant problem solving, going a million miles a second. Even right now, I’m rearranging this exhibit in my mind. My imaginative thinking was huge when I was in the Army.

—Neurodiverse participant

”

## Overall Reactions to the Exhibition

After visiting *Change Your Game / Cambia tu juego*, we asked participants to share what they found interesting or enjoyable about the exhibition, what parts of the exhibition were confusing or if there was anything they did not like, and their thoughts on the interactive activities.

### Favorite Aspects

Participants mentioned a few favorite aspects of the exhibition, including sections that relate to their personal experiences, the provocative questions, and the exhibit design and atmosphere.

- **Sections that relate to personal experience:** Just over half mentioned sections in *Change Your Game / Cambia tu juego* that relate to their personal experiences. For example, one knew Shawn Smith in high school and said it felt “surreal” to see his story in a museum. Another, who works in sports video production, was reminded of when she worked on a documentary about Lance Armstrong after seeing “Invent to Prevent Cheating.” Others related to equipment from sports they play and/or enjoy watching. One, for instance, thought of watching Olympic surfing and wondered if, as a skier, they would be good at surfing or snowboarding after viewing the prototype snow surfer.
- **Provocative questions:** About half liked these, especially in the Fairness and Accuracy section related to gender testing. One was reminded of law school and said it was “really interesting” to think of these “bigger societal questions,” even as someone who is “not a sports person.” Another liked how the questions “ignite a response” and invite visitors to take initiative rather than being passive about problems they care about; they discussed the importance of not accepting the norm with another person in their session.
- **Exhibit design and atmosphere:** Two liked the clearly marked sections and how the exhibition is relatively small—it felt “tight and distinct.” The two blind participants liked the “inspiring” background music from the videos and the carpet, which felt “cozy” yet practical because it muffles sound, allowing them to focus more easily on communication.

“

This exhibit offers a challenge to come up with ways to make things better. There were several statements about including everyone and designing for others. That’s a **powerful message** at this time in our society.

—Blind participant

”

### Least Favorite or Confusing Aspects

Participants with disabilities named several things they did not like or found confusing:

- **Inaccessible labels:** All pointed out issues they had accessing information on the labels:

- Half—with various disabilities—said the text was too small and the labels “too low” to read comfortably, a few saying they would skip them if visiting on their own.
- A few neurodivergent participants said long paragraphs are hard for them—as one put it, “In neurodivergence, words are like musical chairs.” They advocated for plain language, shorter sentences, and bulleted lists. One also wondered what the patent images mean (“engineers might know, but we don’t”).
- The two blind participants were disappointed there were no audio descriptions, and the participant with low vision wished the labels had higher contrast.
- The autistic participant with high support needs did not read any labels and, with the help of the SI staff member, expressed that the vocabulary was too complex.
- **Lack of tactile objects:** Blind and low vision participants were disappointed at the lack of tactile objects (“Are the objects behind glass?” “Why can’t you touch the helmet?”).
- **Unappealing videos:** Two neurodivergent participants did not like the videos’ fast speed and flashing images/colors, which felt “like strobing;” one said this might be triggering for veterans and that the viewing area for the Competitive Edge and Health and Safety videos was too “cramped.” Two others said they generally do not like watching museum videos.
- **Truncated stories:** A few said the exhibition’s stories seemed “very truncated.” For instance, one said the performance-enhancing drug content “left a lot out.” Similarly, a few hoped for side-by-side comparisons to help them understand how inventions have changed over time (e.g., comparing an older wheelchair to the Quickie wheelchair) and/or wanted to know the science behind them (e.g., the science of shatter-proof glass).
- **How End Zone relates to other sections:** Two said there was “no continuity” between the End Zone and the rest of the exhibition. One said it felt “less visually stimulating,” and they wondered why it does not revisit questions posed in previous sections. Another participant with low vision noticed the change from carpet to hard flooring in this space, making them wonder if they had exited the exhibition.
- **Shattered backboard:** Two were confused by the photograph of the shattered backboard, mostly because they were unfamiliar with this issue; one wondered if the photo was real.
- **Perceived focus on competition:** The neurodiverse high school student felt the exhibition put too much emphasis on competition versus fun, saying they do not like competition because it provokes their anxiety and repeatedly pointing to phrases they felt were too competition-oriented (e.g., “All athletes strive for peak fitness”).

## Use of Interactive Activities

We asked participants with disabilities to try and use at least one of the interactives. Most participants tried at least 1-2 of the six activities, choosing to spend more time with those they found engaging and/or were able to easily access. In general, participants thought they were **intriguing, but also found them hard to use for reasons often (but not exclusively) related to their disabilities.**

On the next few pages, we detail participants' reactions to each interactive activity. They are listed in order of frequency of use.



A neurodiverse participant's drawing at the "Drawing Board" interactive

See Appendix G for a description of each interactive activity.

### What Will You Invent?

Most viewed the ideas in the case, though only one (the autistic participant with high support needs) also drew; another, who is also autistic and has ADHD, had too much “choice paralysis” to draw. The participant with low vision said she would have drawn a response if there was a darker marker; the provided pencils did not provide enough contrast with the provided paper for her to see.



Several pointed to other visitors' responses in the case that they found amusing or intriguing, including the folding laundry robot, the toaster, the card about inventing a better education system, and the one about removing microplastics from human bodies. At the facilitator's prompting, two participants brainstormed inventions that would help them and other neurodivergent people, including a lighting system to help boxers know whether to punch left or right and a tool to help teachers work with neurodivergent teens.

### Swimsuit Designer

Most participants tried this interactive and had a negative or mixed reaction to it.

They primarily complained about the 30-second time limit, which they felt was not enough time to digest the challenge before needing to choose a swimsuit shape, material, and seam type, especially for neurodivergent participants who suffer from choice paralysis, overwhelm, dyslexia, and cognitive delays.



One liked the overall concept of the interactive—“it's very creative, makes you think how your choices impact your performance”—but also wished there were more accessibility accommodations (e.g., audio descriptions).

### Fair or Foul

About half of participants used this interactive and had mixed reactions to it.

Two, one with MS and one neurodivergent, played all the way through, carefully reading each question and thinking about their answer. They liked the “Socratic” style of the questions and how they make you think about bigger societal issues. Another participant with MS, however, audibly sighed at the first question (about transgender athletes); she said it reminded her of heated family arguments at holidays and that she was hesitant about touching the buttons, being



immunocompromised. We also observed the participant with high support needs use this interactive; he said the vocabulary was “difficult,” and he chose responses quickly and seemingly randomly.

### Drawing Board

About half of participants tried this interactive, and again, they had mixed reactions.

The two blind participants were intrigued by the idea but were disappointed at the lack of built-in audio descriptions, relying instead on an SI staff member. Another, with MS, spun through a few prompts but left before drawing, commenting, “I bet kids like this one.” In contrast, the neurodiverse high schooler spent several minutes at this interactive; they liked that they could do it alone and that it built off their prior design knowledge. They repeatedly selected the “more time” option and referenced their experience learning to use CAD software.

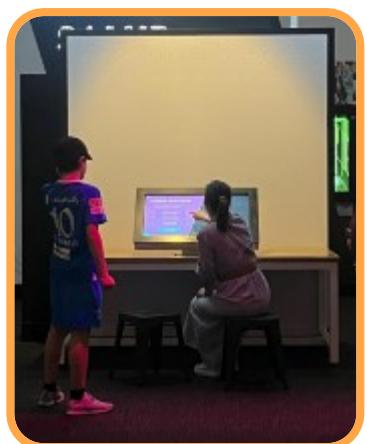


### Be a Game Changer / Your Inventive Portrait

Only one (who is above age 55) used this interactive from start to finish, calling it “very intriguing,” and said, “I’m surprised you do not have two of these.”

### Safety Remix

Only one used Safety Remix (the same participant mentioned above) and they spent several minutes. They seemed to enjoy it overall, but were somewhat frustrated that the game did not show visitors what would be more ideal equipment choices after providing feedback on visitors’ choices (“It’s not praising me for making good choices.”)



## Representation of People Living with Disabilities

After visiting *Change Your Game / Cambia tu juego*, we asked participants what they thought about the representation of people with disabilities throughout the exhibition, including if the stories felt widely representative. Two themes rose to the top.

- **Disappointing lack of universal design:** Several reiterated that while they felt inspired by how the exhibition “offers a challenge to make things better,” they were ultimately disappointed in its “lack of universal design” and accessibility. Blind and low vision participants reiterated that they felt this profusely due to the absence of audio description, voiceover, and narrations, and a group of neurodiverse participants said they had hoped for more tactile components because it would allow visitors with and without disabilities access the exhibition’s stories. One blind visitor said better universal design “would go a long way to highlight the representation of disabilities in a greater way and not just sprinkling [disability] stories here and there throughout. But this is a good start.”
- **Noticeable focus on “standard” disabilities:** A few said the disability stories in *Change Your Game / Cambia tu juego* relate to “standard” physical disabilities, particularly mobility differences rather than invisible disabilities such as neurodiversity, and do not feel widely representative. They had this impression largely because of the prominence of inventions such as the Quickie wheelchair and various prosthetic limbs in the exhibition.

“

I’m physically able, so it was **hard to relate to the stories of physical disabilities.**

—Neurodiverse participant

”

## Relating to Stories about Invention and Innovation

We also asked if participants felt they could relate (or not relate) to the stories about people being inventive and innovative in *Change Your Game / Cambia tu juego*.

- **Could relate:** Most related to one or more stories in the exhibition, often because they found professional connections and/or because they are athletic or sports fans. One, for instance, was drawn to Arielle Rausin's wheelchair racing glove and talked about how she would design similar objects using CAD software. A few were drawn to large photographs of sports they watch (e.g., football, basketball, skiing). One talked about how she is part of a blind ski team and how she loves to cheer on Olympic and Paralympic swimmers. Another talked about her experience working as a sports video producer for over two decades.
- **Could relate, but only to certain aspects:** Two, both of whom said they are "not a sports person," named ways they related to the stories but also aspects they struggled to relate to. One, for instance, reiterated how competition is a turnoff for her, so she did not relate to stories with a competitive focus. The other alluded to privilege and explained that she had trouble relating to the inventors and innovators featured because she had the impression that they had many resources at their disposal to quickly bring their ideas to life, which is not something everyday inventive people have.

“

There was no real context as to how and why these people have access to the funding and resources to make these inventions come to life. That was **kind of jarring** to show how they could just 'do it.'

—Participant with MS

”

## Changes to Thoughts about Invention and Innovation

Finally, we asked participants whether they see an overlap between themselves and a person who is inventive or innovative after visiting *Change Your Game / Cambia tu juego*. Many of their responses naturally touched on perceived skills or qualities a person has when they are inventive or innovative and again fell along a continuum.

- **Still see strong overlap:** Just over half, who previously saw strong overlap between themselves and an inventive person, said the exhibition reinforced this perception. Most cited their experience as a person living with a disability as inherently connected to the need to innovate solutions to everyday problems ("it's human nature to problem solve.") They mentioned many ways they innovate in their everyday lives, like using their canes and carabiner clips to help them carry groceries, modifying yoga equipment to suit their needs, and innovating in the kitchen. A few even brainstormed new innovations, such as a lighting system that would help boxers with ADHD know whether to punch left or right.
- **See themselves as more inventive and innovative:** Two considered themselves more inventive and innovative than they did before visiting the exhibition. One realized how much more she has challenged herself after losing her vision, realizing that she has had to make many modifications that are "right for her," just like Mike Schultz had to invent a prosthetic that was "right for him." The other, who is autistic with high support needs, could now name ways he is inventive—"I'm articulate, creative, artistic."
- **No change, still don't see strong overlap:** Two were still hesitant to claim overlap between themselves and an inventive person, focusing still on their lack of technological knowledge and whether being "inventive" is the same thing as being "creative." One, for instance, shared that she considers the way she edits videos as part of her job to be creative, but not necessarily inventive, since she did not "invent" the editing software.

“

I'm more of an inventor. **For me, it's looking at what aspect of a person that's dyslexic can be invented for. And neurodivergence in general...** When I go back to boxing, I'll think about what needs to change. What would make it more accessible? They call out right, I hit left. What would need to happen to make sure I understand what side of my body I'm supposed to be contorting?

—Neurodiverse participant

”

## 06 Findings: Latinx Visitors



Kera Collective conducted 6 cued interviews with self-identifying Latinx visitors to NMAH during the museum's bilingual *Fenómeno Latino* festival on June 22, 2024. Interviews were conducted outside of the *Change Your Game / Cambia tu juego* exhibition, in either English or Spanish, depending on the participant's preference.

## Visitor Characteristics

All participants are adults who spoke English and Spanish and were visiting the museum that day either alone or in a social group. Additionally:

- **Age:** Participants ranged in age from 22-55 years old.
- **Gender Identity:** Four identify as women and two identify as men.
- **Residence:** All reside in the United States, and half in the greater DMV area.
- **NMAH and Spark!Lab Visitation:** Most were visiting the Smithsonian's National Museum of American History for the first time. None had visited *Spark!Lab*, but four indicated that they planned to do so during their museum visit or on a later visit (*Spark!Lab* was already closed for the day during interviews with three participants).

### WHO CAN BE A GAME CHANGER? ANYONE.

Everywhere, every day, people of all ages, experiences, and abilities invent new things, both simple and sophisticated, that change how we live our lives. We call these people Game Changers.

### WHO IS A GAME CHANGER? YOU ARE.

This exhibition will help you unlock your inventive potential. Be inspired by inventors who have made sports more competitive, safer, fairer, and more fun for everyone.

### HOW WILL YOU CHANGE YOUR GAME?

You too are a game-changing inventor. What problems—in sports or in your everyday life—do you want to solve?

### ¿QUIÉN PUEDE CAMBIAR EL JUEGO? CUALQUIER PERSONA.

Cada día, en todas partes, personas de todas las edades, experiencias y capacidades inventan cosas nuevas, ya sea sencillas o sofisticadas, que cambian nuestras vidas. A eso lo llamamos "cambiar el juego".

### ¿PUEDES TÚ CAMBIAR EL JUEGO? SÍ PUEDES.

Esta exposición te ayudará a desatar tu potencial inventivo. Podrás inspirarte en inventores que han cambiado los deportes para hacerlos más competitivos, seguros, justos y divertidos para todos.

### ¿DE QUÉ MODO CAMBIARÁS TU JUEGO?

Tú también eres un inventor que puede cambiar el juego. ¿Qué problemas (en los deportes o la vida diaria) quieres resolver? Incluso los cambios más pequeños pueden tener un gran impacto.

The bilingual (English Spanish) introduction label of *Change Your Game / Cambia tu juego*

## Overall Reactions to the Exhibition

Overall, Latinx visitors enjoyed the **design, aesthetic, and tone** of *Change Your Game / Cambia tu juego*. One enthusiastic participant summed up the experience directly: “**It feels like a playground.**”

## Use of Interactive Activities

Like other audiences, Latinx visitors were asked which interactive activities they used and to talk about their experiences. See Appendix G for a description of each interactive activity.

In their response, participants mostly referred to the *Fair or Foul* and *Be a Game Changer* interactives, explaining that during their visits, the other stations—*Swimsuit Designer*, *Safety Remix*, *Drawing Board*, and *What Will You Invent?*—were occupied by children for prolonged periods of time, so they did not use them. However, older participants said they watched some of the youth play or chatted with their children about the questions, prompts, or activities as they played. Notably, some said the stations were not obviously interactive to them as they walked through the exhibition, but that they “figured it out” as they moved around.

A few also shared their reactions to specific interactives:

- ***Fair or Foul*** generated lots of interest and reflection. One adult was interested to see how their son responded to the scenarios and questions, such as questions about transgender athletes at the Olympics and a woman with breast cancer who could swim faster after having a mastectomy. Another added that they liked that the prompts focused on “...situations we hadn’t thought about, like turf or e-bikes on trails. It felt more complex than ‘Is this good or bad?’”
- ***Be a Game Changer*** was a favorite among those who tried it because it asked participants to reflect on themselves and think about their own potential. One said, “I like that it made me think about who I am,” while another added, “Le puso a pensar: Nunca he hecho esto, pero lo podría hacer.” [It makes you think: “I’ve never done this before, but I could do it.] However, some disliked that the questions seemed repetitive and that once they received their “inventive portrait” the activity stopped short of offering suggested pathways or actions they could take to put the information into action; as one put it, “lo dejé antes de terminar porque me sentía frustrada [riendose]” [I quit before finishing because I felt frustrated].
- ***Swimsuit Designer*** was used by just a few participants because of crowding. Those that did use the interactive enthusiastically noted that they enjoyed the activity and “kept competing with each other.”
- A few enjoyed ***Drawing Board***, but they were left wondering about what to do with the information and the intended takeaway of the activity.

## Reactions to Bilingual Nature of the Exhibition

Overall, Latinx visitors all reported feeling included, at ease, and more engaged because of language parity in *Change Your Game / Cambia tu juego*. Three main themes emerged when they discussed how the exhibition is bilingual English and Spanish.

- **Overall appreciation:** Nearly all participants expressed appreciation for the bilingual exhibition design because it creates the opportunity for English speakers to be exposed to and learn Spanish, and for language exchange in general.
- **Accuracy of translations:** Nearly all noted the accuracy of the exhibition's Spanish translations as a significant indicator of the museum's commitment to linguistic inclusion and were very impressed with the overall quality of the translations. As one put it, the "translations are on point!" Participants described past experiences where vernacular, idioms, and technical language were inaccurately translated, poorly edited, or hard to read due to font choices (like italics) or placement (like footnotes or peripheral areas of an exhibit), which they said makes Spanish-speakers feel overlooked and like they not a priority.
- **Desire to return:** Two said they would return because they wanted to spend more time in the exhibition—"Queremos volver; nos pusimos a conversar!" [We want to come back; this got us talking]. Another wanted to bring her parents, who she thought would enjoy and benefit from the bilingual exhibition.

“

I grew up speaking Spanish, but mostly speak English now.

It was the **first time I've seen Spanish integrated and the same size rather than in a smaller print or off to the side.**

The translations were better than I've previously seen in museums. My parents came to visit, and this would have been great for them, it's usually more difficult for them to follow along.

—Latinx visitor, interviewed in English

”

## Relating to Stories about Invention and Innovation

Latinx visitors were also asked how, if at all, they relate to the stories of people being inventive or innovative in *Change Your Game / Cambia tu juego*. While half of participants said that they did not find the content personally relatable, their responses suggested greater connectivity than reported.

- **Heritage:** Two participants identified direct connections between the exhibition and the way they or their family experience the world. One, for instance, reflected that “all these advances in this era in my country [Central America] would have been magnificent. There are no limits! One can be accommodated. There are options.”
- **Professional connections:** Two found connections to their occupations in biotechnology, scientific research, and early childhood education. On the topic of innovation in daily life, one explained, “I’m a researcher, so if I don’t know how to do it, I have to figure it out. And even though it’s the computer, I have to be inventive with the [software] tools I use.” Another noted a connection because of “*the work that I do [early childhood education] and my daily life. You have to be very creative.*”
- **Sports:** As one put it, “We watch sports and athletes achieving their goals. We enjoy watching the new technology develop. We were talking about Replay [sports officiating technology], things that we take for granted but were innovations.”

## General Thoughts on Invention and Innovation

Like other audiences, Latinx visitors also responded to a few questions about invention and innovation, including “In general, what comes to your mind when you think of invention and innovation?”, “What do you think are skills or qualities a person has when they are being inventive or innovative?”, and if they can think of any ways they are inventive or innovative in their daily lives.

This bilingual infographic, generated by Kera Collective after the interviews, illustrates participants' reported perception of innovation and invention and what characteristics they associate with being innovative. The words in the cloud are the terms participants used to describe what innovation and invention mean and the characteristics of someone who is innovative or inventive.



Nearly all participants agreed that the characteristics of an innovator include curiosity. The second most common descriptor was a variation on “brave,” such as “unafraid to fail,” or “without fear,” and “risk-taker.” Other notable descriptions included being a “nonconformist” and “out-of-the-box” thinker.

Notably, participants drew a distinction between thinking in innovative ways and taking action to bring about innovation or invention. Innovation and invention require curiosity and the courage to act on that curiosity without fear of failure or the limitations of conformity. As one put it, “Innovador es tener el impulso, invento es hacerlo.” [To be an innovator is to have the impulse, invent is to make it.]

## Changes to Thoughts about Invention and Innovation

Finally, Latinx visitors were asked how, if at all, the exhibition made them think differently about what it means to be inventive or innovative differently than they did before visiting.

- **No change:** Most participants did not feel like their own perspective on invention and innovation had changed but appreciated learning about different perspectives and stories portrayed in the exhibition. For example, one said they did not relate to any of the stories, but because they play soccer, it made them think about how to improve the sport for the first time. They later added that the exhibition in general, “made me very curious about how people that use wheelchairs, all that they do to be able to do a sport.” Another observed that several stories were about the Paralympic or Paralympians and said they “cannot relate to that, specifically...but I like the way [the stories] were told and seeing the technology behind that.”
- **Opened minds:** Two discussed how the exhibition pushed them to think about how invention and innovation relate to social justice and about the value of keeping an open mind. One said “I think the stuff around the Fair or Foul game made me think about that in a different way...thinking about [how] gender testing has to adapt for people who are transitioning. I hadn’t thought about that in an inventive context, just in a social justice way.”

“

I think it [this exhibition] **pushes you to keep your mind open**. Sometimes we think negatively, like ‘something cannot be done,’ but it is good for giving inspiration and encouraging a more positive kind of thinking [about how it can be done].”

—Latinx visitor, interviewed in English

”

## 07 Appendix



## Appendix A: Walk-in Visitor Interview Guide, CONTROL

### Recruitment Script

Hi. We are speaking with visitors about some topics for the Lemelson Center for the Study of Invention and Innovation here at the museum. If you have a few minutes, I'd like to ask you some questions.

- Agree [continue]
- Decline [skip to refusal log]

### Screener

And have you visited the *Change Your Game* exhibition?

- Yes, I have visited *Change Your Game* [skip to ineligibility script]
- No, I have not visited *Change Your Game* [continue with interview]

### Ineligibility Script

We were actually looking to speak with people who had not visited the exhibition yet, but I appreciate your willingness to participate and hope you have a great rest of your visit!

### Interview Questions

1. In general, what comes to mind when you think about **invention and innovation**?
2. How **interested are you in invention and innovation**? And it is okay if you are not so interested. [\[after response\]](#) Why do you say that, can you tell me more?
3. What do you think are **skills or qualities a person has when they are being inventive or innovative**?
4. Can you think of any ways **you are inventive or innovative** in your own life? Can you tell me more about that?
5. Is there **anything else** you would like to share with the museum about invention and innovation?

[\[hand recruited adult iPad for demographic questions\]](#)

Thanks! If you have some time, I encourage you to visit the *Change Your Game* exhibition [\[point visitors in the right direction\]](#). It features stories and objects related to diverse inventors, innovators, athletes, and technologies that have changed how sports are played.

## Appendix B: Walk-in Visitor Interview Guide, TREATMENT

## Recruitment

Hi. We are speaking with visitors about their experience in the exhibition that you just visited, *Change Your Game*. If you have a few minutes, I'd like to ask you a few questions about your experience.

- Agree [continue]
- Decline [skip to refusal log]

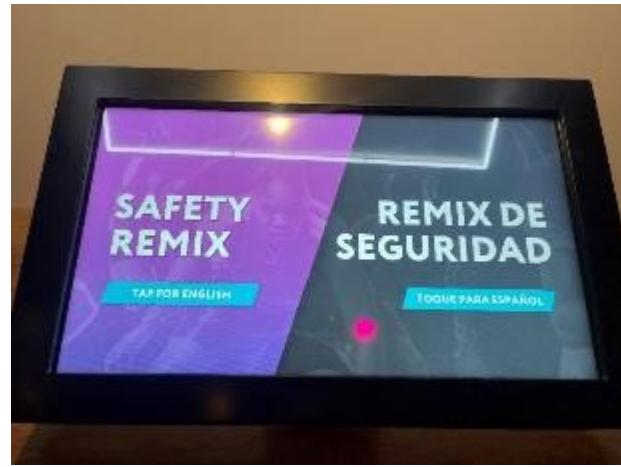
## Interview Questions

1. Can you tell me about something you found **interesting or enjoyable** about the exhibition? What about that was interesting or enjoyable for you?
2. Is there anything you found **confusing or that you did not like** about this exhibition? Can you tell me more about that?
3. There were several **interactive activities** in the exhibition. I have some photos here [\[show images of the 5 digital interactives and write-in activity\]](#). Can you tell me which one of these you used
  - a. [\[For those used\]](#): Can you tell me what you liked or didn't like about each of those interactive activities you used? [\[Make sure the participant comments in some way on all the ones used, but they do not need to say both the likes and dislikes about each one\]](#)
  - b. [\[For those not used\]](#): You mentioned not using these activities. Can you tell me why you decided not to use them?
4. The exhibition is located in a part of the museum dedicated to invention and innovation. In general, what comes to mind when you think about **invention and innovation**?
5. How **interested are you in invention and innovation**? And it is okay if you are not so interested. [\[after response\]](#) Why do you say that, can you tell me more?
6. What do you think are **skills or qualities a person has when they are being inventive or innovative?**
7. Can you think of any ways **you are inventive or innovative** in your own life? Can you tell me more about that?
8. This exhibition features lots of **stories of people being inventive and innovative**. In what ways did you **relate (or not relate) to these stories**? Can you tell me more?
9. Are there any parts of the exhibition that **made you think about what it means to be inventive or innovative differently than you had before?** Can you tell me more or give me an example?
10. Is there **anything else** you would like to share with the museum about your experience in this exhibition?
11. And have you visited or do you plan to visit Spark!Lab today [\[gesture\]](#)?

- Yes, I visited Spark!Lab today
- Yes, I visited Spark!Lab today + I plan to go back
- No, I have NOT visited yet, but I plan to visit
- No, I have NOT visited yet, nor do I plan to



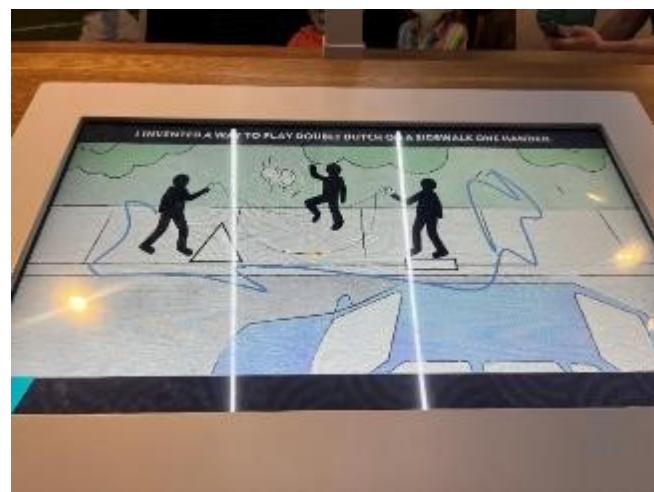
1. Swimsuit Designer



2. Safety Remix



3. Fair or Foul



4. Drawing Board



5. What Will You Invent?



6. Be a Game Changer (Your Inventive Portrait)



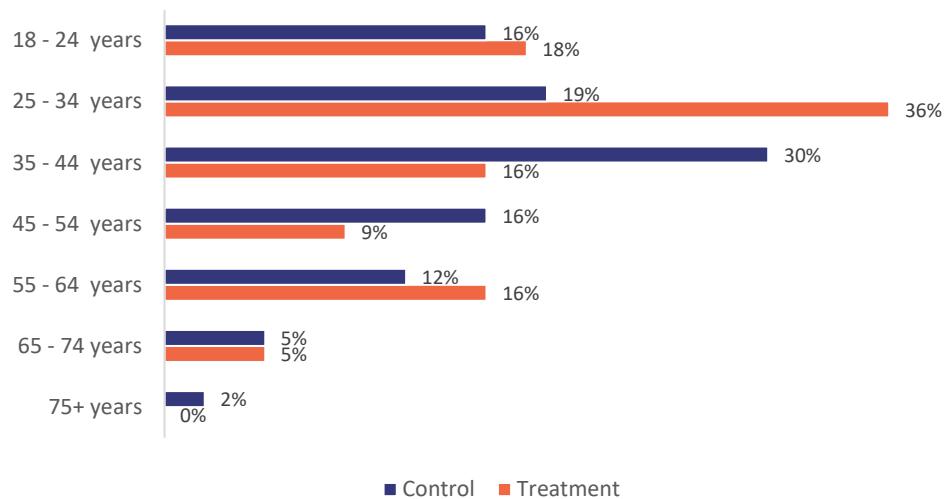
## Appendix C: Visitor Characteristics, Walk-in Visitor Interviews, Control and Treatment Sample Comparison

The following pages highlight visitor characteristics from both the **control** and **treatment** samples.

### Age

Visitors ranged in age from 18 to 77. The median age for the **control** sample was 40 years, and for the **treatment** sample, 33 years.<sup>6</sup>

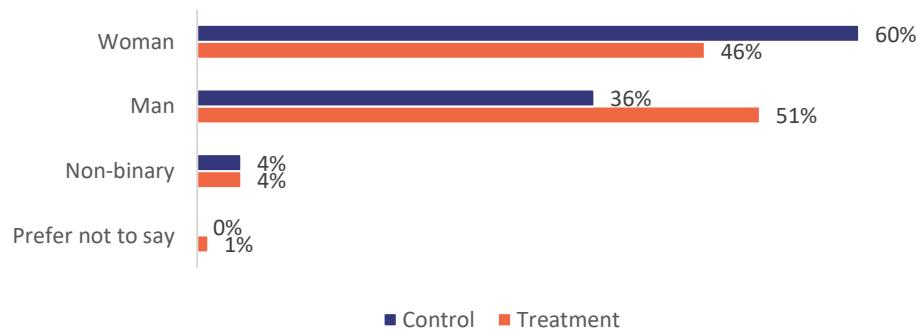
Age (control n = 43, treatment n = 44)



### Gender Identity

Over half of the visitors interviewed for the **control** sample identified as women (60%) and nearly two-thirds identified as men (36%). Almost half of the **treatment** sample identified as women (46%) and over half identified as men (51%). In both samples, a few identified as non-binary.

Gender Identity (control n = 51, treatment n = 55)



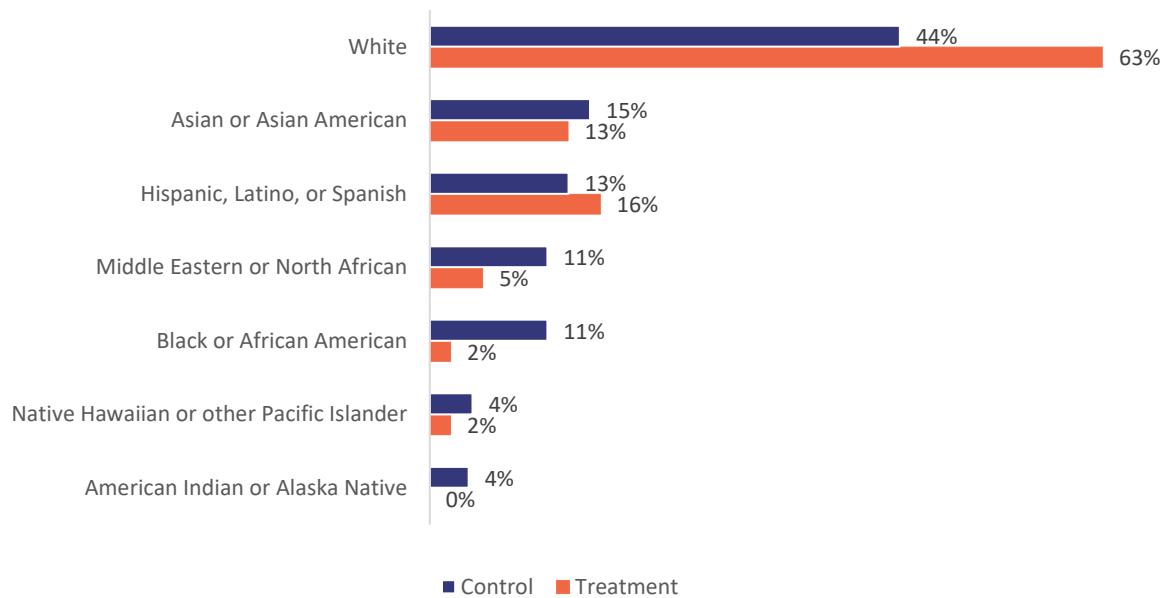
<sup>6</sup> Not all visitors provided their age.

## Race or Ethnicity

Most visitors interviewed identified as White (**control**: 44%, **treatment**: 63%). A smaller proportion of visitors identified as Asian or Asian American (**control**: 15%, **treatment**: 16%), Hispanic, Latino, or Spanish (**control**: 13%, **treatment**: 16%), Middle Eastern or North African (**control**: 11%, **treatment**: 5%), or Black or African American (**control**: 11%, **treatment**: 2%).

Only a few identified as Native Hawaiian or Pacific Islander (**control**: 4%, **treatment**: 2%) or American Indian or Alaska Native (**control**: 4%, **treatment**: 0%).<sup>7</sup>

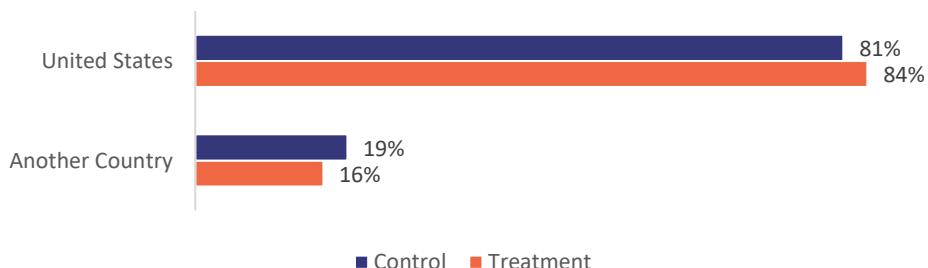
Race or Ethnicity (control = 49, treatment = 54)



## Residence

Over three-quarters (**control**: 81%, **treatment**: 84%) of visitors live in the United States. Of these, a few were local to DC, Maryland, or Virginia. International visitors were from Argentina, Brazil, Canada, Germany, Scotland, the Netherlands, and the United Kingdom.

Country (control = 37, treatment = 44)

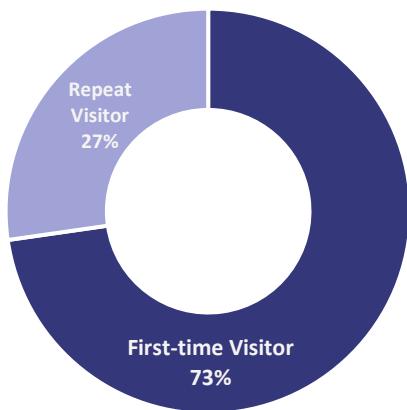


<sup>7</sup> Visitors were able to self-identify as multiple races and/or ethnicities.

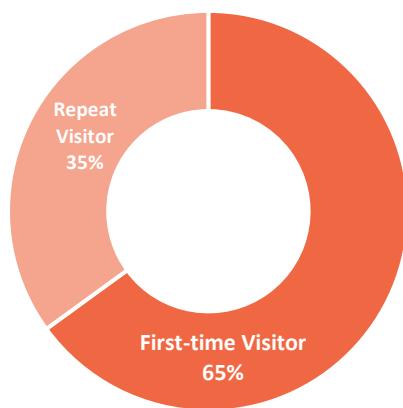
## NMAH Visitation

Visitors were asked whether it was their first time visiting NMAH or if they had visited previously. In both samples, nearly three-quarters (**control**: 73%, **treatment**: 65%) were first-time visitors.

Control (n = 51)



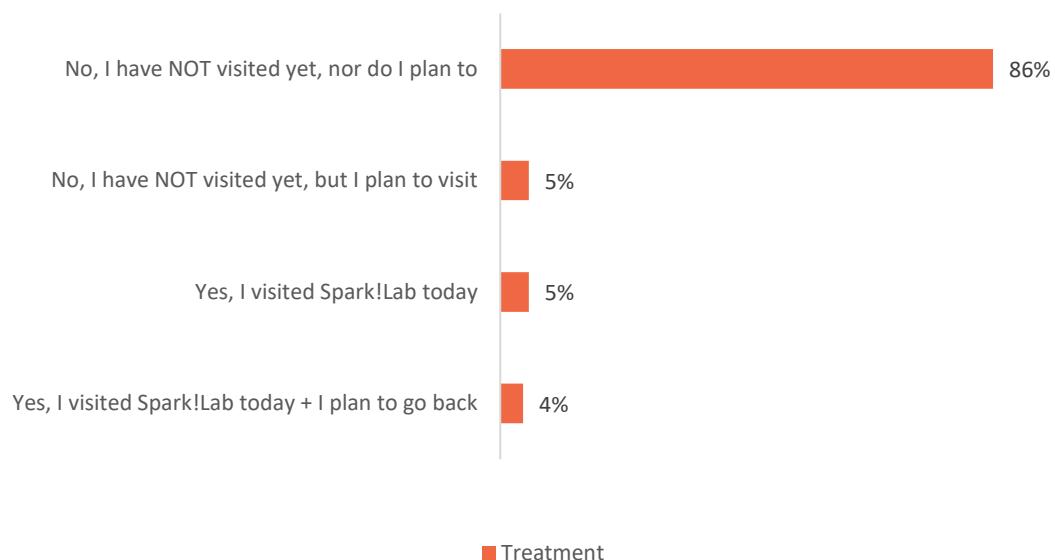
Treatment (n = 55)



## Spark!Lab Visitation

**Treatment visitors** were also asked whether they planned to visit or had already visited *Spark!Lab*, the Lemelson Center's invention education studio, located adjacent to the *Change Your Game /Cambia tu juego gallery*. Most did not visit *Spark!Lab* or have an interest in visiting (86%), and some had not visited but planned to visit (5%). A few said they had visited *Spark!Lab* during their visit (5%), and two planned to visit again before leaving the museum (4%).

Visiting Spark!Lab (n = 55)



## Appendix D: Youth Audiences Group Interview Script and Worksheet

### Introduction

Hi! Thanks again for coming to the museum today. The museum has just opened a new bilingual exhibition called *Change Your Game / Cambia tu juego*. Today, we want to invite you to visit this exhibition and share your thoughts on it with us. At the end, each of you will get a \$50 Visa gift card as a thank you.

The exhibition is about invention, innovation, and sports.

1. In general, what comes to mind when you think about **invention and innovation**?
2. How **interested are you in invention and innovation**? And it is okay if you are not so interested. [\[after response\]](#) Why do you say that, can you tell me more?

This area here is the introduction, and then there are five other sections:

1. **Competitive Edge**, with the pink signs, has stories of inventors and innovators who improved technologies, techniques, and training methods to boost athletic performance and asks “When have YOU wanted to gain an advantage?”.
2. **Health and Safety**, with the purple signs, features athletes and inventors who create technologies that maximize fitness and reduce risk in sports and everyday life and asks “What would YOU invent to play sports safely?”
3. **Fairness and Accuracy**, with the blue signs, is about inventing new technologies to ensure fair and accurate play and asks “What could YOU invent to keep time, keep score, and ensure fair play?”
4. **Fun for Everyone**, in the back with the blue-green signs, asks “How could you apply your innate playfulness and inventiveness so a broader range of people can participate in your favorite activity?”
5. **The End Zone**, over here with the glowy lights and large video, lets you explore how you are a game changer.

In a moment, I'll invite you to visit the exhibition on your own and look at and try out anything you'd like. Spend as much or as little time as you want with things that interest you. Please try out at least one of the interactive activities; there are 5 digital interactives throughout the exhibition and one write-in activity, over here [\[gesture to End Zone\]](#).

Also, I have a few questions for you to think about while you visit [\[handout worksheet, clipboards, pencils and explain questions\]](#). Take some notes so you can remember things you want to tell me about after your visit when we talk together.

Any questions?

Okay, you are now free to visit the exhibition. Let's meet back here in 20 minutes.

### Group Interview Questions

1. Could a few people tell me about something you found **interesting or enjoyable** about the exhibition? What about that was interesting or enjoyable for you?

[Throughout, get consensus if other people agree with the thing that was said or if they have different ideas to add. For example, show of hands.]

2. And, same thing, could a few people share if there was anything you found **confusing or that you did not like** about this exhibition? Can you tell me more about that?
3. I asked you all to try and use some of the interactive activities.
  - a. Did anyone use the **Swimsuit Designer** activity? Or watch others use it? **[if yes]** What did you like or not like about it?

[For all, if none used, probe about why not. Can you tell me why you decided not to use them?]
  - b. How about the **Safety Remix** activity, the one with the skateboarding and the snowball fight? **[if yes]** What did you like or not like about it?
  - c. And the **Fair or Foul activity** in the back, with the questions to answer about if a situation was fair or foul? **[if yes]** What did you like or not like about it?
  - d. What about the **Drawing Board** activity, where you get to draw your own invention? **[if yes]** What did you like or not like about it?
  - e. And the **What Will You Invent?** Write in activity? The one with the cards you get to write on? **[if yes]** What did you like or not like about it?
  - f. Last one—did anyone use (or watch people use) the **Be a Game Changer / Your Inventive Portrait** activity over there **[gesture to end zone]**? The one with the words you drag to create your inventive portrait. **[if yes]** What did you like or not like about it?
4. What do you think are **skills or qualities a person has when they are being inventive or innovative?**
5. Can you think of any ways **you are inventive or innovative** in your own life? Can you tell me more about that?

6. This exhibition features lots of **stories of people being inventive and innovative**. In what ways did you **relate (or not relate) to these stories**? Can you tell me more?
7. Are there any parts of the exhibition that **made you think about what it means to be inventive or innovative *differently than you had before***? Can you tell me more or give me an example?
8. Is there **anything else** you would like to share with the museum about your experience in this exhibition?

Great! That was my last question about the exhibition.

Before I let you go, I have a few questions for you to answer on your own. Please fill out this sheet and hand it back to me when you are done. Thanks!

[hand out Background Questions sheet to and collect once complete]

## Background Questions

Please complete these questions on your own. Hand this sheet to Hannah or Cathy when you are done.

1. **What is your age:** \_\_\_\_\_
2. **How do you identify yourself?**  
 Man  
 Woman  
 Non-binary  
 Prefer to self-describe: \_\_\_\_\_  
 Prefer not to say
3. **With which US Census racial or ethnic group(s) do you identify with? Select all that apply.**  
 American Indian or Alaska Native  
 Asian or Asian American  
 Black or African American  
 Hispanic, Latino, or Spanish  
 Middle Eastern or North African  
 Native Hawaiian or Pacific Islander  
 White  
 Another racial or ethnic group: \_\_\_\_\_  
 Prefer not to say
4. **Do you live in the United States?**  
 Yes (write your zip code below)  
 No (write your country of residence below)  
Zip code or country: \_\_\_\_\_
5. **Is today your first time visiting the Smithsonian National Museum of American History?**  
 Yes, it's my first time visiting  
 No, I've visited this museum before

Thank you!

## ***Change Your Game / Cambia tu juego Worksheet***

Please fill out this worksheet as you go through the exhibition. Rough notes are okay!

<b>Things I liked (and why):</b>	<b>Things I didn't like as much (and why):</b>
<b>Questions I have/anything that seemed confusing</b>	<b>Something (an idea, a story, anything) that surprised me:</b>
<b>Which interactive activities did you try?</b> <b>Circle them.</b> <p>Swimsuit Designer  Safety Remix  Fair or Foul  Drawing Board  What Will You Invent? (write-in)  Be a Game Changer / Your Inventive Portrait</p>	<b>What did you think about them?</b>

## Appendix E: Visitor with Disabilities Contextual Inquiry Session Script

Please note that this script includes visual descriptions from the Smithsonian that were used only when working with blind and low vision visitors; they are highlighted in gray.

### Overview

We'd like to begin by giving you an overview of the Change Your Game exhibition and where you are standing right now.

In Change Your Game, there are six video programs in the exhibit that combine imagery with text. Each program has background music and environmental noises, but none has audio narration. You will hear this music and environmental noises, as well as the sounds of other visitors as we move throughout the space.

Immediately to your left is the twelve-foot-wide entrance to the exhibit. At the far-left side of the entrance is a 7- by 8-foot video screen set into a wall 14 feet high and angled on the left side. It shows ever changing images of athletes, inventors, and everyday people from the past and present. A series of quotes, questions, and text highlight how game changers invent to win, make sports safer, ensure fair play, and make games more fun and inclusive. The exhibition's exit is on the other side of this wall.

The pathway through the exhibit is roughly circular, running in a counterclockwise direction through a space that is roughly square.

You are now just to the right of the entrance to the exhibit. The wall here and to your right is eight feet high and black with subtle, overlapping concentric broken-circle patterns along the top and bottom. Two parallel bands of color about two feet apart run midway along the wall.

Above the top line, is the title of the exhibit, "Change Your Game." The words "Change" and "Game" are in bright white block letters. The letters in the word "Your" are double lined—evocative of a glowing neon sign—and of a reflective material that changes colors as you move past it. The title in Spanish is on the wall below this.

In between the lines is the introductory label for the exhibit which, like text throughout the exhibit, is in both English and Spanish. It asks three questions in white text against the black wall:

First question: "Who can be a game changer? Anyone.

Everywhere, every day, people of all ages, experiences, and abilities invent new things, both simple and sophisticated, that change how we live our lives. We call these people game changers."

Second question: "Who is a game changer? You are.

The exhibition will help you unlock your inventive potential. Be inspired by inventors who have made sports more competitive, safer, fairer, and more fun for everyone.”

Third question: “How will you change your game?

You too are a game-changing inventor. What problems—in sports or in your everyday life—do you want to solve? Even small changes can have huge impacts.”

1. **Based on the introduction label, is there anything about the exhibition that is piquing your interest so far? Anything you are excited or curious about?**

### Topical Sections Overview

The Change Your Game exhibition has four topical sections and a final area that encourages all of us to think of ourselves as inventors—as game changers. In a moment, I’ll tell you the focus of each section and then you’ll get to choose where you’d like to start.

Once you feel done with a section you’ll get to choose where we go next. We have until [time], so about 90 minutes. Do not feel pressured to “see it all.” We’ll get through as much of the exhibition as we can based on where you would like to go and the pace that feels right for you.

There are [2-3] of you here today. We realize you might not want to see the same thing at the same time. If you’re interested in starting at different sections we can split up. One of you can go with Avi and Joanna and the other can go with Cathy. Or, we can stay together if you’d like to start in the same section.

Any questions so far?

The four topical sections in Change Your Game highlight everyday inventors and explore various innovations in technologies, techniques, or training developed to boost athletic performance, to reduce injury and promote health, to ensure fair play and accuracy, and to make sports more accessible or just easier and more fun. Sports may or may not be your passion, but when you think about it, you look for and find ways to improve things all the time. This way of thinking and doing is inventive!

Each of the four topical sections is a semi-enclosed room-like space with content on the walls and a freestanding interactive station in the center. A glowing white outline of a rectangle hangs from the ceiling above each station. A flat structure centered on one wall in each section reaches 14 feet to the ceiling of the gallery and is 9 feet wide; it resembles a trapezoid or left-leaning rectangle. These structures are black and carry section titles in large multi-lined letters that glow like the tubes of neon signs and pose a section-defining question or statement. Attached to each structure, a video screen displays changing imagery, text, quotes, and questions.

A large color photograph of athletes in action, nearly ten feet high and six feet wide, marks the beginning of each section’s content. A swooped panel with a small circular display case to the right of the large photograph features each section’s key story. Additional panels and cases of various shapes

and sizes run around the perimeter of the room-like space. These displays have photographs, objects, and text that tell the stories of different inventors and their motivations.

In terms of content, each section has a few common things:

- A “VIP story” of an inventor/innovator
- At least one story featuring an inventor/innovator living with a disability
- An interactive activity station. We would love for you to try out at least one of these interactives, but we do not have to start with them. We can see which one(s) you’re interested in as we move through and I will make sure that by the end we’ve tried out at least one together. All that said, I want to acknowledge that we already know that there are accessibility issues with these interactives. Still, during our walk-through, we’re interested in which ones appeal to you and why you would (or would not) want to use them if the accessibility was better.

Now for a little more about each section so you can choose where you’d like to start:

- The Competitive Edge section, just to the right as you enter the exhibit, asks When have you wanted to gain an advantage? Stories in this section are about athletes, coaches, and inventors who chased the thrill of victory by improving technologies, techniques, and training methods to boost athletic performance.
- The Health & Safety, in the middle of the gallery, asks What would you invent to play sports safely? Stories in this section are about game-changing athletes and inventors who have developed technologies that maximize fitness and reduce risk in sports and in everyday life.
- The Fairness & Accuracy section, in the far, right corner of the gallery, asks What could you invent to keep time, keep score, and ensure fair play? The stories in this section explore issues ranging from improving officiating to preventing cheating.
- The Fun for Everyone section, in the far, left corner of the gallery, asks How could you apply your innate playfulness and inventiveness so a broader range of people can participate in your favorite activity? Stories in this section are about inventions that help make sports more fun and more welcoming and inclusive for more people.
- The concluding section, an open area where the flooring changes from carpet to hardwood, has a video and two activity stations that encourage us to think of ourselves as inventors—as game changers.

**We can start wherever you’d like. Which section should we go to first?**

[Get consensus and guide participant to the section of their choice. Okay to split up, one person with evaluator and one with researchers]

2. *[On the walk over] Why did you choose to visit [section] first?*

## Exhibition Walkthrough, Guided by Participants

Now that we're here at the [x section], I'll tell you more about what it contains and we can spend as much time as you'd like in here.

*[Read the visual description text for the particular section you are in so they have an overview of what is available to them in that section. Then, let them know a little more specifically what is there, asking things like "Would you like me to read this to you?" (for headers and labels) and "Would you like me to describe this to you? (for videos, interactives, objects)"]*

*[Take as much time as they would like in the section. Encourage them to share their reactions to content aloud and ask probing questions throughout]*

**Before we move on to the next section, can you tell me:**

3. What's your favorite/least favorite part of this section? Why is that?
4. What stories, objects, or content in this section do you find to be most/least relatable? Why is that?
5. How and in what ways is this section making you think about invention and innovation? Can you tell me more?

Thanks! **Where should we go next?** *[Remind of remaining sections]*

*[Continue visiting other sections. Repeat process]*

## Wrap Up Questions

1. I know you might not have seen everything in the exhibition, but from what you did see, could you tell me about something you found **interesting or enjoyable** about the exhibition? What about that was interesting or enjoyable for you?
2. Was there anything you found **confusing or that you did not like** about this exhibition? Can you tell me more about that?
3. I had asked you to use at least one of the **interactive activities** and together we tried **[name interactives]**. Can you tell me a little more about what you liked (or did not like) about them?
4. What do you think are **skills or qualities a person has when they are being inventive or innovative?**
5. Can you think of any ways **you are inventive or innovative** in your own life? Can you tell me more about that?
6. This exhibition features lots of **stories of people being inventive and innovative**. In what ways did you **relate (or not relate) to these stories**? Can you tell me more?
7. Are there any parts of the exhibition that **made you think about what it means to be inventive or innovative differently than you had before?** Can you tell me more or give me an example?

[if not already brought up naturally at this point →]

8. Could you tell me more about your thoughts on the **representation of people with disabilities** in the exhibition:
  - a. Did the stories feel widely representative? Why or why not?
  - b. Did you feel stories of people with disabilities were told with care and respect? Why or why not? *[Remind that we want honest feedback]*
  - c. What, if anything, do you think people should know more about related to invention, innovation, and people with disabilities?
9. Is there **anything else** you would like to share with the museum about your experience in this exhibition?

## Appendix F: Latinx Visitors Cued Interview Guide

### Recruitment + Screener

Hi. We are speaking with visitors today about a new exhibition. We want to know what Spanish speakers think about this new exhibition because it uses bilingual interpretation.

Do you happen to speak Spanish?

- Yes [eligible, continue with interview]
- No [not eligible, use ineligibility script]

### Ineligibility Script

We were actually looking to speak with people who speak Spanish, but I appreciate your willingness to participate and hope you have a great rest of your visit!

### Eligible Visitor Instructions

[Clarify if they'd like to continue speaking with you in English or Spanish]

Great! I'd like to invite you to visit the new exhibition, which is called *Change Your Game / Cambia tu juego*, and then come back and find me so I can ask you some questions about your experience. As a thank you for answering my questions, you will receive a \$50 gift card. I will need to collect your email address and your phone number so we can send you the gift card virtually on Monday.

Are you willing to visit the exhibition and then share your feedback with me?

- Yes [continue]
- No [politely end interaction]

Thanks! The Change Your Game / Cambia tu juego exhibition is there [\[gesture\]](#). You can go visit it now. Just make sure you spend **at least 15 minutes** visiting the exhibition—but please feel free to spend longer if you'd like!!

After your visit, come find me and I'll ask you some questions about your experience. I'll be in this area. If you don't see me right away or if I'm with another group, I appreciate your patience.

## Interview Questions

1. Can you tell me about something you found **interesting or enjoyable** about the exhibition?  
What about that was interesting or enjoyable for you?
2. Is there anything you found **confusing or that you did not like** about this exhibition? Can you tell me more about that?
3. There were several **interactive activities** in the exhibition. I have some photos here [\[show images of the 5 digital interactives and write-in activity\]](#). Can you tell me which ones you used?
  - a. [\[For those used\]](#): Can you tell me what you liked or didn't like about each of those interactive activities you used? [\[Make sure the participant comments in some way on all the ones used, but they do not need to say both the likes and dislikes about each one\]](#)
  - b. [\[For those not used\]](#): You mentioned not using these activities. Can you tell me why you decided not to use them?
4. As you saw, this exhibition is bilingual Spanish-English. Can you tell me about how that affected your visit experience? [\[after response\]](#) Can you tell me more / what makes you say that?
5. The museum is committed to any new exhibitions being bilingual. What did you like (or not like) about how they used Spanish language in the exhibition alongside English language? Can you tell me more / what makes you say that?
6. The exhibition is located in a part of the museum dedicated to invention and innovation. In general, what comes to mind when you think about **invention and innovation**?
7. How **interested are you in invention and innovation**? And it is okay if you are not so interested. [\[after response\]](#) Why do you say that, can you tell me more?
8. What do you think are **skills or qualities a person has when they are being inventive or innovative**?
9. Can you think of any ways **you are inventive or innovative** in your own life? Can you tell me more about that?
10. This exhibition features lots of **stories of people being inventive and innovative**. In what ways did you **relate (or not relate) to these stories**? Can you tell me more?
11. Are there any parts of the exhibition that **made you think about what it means to be inventive or innovative differently than you had before**? Can you tell me more or give me an example?
12. Is there **anything else** you would like to share with the museum about your experience in this exhibition?

13. And have you visited or do you plan to visit Spark!Lab today [\[gesture\]](#)?

- a. Yes, I visited Spark!Lab today
- b. Yes, I visited Spark!Lab today + I plan to go back
- c. No, I have NOT visited yet, but I plan to visit
- d. No, I have NOT visited yet, nor do I plan to

### **About You Form**

Thanks! Now, I have a few questions for you to fill out on your own [\[hand About You sheet and pen to the recruited visitor only\]](#). The part in gray at the bottom is for me; you only need to complete questions 1-6.

[\[On returned form, double check that all questions are complete AND that phone number/email address is legible.\]](#)

### **Thank you Gift Contact Info Check**

Thanks! Last thing—I want to double check that I have your phone number/email address right.

[\[Read number or email back to participant and have them confirm it's right\]](#)

Great. We will send a link for you to receive your \$50 gift within the next 1-2 days. It will come from a platform called Tremendous, so if you see that, it is us and not spam!

I'm also going to give you one of our business cards [\[Hand one of Cathy's cards\]](#). You can contact my colleague Cathy at this email address if you have any questions or issues with receiving the gift card.

Thank you so much and have a great rest of your day!

## Appendix G: Description of Interactives

### Swimsuit Designer

This interactive challenges visitors to outfit a competitive swimmer. They are prompted to choose the style (e.g. one-piece or bikini), fabric (e.g. cotton or nylon), and seam style (e.g. sewn or glued). The activity then runs a virtual time trial, and visitors are invited to learn and iterate: i.e., make new selections and see which combinations are fastest.

### Safety Remix

This interactive invites visitors to strike the right balance between safety and performance. The interactive invites visitors to consider how different combinations of protective devices (e.g. helmets, knee pads, but also whimsical gear like a suit of armor) would affect a person's ability to ride a skateboard or participate in a snowball fight. The activity helps visitors understand that trial-and-error testing is key to the inventive process.

### Fair or Foul

The "Fair or Foul?" interactive invites visitors to consider how emerging technologies, extraordinary athletes, and evolving social norms influence debates over questions of fairness in sports. Visitors are presented with a series of debatable sports-technology scenarios, and asked to vote whether the situation is Fair or Foul? There is no right answer; visitors are simply encouraged to debate various norms while reflecting on their own ontological-epistemological beliefs. After voting on five scenarios, visitors are presented with a summary screen showing their votes, and how those compare historically against all previous visitors' responses (e.g. 40% voted Fair, 60% voted Foul).

### Drawing Board

This interactive encourages visitors to exercise their inventive creativity by imagining and sketching how they might invent a game given a randomized set of whimsical constraints. For example, visitors might be invited to sketch how they play football on hot lava in a potato sack or play golf in a living room one handed. Visitors can then select from a menu of different elements that might contribute to their imagined game such as different balls, sticks, goal posts, and timers. Visitors can "spin again" and the randomizer presents a new combination of sport, playing environment, and constraint.

### Be A Game Changer

This interactive explicitly invites visitors to be self-reflective about their own inventive identities, while reminding visitors that there are many different ways to be an inventor. The activity station first asks visitors to think about activities that represent things they do every day that are inventive, e.g. playing, exercising, cooking, helping. Then it asks about roles visitors identify with: do you consider yourself a worker, a team member, a leader, an advocate? Finally, it asks visitors to consider their inventive strategies and how they like to get things done: By teambuilding? By imagining? By problem finding? By innovating? The interactive reminds visitors that "The things that you do every day are inventive" then

presents a screen titled “Inventive Me” surrounded by a word cloud consisting of the different activities, roles, and strategies that the visitor self-selected on the earlier screens.

### **What Will You Invent?**

This interactive in the End Zone poses visitors with a rotating set of open-ended prompts toward inventive identity exploration such as: What problems have you solved in the past? How has this changed how you will address future challenges? Visitors are invited to write or sketch responses on paper and drop them in a secure box. The exhibition team vets and posts the most interesting responses as inspiration for future visitors.

*With gratitude, Kera Collective thanks the Lemelson Center for the Study of Invention and Innovation for the opportunity to evaluate the groundbreaking Change Your Game / Cambia tu juego exhibition.*

*Our doors are always open—don't hesitate to reach out with anything that's on your mind!*

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Kera Collective explores, measures, and furthers the meaning-making that occurs between museums and people.

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