



National Federation of the Blind STEM2U

Regional Program - Boston

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Introduction

As part of a grant from the National Science Foundation, the National Federation of the Blind (NFB) is conducting regional STEM workshops in partnership with local science museums, entitled NFB STEM2U, for blind youth [youth], grades 3 – 6 and 9-12. During this second regional workshop in Boston, the NFB operated two different programs simultaneously: one program for youth, and a second program for their parents/caregivers. A third program, for Boston Museum of Science staff, was conducted earlier to prepare the museum staff to assist with the youth program. A separate report will discuss the teen apprentices (grade 9 – 12) that participated in a leadership academy and all three regional programs.

The youth program involved small groups of youth working with blind teen mentors to complete STEM-related activities. The parent/caregiver program focused on STEM resources that could help their children, connecting parents to the NFB network and the resources it offers, and sharing ideas on how parents/caregivers could advocate for their child's rights in the school and community setting. The museum staff program focused on staff members' awareness of issues faced by blind visitors to the museum, and provided strategies to assist blind museum visitors explore STEM concepts.

The evaluation questions for this program were:

1. What happens in the regional programs for each of the audiences?
2. What are perceptions of each audience in terms of appropriateness, value, and intentions emerging from the regional program?
3. In what ways does each audience see the program affecting their work (adult audiences) or their potential educational and career paths (youth)?
4. How does this experience affect the individual and their understanding of blind youth and STEM?

The Lifelong Learning Group was contracted to conduct an evaluation for the grant, focusing on the affective outcomes of the project through youth and adult perceptions of the efficacy and value of the training and experience from their various perspectives.

Methods

Data for this program evaluation were collected from three different audiences using three methods. Data for the youth program were collected from the youth and their parents/caregivers. Data for the parent/caregiver and museum programs were collected from those specific audiences.

During the course of the regional programs, the evaluation team observed the parent/caregiver and youth programs in order to note the flow and intersections of the sessions and how different components serve the desired outcomes from a design perspective. During each program, evaluators did pulse interviews, asking participants questions in order to track connection to the program.

At the conclusion of the program, the younger participants were invited to respond to questions about the program using an oral questioning route. The adult participants were invited to respond to computer-based questionnaires tied to each of the programs (parent/caretaker, and science-museum staff) at the final program meeting and via e-mail from the NFB staff.

Data were analyzed collectively. During analysis, categories of participant responses about their knowledge were developed inductively through the coding process (i.e., they emerged from the data itself rather than being prescribed). Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS); descriptive statistics were used to present overall patterns in the data.

Findings

The NFB STEM2U regional workshop in Boston consisted of two separate, but interwoven, programs and involved three different audiences. In this section, findings will be discussed by program and audience.

To better understand the youth program, data were collected from all of the youth participants (16), and 14 of the 16 parents/caregivers (88% return rate).

Most of the youth participants were good students (9 were either A or B students in science) in the fifth and sixth grade who favor science or math class (10 of 15). The majority of parents/caregivers and museum staff did not consider themselves blind. No additional demographic data were obtained for the parents.

Data were also collected from 18 museum staff who attended a training presented by NFB staff and/or assisted with the program the day of the museum visit. The majority of museum staff considered themselves to be museum educators (15) or exhibit (3) staff, with varying degrees of tenure in the informal science/museum field.

Youth Program

Youth were satisfied with the program. They liked the museum visit, sleeping accommodations, and STEM activities. A complete breakdown of their ratings can be found in Appendix B. The majority would do the program again (12 of 13) and would tell a friend they really liked the NFB STEM2U program (9 of 13).

During the program, youth learned about DNA and electricity, built a car out of recyclable materials, and explored the Museum of Science. Youth believe the STEM content and the activities they completed at NFB STEM2U will help them with their schoolwork. Blindness and life skills were also something youth learned at the workshop; several youth shared they learned how to be more independent using good cane technique.

These youth shared they enjoyed several aspects of the program, including:

- Spending time at the museum
- Meeting other children like them
- The travel experience
- Swimming in the pool at the hotel

Youth believed they improved their skills or content knowledge in the following areas:

- Teamwork
- Blindness skills, especially cane skills
- DNA—what types of organisms have it, what cells are made of, extracting it from banana
- Building cars out of recycled materials

Youth believed these skills would help them in school. One child shared, “I feel like I can do more math than I could do before” because he used it in the engineering activity. Another appreciated the program, sharing she did “better” in science at NFB STEM2U because she “had the materials I needed.”

During the program, parents/caregivers were queried regarding their expectations for the program for their ward. Similar to the first regional workshop in Baltimore, two dominant expectations emerged: science content and social opportunities. An adult shared, her son is an “engineering type of boy. He loves transportation systems (cars, trains, planes) and buildings.” She “wants experiences that inspire him to follow his passion.” Another parent shared that her daughter “doesn’t have the opportunities to go have fun and do educational things with other kids. She goes to a public school—only gets about half the experience. . . She loves science. Here, it’s hands on, she can experience the activities, she can experience the museum.”

For many of these parents/caregivers, a strong motivation in bringing their child to the NFB STEM2U program was to interact with other blind children in a social setting. Boston parents rated social skills the most important program skill element (4.21 on a 5 point scale) and believed their child wanted to spend time with other blind youth (4.43 on 5 point scale). Responding to an open-ended question about the most important aspect of the program for their child, one parent mentioned, “I want him to be immersed with other Blind children—he’s in general school population, so exposure to more blind kids is important.” Another parent shared she is continually looking for other opportunities for her child to interact with other blind children. She is “from a small town with two other blind children” where these opportunities do not exist.

When interviewed toward the end of the program, youth mentioned they valued doing the STEM activities with other blind youth. They equated their success with these activities with future success in school STEM activities. One youth shared, “I understand it better because I got a feel of it”. Youth also valued the sense of independence they gained at the NFB STEM2U program. They believed the NFB STEM2U program helped them improve their cane skills.

Following the program, parents/caregivers were asked to rate several elements of the NFB STEM2U program in regards to their child’s skill development; mean ratings for each element were above the midpoint on a 5 point scale, indicating parents felt the program was successful in developing these skills. As you can see in Table 1, Boston parents were most likely to believe their child developed social skills while participating in the program, which received a mean score of 4.21 out of 5. Boston parents were less likely than Baltimore parents to believe their child was developing science skills. Both sets of parents (Boston and Baltimore) believed the program was least likely to develop blindness skills (braille, cane travel, self-advocacy); however both groups of children (Boston and Baltimore) indicated they developed blindness skills, particularly cane use, during the program.

Table 1 Parent’s ratings of program skill elements, on a 5 point scale
1(Strongly Disagree) to 5 (Strongly Agree)

	Baltimore Parents’ Mean	Boston Parents’ Mean
	N=11	N=14
Blindness skills	3.91	3.64
Science skills	4.09	3.86
Social skills	4	4.21
Skills to be successful in society	4.2	4.07

Similar to the parents/caregivers in Baltimore, the parents/caregivers in Boston believed their children found the opportunity to have fun with other blind children while learning science content essential to the success of the program, these three beliefs had the highest mean scores from both Boston and Baltimore parents. Table 2 includes mean scores for parent’s/caregiver’s beliefs of what their child felt were the most important elements of the program for both programs to date.

Table 2. Parent’s belief of what children found important, on a 5 point scale
1 (Not At All Important) to 5 (Extremely Important)

	Baltimore Parents’ Mean	Boston Parents’ Mean
	N=11	N=14
Have fun	4.82	4.79
Spend time with other blind children	4.36	4.43
Learn science content	4.27	4.21
Spend time with teen mentors	4.18	4.14
Visit a Science Museum	4.09	4
National Federation of the Blind Reputation	3.45	3.14

If they were going to change anything, the youth would like the opportunity to do more interactives. One child said, “The [classroom] has so much open space but all we do is sit” and another added, “We want to do more things.” Additionally, they would like to choose their project from several options instead of everyone working on the same project all day (Racer), different youth had different science interests. Finally, the youth would like the program to last longer.

Parents/Caregivers Program

Overall, parents were satisfied with the NFB STEM2U program. Of the 16 parents who attended the program for parents/caregivers, 14 completed the web-based questionnaire (88% return rate). Post-program mean scores were determined for several program elements, including staff, schedule, and meals. These statements were typically rated above the midpoint on a 5 point scale. Staff went above and beyond to accommodate parents, earning the highest satisfaction score, 4.86. Sleeping accommodations scored higher in Boston than in Baltimore. Mean scores for each element can be found in Appendix B.

In the on-site interviews, two expectations emerged for the parent program: 1) support/network opportunities; and 2) science/teaching science resources. Although the evaluators observed the amount of STEM content increased between the Baltimore and Boston programs, Boston parents/caregivers shared they would have liked more. One parent pointed out “[the STEM content] was only a couple hours of the entire workshop” (Friday afternoon one session and Saturday afternoon one session). She further shared, “I have had many experiences with IEPs, but I don’t know science and wouldn’t know what to ask for. The session yesterday afternoon (Friday) gave me some ideas.” Another parent shared, “I wish the parents would have received more information specific to STEM fields. Listening to the Scientists and reviewing the TVI tools were most valuable to me. I was expecting to learn more about STEM and how our children can be involved and increase their interest.”

Parents also indicated that they would have liked less “formal content”, more opportunities to network, and interact with the materials. One parent shared s/he “Felt like I was in blind boot camp. Less NFB indoctrination and more inter parent support.” Another parent suggested, “Make the parent portion a little more active and visual. A lot of us had problems staying engaged - not because of content but because of the delivery method of it all. Build in some hands on activities, or even some fun visuals to go with all the talking. Caffeine was nice but movement is what we really needed.”

The program succeeded in successfully helping parents learn how to connect with the NFB and advocate for their child, as all mean scores are 4 or higher on a 5 point scale. Boston parents were more likely than Baltimore parents to indicate they learned alternative techniques their child could use to succeed in STEM learning; Boston parents’ mean score of 4.21 compared to Baltimore parents’ mean score of 3.64, supporting the observation of increased science education content. See Table 3 for a complete listing.

Table 3. Parents learning in NFB STEM2U parent program
1 (Strongly Disagree) to 5 (Strongly Agree)

	Baltimore Parents Mean	Boston Parents Mean
	N=11	N=14
How to connect with the NFB network to acquire information for myself and my child (ren).	4.64	4.21
Their rights and the rights of my child in the school setting	4.27	4.07
How to advocate for my child if their rights are violated in the school setting	4.18	4
Alternative techniques their child could use to succeed in STEM learning	3.64	4.21

In an open-ended question, parents indicated they valued the NFB STEM2U program for providing opportunities to network with parents of other blind children. This was more important to Boston parents who gave networking opportunities a mean score of 4.57 out of 5 compared to Baltimore parents, who rated this 4.09 out of 5. Additionally the open-ended question revealed parents valued learning new ways both they and their child could use to access science and the opportunity to meet successful blind adults, which was supported by the quantitative data in Table 4. It appears Boston parents found all workshop elements important, indicated by mean scores of 4.5 or greater.

Table 4. Parent’s rating of the importance of NFB STEM2U workshop elements
1 (Not At All Important) to 5 (Extremely Important)

	Baltimore Parents’ Mean	Boston Parents’ Mean
	N=11	N=14
Child learn science content	4.82	4.71
Child had fun	4.64	4.93
Child spent time with other blind children	4.64	4.93
Child develop independence	4.55	4.64
Child spent time with teen mentors	4.55	4.5
National Federation of the Blind Reputation	4.45	4.5
Opportunity to network with other blind parents	4.09	4.57

While the amount of STEM content included in the parent program increased between the Baltimore and Boston programs, parents indicated they would like even more STEM content delivered using interactive pedagogy.

Museum Staff Training

Although the museum staff training program elicited slightly positive ratings from the staff, the training is most likely to impact staff’s ability to properly offer assistance to a blind visitor (3.7 mean, 4 median) and confidence level in working with blind visitors (3.6 mean, 4 median), as illustrated in Table 5. Staff who shared about how the workshop might change their work at the museum were most likely to mention they “will be much more specific regarding the language [they] use in describing things to museum guests.” Specific aspects of the training staff felt were important include:

- “Thoughtful use of analogy within descriptive language (describing things in terms of familiar objects rather than geometric shapes is better)”
- Examples of adaptations from other museums
- Learning in our museum setting
- “The 10 tips at the end of the program”
- Learning how folks who are blind adapt, teaching tips
- “I didn’t realize how much tactile clues contributed, as audio seemed more obvious to me as a method of learning and perceiving things”

Table 5. Program impact on museum staff's abilities
1 (No impact) to 5 (Completely Changed)

	Mean	Median	Range
Comfort level with blind visitors	3.5	3.5	2-5
Confidence level in working with blind visitors	3.6	4	2-5
Knowledge of accessibility and universal design and how it pertains to museums	3.4	3	2-5
Everyday museum program and exhibit experiences	3.1	3	2-5
Ability to describe STEM content to blind visitors	3.4	3	2-4
Ability to describe STEM content to all visitors	3.2	3	2-4
Ability to determine if assistance is needed by a blind visitor	3.4	4	1-5
Ability to properly offer assistance to a blind visitor	3.7	4	2-5

Museum staff cited the following examples of tools, resources, services and/or environmental features that currently exist at the museum that facilitate full participation by blind visitors:

- Live presentations include tactile items from collections and models created by a 3d printer
- Descriptive language within live presentations
- Cameras, projectors, screens and good lighting in presentation spaces
- Differently-textured flooring that differentiates program space from exhibit space.

Staff shared several resources or services that the museum might consider adding to facilitate full participation by blind visitors, including:

- Additional way-finding resources, possibly “a braille description of the museum’s layout”
- “Working to better sonify data so that visitors who are blind can interpret graphs during their museum experience.”
- “Re-usable raised-line notepads”

Staff felt the workshop was well worth the time and planned to share what they learned with others. Finally, one staff reminded, “Even small changes/modifications can have a big impact on accessibility. Start small, think big. As educators interacting with visitors we can make changes on the fly if we are aware of challenges.”

Conclusions and Recommendations

Overall, participants were satisfied with the program. Youth liked the museum visit, sleeping accommodations, and STEM activities. Parents/caregivers appreciated the staff and learning alternative STEM content.

Youth valued their program for providing opportunities to spend time at the museum, meet other children like them, and travel. They developed science process skills and blindness skills (especially cane skills) during the workshop. Youth believed these skills would help them both in and out of school. Parents/caregivers believe the youth program helped their child develop social skills and the skills necessary to be successful in society.

Parents/caregivers valued the opportunity their program provided for networking with others in similar situations and showcasing alternative techniques their child could use to succeed in STEM.

While the evaluators observed an increase in STEM content between the first and second workshop, parents/caregivers would like this to be the sole focus of their workshop. Other topics, including connecting with the NFB and advocating for their child, could be secondary topics viewed through the STEM content lens.

Museum staff valued their training for increasing their ability to properly offer assistance to blind visitors. During the training, museum staff increased their skills to effectively describe science content and assist blind visitors throughout the museum. Museum staff felt more confident in helping blind visitors and intend to add additional wayfinding resources for blind visitors.

Recommendations

For future workshops, continue to strengthen the STEM content in the parent/caregiver program. While additional STEM material was provided for this second parent workshop, parents appear to be completely unaware of materials/tools that are available that would increase their child's access to STEM. In order to better advocate for their child, understanding the available tools and materials is necessary. Parents would also like a more engaging, interactive workshop with additional opportunities to network.

Appendix A: Instruments

NFB STEM2U Youth Post-Evaluation Questions

I'm going to read you a series of questions and responses. First I'll read the question, then I'll read all the answers, so you know what choices you have. Then I'm going to read the answer choices one at a time and ask you to stand up (by your chair) when I read the answer you agree with. Does that make sense? When you stand up to answer the question, I need to count, so stay standing until I tell you to sit down. Do you have any questions about what we are going to do?

Demographics

1. OK, the first question is—What grade are you in? Your answer choices are First, Second, Third, Fourth, Fifth, Sixth, Seventh, and Eighth. Is there anyone who isn't sure what grade you are in?

Stand up if you are in first grade. Second. Third. Fourth. Fifth. Sixth. Seventh. Eighth.

2. That went well, the second question is What is your favorite subject? I'm only giving you four choices, so you need to pick your favorite from one of these four—English, Math, Science and Social Studies. Think about it for a moment.

OK, stand up if your favorite subject of the four is English. Math. Science. Social Studies. Now I need you to sit in your seat. The next set of questions may have longer answers and each of you may have a different answer. So after I ask the question, if you'd like to answer it, please say your name and I'll call on you. Does that make sense?

Skills

3. What skills (things you can do) are you better at because of activities you did here at the NFB STEM2U program?

Value/Intention

4. How will what you learned here help you in your science or math class?
5. How will what you learned here help you outside of school, in your everyday life?

Importance

6. What was most important about the time you spent at the NFB STEM2U program? (This can be open ended or like the multiple choice questions above based on children's experiences at the NFB STEM2U program; i.e., time at the museum, building the car?)

Satisfaction

7. What was the best part of the NFB STEM2U program? Why?
8. What was the worst part of the NFB STEM2U program? Why?

Now we are going to move again. Like I did when we started, I'll read the question, then I'll read all the answers, so you know what choices you have. Then I'm going to read the answer choices one at a time and ask you to stand up (by your chair) when I read the answer you agree with. I hope you are you still with me, we'll be finished soon. These questions

9. Did you like what you ate? Your answer choices are
- I really didn't like it and I would never eat it again
 - I didn't like it but I would eat it if there was nothing else
 - It was OK
 - I liked it and would eat it again
 - I really liked it and I want to eat it again soon

Stand up if you really didn't like it. Didn't like it. It was OK. You liked it. You really liked it.

10. Did you like where you slept?
- I really didn't like it, I didn't sleep well
 - I didn't like it, but I slept
 - It was OK
 - I liked it and I slept well
 - I really liked it and I want to come back and sleep here again

Stand up if you really didn't like it. Didn't like it. It was OK. You liked it. You really liked it.

11. How did you feel about the STEM activities (anything to do with designing your recycled racer)?
- I really didn't like the activities, I never want to do them again
 - I didn't like it
 - It was OK
 - I liked it
 - I really liked it and I want to do more STEM activities

Stand up if you really didn't like it. Didn't like it. It was OK. You liked it. You really liked it.

12. How did you feel about your time exploring the museum?
- I really didn't like it, I never want to do it again
 - I didn't like it
 - It was OK
 - I liked it
 - I really liked it and I want to go back to the museum tomorrow

Stand up if you really didn't like it. Didn't like it. It was OK. You liked it. You really liked it.

13. Would you tell a good friend who is blind and likes science and math to sign up for this program?
- I really didn't like it, so I wouldn't tell a friend to sign up for it
 - I didn't like it
 - It was OK
 - I liked it
 - I really liked it and I think others will like it.

Stand up if you really didn't like it. Didn't like it. It was OK. You liked it. You really liked it.

14. Would you do it again?

- a. I really didn't like it, I never want to do it again
- b. I didn't like it, but I might do it again.
- c. It was OK
- d. I liked it, but I don't want to do it again
- e. I really liked it and I don't want to leave

Stand up if you really didn't like it. Didn't like it. It was OK. You liked it. You really liked it.

15. And for the last question, let's do this a little differently. This time, instead of standing, just raise your hand when you hear the answer you most agree with. And remember, like with all the other questions, if you feel uncomfortable answering, you can choose not to. Now I'd like to know the kind of grades you usually get in science? Once again, I need you to raise your hand to help me understand your answer. Your answer choices here are A, B, C, D. Is there anyone who doesn't get grades? Or gets grades by numbers instead of letters?

Raise your hand if you usually get an A in Science. B. C. D.

Thank you very much!

NFB STEM2U Parent Post-Program Evaluation

To help the organizers of the NFB STEM2U program better understand your experience, please take 10 minutes to answer the following questions.

The following set of questions deal with your satisfaction of various aspects of the NFB STEM2U program

How satisfied were you with the application process for the NFB STEM2U program? Enter a 1 if you were Very Dissatisfied, 2 for Dissatisfied, 3 for Neither Dissatisfied or Satisfied, 4 for Satisfied, and 5 for Very Satisfied.

- 1. I was very dissatisfied with the application process for the NFB STEM2U program
- 2. I was dissatisfied with the application process for the NFB STEM2U program
- 3. I was neither dissatisfied or satisfied with the application process for the NFB STEM2U program
- 4. I was satisfied with the application process for the NFB STEM2U program
- 5. I was very satisfied with the application process for the NFB STEM2U program

What did you think about the pre-visit information for the NFB STEM2U program? Enter a 1 if you were Very Dissatisfied, 2 for Dissatisfied, 3 for Neither Dissatisfied or Satisfied, 4 for Satisfied, and 5 for Very Satisfied.

- 1. I was very dissatisfied with the pre-visit information for the NFB STEM2U program
- 2. I was dissatisfied with the pre-visit information for the NFB STEM2U program
- 3. I was neither dissatisfied or satisfied with the pre-visit information for the NFB STEM2U program
- 4. I was satisfied with the pre-visit information for the NFB STEM2U program
- 5. I was very satisfied with the pre-visit information for the NFB STEM2U program

What did you think about the meals for the NFB STEM2U program? Enter a 1 if you were Very Dissatisfied, 2 for Dissatisfied, 3 for Neither Dissatisfied or Satisfied, 4 for Satisfied, and 5 for Very Satisfied.

- 1. I was very dissatisfied with the meals for the NFB STEM2U program
- 2. I was dissatisfied with the meals for the NFB STEM2U program
- 3. I was neither dissatisfied or satisfied with the meals for the NFB STEM2U program
- 4. I was satisfied with the meals for the NFB STEM2U program
- 5. I was very satisfied with the meals for the NFB STEM2U program

What did you think about the sleeping arrangements for the NFB STEM2U program? Enter a 1 if you were Very Dissatisfied, 2 for Dissatisfied, 3 for Neither Dissatisfied or Satisfied, 4 for Satisfied, and 5 for Very Satisfied

- 1. I was very dissatisfied with the sleeping arrangements for the NFB STEM2U program
- 2. I was dissatisfied with the sleeping arrangements for the NFB STEM2U program
- 3. I was neither dissatisfied or satisfied with the sleeping arrangements for the NFB STEM2U program
- 4. I was satisfied with the sleeping arrangements for the NFB STEM2U program
- 5. I was very satisfied with the sleeping arrangements for the NFB STEM2U program

What did you think about the schedule for the NFB STEM2U program? Enter a 1 if you were Very Dissatisfied, 2 for Dissatisfied, 3 for Neither Dissatisfied or Satisfied, 4 for Satisfied, and 5 for Very Satisfied.

- 1. I was very dissatisfied with the schedule for the NFB STEM2U program
- 2. I was dissatisfied with the schedule for the NFB STEM2U program
- 3. I was neither dissatisfied or satisfied with the schedule for the NFB STEM2U program
- 4. I was satisfied with the schedule for the NFB STEM2U program
- 5. I was very satisfied with the schedule for the NFB STEM2U program

What did you think about the social time activities during the NFB STEM2U program? Enter a 1 if you were Very Dissatisfied, 2 for Dissatisfied, 3 for Neither Dissatisfied or Satisfied, 4 for Satisfied, and 5 for Very Satisfied.

- 1. I was very dissatisfied with the social time activities for the NFB STEM2U program
- 2. I was dissatisfied with the social time activities for the NFB STEM2U program
- 3. I was neither dissatisfied or satisfied with the social time activities for the NFB STEM2U program
- 4. I was satisfied with the social time activities for the NFB STEM2U program
- 5. I was very satisfied with the social time activities for the NFB STEM2U program

What did you think of the staff for the NFB STEM2U program? Enter a 1 if you were Very Dissatisfied, 2 for Dissatisfied, 3 for Neither Dissatisfied or Satisfied, 4 for Satisfied, and 5 for Very Satisfied.

- 1. I was very dissatisfied with the staff for the NFB STEM2U program
- 2. I was dissatisfied with the staff for the NFB STEM2U program
- 3. I was neither dissatisfied or satisfied with the staff for the NFB STEM2U program
- 4. I was satisfied with the staff for the NFB STEM2U program
- 5. I was very satisfied with the staff for the NFB STEM2U program

In the next set of questions you will be asked to consider how important aspects of the NFB STEM2U program were to you.

How important is it to you that your child learn science content? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. It is Not At All Important for my child to learn science content
- 2. It is Unimportant for my child to learn science content
- 3. It is Neither Unimportant or Important for my child to learn science content
- 4. It is Important for my child to learn science content
- 5. It is Extremely Important for my child to learn science content

How important is it to you that your child experience independence by visiting a science museum? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. It is Not AT All Important that my child experience independence by visiting a science museum
- 2. It is Unimportant that my child experience independence by visiting a science museum
- 3. It is Neither Unimportant or Important that my child experience independence by visiting a science museum
- 4. It is Important that my child experience independence by visiting a science museum
- 5. It is Extremely Important that my child experience independence by visiting a science museum

How important Is it to you that your child experience fun activities as part of the program? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important..

- 1 It is Not At All Important for my child to experience fun activities as part of the program
- 2. It is Unimportant for my child to experience fun activities as part of the program
- 3. It is Neither Unimportant or Important for my child to experience fun activities as part of the program
- 4. It is Important for my child to experience fun activities as part of the program
- 5. It is Extremely Important for my child to experience fun activities as part of the program

How important is the NFB reputation to you when choosing programs for your child? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important..

- 1. The NFB reputation is Not At All Important when choosing a program for my child
- 2. The NFB reputation is Unimportant when choosing a program for my child
- 3. The NFB reputation is Neither Unimportant or Important when choosing a program for my child
- 4. The NFB reputation is Important when choosing a program for my child
- 5. The NFB reputation is Extremely Important when choosing a program for my child

How important is it to you that your child participates in programs with other blind youth? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important..

- 1. It is Not At All Important that my child participates in programs with other blind youth
- 2. It is Unimportant that my child participates in programs with other blind youth
- 3. It is Neither Unimportant or Important that my child participates in programs with other blind youth
- 4. It is Important for my child to participate in programs with other blind youth
- 5. It is Extremely Important for my child to participate in programs with other blind youth

How important is it to you that you participate in programs with parents of blind youth? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important..

- 1. It is Not At All Important for me to participate in programs with parents of blind youth
- 2. It is Unimportant for me to participate in programs with parents of blind youth
- 3. It is Neither Unimportant or Important for me to participate in programs with parents of blind youth
- 4. It is Important for me to participate in programs with parents of blind youth
- 5. It is Extremely Important for me to participate in programs with parents of blind youth

How important is it to you that your child participates in programs with blind teens as group leaders? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. It is Not At All Important for me that my child participates in programs that have blind teens as group leaders
- 2. It is Unimportant for me that my child participates in programs that have blind teens as group leaders
- 3. It is Neither Unimportant or Important for me that my child participates in programs that have blind teens as group leaders
- 4. It is Important for me that my child participates in programs that have blind teens as group leaders
- 5. It is Extremely Important for me that my child participates in programs that have blind teens as group leaders

In the next set of questions you will be asked to consider how important aspects of the NFB STEM2U program were for your child.

How important do you think it is to your child that s/he learn science content? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. It is Not At All Important to my child that s/he learn science content
- 2. It is Unimportant to my child that s/he learn science content
- 3. It is Neither Unimportant or Important to my child that s/he learn science content
- 4. It is Important to my child that s/he learn science content
- 5. It is Extremely Important to my child that s/he learn science content

How important do you think it is to your child that s/he visit a science museum? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. It is Not At All Important to my child that s/he visit a science museum
- 2. It is Unimportant to my child that s/he visit a science museum
- 3. It is Neither Unimportant or Important to my child that s/he visit a science museum
- 4. It is Important to my child that s/he visit a science museum
- 5. It is Extremely Important to my child that s/he visit a science museum

How important do you think it is to your child that fun activities were part of the program? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. It is Not At All Important to my child that fun activities were part of the program
- 2. It is Unimportant to my child that fun activities were part of the program
- 3. It is Neither Unimportant or Important to my child that fun activities were part of the program
- 4. It is Important to my child that fun activities were part of the program
- 5. It is Extremely Important to my child that fun activities were part of the program

How important do you think the NFB reputation is to your child? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. The NFB reputation is Not At All Important to my child
- 2. The NFB reputation is Unimportant to my child
- 3. The NFB reputation is Neither Unimportant or Important to my child
- 4. The NFB reputation is Important to my child
- 5. The NFB reputation is Extremely Important to my child

How important do you think it is to your child that s/he participate in programs with other blind youth? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. It is Not At All Important to my child that s/he participate in programs with other blind youth
- 2. It is Unimportant to my child that s/he participate in programs with other blind youth
- 3. It is Neither Unimportant or Important to my child that s/he participate in programs with other blind youth
- 4. It is Important to my child that s/he participate in programs with other blind youth
- 5. It is Extremely Important to my child that s/he participate in programs with other blind youth

How important do you think it is to your child that s/he participates in programs with blind teens as group leaders? Enter 1 for Not At All Important, 2 for Unimportant 3 for Neither Unimportant or Important, 4 for Important, 5 for Extremely Important.

- 1. It is Not At All Important to my child that s/he participate in programs that have blind teens as group leaders
- 2. It is Unimportant to my child that s/he participate in programs that have blind teens as group leaders
- 3. It is Neither Unimportant or Important to my child that s/he participate in programs that have blind teens as group leaders
- 4. It is Important to my child that s/he participate in programs that have blind teens as group leaders
- 5. It is Extremely Important to my child that s/he participate in programs that have blind teens as group leaders

At the NFB STEM2U program, my child developed blindness skills (braille, cane travel, self-advocacy). Enter a 1 if you Strongly Disagree, 2 if you Disagree, 3 if you Neither Disagree or Agree, 4 if you Agree, and 5 if you Strongly Agree.

- 1. I strongly disagree with the statement: My child developed blindness skills at the NFB STEM2U program
- 2. I disagree with the statement: My child developed blindness skills at the NFB STEM2U program
- 3. I neither disagree or agree with the statement: My child developed blindness skills at the NFB STEM2U program
- 4. I agree with the statement: My child developed blindness skills at the NFB STEM2U program
- 5. I strongly agree with the statement: My child developed blindness skills at the NFB STEM2U program

At the NFB STEM2U program, my child developed science skills. Enter a 1 if you Strongly Disagree, 2 if you Disagree, 3 if you Neither Disagree or Agree, 4 if you Agree, and 5 if you Strongly Agree.

- 1. I strongly disagree with the statement: My child developed science skills at the NFB STEM2U program
- 2. I disagree with the statement: My child developed science skills at the NFB STEM2U program
- 3. I neither disagree or agree with the statement: My child developed science skills at the NFB STEM2U program
- 4. I agree with the statement: My child developed science skills at the NFB STEM2U program
- 5. I strongly agree with the statement: My child developed science skills at the NFB STEM2U program

At the NFB STEM2U program, my child developed social skills. Enter a 1 if you Strongly Disagree, 2 if you Disagree, 3 if you Neither Disagree or Agree, 4 if you Agree, and 5 if you Strongly Agree.

- 1. I strongly disagree with the statement: My child developed social skills at the NFB STEM2U program
- 2. I disagree with the statement: My child developed social skills at the NFB STEM2U program
- 3. I neither disagree or agree with the statement: My child developed social skills at the NFB STEM2U program
- 4. I agree with the statement: My child developed social skills at the NFB STEM2U program
- 5. I strongly agree with the statement: My child developed social skills at the NFB STEM2U program

At the NFB STEM2U program, my child developed skills to be successful in society. Enter a 1 if you Strongly Disagree, 2 if you Disagree, 3 if you Neither Disagree or Agree, 4 if you Agree, and 5 if you Strongly Agree.

- 1. I strongly disagree with the statement: At the NFB STEM2U program, my child developed skills to be successful in society.
- 2. I disagree with the statement: At the NFB STEM2U program, my child developed skills to be successful in society
- 3. I neither disagree or agree with the statement: At the NFB STEM2U program, my child developed skills to be successful in society
- 4. I agree with the statement: At the NFB STEM2U program, my child developed skills to be successful in society
- 5. I strongly agree with the statement: At the NFB STEM2U program, my child developed skills to be successful in society

At the NFB STEM2U program, I learned my rights and the rights of my child in the school setting. Enter a 1 if you Strongly Disagree, 2 if you Disagree, 3 if you Neither Disagree or Agree, 4 if you Agree, and 5 if you Strongly Agree.

- 1. I strongly disagree with the statement: At the NFB STEM2U program, I learned my rights and the rights of my child in the school setting.
- 2. I disagree with the statement: At the NFB STEM2U program, I learned my rights and the rights of my child in the school setting.
- 3. I neither disagree or agree with the statement: At the NFB STEM2U program, I learned my rights and the rights of my child in the school setting.
- 4. I agree with the statement: At the NFB STEM2U program, I learned my rights and the rights of my child in the school setting.
- 5. I strongly agree with the statement: At the NFB STEM2U program, I learned my rights and the rights of my child in the school setting.

At the NFB STEM2U program, I learned how to advocate for my child if their rights are violated in the school setting. Enter a 1 if you Strongly Disagree, 2 if you Disagree, 3 if you Neither Disagree or Agree, 4 if you Agree, and 5 if you Strongly Agree.

- 1. I strongly disagree with the statement: At the NFB STEM2U program, I learned how to advocate for my child if their rights are violated in the school setting.
- 2. I disagree with the statement: At the NFB STEM2U program, I learned how to advocate for my child if their rights are violated in the school setting.
- 3. I neither disagree or agree with the statement: At the NFB STEM2U program, I learned how to advocate for my child if their rights are violated in the school setting.
- 4. I agree with the statement: At the NFB STEM2U program, I learned how to advocate for my child if their rights are violated in the school setting.
- 5. I strongly agree with the statement: At the NFB STEM2U program, I learned how to advocate for my child if their rights are violated in the school setting.

At the NFB STEM2U program, I learned how to connect with the NFB network to acquire information for myself and my child (ren). Enter a 1 if you Strongly Disagree, 2 if you Disagree, 3 if you Neither Disagree or Agree, 4 if you Agree, and 5 if you Strongly Agree.

- 1. I strongly disagree with the statement: At the NFB STEM2U program, I learned how to connect with the NFB network to acquire information for myself and my child (ren).
- 2. I disagree with the statement: At the NFB STEM2U program, I learned how to connect with the NFB network to acquire information for myself and my child (ren).
- 3. I neither disagree or agree with the statement: At the NFB STEM2U program, I learned how to connect with the NFB network to acquire information for myself and my child (ren).
- 4. I agree with the statement: At the NFB STEM2U program, I learned how to connect with the NFB network to acquire information for myself and my child (ren).
- 5. I strongly agree with the statement: At the NFB STEM2U program, I learned how to connect with the NFB network to acquire information for myself and my child (ren).

At the NFB STEM2U program, I learned alternative techniques my child can use to succeed in STEM learning. Enter a 1 if you Strongly Disagree, 2 if you Disagree, 3 if you Neither Disagree or Agree, 4 if you Agree, and 5 if you Strongly Agree.

- 1. I strongly disagree with the statement: At the NFB STEM2U program, I learned alternative techniques my child can use to succeed in STEM learning
- 2. I disagree with the statement: At the NFB STEM2U program, I learned alternative techniques my child can use to succeed in STEM learning
- 3. I neither disagree or agree with the statement: At the NFB STEM2U program, I learned alternative techniques my child can use to succeed in STEM learning
- 4. I agree with the statement: At the NFB STEM2U program, I learned alternative techniques my child can use to succeed in STEM learning
- 5. I strongly agree with the statement: At the NFB STEM2U program, I learned alternative techniques my child can use to succeed in STEM learning

What was the most valuable aspect of the NFB STEM2U program for you, as a parent?

What do you think was the most valuable aspect of the NFB STEM2U program for your child?

If there was one thing you would change about the NFB STEM2U program, what would that be?

Are you blind or low vision?

Yes

No

One last question, is there anything else you would like to share about your experience with the NFB STEM2U program?

Thank you so much for answering our questions. Have a great day!

NFB STEM2U Museum Staff Post-Program Evaluation

To help the organizers of the NFB STEM2U program better understand your experience with the museum staff training, please take 10 minutes to answer the following questions.

The next two questions deal with your satisfaction of various aspects of the NFB STEM2U museum staff training program

Please rate your level of satisfaction with NFB STEM2U Museum Staff Training Program Schedule. Enter a 1 if you were Very Dissatisfied, 2 if you were Dissatisfied, 3 if you were Neither Dissatisfied or Satisfied, 4 if you were Satisfied, and a 5 for Very Satisfied.

- 1. I was very dissatisfied with the NFB STEM2U Program Schedule.
- 2. I was dissatisfied with the NFB STEM2U Program Schedule.
- 3. I was neither dissatisfied nor satisfied with the NFB STEM2U Program Schedule.
- 4. I was satisfied with the NFB STEM2U Program Schedule
- 5. I was extremely satisfied with the NFB STEM2U Program Schedule.

Please rate your level of satisfaction with Staff and Volunteers of the NFB STEM2U Museum Staff Training Program. Enter a 1 if you were Very Dissatisfied, 2 if you were Dissatisfied, 3 if you were Neither Dissatisfied or Satisfied, 4 if you were Satisfied, and a 5 for Very Satisfied.

- 1. I was very dissatisfied with Staff for the NFB STEM2U Program.
- 2. I was dissatisfied with Staff for the NFB STEM2U Program.
- 3. I was neither dissatisfied nor satisfied with Staff for the NFB STEM2U Program.
- 4. I was satisfied with Staff for the NFB STEM2U Program.
- 5. I was very satisfied with Staff for the NFB STEM2U Program.

What was the most important aspect of the NFB STEM2U Museum Staff Training program for you?

In the next set of questions, you will be asked to reflect on the NFB STEM2U programs impact on your work at the museum.

To what extent, if at all, do you believe the NFB STEM2U Museum Staff Training Program changed your comfort level with blind visitors in your museum? Enter a 1 if it had no impact, 2 if it had little impact, 3 if it had some impact, 4 if it had a great deal of impact, and a 5 if it completely changed your comfort level with blind visitors in your museum.

- The NFB STEM2U Program had no impact on my comfort level with blind visitors in my museum.
- The NFB STEM2U Program had little impact on my comfort level with blind visitors in my museum
- The NFB STEM2U Program had some impact on comfort level with blind visitors in my museum
- The NFB STEM2U Program had a great deal of impact on my comfort level with blind visitors in my museum
- The NFB STEM2U Program completely changed my comfort level with blind visitors in my museum

To what extent, if at all, do you believe the NFB STEM2U Museum Staff Training Program altered your confidence level in working with blind visitors in your museum? Enter a 1 if it had no impact, 2 if it had little impact, 3 if it had some impact, 4 if it had a great deal of impact, and a 5 if it completely altered your confidence level in working with blind visitors in your museum.

- The NFB STEM2U Program had no impact on my confidence level in working with blind visitors in my museum.
- The NFB STEM2U Program had little impact on my confidence level in working with blind visitors in my museum.
- The NFB STEM2U Program had some impact on my confidence level in working with blind visitors in my museum.
- The NFB STEM2U Program had a great deal of impact on confidence level in working with blind visitors in my museum.
- The NFB STEM2U Program completely altered my confidence level in working with blind visitors in my museum.

To what extent, if at all, do you believe the NFB STEM2U Museum Staff Training Program expanded your knowledge of accessibility and universal design and how it pertains to museums? Enter a 1 if it had no impact, 2 if it had little impact, 3 if it had some impact, 4 if it had a great deal of impact, and a 5 if it completely expanded your knowledge of accessibility and universal design and how it pertains to museums.

- The NFB STEM2U Program had no impact of my knowledge of accessibility and universal design and how it pertains to museums.
- The NFB STEM2U Program had little impact on my knowledge of accessibility and universal design and how it pertains to museums.
- The NFB STEM2U Program had some impact on my knowledge of accessibility and universal design and how it pertains to museums.
- The NFB STEM2U Program had a great deal of impact on my knowledge of accessibility and universal design and how it pertains to museums.
- The NFB STEM2U Program completely changed my knowledge of accessibility and universal design and how it pertains to museums.

To what extent, if at all, do you believe the NFB STEM2U Museum Staff Training Program will alter your everyday museum program and exhibit experiences? Enter a 1 if it had no impact, 2 if it had little impact, 3 if it had some impact, 4 if it had a great deal of impact, and a 5 if it will completely change the way your everyday museum program experiences.

- The NFB STEM2U Program had no impact on our everyday museum program experience.
- The NFB STEM2U Program had little impact on our everyday museum program experience.
- The NFB STEM2U Program had some impact on our everyday museum program experience.
- The NFB STEM2U Program had a great deal of impact on our everyday museum program experience.
- The NFB STEM2U Program completely changed our everyday museum program experience.

To what extent, if at all, do you believe the NFB STEM2U Museum Staff Training Program changed your ability to describe STEM content to blind visitors? Enter a 1 if it had no impact, 2 if it had little impact, 3 if it had some impact, 4 if it had a great deal of impact, and a 5 if it completely changed your ability to describe STEM content to blind visitors.

- The NFB STEM2U Program had no impact on my ability to describe STEM content to blind visitors.
- The NFB STEM2U Program had little impact on my ability to describe STEM content to blind visitors.
- The NFB STEM2U Program had some impact on my ability to describe STEM content to blind visitors.
- The NFB STEM2U Program had a great deal of impact on my ability to describe STEM content to blind visitors.
- The NFB STEM2U Program completely changed how I describe STEM content to blind visitors.

To what extent, if at all, do you believe the NFB STEM2U Museum Staff Training Program changed your ability to describe STEM content to all visitors? Enter a 1 if it had no impact, 2 if it had little impact, 3 if it had some impact, 4 if it had a great deal of impact, and a 5 if it completely changed your ability to describe STEM content to all visitors.

- The NFB STEM2U Program had no impact on my ability to describe STEM content to all visitors.
- The NFB STEM2U Program had little impact on my ability to describe STEM content to all visitors.
- The NFB STEM2U Program had some impact on my ability to describe STEM content to all visitors.
- The NFB STEM2U Program had a great deal of impact on my ability to describe STEM content to all visitors.
- The NFB STEM2U Program completely changed how I describe STEM content to all visitors.

To what extent, if at all, do you believe the NFB STEM2U Museum Staff Training Program changed your ability to determine if assistance is needed by a blind visitor? Enter a 1 if it had no impact, 2 if it had little impact, 3 if it had some impact, 4 if it had a great deal of impact, and a 5 if it completely changed my ability to determine if assistance is needed by a blind visitor.

- The NFB STEM2U Program had no impact on my ability to determine if assistance is needed by a blind visitor.
- The NFB STEM2U Program had little impact on my ability to determine if assistance is needed by a blind visitor.
- The NFB STEM2U Program had some impact on my ability to determine if assistance is needed by a blind visitor.
- The NFB STEM2U Program had a great deal of impact on my ability to determine if assistance is needed by a blind visitor.
- The NFB STEM2U Program completely changed my ability to determine if assistance is needed by a blind visitor.

To what extent, if at all, do you believe the NFB STEM2U Museum Staff Training Program changed your ability to properly offer assistance to a blind visitor? Enter a 1 if it had no impact, 2 if it had little impact, 3 if it had some impact, 4 if it had a great deal of impact, and a 5 if it completely changed my ability to properly offer assistance to blind visitors.

- The NFB STEM2U Program had no impact on my ability to properly offer assistance to a blind visitor.
- The NFB STEM2U Program had little impact on my ability to properly offer assistance to a blind visitor.
- The NFB STEM2U Program had some impact on my ability to properly offer assistance to a blind visitor.
- The NFB STEM2U Program had a great deal of impact on my ability to properly offer assistance to a blind visitor.
- The NFB STEM2U Program completely changed my ability to properly offer assistance to a blind visitor.

Identify and explain 2 examples of tools, resources, services and/or environmental features that currently exist at your museum that can facilitate full participation by blind visitors.

Identify and explain at least one tool, resource, or service that you believe your museum is considering adding that can facilitate full participation by blind visitors.

Will anything you observed or learned during the NFB STEM2U Museum Staff Training Program change your work at your museum? If so, please share specific examples.

Finally, we'd like to find out a little bit about you and your museum environment. With which museum do you work?

- Port Discovery
- Museum of Science
- COSI

Are you blind or low vision?

- Yes
- No

How would you describe your role at your museum (check all that apply)

- Educator
- Exhibits Design/Development
- Marketing
- Finance
- Visitor Services

Including this year, how long have you worked in the informal learning/museum field?

- This is/was my first year
- 2-5 years
- 6-10 years
- 11-15 years
- More than 15 years

Is there anything else you would like to share about your experience with the NFB STEM2U program?

Thank you for answering our questions. Have a great day!

Appendix B: Boston Participant Satisfaction Ratings

Mean satisfaction ratings on a 5 point scale
1 (Very Unsatisfied) to 5 (Very Satisfied)

	Youth	Parents/ Caregivers N=14	Museum Staff
Meals	3.93	4.36	N/A
Sleeping Accommodations*	4.08	4.71	N/A
STEM Activities	3.93	N/A	N/A
Museum Visit	4.21	N/A	N/A
Staff	N/A	4.86	4.78
Application Process	N/A	4.14	N/A
Pre-Visit Materials	N/A	4.36	N/A
Social Opportunities	N/A	3.43	N/A
Program Schedule	N/A	3.93	4.39

*One child did not stay in the hotel
Youth n varies between 13-14