2019

Science Communication for Global Talents/
- Overseas Programme -
Report

“Social Inclusion Design in UK Scientific Communication Scenes”

General information

Student’s name	Hiroko IKENO
Affiliation and grade	M 1
Organization	London Science Museum, Royal Society, Parliamentary Office of Science and Technology, Royal Institution, Royal Academy of Engineering
Person in charge at Organization and His/her position	Ms. Arjinder Nirwal / Team Leader of Interactive Galleries and Explainers, London Science Museum Prof. Michael Norton
Schedule	25 Aug. 2019 - 3 Sep. 2019

Summary in English

In this program, we visit five UK science-related institutions: London Science Museum, Royal Society, Parliamentary Science and Technology Bureau, Royal Institution, and Royal Academy of Engineering, and learn science communication.

Each institution aimed to improve engagement between science, society and people by using appropriate methods depending on the purpose and target. Especially, at the London Science Museum, we were not only able to hear the PDCA cycle of the Science Communication measures conducted by the Science Museum directly from speakers, but also able to observe the audience and to have same experiences.

I felt that the nine action guidelines of the Science Museum Group are in line with the concept of social inclusion. I was surprised that this guideline permeated the Science Museum staff, exhibitions and spaces. I became more interested in the human resource development measures and organizations that made it possible. The experience at the Science Museum is more than just a frame of scientific communication, and I think it is suggestive for many organizations.

The Science Museum Group's nine action guidelines have become important guidelines for my research and music workshop practices.

Objective

The purpose of this UK training program is to know the “UK of the present day” in scientific engagement and to apply the insights gained by this program to my own research.

The situation of science and classical music are similar, both of which tend to distance people because of their high level of expertise and impression of high barriers.

Through a symposium hosted by the British Council in 2018, I learned about the use of art to solve British social problems. My research theme is music workshops, especially the impact on the participants and artists involved, and the possibilities of their utilization. In the UK, music workshops are also used to solve social problems.

In this training program, we will learn about the science engagement measures of each visited site. In particular, I would like to learn what role the exhibition at the Science Museum plays as a medium to connect science and people, and what kind of philosophy it involves, and use it in my own research.

Detailed schedule

▼Day 1: Aug. 25th, Moving Day

▼Day 2: Aug. 26th , Science Museum1

We met Ms Arjinder Nirwal who is Team Leader of Interactive Galleries and Explainers at 10:30 am. We called her Jin-san. She welcomed us with kindness, so our tensions were quickly relieved. After introducing ourselves at the café in the museum, we received an activity summary of the Science Museum from her. What impressed me was they plan “FOR ALL PEOPLE”--- in other words, consider the differences of all ages, nationalities, physical abilities etc.----they make an effort to have all people enjoy science and the museum and feel the excitement it arouses, and they strive to challenge themselves towards that goal.

First, we saw the science show. It was called The Rocket Show, and audiences can learn about how rockets fly. I was surprised that the science show was not audiences just watching but participating. The explainer recruit volunteers from the audience, which included both children and adults, to join on the experiment. The show was proceeded very speedily. The explainer spoke very quickly and in many words like an actor. The explainer frequently asked questions to the audience, which responded immediately, The show proceeded with everyone thinking together. The Rocket Show took place in a close-by room because it involves a small explosion and a loud boom. This loud sound was successful in leaving strong impact on the audience.

In the afternoon, we watched the exhibitions under the guidance of Ms. Jin. There were a lot of hands-on exhibits in the hall. I enjoyed them in excitement, as if I had returned to my childhood.

Fig. 1 Science Museum

Fig. 2 The Rocket Show

▼Day3: Aug. 27th, Science Museum 2

AM: Interview Session with the Audience Research Team

We had an opportunity to interview Ms. Josephine Wood, Senior Audience Researcher, Audience Research and Advocacy Team, about her team's job of planning and studying the design of the audience's experience through exhibits at the Science Museum. Her team is always thinking of how to respond to audiences with diverse backgrounds, researching and developing the exhibitions and activities there. Moreover, even after the exhibits are released, they are not finished but continue to challenge on. For example, in order to make the exhibits easier to understand, explanation panels have been redesigned many times, and hands-on exhibitions modified. What is distinctive is that a system that incorporates and reflects the opinions of visitors has been established. They consider the visitor's learning design extensively, and instead of perceiving the show or exhibition as individual points of events finished with the conclusion of the visit, and prepare a page on the Web so that visitors who have become interested in the show or exhibition can get further information there.

She explained that a single message was used at each show, but this was not only for the sake of clarity, but to leave a blank space for people to think, feel and wonder. I understood that this was an important factor in further guiding people to a more complex learning design.

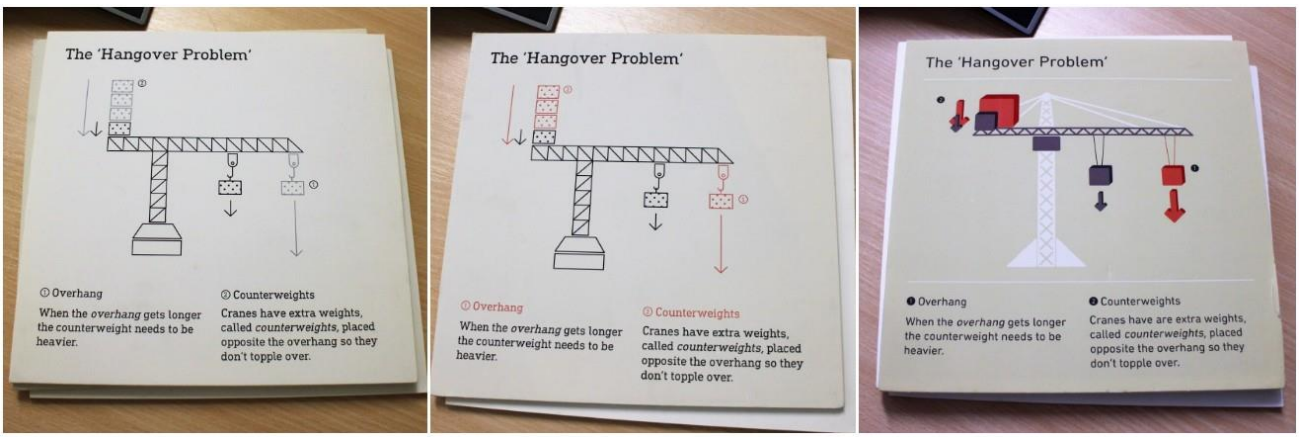

Fig. 3 modified explanation panels

PM: Fly me to the moon / Marvelous Medley / The Garden

I visited both a relatively long show and a shorter show. The methods were the same---recruiting

people to help the audience and experiments using familiar objects such as Pringles paper tubes. But in the longer show, the Explainer's speaking speed was slower and procedure of events a bit gradual. The longer show took place in a large lecture-style room, but the explainer seemed further away when viewed from the rear seats, and the realism did not set in as much as in a smaller room. There seems to be a close relationship between the contents of the show and the size of the venue and the distance of the audience.

'The Garden' area focused on children and provided learning through physical experiences. It was set in the likeliness of a playground than an exhibition. In bright lighting, activities that affect the five senses are can be experienced. For example, in the waterway area, children were only thinking about playing with water where water flowed from upstream to downstream, or blocked the flow to build a dam while unconsciously experiencing and contemplating the currents to their own means. There is also a space for adults to sit nearby to watch over them from a distance. Rather than emphasizing learning design through exhibitions, this area secured the enthusiasm for both children and adults, and was responsible for providing a place where they free to do whatever they wanted.

▼Day4: Aug. 28th, Science Museum 3

This day was a 'Lates' day. 'Lates' is an event for adults that opens at night and is held on the last Wednesday of every month.

Prior to that, in the morning, we listened to Ms. Lilly Babirye, Events Programmer, Cultural Team explain various events held at the Science Museum. The Science Museum offers workshops in addition to its shows and exhibitions. We then actually experienced a workshop to make a bracelet that imitated the solar system with Ms. Lilly's facilitation. The distance to the sun is expressed by the number of beads, but Ms. Lilly had us pay attention to how the questions were asked. Instructions for each step were explained with care, but when it was time to make the bracelet, she asked a question that was just a bit difficult, "What's next?", created a margin for children to think.

The Science Museum also does workshops that respect the tranquility of children with autism, and hosts overnight stays in the museum. I felt these workshops and events release the museum from the traditional image.

PM

We interviewed Ms. Micol and Ms. Scout, Academic Program Leader, the Science Museum Group on the importance of connecting science with society and people at the Science Museum. This part of our stay in London was the most impressive for me.

The Science Museum forms an alliance with the five museums in UK, which is called the Science Museum Group (SMG). These five museums have nine common action guidelines. All nine are based on the idea of getting a positive experience with science and helping to nurture it. They act Audience-centred always. "The more experts you have, the more you want to pack in knowledge and messages, but it's important to getting the participants to think of doing more," Ms. Micol said. This is a common occurrence in the classical music scene, and I was caught up listening to her.

We experienced a workshop called "Mouse Rocket". It was designed so that participants could learn various aspects of science while using common materials you can find anywhere to test how to fly a

mouse made of paper, using the pressure of air pushed out of an empty plastic bottle. There will be plenty of time for participants to experiment and reflect on what happens, and a little scientific explanation at the end adds up to them thinking "I see!" This simple workshop was also packed with nine guidelines that SMG values.

Fig. 4 nine common action guidelines

Night

I participated in "Late". The opening was at 18:45. At 18:30, a long line (“Adults only!”) of maybe over 200 people were lined up outside. When participants enter the museum on a Late event, alcoholic beverages are being sold, and they are able to experience the new technologies deployed at the temporary booths of various companies and universities while having a drink, or enjoy meals while watching permanent exhibits. The companies seem to have the advantage of not only collecting customer feedback but also reducing the cost of testing by exhibiting new technologies and having participants try them out. Adults have a way of enjoying the Museum as only adults can, and I felt the depth of the performance level of the event team that provides them the opportunity.

Fig. 5 Lates

▼Day5: Aug. 29th , Science Museum 4

The last day at the Science Museum. First, we reflected upon the previous night’s Lates with Ms. Jin. Lates has an average of 3,000-5,000 visitors each time. Visitors are mostly adults in ranging from 18 to 49 years old, and there are many repeaters. A typical example of a Museum visitor of olden days used to be

a student coming in with a teacher. Ms. Jin mentioned that their aim is to get the visitors to feel as if they were on a journey. Visitors assemble a plan to view exhibitions and shows or participate in various events, as if they were traveling freely. In other words, the Museum requires preparation for exhibitions and activities to answer to those needs. I was surprised by the space production of this Museum. The exhibition area, café and shop are designed to join into one unified space. This was the moment when Ms. Jin's words “feel like traveling” matched my perceptions of space of this museum.

Fig. 6 The exhibition area, café and shop are designed to join into one unified space.

After that, a presentation training session was conducted. We had to make self-introductions, which was unexpectedly difficult. And in English! I tried to express myself by building a story based on the keyword “music”, which I value.

Finally, we had the challenge of constructing/ putting on a short science show. I did a show on sound, but I needed to deal with small problems that rose up while experimenting, gauging the atmosphere and interacting with the audience. There was a big difference between seeing and doing, and was quite difficult. It was not easy to create its content because I had to choose a method and production that suited our audience. This also overlaps with my experience of taking considerable time exchanging opinions with a production team when producing music content.

PM

After watching a short movie of the Apollo moon landing at IMAX theatre, Ms. Jin gave a general review of the four days and concluded the training session.

I wish to express my heartfelt gratitude to Ms. Jin and all of the Science Museum for providing us with so much learning over the four days.

Fig. 7 Photo with Jin-san

▼Day6: Aug. 30th ,

The second half of this year's training program began. Guided by Professor Norton, we visited two of the four UK science-related institutions: Royal Society and Parliamentary Office of Science and Technology(POST).

AM: Royal Society

First, Mr. Bushell guided us through its halls while explaining the history of the establishment of the Royal Society. The most interesting was the Library Reading Room. There is an old record of the Science Council here, and we were able to see very valuable materials. The Science Council is composed of 20 to 24 fellows, and many of the successive fellows have been renowned scientists who appear in textbooks. When we found Newton's signature on the records, we let out a sigh of surprise. There are also female fellows in the current Council.

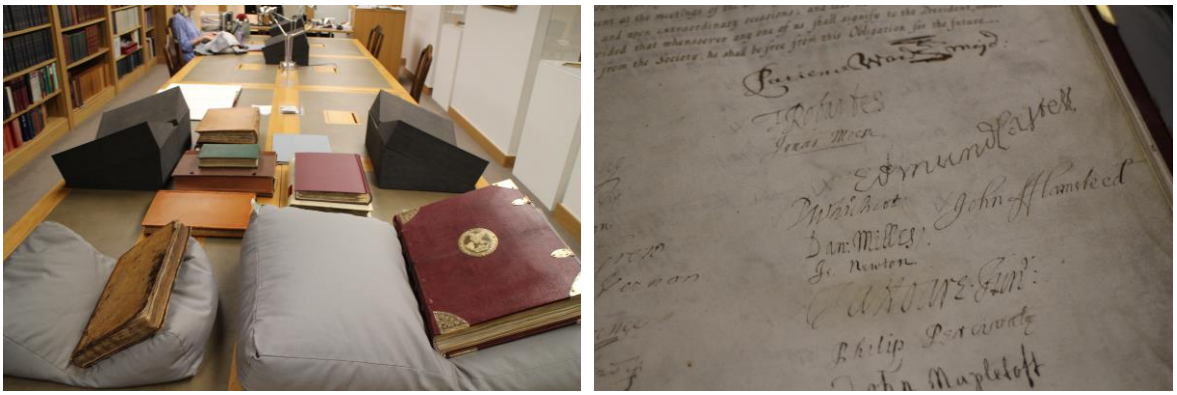

Fig. 8 Old records and Newton's signature

After that, we received an explanation of the activities of the Royal Society. Team leaders of various

projects of the Royal Society explained their work, coordinated by Mr. David. The projects were aimed at the following.

(1) Connect science with society. (2) Connect science with schools. (3) Collaborate with the world.

(4) Promote science policy proposals and raise awareness for the general public (5) Use media such as publishing to promote these aims. There are many projects undertaken in each initiative.

PM: Parliamentary Office of Science and Technology (POST)

Mr. Jonathan moderated the introduction of POST activities. POST is an organization belonging to the British Parliament that analyzes policy issues related to science and technology in an easy-to-understand manner and acts as go-betweens for politicians and science specialists. It is a neutral organization that does not lean towards specific policies. I felt that this idea was also symbolized by the frequent occurrence of the word “Evidence” in the explanation. We were showed some "POST NOTE"s issued by POST. Current topics are concisely summarized on both sides of a sheet of A3-sized paper, and as the contents are supervised by experts in the field and issued in a fair position, it is easy to imagine that it is accepted as a highly reliable document. Marine pollution by microplastics, which has been reported frequently in world media, is one of the recent achievements of POST.

Later, Ms. Jonathan and Mr. Pete guided us around the British Parliament. Unfortunately, Big Ben was under repairs and we couldn't fully see its beautiful figure, but I was struck by the presence of the portraits of Anne Boulin and Jane Seymour in the Tudorian room. The battle for Henry VIII between the two women became an opera called "Anna Bolena" by the Italian composer Donizetti (I played role of Jane, who took Henry VIII from Anne), and if the opportunity rises again to sing in another production, I must remember this experience.

Fig. 9 House of Lords

▼Day7: Aug. 31th, Free Research

I went to the British Museum. I set a goal to cover the "In 1 hour" course focusing on the ‘Don't miss’ exhibits specified on the Museum map and started the tour, but I gave up at Level 0 on the Ground floor. There were three reasons. 1. There were too many items 2. ‘Don't miss’ objects difficult to find 3. It was difficult to appreciate the individual exhibits without getting bored halfway. I will explain in order.

1. Too many items

There are just too many exhibits that I could not even figure out where to start! I felt it difficult to observe the exhibits because of the sheer overwhelming number of exhibits and rooms.

2. Don't miss' objects difficult to find

There are exhibits listed as ‘Don't miss’ on the floor plans. With your map to guide you, you are supposed to be able to get around them in about an hour’s time. However, there is no visible sign near the exhibit itself, so it takes a long time to actually find them. In the meantime, you will look at other exhibits that jump into your line of sight, costing you more time. And so it drags on, thus becomes a battle against the limits of your physical strength. I was very curious as to who planned the route and estimated the time. He must have had really fast feet and a concentration level as high as a mountain.

3, Difficult to appreciate without getting bored

I thought that the distinctions between the concept of passive and active was difficult. I think it is an active act for visitors to go around the exhibits, but it becomes passive as soon as they stand in front of a work. It is certain that the work radiates some power, and by accepting it, it may be regarded as active act. (That is the reason I get tired so easily in a museum.) However, I felt I couldn't appreciate it without motion for a period of time.

It seems that some measures are being taken for children and families, but so-called adult viewers basically left to fend for themselves, though they do have the help of audio guides.

For example, it seems that the below photos, probably taken when the item was discovered, could be more effectively displayed recreating the scene, maybe as a diorama. , and there could be a recreated film an audience can experience in VR when you find the exhibit in the second photo. There are many ways to do this.

I felt frustrated thinking there ought to be better ways to design the routes themselves to effectively present the artifacts and create a flow of the viewers, moving them in a productive way.

Sadly, it was an institution where I could not stay for a long period of time.

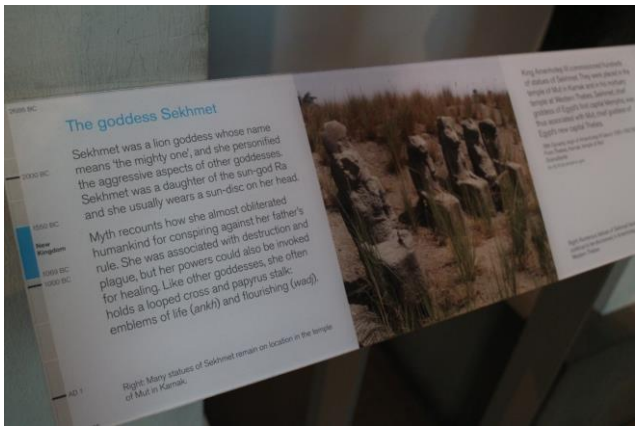

Fig. 10 Exhibition and explanation panel

▼Day8: Sep. 1st , Free Research

1) The National Gallery

When I visited the Art History Museum in Vienna three years ago, I was overwhelmed by the number of works of art, and it paralyzed my sense of value for them. However, this National Gallery was different.

The National Gallery is large in size and it goes without saying that the art on display is wonderful, but I felt that space was well produced here. I have considered why I felt such a difference despite it being the

same large-scale museum as the one in Vienna.

1. Many exhibition rooms are relatively compact, and many paintings also.

In places where people stay for hours like an art museum, it may be an important factor not to overwhelm people.

The Art History Museum in Vienna had many huge paintings, and I remember that there were also many large exhibition rooms. That may be one of the factors that led to a sense of overbearing pressure.

2. Facilitating appreciation through the setting, chiefly by color

The color of the wallpapers and their patterns, the color of the floors, the shapes and materials of the chairs ... Because there are many variations, it is less monotonous, and visitors can enjoy the display without becoming bored. Though they are not uniformly the same, there is also a sense of unity in the overall setting, and visitors do not get overwhelmed when viewing the artwork. Since the rooms are not too large, there is less distance between the artwork and the viewer, and chairs are set in a way that not only can the visitor appreciate the art, or take breaks in between viewings, but also talk quietly amongst themselves or just meditate, making it into an experience.

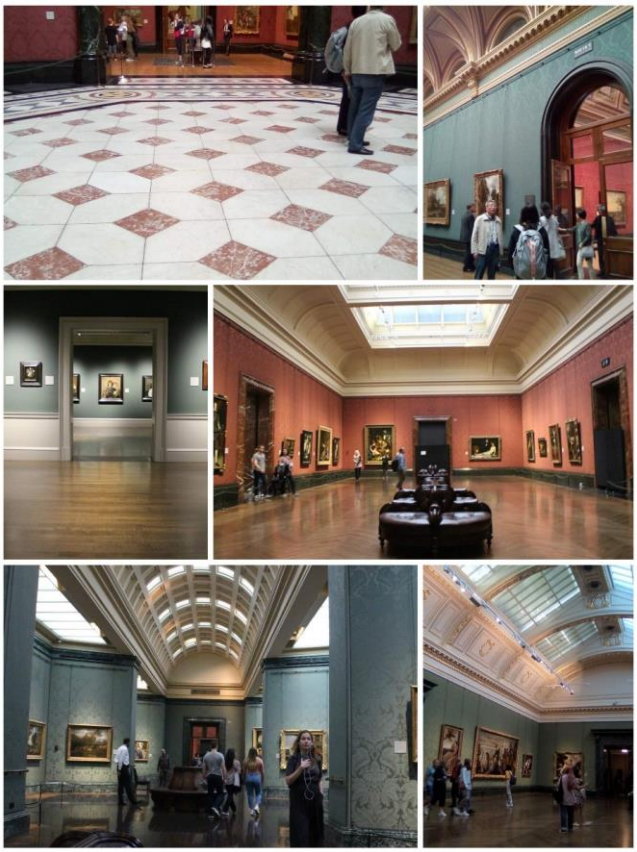

Fig. 11 The National Gallery

2) Allbirds

Allbirds is an US company that manufactures and sells sneakers that are high in quality in terms of design and comfort. The company has attracted attention for its business model that emphasizes sustainability, such as making all of its products from sustainable materials. It is sold mainly online, and real store are currently only in San Francisco, New York and London. The price is uniformly £95, the design lineup is minimalized, and the number of products on display is small, and the store design is very simple, as if expressing minimalism. In order to try on their products, it is necessary for the store clerk to

take them out of storage, creating the need for communication. Wooden chairs for fitting is placed in the centre of the store, and when sitting and leaning forward, the chair are designed to shift slightly forward to support it bearer's movements. The panel where the shoes were displayed was actually brought from a place that symbolizes London, and when I asked the clerk why, he explained that they was conscious of the image of the store brand. The interior of the store was unified with trees, birds and clouds and was conscious of nature.

Fig. 12 Allbirds

▼Day9: Sep. 2nd ,

AM: Royal Institution

Professor James guided us through the hall where Christmas lectures are held. The hall, where a steep slope of seats look down on the stage, has been a model for modern science shows for children since the first half of the 19th century and still carries on the tradition to this day. There is a museum in the basement that exhibits tools that prominent scientists of the past actually used in their experiments.

Fig. 13 Christmas lecture

PM: Royal Academy of Engineering(RAE)

The RAE was established in 1976 and is a relatively new organization in this visit. Their activities are based on the vision ‘Engineering is for Everyone’. Promoting the concept of Digital First, various efforts such as coloring and speed are being made in each target group. I watched a promotion video of young people working in the engineering world, where there is a heavyset, masculine image stereotype, but the video is presented dramatically like a movie trailer, targeting a young person who starts to contemplate his or her future occupation. In addition, I felt that the organization was trying to engage fully to change society and people’s involvement in science and engineering, using such tools as SMS and verifying its effectiveness.

The entire schedule of the training ended here. The following is an independent study.

Evening: Peloton

Peloton is a fast-growing US company which applies a SaaS + a Box business model that uses fitness exercise bikes as IoT, selling machines, and offering fitness programs by subscription. It entered London a year ago as a first location outside North America. In the store, people can test drive the machine and experience the program. The store located in Chelsea, a high-class residential area. I was excited about visiting the store and experiencing its fitness program, receiving information about its services utilizing both design and digital technology. Though it was necessary to provide personal information such as name, as I left the store, the store clerk called out "Bye, Hiroko!" I felt the power of design everywhere, including touch points with its customers.

Fig. 14　Peloton

▼Day10: Sep. 3rd：Free action

I visited Stonehenge and city of Bath, both of which are World Heritage Sites.

▼Day11. Sep. 4th：Moving day

Results

▼ Purpose and appropriate method

The five institutions visited during this trip aimed to improve their engagement with science using different methods for their purpose and target.

The Science Museum emphasizes joining people with STEM, and the Royal Society is characterized by subdividing its subjects. The Royal Institution has passed on the tradition of scientific communication centred on the youth of UK to the present. The purpose of the RAE was very clear. In POST, highly trustworthy information was sent out, creating an opportunity to debate scientific topics all around the world.

▼ Inclusive communication

I especially sympathized with the Science Museum's efforts. I felt that the nine action guidelines that they value were also relevant to the concept of social inclusion. In other words, increasing accessibility to science for those who feel distanced from science creates a more accessible environment for those who do not feel those barriers, and as a result, creates a society where all are able to reside in a world coexisting with science. And by including the ‘general population’ who seem to be far from scientific communication, which tends to be conducted only by scientists and people who have a specialized understanding of science, forces scientists and specialists to take in ideas from a new group of thinkers,

thus making it possible for them to incorporate new ideas creating a happier future for science.

▼ Way penetration

The reason I never felt uncomfortable during the four days in Science Museum was because the nine action guidelines permeated every feature of the institution. I achieved a variety of knowledge and skills, but I think the most important element is the skill of humans to activate them. I was very interested in the Science Museum's human resource development measures that made this possible.

▼ Hop, Step, Jump of learning design

At the Science Museum, a large learning design was planned from Science Show → Hands-on Exhibit → HP browsing → STEM learning, each aspect design for a specific purpose for to achieve the next step. Not only did the learning design circulate in a short-term cycle, I felt an overwhelming accumulation that the long-term learning design was also achieved during the decades in one human life course.

▼ Balance between tradition and innovation

However, there must have been a period of traditional exhibitions at the Science Museum, and will not be lost entirely. The secret of the Science Museum, which has evolved in contrast to the highly traditional method of exhibition at the British Museum, could not be fully pursued in this visit. If there is another opportunity, I would like to investigate further.

Future prospects

I would like to explore the impact and potential of music workshops on the participants and artists involved, by both research and demonstration.

The nine guidelines of SMG have also become my own guiding princles. I will need to do further research to use them effectively, especially when I am designing a workshop myself.

These guidelines can be used not only in the framework of scientific communication but in other fields of knowledge, and I would like to make use of what I learned when working with people from diverse backgrounds.

Suggestion

I felt that the idea of giving consideration to all people in order to connect science with people and society, and aiming for a fun learning experience its visitors is instilled in all of the Science Museum's exhibitions, various workshops, and its people. I want to investigate further into how the policy of human resource development and interactions with various organizations have made it possible, how they changed from traditional exhibitions, and the difficulties that lay in between. The experience of the Science Museum is more than just a framework of scientific communication, and seems to hold possibilities suggestive of improvement for many organizations.