

American Museum of Natural History

Summer 2013 Badging System Report

Since early 2013, the American Museum of Natural History has been revisiting and exploring the benefits of incorporating a digital badging system into select youth-serving after-school programs. In summer 2013, 131 badges were conferred to 72 youth amongst a pool of 38 different badges across seven programs.

Throughout the prototype, we were particularly interested in learning more about the effect on the staff and on youths' learning, and on the ability for badge earners to use them outside the Museum to demonstrate their new knowledge, skills and achievements.

We created a new website prototyping a new digital badging platform, BadgeOS, developed and recently launched as an open sourced tool by Learning Times, a company whose tools had been used by the Museum earlier in the year. Each of the seven programs had their own unique section of the site where youth could manage their profiles, submit evidence (text or images) to earn badges, "friend" one another and leave each other comments.

This report offers further details on how the badges were designed and administered, and key observations we took away from the educator and youth surveys.

BACKGROUND

Youth Initiatives has been exploring the benefits of incorporating a digital badging system into select programs, with an eye towards expanding them throughout our offerings. During the summer of 2013, we ran dozens of programs for youth aged from elementary through college. Seven programs were selected to prototype a new iteration of an AMNH badging system:

- Adventures In Science - Seas
- Adventures in Science - Neanderthals
- Lang Institute - Dog Parks
- Lang Institute - Bronx River
- Summer Science Institute
- Saltz
- Capturing Dinosaurs

Each program was unique, rich with content, and offered a new way to test the badging system. Each program was also led by instructors who were open to this level of disruptive innovation. By the end of the summer 131 badges were conferred (out of 155 reviewed requests, with another two dozen submitted but never reviewed) to 72 youth amongst a pool of 38 different badges.

Collaborating closely with three staff in the Museum's National Center for Science Literacy, Education and Technology (NSCLET), a new web site was created prototyping a new digital

badging platform, BadgeOS, developed and recently launched as an open sourced tool by Learning Times, a company whose tools had been used by the Museum earlier in the year. Each program had their own unique section of the site where youth could manage their profiles, submit evidence (text or images) to earn badges, “friend” one another and leave each other comments.

Youth learned about the badges at the start of their program, both technically but also at a conceptual level. They were introduced to badging systems as a new innovation in informal learning and invited to participate in this new experiment. Within most of the programs badges were introduced in the context of self-directed, interest-driven learning - the badges were there if they wanted to pursue them - while a few instructors required or strongly encouraged the youth to participate.

38 unique badges were designed by the program managers (a few shared across programs but most mutually exclusive) and, by and large, conferred by instructors. Each badge has its own unique graphic icon and language describing the badge content and the requirements for earning it. Instructors went through a 1.5 hour training to learn about the conceptual basis behind the badges and how to technically use the site.

Youth in each program were told when to expect submitted badge requests to be reviewed - for some that very day, for others by the end of the weekend.

Below are a few examples of both badges and the evidence submitted to earn them:



The **Ecologist** badge offered the following instructions: “Ecologists understand how the various interactions organisms have with the environment can have an impact... To demonstrate that you are an ecologist, you must compose a detailed narrative of your field site that includes any pertinent information from peer reviewed sources and your personal field observations that will support your investigation.”

The following example is one of the shorter entries that was submitted and approved:

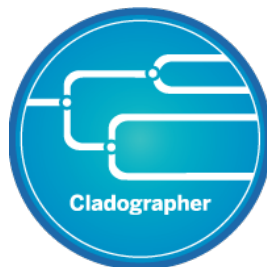
On friday when we went to the bronx river it was partly cloudy with scattered cumulus clouds overhead. it was 25 degrees celcius. it had rained the day before so the river was higher than usual. The surrounding trees covered most of the river in shade but some areas were in direct sunlight. water scimmers covered the water as they moved on the surface of the water. the bottom of the river was

covered in rocks and sand towards the middle of the river, and black mud and decaying plant material more towards the edges. there was a large shelf in the river that extended out towards the middle of the river and was much shallower than the rest of the river. at the edge of the shelf there was drop off.

The **Babel Fish** badge (a playful science fiction reference to a device that lets alien characters communicate) offered the following instructions: “Many Museum visitors speak little or no English, and this should not exclude them from the opportunity to interact with Saltz carts. ... Demonstrate that you can communicate with visitors using non-verbal or non-English language skills by describing examples of your interactions, including how you communicated, what information or concepts were conveyed, and how the visitor(s) response indicated that they understood you.”

The following example describes the youth’s experience teaching how light first enters our eyes and then our brain reverses the image:

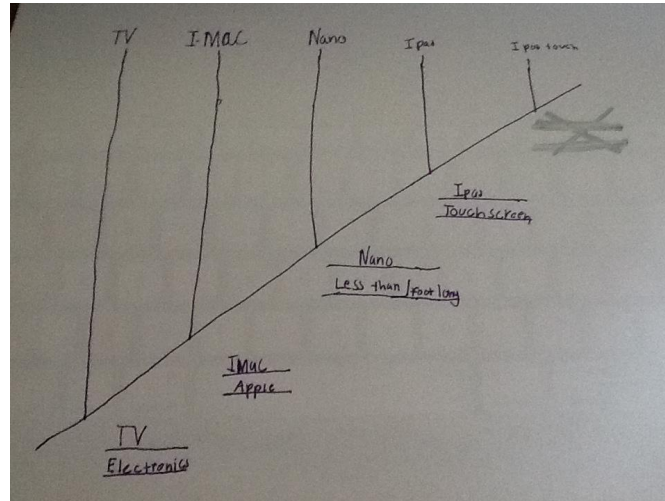
On the telescopes cart, I was presenting the prism goggles. This couple from Italy came over and they barely knew any English. I told them to put on the goggles by doing it myself then handing the goggles to them. Obviously they were like "oh my gawd" but speaking in their own language. I give them a crayon and a piece of paper. I drew a star on mine and told them to "color" and moved my hand around in a star shaped motion. Once they were finished, I told them to put the goggles back on and draw a star as I had showed them. Somehow they understood my hand motions and did exactly what I told them to do. They laughed and ultimately failed at the given task. Then I was like what do you see and pointed at my eyes. They knew enough English to say backwards. Then I points at my eye again and said we see backwards. I am guessing they understood me because they said wow really. I said yeah and brought them over to the lense activity with the lasers. I trace the laser from one side to the other to prove to them that the light is reflected upside down (on opposite side from original) I said that lens is the shape of your eye and had them put their fingers over their eyes to show me how they think their eyes look. They must have understood me since they constantly waved their hands around as if they were flipping over an object.



The **Cladographer** badge offered the following instructions: “Cladograms are diagrams which use specific traits to show relationships among organisms.... Demonstrate your understanding of cladograms by making a cladogram at home for a series of objects you

choose and posting a photograph of it here.”

The following example depicts the “evolution” from TVs and iMacs to the iPod Touch, to which the instructor responded, along with the approval, “This is clever!”



The **I Summered at AMNH 2013** badge offered the following instructions: “You don't need to prove you completed the program, as we already know that. So what can you tell us that we don't know?” The following is an approved submission:

Something odd that happened in summer lang this year was starting a research team for the first time. Honestly, for the last two years I had been pretty scared of doing a project because I didn't know what it entailed. I also did not realize just how helpful the teachers are at finding information and resources. I now know what I'm doing, and my paper is beginning to take form. I feel like I changed a lot during lang this summer.

Key Observations From Educator Survey

“I think the potential [for digital badges] ranges from somewhat damaging to nearly revolutionary.” -- Educator survey respondent

“I thought the badges were useful in forcing me to think about the learning goals

for each lesson I wrote.” -- Educator survey respondent

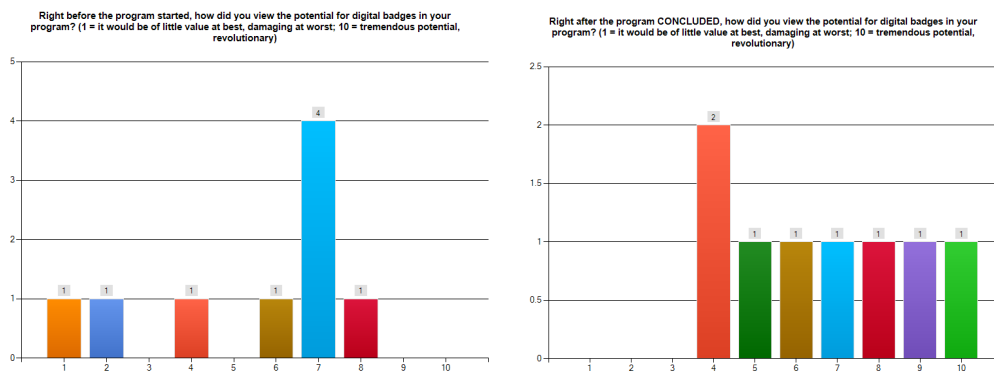
In September surveys were conducted of all youth (invited by email with response rates shifting dramatically across the programs) and all program managers and educators. The following two sections explore what we learned.

When badges were introduced, to both youth and adults, most had never experienced or worked with a digital badging system in an educational context. Adults could easily reference analog badges within the Boys and Girl Scouts while youth could quickly point to digital badges within video games. But it was new to most, and interesting to many, to think about a way to certify skills developed, information acquired, and levels of participation within an informal learning context. At the same time, as the first quote above shows, concerns were raised - for the adults, about it taking too much of their time, for the youth about feeling left out if choosing not to participate, and for both about trivializing learning.

The surveys were designed to assess, from their educator perspectives, what impact badging had across youth’s educational experience, how their personal view on badges changed (if at all), and what advice they might have for the Museum moving forward.

When asked what, to the best of their knowledge, the digital badging system had an impact on, the majority of educators reported it had a positive effect on youth’s motivation to learn, on their own understanding of what youth were actually learning, on facilitating an assessment process between them and the youth, and on youth’s ability to put word to what they were learning. In addition, almost half felt it had a positive impact on youth’s ability to direct their learning trajectory and their identity as science learners. None reported the badges having a **negative** impact on any of these areas.

In regards to their view of the potential for digital badges, the first chart below shows how they described their view at the beginning of the program (1 was little value, 10 was tremendous) and the second their views upon the conclusion of their program. As you can see, the entire group shifted: the lowest potential was removed while the highest potential was added:



Finally, educators were asked about their interest in using badges in the future (1 = “please don’t make me” and 10 = “I will do it even if you don’t”). All reported a mild to strong interest in using digital badges in the future (all reported numbers from 6 to 9, with more than half reporting 8 or 9).

In summary, the educators were new to using digital badges, understood the positive and negative potential, observed positive impact across a number of areas and are interested in expanding their use in the future.

However, there is one big exception. None of the data above included the M.A.T. students within the Summer Science Institute (SSI). The SSI is a week-long introduction to science education. While the idea is strong - a program to bring new youth into the AMNH Education Pipeline - it was felt by the end of the summer that the program should not be offered in the future. How that affected the badging system is hard to ascertain. What is clear, however, is that the M.A.T. students, who all facilitated a brief learning activity with the youth and then offered related badges, had a **very** different experience of the badging system. Many reported negative impact by the badging system on youth, decreased their view of the potential of badges over their time in the program, and more than 50% selected 1 or 2 on the chart of interest in using it in the future. Not all were negative, and the negative was usually in the minority, but it stands in stark contrast with the other six programs.

This is best summarized by one resident who reported the following:

Perhaps it is better used in a longer program where the instructors are more stable and can use it over a longer period. I had hoped the Residents would be introduced to a new and innovative way of evaluating students, but b/c it was such a fleeting thing, and they didn't actually get to know students it wasn't as successful for this as I had hoped.

Comparing the two, a correlation becomes clear: an increase or decrease in any one of the following four factors signifying an increase or decrease in the other three:

- amount of time spent with youth;
- positive impact observed on youth;
- the potential of badges; and
- an interest in further using badges.

It is possible that the causal factor might be time spent with youth which, if correct, would tell us two things:

- badges should only be used for youth activities that happen over a significant amount of time (perhaps more than one week); and
- badges should only be conferred with lead facilitators not guest lecturers.

This topic could be the subject of future research.

Our observation of how facilitators were able to incorporate the badges into their programs, and what they reported on the survey, suggested that most (excluding SSI), if not all,

received the support required to effectively integrate the badging system into their education program. How youth interacted with it, and what motivated that interaction, is a separate question. To answer that we have to turn to the youth survey.

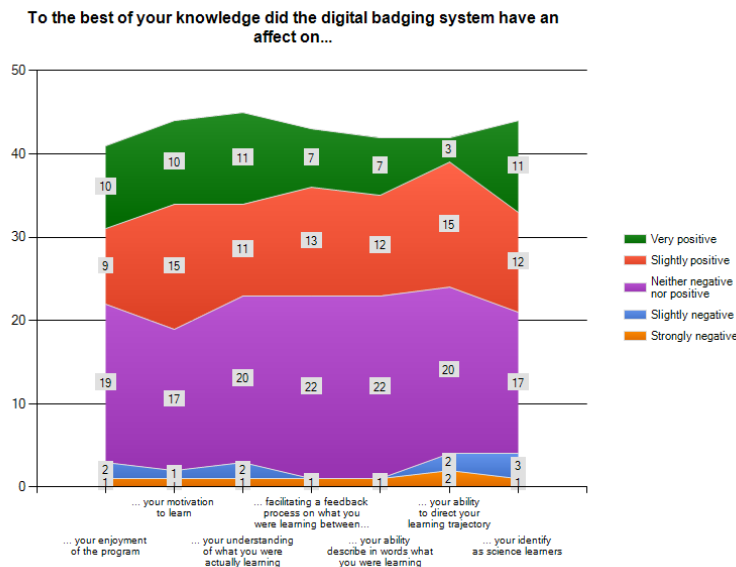
Key Observations From Youth Survey

“The badges kept me focused on what I wanted to accomplish in my research.” -- Youth Survey Respondent

“The effort that is used to get something most people have never heard of is silly.” -- Youth Survey Respondent

The youth survey asked questions similar to the ones posed to the adults, but the survey also separated them into two groups: those who requested and received badges and those who never requested badges (those who requested but did not receive badges were too small to be significant). Not all youth in all programs responded, so the results should be viewed not as definitive but suggestive.

Overall, the youth were equally split regarding their sense of whether the badges had any impact on them and their learning. Of those who reported the badges having an effect, the effect was overwhelming positive. Purple below depicts no effect, while the colors above are positive and the colors below negative.



In summary, around half of all survey respondents found that badges had a slightly or very positive effect on:

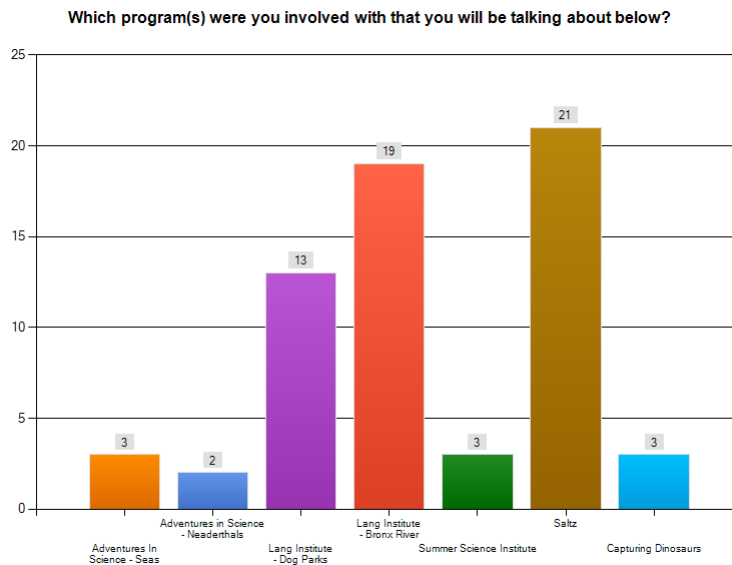
- their enjoyment of the program
- their motivation to learn
- their understanding of what they were actually learning

- facilitating a feedback process on what they were learning between them and the facilitators
- their ability describe in words what they were learning
- their ability to direct their learning trajectory
- their identify as science learners

Those are fairly remarkable findings and strongly recommend both continued exploration of badges within our programs and areas of future research to identify if youth’s perceptions were correct.

The question remains, however: what motivated youth to participate? While one or two instructors introduced badges as something required, most positioned the badges as optional and only to be pursued if the youth had the interest.

Of the youth who responded to the survey, 38 youth reported having earned badges while 21 reported not pursuing badges. In addition, most respondents were from a Lang Program (32) or Saltz (21). For some reason there was a strong correlation between Lang/received badges and Saltz/no badges. The following is a chart showing the numbers that responded by each program:

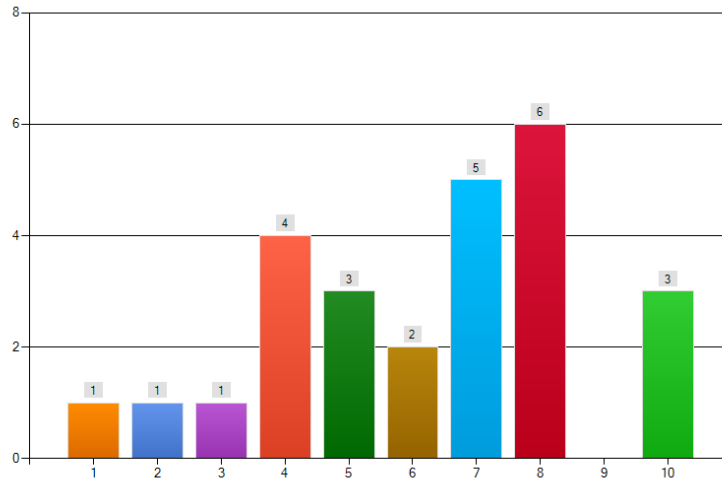


As a result, the data was analyzed comparing data from the two programs.

The youth were asked the question about their interest in the Museum using badges in the future, this time 1=“I’ll hate you if you do” and 10=“I would be so so so so excited.”

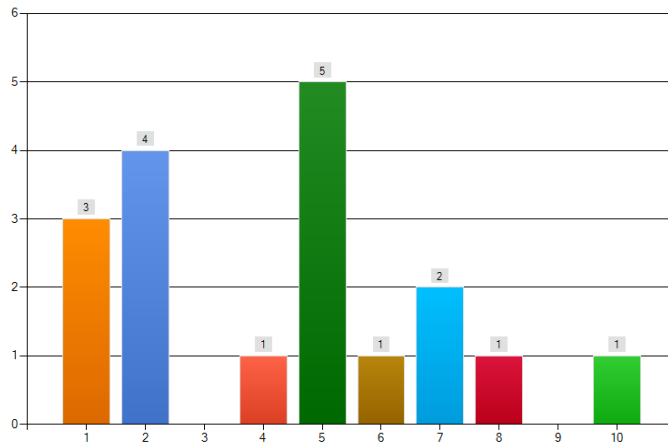
Lang youth reported strong interest with some disinterest:

To what extent would you be interested in having digital badges offered in future AMNH programs (presuming any feedback you might have mentioned above were incorporated)? (1 = I'll hate you if you do; 10 = I would be so so so so excited).



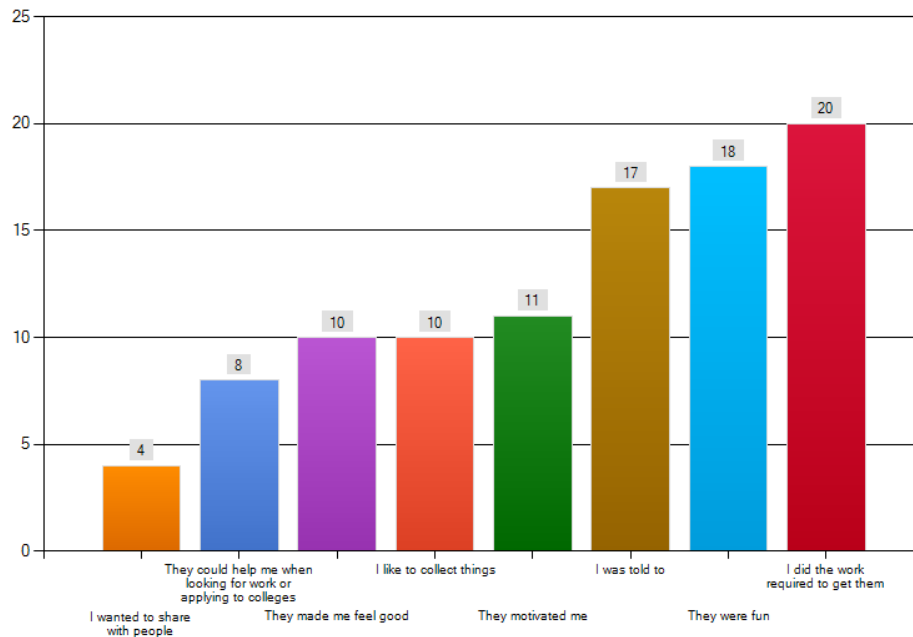
Saltz was the opposite: strong disinterest with some interest.

To what extent would you be interested in having digital badges offered in future AMNH programs (presuming any feedback you might have mentioned above were incorporated)? (1 = I'll hate you if you do; 10 = I would be so so so so excited).



It is hard to know how to analyze this on the surface - what is correlation and what is casual - but those who pursued and those who did not were asked separate questions to explore their separate motivations. For those seeking badges, all youth and not just Lang, the following was reported as the reasons why:

What were some of the reasons why you sought badges?



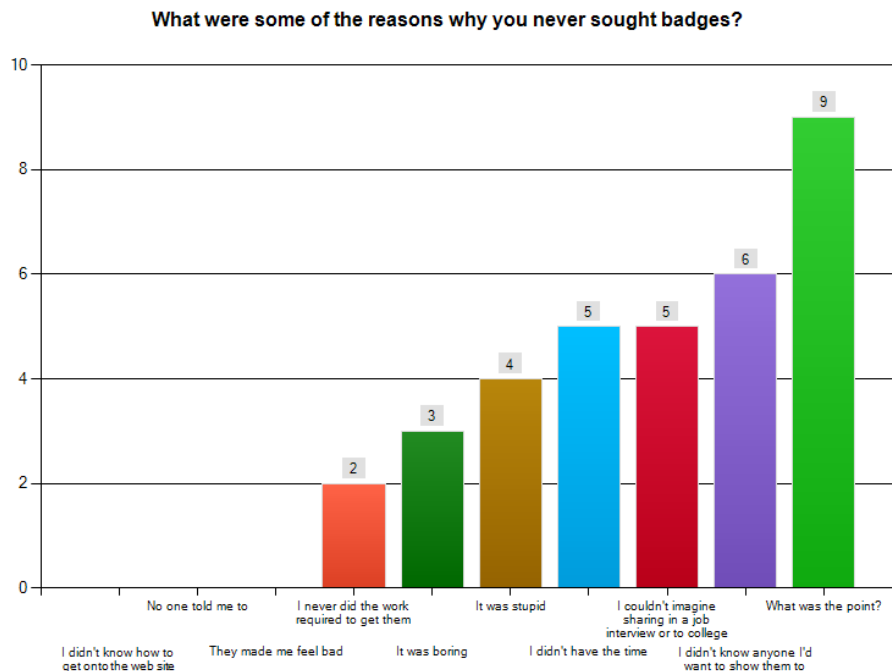
So, of the 38 who responded that they had received a badge, just around half were motivated because they were instructed to, they enjoyed it, and/or they had completed the required work. A quarter responded that they were motivated because pursuing or earning badges made them feel good, they liked to collect things, and that the badging process itself was inherently motivating. The reasons less often mentioned were an interest in sharing them with others, whether for personal reasons or for self-promotion. So, in general, one way to understand this is that the badging system offered motivating value to the youth at a personal (the activity felt good) or programmatic level (it connected with their work in a positive way) but not at a peer level (it was not for reasons of competition or social capital) or world-wide level (it was not to advance their education or career within or outside the museum).

We invited youth to say more about one of their answers above. The following are some illustrative examples:

- *It gave me a sense of fulfillment*
- *The badges kept me focused on what I wanted to accomplish in my research. Instead of wandering off, I had something to work toward.*
- *I do not think that I would use them in the future to apply to any schools. Although they are a very good idea, I do not feel that they are developed enough/well-spread enough to be used in applications.*
- *I think by receiving the badges I get a feeling of pride to know that I did the work to earn the badge and that it is mine.*
- *I just felt really good when I got one. They were fun. It felt good to collect them.*

- *I feel like I had accomplished something, which made me feel good with myself.*
- *I was able to push myself to earn the badges and elaborate on my learning. It helped me to take a step forward to learn the material in my research group.*
- *The badges could help me out in the future when their better known.*
- *I felt that badges motivated people who otherwise would not have worked as hard.*
- *They were really cool and fun to collect and I hope that they will help me get into a good high school*
- *They motivated me, because when I did something good I knew that I would be rewarded. They are a good addition to these programs.*
- *They were fun because you knew you had earned them, and that made me feel satisfied, and that my work had been approved.*
- *Honestly it was a good review of the material covered in class- kid of like homework, but with instant validation.*
- *The badges were fun to get because my friends and I would have competitions to see who could get the most badges.*

For those who did not seek badges, all youth and not just Saltz, the following was reported as the reasons why:



So of the 21 who responded, half agreed with the statement “What was the point?” A quarter didn’t want to share them with anyone or didn’t have the time.

We invited youth to say more about one of their answer above. The following are some illustrative examples:

- *Badges were great as a concept, but as a tool for students, I didn't see it to be useful.*
- *Spending my time seeking badges for certain educational objectives would have taken away from the time I had available to spend on actually achieving the educational objectives themselves.*
- *The whole idea behind Saltz is enthusiasm and understanding about science and encouraging others to do the same. We didn't need badges to show what we earned from the experience.*
- *The badges made it feel like school, especially since the badges had to be validated by the supervisors. I always thought of Saltz as a program where the interns are self-motivated and learn for the sake of learning.*
- *It was fostering competition that no one wanted*
- *Although they had good meaning to them I just didn't find them very useful in the longrun because just bringing up an earned online badge on a rather unknown website seemed silly and I felt like it wouldn't be taken seriously*
- *I think that overall the issue with the badge system was simple: There was no real world use for them. If I were to say I got the "Marine Life Badge," or put that on my resume I am not sure it would hold stock with any job interviewer or college interviewer.*
- *The idea in itself was good. It is a way to reward people for their hard work, but there is just no real world application for them and that is why I feel many people did not partake in the badge system.*
- *Well, I already knew that I'd done my job; why did I need this superfluous badge to again reinforce for me that I'd done it? It was reward enough for me to have a successful day and feel like I'd informed someone.*
- *Their was no prize or goal involved*

Note that the two less likely reason to motivate badge earners were also two of the stronger reasons motivating youth to NOT pursue badges: sharing them with others. In other words, comparing the two, those motivated by personal or programmatic reasons valued, enjoyed and pursued badges while those motivated by peer or world-wide reasons devalued, disliked and did not pursue badges. In addition, those who chose to mention that they liked peer competition liked the badges while those who chose to mention they did not like peer competition did not like the badges.

A key lesson here is that to increase youth's motivation we need to explore how to enhance youth's direct pleasure within the badging system (e.g. a better user interface, a technically smooth experience, enhanced gamification features like a leaderboard, etc.) and its direct connection with their work (e.g. privileges within the museum related to their new skills, opportunities that are "unlocked" as a result, etc.) while minimizing the youth's lack of motivation by increasing badge value amongst their peers (e.g. strengthen the social network aspect of the badging system) and with potential academic and workplace

opportunities (e.g. developing relationships with scholarships and school admission departments to ensure they understand the value of the AMNH badges). We also would need to think about the role badges play fostering competition and how that aligns with our program goals.

APPENDIX A: Youth Recommendations for Improving the System

Do you have any feedback for the Museum on how the digital badging system can be improved?

- *I love the museum and their badge system so i am so excited to earn a badge.*
- *I think that the digital badge system works fine.*
- *I think the badges would be vastly improved if they were much more widespread and accepted in other institutions (I am sure they are accepted in many). If they were accepted as part of school's applications or anything else that would make it better.*
- *The digital badging system can be improved by adding further badges that are more challenging. Also the website should be more user friendly and well maintained as it crashes sometimes and doesn't give the badges for the automatic ones.*
- *I think the digital badging system is perfectly fine in my opinion.*
- *Allow more privacy options for people who want to hide what they earned from people they aren't familiar with.*
- *It can be improved by better explaining the significance of the badges.*
- *Most of the interns did not use the badging system because we were not reminded to, or reminded of its importance. Having the educators tell us to use the system more often, and with greater enthusiasm would help us be more interested.*
- *Have representatives show up and reinforce program more often to motivate and encourage the use of badges.*
- *There could be smaller badges for specific challenges, like connecting some hall to another or independently learning something more about a topic & then presenting it. After winning a series of smaller, related badges you could earn a "big" one.*
- *Possibly if the interns have to check and validate other interns badges instead of having the supervisors do so. It would encourage us to share our knowledge and enthusiasm with each other instead of feeling like "oh yes I passed the exam!" Just a thought!*
- *Make it easier to submit badges.*
- *If there is a way to make the badges more "real world" then that is how they can be improved. It is hard to imagine an approach in which the badges can attain that level of real world application.*
- *If some level of (friendly) competition is introduced to the badge system people might be more interested in getting them. As in the more badges you get on the Saltz carts the more desirable you are for work WITHIN the museum itself. That way there is a real world application, there is a reason to get the badges, and there is a clear reward for people like myself who just love working in the museum.*
- *ALL the badges that are earned should appear on the screen for completed badges.*
- *The badging system should be more competitive and include an impetus to get a badge, such as a prize.*

APPENDIX B: AMNH Badges from Summer 2013

Badges Shared by All Programs



I Summured at AMNH

Have you completed at least one AMNH summer program in 2013?

Adventures in Science Badges



Peer Reviewer

Can you critique hypotheses in light of new evidence?

Hypothesizer

Can you develop and communicate an evidence-based Neanderthal extinction hypothesis using multiple lines of evidence?

Presenter

Can you present a scientific hypothesis to an audience?

Inquisitive

Have you asked a question of a guest speaker?

Scientific Modeler

Can you recognize the strengths and weaknesses of widely available tools for scientific modeling of past organisms and environments?

Cladographer

Can you understand the relationships between selected extinct and extant species?

Theorist

Can you understand and evaluate scientific theories?

Model Developer Master L1

Can you develop a sketch based on data?

Model Developer Master L2

Can you develop a clay model based on data?

Model Developer Master L3

Can you develop a digital model based on data?

Model Developer Master

(achieved when all three Model Developer Badges are achieved)

Lang Institute Badges



Data Collector

Have you completed all data collection as planned in the research design?

Research Designer

Can you design a research project?

Animal Behavior

Do you know how and why scientists study animal behavior?

I Know Ethograms

Do you know what an ethogram is and what it is used for?

I Make Ethograms

Do you know how to create, record, and read an ethogram?

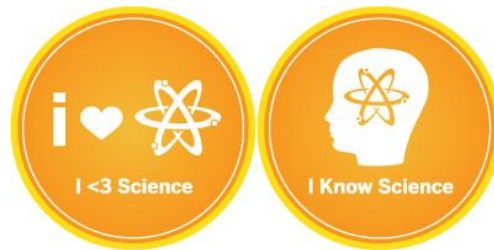
Ecologist

Do you know what ecology is and how scientists study it.

Field Site Sampler

Do you know how to take samples at a field site?

Summer Science Institute Badges



I <3 Science

Did you experience a new passion for science this week? Or did this week help you pursue an existing passion for science?

I Know Science

What have you learned this week?

Saltz Badges



Carts Master

This badge is for someone who has completed all activities on all 7 carts.

Ocean Carts

This badge is for someone who has completed all activities on all 3 ocean carts.

Astro Carts

This badge is for someone who has completed all activities on all 3 astro carts.

Dino Cart

This badge is for someone who has completed all activities on the dino cart.

Ask Me

Are you knowledgeable in more than one content area related to the halls?

Rainbow Universe

Can you understand the parts of the electromagnetic spectrum and how astronomers use them

to learn information about the universe?

Telescoper

Can you explain the purpose of telescopes and describe how they work?

Plankton for All

Can you understand what plankton are, the types of plankton, and the importance of plankton in ecology?

Togethernesses

Can you understand the different types of symbiosis?

Hear This

Have you developed at least two new communication skills?

Beyond Words

Can you pick up on non-verbal clues when interacting with Museum visitors?

Babel Fish

Can you communicate with visitors using non-verbal or non-English language skills?

Cart Presenter

Can you present a cart topic in a confident, professional manner?

Mob Master

Can you effectively engage groups of two to twelve people?

Audience Gauge

Can you gauge the audience's interests and knowledge levels by observing and assessing verbal and nonverbal communication?

Super Saltzer

Have you totally rocked the Saltz Internship Program?

Capturing Dinosaurs Badges



123DCatcher

Can you use 123D Catch on an iPhone to create a digital 3D model from a physical object?

DinoDef

Can you demonstrate the ability to critique and support definitions of dinosaurs based on the ones used by today's paleontologists?

FossilDef

Can you demonstrate the ability to critique and support definitions of fossils based on the ones used by today's paleontologists?

I Made That

Can you communicate scientific or cultural data through a digital-enhanced media product?

Inquisitive

Have you asked a question of a guest speaker?

Peer Reviewer

Can you critique hypotheses in light of new evidence?

Presenter

Can you present a scientific hypothesis to an audience?

Theorist

Can you understand and evaluate scientific theories?

Ruthless Paleo

Do you know what the bones wars were and what they can teach us about the field of paleontology?