

A Piece of Advice on Development of Virtual Museums of Musical Instruments
-- Proposals for Educational Uses of Musical Instruments Museums --

Yukari SHIROTA[†]

[†] Faculty of Economics, Gakushuin University 1-5-1 Mejiro, Toshima-ku, Tokyo, 171-8588 Japan
 E-mail: [†] yukari.shirota@gakushuin.ac.jp

Abstract Recently many museums have admitted the value of virtual museums on the Web and they have been developing their multimedia databases and virtual museums to publish their exhibits on the Web. This situation is highly desirable for us database researchers and encouraging. I hope that much more database researchers will technically support the museum curators who want to develop their own virtual museums. In the paper, I would like to describe a piece of advice on development of virtual museums of musical instruments for the database researchers through my experience in Oxford, UK. A virtual museum on the Web can easily provide viewers with a lot of information. It is, however, more important that visitors visit the real museums and be able to see and touch the actual musical instrument using their five senses. I think we should bear in mind when developing the virtual museum that a virtual reality museum exists only to supplement actual experience and that multimedia databases must play a supporting role to help and supplement the children's actual experiences with a lot of information. The best thing we can do for children would be to develop virtual museums that could have them want to go to the real museums.

Keyword museum, musical instrument, virtual museum, curator, Oxford.

1. Introduction

I have been researching effective museum usage for children from ages seven to 11 years. When children visit a museum and view the exhibits, even those who are impressed tend to forget what they have seen once the excursion ends. Thus, they are unable to apply what they have experienced at the museum in their school work. To facilitate the use of museum exhibits for educational purposes and enrich children's experiences, museum curators make various efforts, including providing useful pamphlets and leveraging the Internet. At a museum, for example free do-it-yourself activity sheets and trails are available for young visitors. Virtual museum facilities (24-hour museums) are also offered on the Web.

For children to benefit from museum visits, they require experiences both at the museums themselves and on the Web. Although digital augmentation dissolves many physical barriers, Web visits alone are not enough and children require real-life impressions of the museum setting to be motivated. I shall discuss effective museum usage by children from the viewpoints of both a database/e-learning researcher and the parent of an eight-year-old child.

The virtual museum facilities are necessary tools for their activities and more and more museums will try to develop their virtual museums on the Web. Then, more and more database researchers will support the museum curators. To help the database researchers I shall describe a piece of advice on developing of virtual museum facilities.

The target area of my research is museums of musical instruments at an early age. I spent a sabbatical research term as an academic visitor at the University of Oxford, from August 2006 through March 2007. During that time, I was accompanied by my son with whom I often visited musical instrument museums in Oxford and Europe to study his activity in the museums. I hope my experience would help the database researchers develop fruitful virtual museum facilities.

In the next section, I describe the significance to realize the differences among the collection and exhibition policies of museums. In Section 3, using my experiences with my son as examples, I describe my proposal for an instruction method for children. Following that I shall describe requirements for the educational use of virtual museums and give a piece of advice on development of the virtual museums.

2. Exhibition Policy of the Museum

In this section, I shall describe museums that my son and I visited. At the beginning of my research, the late Dr H el ene La Rue gave me the following advice: Each museum has its own collection and exhibition policy. It is important to identify and appreciate the differences among them. Therefore I would like to say the same thing to every database researcher: we should try to understand the collection policy of the target museum before we begin the development of the virtual museum facilities and the database construction.

As concrete examples of various collection policies, I shall describe the museums we visited and my impressions of them. I also hope that these descriptions would be helpful to understand typical activities of children and the parents in the museums, because I think that the virtual museum developer should deeply understand the museum visitors' activities.

(A) Bate Collection

(Oxford, <http://www.bate.ox.ac.uk/>)

The Bate Collection is located in the centre of Oxford and in the same area as the University of Oxford's Faculty of Music¹. In their book, Museums of Music, Kate Foster and H el ene La Rue note that the historical (mostly wind) instruments at the Bate are available to students to demonstrate how instruments of earlier periods influenced playing style². Even I can understand that it must cost a lot to keep such historic instruments in playing condition, because "use uses up" (E.A.K. Ridley, *corres.*).

Unaware of the staff's dilemmas, children on family fun days have great fun hearing the Serpent and the Russian bassoon played by the staff. My son also had an opportunity to play the Serpent. Later, while reading "The Silver Chair" of the *Chronicles of Narnia*³ which is a famous children's book, we came across the Serpent in Chapter 3. The experience at the museum helped us to understand the phrases in the book. I think that seeing many musical instruments in museums has made us take much more notice of musical instruments that appear in books and paintings or on ornaments. At the Bate, family educational sessions are also held so that children can learn about the care of historical musical instruments with their parent.⁴

(B) Pitt Rivers Museum (PRM)⁵

(Oxford, <http://www.prm.ox.ac.uk/>)

The PRM displays archaeological, anthropological and ethnographic objects from all parts of the world. The PRM is dark inside and great many things are on display. Walking among the exhibits with a torch, we come across many mysterious objects, such as shrunken heads and an African power figure. For us, it was like exploring unknown territory. Every time I opened the drawer under a display, I found many objects. This always made us excited about opening the next drawer. My son lay flat on his stomach on the floor because there were also many objects underneath the ordinary exhibits.

The PRM offers us many musical instruments from around the world. Thus I hoped my son would gain an understanding of the diversity of the world from the exhibits. I referred to a guidebook entitled "Pitt Rivers Museum A Whole Room for Music", when we looked at the musical instruments.⁶ This guidebook is excellent as it is written in plain English so that children can understand the contents. Although many musical instrument museums offer catalogues of their collections, they do not have such a guidebook for the excursion children, to the extent of my knowledge.

Surely at such museums we can learn to appreciate the countless ways of making musical instruments. It is impressive that various materials have been used as or to make musical instruments, including bones (both animal and human), animal skins, horns, shells, and bamboo. In addition, we can see many animal shapes and decorations on musical instruments. This is because people long ago lived in close contact with a variety of animals. We are able to get a glimpse of their ceremonies and events through their musical instruments, when we consider when and how the musical instruments were played. Although the PRM collection is not playable, its educational programme aims to bring children whenever possible into direct contact with instruments and sound-making, through such activities as the gamelan 'Metalworks' workshop for children held at the PRM⁷.

(C) Horniman Museum⁸

(London, <http://www.horniman.ac.uk/>)

Of the UK musical instrument museums we visited, only at the Horniman Museum and the PRM were we

able to see many musical instruments from around the world. In other countries, we found that the Brussels and Hamamatsu musical instrument museums also offer broad international collections. When I wrote a report concerning African musical instruments^{9,10} both the PRM and the Horniman Museum helped me greatly. Before visiting the music gallery at the Horniman, we repeatedly found the Horniman noted as the owner of items pictured in instrument books^{11,12}. Thus, we were pleased to find the same instruments as we had seen in the books at the museum.

In the music gallery exhibition room, there are two tables. Museum visitors are allowed to listen to the sounds of the instrument; the projector installed on the ceiling can display computerized images on the table desk. No headphones are required. It is good that we can listen to the sounds as we can observe the actual musical instrument in front of us. The IT facilities provide us wonderful modern conveniences.

(D) Ashmolean Museum, The Hill Collection¹³

(Oxford, <http://www.ashmolean.museum/>)

Here, we can see a violin made by Antonio Stradivari (1644?- 1737), as well as a guitar and a cittern that he also made. Nicola Amati's violin is also on display. These instruments are for preservation in their original form, not for playing: "hence the Hills were able to appreciate the need to preserve an historic record of instruments that would provide future generations with evidence of original makers' work."¹⁴

Although my son understands the collection policy that "this is a place for preservation", he said that he would still like to hear the sounds of these Stradivari stringed instruments. We could also see Stradivari's violins in Paris and Victoria & Albert. Because these are such valuable instruments, I wonder how much they are insured for by the museum.

Other than the Hill collection, I like the porcelain ornaments of players with musical instruments, such as the viol and the hurdy-gurdy, in the porcelain corner. We can get a sense of the players' lives from them.

(E) Brussels Musical Instrument Museum¹⁵

(Belgium, <http://www.mim.fgov.be/>)

We visited this museum on 1 October 2006. I think the key feature of this museum is its headphone

facilities. Thanks to a sensor and wireless connection, the visitor can listen to the sounds of any one of the numbered instruments when he/she stands in front of it. The point is the excellent sound contents, not the IT facilities. The music selected and recorded by the museum was so impressive that we were happy to listen intently to each instrument while looking at it. The content of the recording includes not only the sounds of the instrument but also a piece of music and the sounds of several instruments played together and background sounds, such as dancing and laughing, which enable us to imagine the performance environment. The sounds often made my son begin dancing in front of the exhibitions. Because he concentrated so hard when listening to the various sounds of the musical instruments, at night in his bed he said he could still hear them in his head. Certainly there were many sounds that we had not heard before.

The Serpent, the Russian bassoon, and the Buccin trombone are all displayed together because they all have snake heads or shapes. My son calls these three the "Serpent trio". In the Chinese instrument corner, we were able to see the "O", which is in the shape of a white, tiger-like animal. Because he had seen a similar one at the Hamamatsu, he was pleased to see the one in Brussels.

The most impressive exhibition was the violin maker's workshop. Seeing this room makes the visitor feel like he/she is in the actual workshop of a violin maker in Renaissance Italy. The exhibit reminded me that a good violin is made almost completely by hand. In the mechanical musical box corner, we could see the Componium, which is a music box with a cylindrical mechanism and the ancestor of the current computer: "The instrument can imitate a small orchestra and plays from a barrel (stepped drum) and represents a fine example of preprogrammed processes. Looking at the layout of the music 'program' it looks like a binary notation."¹⁶ I was surprised as I never dreamed I would be able to see the ancestor of the computer at the Brussels museum.

(F) Stockholm Musikmuseet¹⁷

(Sweden, <http://stockholm.music.museum/>)

The special feature of this museum is the sound room where there are many playable musical instruments, including the harp, the synthesizer, the

electrical guitar, and the dulcimer. Both my son and I were excited to play these valuable instruments. It was the first time I had ever touched a dulcimer. It was impressive. My son was attracted to some electrical drums and an African drum. Children of his age love to play percussion instruments. The musical instruments are soon worn out because the children play them so hard; they use the bows of the string instruments like saws, for example. However, playing the actual (not virtual) musical instruments is really enjoyable and the most impressive experience for children.

(G) Victoria & Albert Museum¹⁸

(London, <http://www.vam.ac.uk/>)

There is a music room in the Victoria & Albert museum (V&A). The authors of "Museums of Music" said, the following¹⁹: "The collection, which specializes in the Western art tradition, forms part of the Department of Furniture and Woodwork, and as such is regarded primarily for its importance as a collection of outstanding examples of design and cabinet making. Although held primarily as outstanding examples of design and cabinet making, the V&A's collection of mainly Western instruments is also of great musicological importance."

We obtained a copy of the instrument catalogue²⁰ before visiting the museum and checked those that we wanted to see. They were (1) Annibale dei Rossi's beautifully decorated spinet set, (2) Queen Elizabeth's beautifully decorated virginal, (3) Antonio Stradivari's violin, (4) Wendelin Tieffenbrucker's chittarone, and (5) Cristoforo Choco's archlute or theorbo. Rossi's spinet is very famous as the most valuable instrument because it is inlaid with 1,928 precious and semi-precious stones, including turquoise, lapis lazuli, topaz, emerald, sapphire, garnet, pearl, amethyst, jasper, cornelian and ruby.²¹ When I asked my son about this gorgeous spinet, his answer was, "I would like to have it because I would like to play it. It must sound like a stone, which must be completely different from a normal keyboard, because the keyboard notes are made of many stones." I found that a child will instinctively want to play an instrument when he/she sees it even if it is so materially valuable.²²

(H) Royal College of Music (RCM), Museum of Instruments (London, <http://www.rcm.ac.uk/>)

This museum is mainly for students at the college

and is not open to the public like other museums. I made an appointment to see the collection and obtained the catalogues^{23,24,25} in advance. Because children are not allowed in the museum, I went by myself. The building's atmosphere was very much that of a music college. I was lucky, as the Curator of Musical Instruments explained the details of the instruments to me. I have heard that the conservator regularly visits the museum to keep the instruments playable. I wonder whether only a few select students are allowed to play these valuable instruments.

I was able to see a clavicytherium (southern Germany -- ?, 1480) which is a very old keyboard, and a chitarrone made by Mango Tieffenbrucker (Venice, 1608). The RCM collects mainly western art music but there was also a corner for Asian and African instruments. I was so pleased to see a wonderful African lyre there.

(I) Hamamatsu Museum of Musical Instruments²⁶

(Hamamatsu, Japan, <http://www.gakkihaku.jp/>)

Even after having seen great musical instrument museums in Europe, I felt very proud that Japan has such a splendid musical instrument museum. The exhibition concept of the Hamamatsu Museum of Musical Instruments is "To exhibit and introduce musical instruments from around the world on an equal basis without prejudice and from the same viewpoint." As the concept says, there are also many Asian and African musical instruments on exhibit. In addition, wonderful keyboards, such as pianos, harpsichords, and clavichords, are exhibited, perhaps because Hamamatsu is where musical instrument makers Yamaha and Kawai were founded. At the museum, we can listen to explanations about the instruments and their sounds using earphones. After pushing the exhibit number on the hands-on equipment, we push the start button to listen. There are also PC corners where visitors can appreciate videos of the musical instruments.

The most attractive corners for my son were the experiential corners where he was allowed to play the instruments. There he was pleased to be able to play the raft-shaped zither, called a Tiawoun, from Burkina Faso, Africa. The explanation said that a tourist in the country had continued to walk playing the Tiawoun, encouraging himself with the music. My son also said that he would like to walk to a far

away country with a Tiawoun. Since then his dream has become to go to Burkina Faso to obtain a Tiawoun. After the visit, Prof. Gunji told me how to make a Tiawoun from bamboo, a process that seemed not to be so hard for us. My son's other favourite instruments at the museum were the Jagog (Bali, Indonesia) and the Javanese Gamelan Bonang (Indonesia).

Another feature of the Hamamatsu is that it provides many published brochures for special exhibitions, such as "Musical Instruments of Mexico & Guatemala". These brochures are very useful to help children understand the geographical information and the life styles of people in other countries in addition to their musical instruments.

(J) British Museum²⁷

(London, <http://www.thebritishmuseum.ac.uk/>)

Although the British Museum is not a musical instrument museum, it can greatly inspire children concerning musical instruments. On 20 September, 2006, as a volunteer parent, I helped teachers take a group of my son's primary school students in Years Three and Four (about 35 pupils) to the British Museum. We saw the following exhibitions on the main floor: Greece and Rome, the Ancient Near East, and Egypt. The British Museum is very big, and so although we saw only these exhibits, we became very tired owing to their grandeur. Before our visit, we searched the British Museum site to locate the oldest musical instruments: <http://www.thebritishmuseum.ac.uk/compass/>.

The "assignment" that I gave my son in advance was: Let's find the oldest musical instrument. I wish he were able to understand that human beings in ancient times also loved music and to play musical instruments. Seeing the Assyrian and Greek art helped him to understand the description in the book: "In most ancient civilizations, musicians were thought very important, second only to the kings and priests. This was true in Assyria."²⁸ Through my experience with the primary school pupils, I felt the following: It may be helpful for children to take snap photos themselves while visiting the exhibits. If it is impossible or impractical, it would be ideal if the museum would offer them some photos for their convenience. At home or at school, it would be ideal to have PCs and color printing facilities to enable the children to print out their favourite photos

because visual memos are effective.

3. Instruction Method

In the section, I shall describe an instruction method problem. The problem is "How can school teachers/parents get children interested in museum exhibits and help them learn something (namely identify underlying principles/theories) by analyzing museum artifacts?" This is also a significant problem while developing virtual museums.

I think that if children were given an "assignment" in advance, they would become more interested in seeing the exhibition. Although I am not sure whether or not these would be effective for children in general, following are the methods that I tried on my son's visits.

- (1) Usage of visual materials, such as portraits of great composers.
- (2) Studies of the geography and history of the region.
- (3) Comparisons between European and Asian/African instruments.
- (4) Questions concerning his favourite instruments and why he liked them.

3.1. Usage of visual materials²⁹

To get children interested in great composers and their masterpieces as well as in musical instruments, I would like to propose a method whereby we start giving explanations about the great composers at the time we view the actual museum exhibits. I think the visual impact of the exhibits would be significant. If some of the exhibits were related to famous historical persons it would be more effective.

A good example of this kind of instruction involves Handel's 1720 harpsichord in the Bate Collection. The collection includes a portrait of Handel by Philip Mercier in which the composer, a quill in hand and with a manuscript on the table in front of him, is leaning on a single-manual harpsichord. "The harpsichord in the portrait is almost certainly Handel's own, as it is unlikely that he would have wished to be shown in a portrait with an instrument that had nothing to do with him; indeed, the music in front of him in the portrait may even be sketch work for the keyboard suites published in London in 1733."³⁰

In front of the portrait and the harpsichord, I asked my son the question, "Do you think the harpsichord

in this portrait is this harpsichord?” His answer was, “I think it is this harpsichord because the black keys of the harpsichord are same coloured as the white line between black lines.” Then I explained Handel’s masterpieces and his life to my son in front of the portrait. Seeing the harpsichord makes children want to hear its actual sound and that of other instruments on exhibit. Some CDs recorded by the Bate Collection using the instruments they have on exhibit, such as one entitled “Henry Purcell Suites”, are available at the museum.

3.2. Studies of the geography and history of the region³¹

Comprehensive studies of musical instruments together with regional details, such as geography and history, should be effective in helping children to understand a region. To implement this learning method, I selected the Aztec, Mayan, and Inca civilizations. My planned study processes were as follows:

1. Learn about the history of the Americas, particularly the Aztec, Mayan, and Inca civilizations.
2. Learn about the musical instruments of the times and the region.
 - What musical instruments were there?
 - Why and how were the instruments played?
3. Find and look at the musical instruments of the Aztec, Mayan, and Inca worlds at the PRM.

In implementing this, the brochure for a special exhibition on the musical instruments of the Aztec and Mayan civilizations published by the Hamamatsu Museum of Musical Instruments was helpful³². The museum has also published brochures about African and Oceanic instruments, and these were helpful in learning about various aspects of that region and its musical instruments^{33,34}.

The biggest surprise for us was that string instruments were practically unknown in the Americas, that is among the Inca, Aztec and Mayan peoples. After my son and I had been pondering the reason, I received the answer from Dr H el ene La Rue on 2 November, 2006. It was because there were no horses in the Americas. Horse tails are the best materials for a bow. Because there were no ideal bow materials, there were no string instruments in the Americas. This lesson made us more interested in the relationship between musical instruments and the

materials obtainable in specific countries/regions.

After surveying the instruments in picture books, we visited the PRM. There we were pleased to find actual musical instruments similar to those in the picture books. However, it was difficult for us to find the musical instruments because even if the area name is Mexico, for example, we were unsure whether the time of the musical instrument was before or after the Spanish Conquest. However, this kind of search at the museum is very educational because children require both geographical and historical knowledge while intensely reading the exhibit explanations. In addition, children would be able to imagine peoples’ lives in these civilizations through their musical instruments. I think that searching for musical instruments in this way would be educational for children of aged seven to 11 because it requires much preparation before they can identify the musical instruments at the museum.

3.3. Comparison between European and Asian/African musical instruments³⁵

Many people from a Western culture are familiar with Western/European music idioms and sounds, but not particularly familiar with Eastern/Asian idioms and sounds. An interesting study would be on the ways of teaching these differences at an early age, gauging young children’s reactions to different musical cultures. Concerning this study, I would like to make it one of my future works.

3.4. Questions concerning a child’s favourite instruments

I always ask my son during a museum excursion, “If you were told that your favourite instrument would be given to you, which instrument would you select?” Of course, he knows that the instrument on exhibit is too valuable for us to obtain, but such questions make him much more interested in the musical instruments. Another question might be, “Which instrument would you like to learn to play?” Additional questions are, “Why do you like the instrument?” “Why would you like to play the instrument?” “How do you like the sounds?”

Both before and after seeing the exhibitions, I think a teacher or a parent should ask the children such questions. And, when he/she begins to talk about his/her favourites, the parent should concentrate on what the child is saying. At the same time, parents should think about their favourite instruments from

the same viewpoint as the child.

4. Requirements for Virtual Museums for Educational Use

I shall discuss an ideal excursion plan for a musical instrument museum. From our experiences visiting museums, I would like to request the following of museums:

- (1) I would like to be able to listen to the sounds of each instrument in front of the instrument itself.
- (2) I would like to be able to touch and play the instrument if at all possible.
- (3) I would like to be provided with only the summary information that I want. The long and detailed explanation would be boring.
- (4) I would like to be able to access the virtual museum/database on the Web after returning home or to school for much more information of the instruments.

These are our basic requirements. My main point is that listening to the sounds of each instrument while standing in front of and looking at the instrument itself would be much more effective than only watching a video in a location separated from that of the actual instruments. When I asked Prof. Gunji about the key factors for a musical instrument museum, she answered as follows³⁶:

(A) It is most desirable that museums offer an environment with simple instruments, where children can make instruments by themselves and listen to the sounds. Such experiences would make children interested in sounds.

(B) The museum should offer children opportunities for concentrated listening. Whatever the target, concentrated experiences are important for children.

Prof. Gunji also said "I think it is preferable that we use virtual reality devices to supplement actual experience."

Because I am a computer scientist and my field of specialty is databases, I tend to think about multimedia database construction as a primary matter. However, children should first visit actual museums as much as possible. Virtual museums and multimedia databases should then support their actual museum excursions. I think that Prof. Gunji's comment taught me something very important concerning the purpose of/policies on virtual

museum construction.

These advices of hers are helpful for us database researchers while we develop virtual museums on the Web. I shall describe the advices I was given as conclusions I reached from my studies as follows:

- (1) From Prof. Guji: Although we tend to think about multimedia database construction as a primary matter, children should first visit actual museums as much as possible. Virtual museums and multimedia databases should then support their actual museum excursions. The best virtual museums would be ones which have children want to go to the real museums;
- (2) From the late Dr La Rue: Before the development, we had better understand collection policies of the target museum which vary from museum to museum; and
- (3) I think: When we develop virtual museum software, we should observe children's activities much more to develop well-organized software which can get children interested in museum exhibits and help them learn something (namely identify underlying principles/theories).

I think these three advices are also useful to develop a virtual museum in every field, not only just in musical instruments.

5. Conclusions

To make children's museum visit fruitful, preparation and follow-up work using the virtual museum and various Web sites are required. When I consider virtual museum construction as a database researcher, the important thing to keep in mind is that the most significant experience for children is seeing and listening to the actual instruments, and, if possible, playing them. Although we tend to think about multimedia database construction as a primary matter, multimedia databases must play a supporting role to help and supplement the children's actual experiences with a lot of information. I think the best thing we can do for children would be to develop virtual museums that could have them want to go to the real museums. I also wish my experiences with my son described in this paper would help the database research people more understand the children's activities in the museums

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