The university museum: respecting old values, embracing new directions

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Abstract

Preserving collections for future generations does not exclude finding new and modern uses for collections, thus combining 'old' materials with new ideas and modern technologies. In this article, I demonstrate how we use our collection specimens for knowledge communication while not only conveying scientific information, but also the historic and cultural significance of specimens; how they are used not only for classes and exhibitions, but for workshops where students determine group characters and find evolutionary processes, and for bachelor dissertations in science communication. We are developing workshops to be accessed by students through the internet while studying the actual specimens. We organize workshops on the use of the senses and the strength of the scientific method. Behind the scenes, we are conversing with others to form one university museum with a collective mission statement and an original niche within the museum community that corresponds with expectations of the public.

Introduction

Our first duty is to preserve collections for future generations to study and research the collections, and to help the public understand the knowledge behind the collections. How can we combine these primary duties interactively without endangering the specimens? In order to preserve them, we need to find new uses for these collections. As Michael Mares (2006) stated, museum collections form the thread that combines the past with the future.

To protect and serve

Protecting collections is not locking them away in a cupboard. By using them for research education, we ensure their future existence by demonstrating to those that fund us that collections render service to the public. The following list gives examples of lectures, workshops, practical courses that we organize in our museum with our collections, but which can to some degree be adapted with other collections.

Informing and educating the public in our museum is done on various levels:

1. Giving lectures to peers on conservation techniques, and associated tests in our museum.
2. Lectures to peers and students on marketing museums.
3. Lectures to students on how to give a presentation.
4. Lectures on 'what is a museum' and the code of museum ethics.
5. Suggesting bachelor theses on organizing exhibitions.
6. Suggesting bachelor theses on morphometrics: isometric growth studies on skeletons of related specimens or species.
7. Organizing practical courses and workshops.

For these we use, and need, our collection specimens.

For example, in bachelor theses on isometric growth studies on skeletons of related specimens or species, students have to compare specific bones of different skeletons of related species or of the male and female within a species. The student takes digital pictures of the bones and using freeware

geometric morphometric software in order to visualize shape variation through grids being virtually positioned on the bones.[1]

In a bachelor thesis on organizing an exhibition the student is confronted with three important aspects of the work of a scientist and biologist: (1) science communication ("how do I convey this subject or matter to the public?"); (2) organization ("how to create and establish an exhibition?"); (3) presentation ("with what means do I communicate this subject to the public?"). Exposing students to this challenge develops object literacy and museum literacy.

In practical courses on zoology conducted in our museum, bachelor students have to solve a list of questions by means of looking and studying the skeletons, thus learning the characters of vertebrates (different characters of reptiles, birds and mammals; positioning of muscles for use in locomotion and foraging, etc.).

A second part of that same practical course deals with convergent evolution (see below). These practical courses are part of the zoology curriculum, and are given by the curator or by assistants, but the professor of zoology also gives some lectures inside our museum, using the collection specimens to illustrate the lessons, eventually examining the students, using specimens from our museum.

Seavolution was a science education project with experiments, workshops, and lessons on marine biodiversity, genetics and evolution of sea organisms.[2]

A genetics workshop took place in the lab of our counterpart (Katho, Roeselare). Our own workshop for schools on vertebrate evolution was so successful, that although the project itself finished some months ago, teachers and professors of secondary schools, high schools and other universities still attempt to book this workshop for their students.

We run a course on the principles of variation, adaptation, speciation, and evolution, and on recognizing clues of evolution (DARWIN 1859). During the workshop students have to look for clues to answer and discuss three questions:

1. Do species change and evolve more and more apart from one another (divergent evolution)?
2. Do unrelated species change to look more and more alike (convergent evolution)?
3. Can we see evolution at work or happening in front of us (do transitional forms exist)?

To solve the first question, the students have to recognize and identify at least four different skull bones and compare these between skulls of different species of pets and wild mammals. Studying these bones gives clues towards evolutionary tendencies. For example, when the nasal bone and frontal bone retreat (and the premaxillary bone lengthens), the nasal opening shifts backwards and tends to grow upwards. This can be observed in domestic pets (shorter snout either for puppy effect or for fighting purposes; *Canis lupus*: three dog races; Greyhound, Chihuahua, and Boxer), and in marine mammals (comparison of *Procyon lotor*, the Raccoon, with *Monachus monachus*, the Mediterranean Monk Seal; also when comparing *Procavia capensis*, Hyrax, with *Elephas maximus*, Elephant, and *Dugong dugong*, Dugong; and finally comparing *Hippopotamus amphibius*, Hippo, with *Delphynapterus leucas*, Beloega, and *Orcinus orca*, Orca).

The second question concerns the importance of a niche. When an animal becomes adapted to a certain habitat or niche, it then obtains a best suited shape for that niche. When unrelated animals (say a reptile and mammal) inhabit a similar niche, then they may have a similar form. The best known example of convergent evolution is that of the Thylacine and wolf or dog (fig. 1a & b) where not only the animals look alike, but also their skulls are very similar.

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[1] Morphometrics, life.bio.sunysb.edu/morph/ (accessed September 12, 2012).
[2] European Society of Evolutionary Biology: Outreach Initiative 2011. Title: *Seavolution*.

Fig.1 - *Canis lupus*, Wolf, skull (missing a few teeth, fig.1a), and *Thylacinus cynocephalis*, Tasmanian Tiger, skull reproduction (fig. 1b). Photo: D. Verschelde

The third question deals with witnessing evolution and transitional forms. Transitional forms within the Skinkidae (Reptilia) (lizards with normal extremities [arms and legs], forms with smaller extremities, to form without extremities all together (fig. 2 a & b) suggest a transitional series within that group).

Fig. 2 a & b - A series of Skinkidae, illustrating forms having normal extremities to being legless. Photo: D. Verschelde

In the workshop *Pond Creatures* children and students look at the collection specimens to see protists, invertebrates and vertebrates. Then they go out to collect their own samples which they must identify.

In our extended *Sensible Senses* workshop, children and students learn through fun exercises and experiments how important it is to use all our senses in order to make good observations and critically analyse them. Through these exercises and ‘games’ the children and students are positively confronted with the scientific methodology and the power of critical reasoning.

Based on the response we get, we notice that organizing all these workshops and programs gives much satisfaction not only to us but also to the students and teachers. However, we have not yet surveyed the students who have done these programs to see whether there was any statistical change in attitude to the subject area, nature in general, the museum, and/or the university

Modern times

Having organized a number of different workshops, we are now working to make these accessible through the internet. We will offer these digital workshops as several different components that can be chosen and combined by the 'customer' into packages of their own choice.

We want to experiment with 3D pictures of skulls and other skeleton parts or organs, using 'Vi3Dim' which is a software package that generates a 3D surface image based on ordinary video camera pictures.[3] With this process there is no need for a laser scanner.

Surviving in modern times implies not only being aware of interesting technologies, but also that you are aware of the contemporary interests and issues of the community. In 2012 our exhibition *Olympic heroes?* provided a comparison of the sport achievements of Olympic and world gold medallists with the abilities of animals in similar events. It is a good idea to add historical and cultural context to your own subject of expertise in exhibitions. Thus, to give an example, we demonstrated that although Usain Bolt can run the 100m in 10.59 sec (almost 38km/h);[4] a greyhound runs at 66.8km/h,[5] the cheetah runs at 120km/h,[6] and the tiger beetle (*Cicindella* species) even runs at the speed of 8km/h.[7] This last result seems not so much at first, but if a tiger beetle would have the size of Usain Bolt, it would run the 100m in 0.7 seconds (a staggering 466km/h).

Behind the scenes

University museums always have to look over their shoulder. Even though science communication is a major issue for many organizations which provide important funding, university governments often still are convinced that science communication needs to come from their professors and researchers in their labs, even if these academics see themselves as researchers and teachers, but not as 'communicators'. Even when the staff of university museums think of and organize a ground breaking new idea university management need to be persuaded of its importance.

It is a matter of having to constantly assert our value to those that make management decisions. The importance and difficulties of this issue have been discussed by Michael Mares (2006).

Thus, behind the scenes, and within our university walls, we are combining our thoughts with several collection curators and directors to form one university museum with a collective mission statement; hoping to form the Gent University Museum(s). Our group (Archaeological Collection, the Botanic Garden, the Ethnographic Collection, the Morphology Museum, the Museum for Medical History, the Museum for the History of Sciences, and the Zoology Museum) aims to obtain a regional recognition, 2017 could be a quadruple anniversary: 200 years Ghent University (bicentennial birthday), 200 years Ghent University Zoology Museum, 20 years as the first Flemish university museum curator, and hopefully the birth year of the Ghent University Museum. Combining different collections together is no easy task, but we have to take hart, as in France university museums were even able to organize themselves towards cooperating among different universities.[8] The importance of 'strength in numbers' was also commented on by Michael Mares in Lisbon.[9]

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[3] Vi3Dim Technologies, www.vi3dim.com/ (accessed September 12, 2012).
[4] Human records: IOC 2012. www.olympic.org/medallists-results and www.olympics-records.com/olympic_records (accessed September 12, 2012).
[5] Windhonden.Net, www.windhonden.net/site/ (accessed September 12, 2012)
[6] Natuurwetenschappen.Be, www.natuurwetenschappen.be/museum/exhibitions/games/_noflash/records (accessed September 12, 2012).
[7] Natuur-Wereld.Be, www.natuur-wereld.be/natuur/insecten/kevers/groene-zandloopkever.php (accessed September 12, 2012).
[8] Conference in Strasbourg, February 2012.
[9] UMAC Conference 2011, oral communication.

The Ghent University is starting to recognize the importance of reaching out to primary and secondary schoolchildren as well as high school students. Last year the university, together with several professors and scientists of the science faculty, organized the *Children's' University* on a Saturday. We presented a program of lessons and practical courses from which the attending children could choose a curriculum for the day. After their days work, they each received a *Children's' University* diploma. Contributing to this event our museum organized the practical course *Sensible Senses*, on the use of the senses and the importance of critical thinking (for example, we demonstrate that 'tasting' ones food is not just a matter of using ones taste buds, but that it is the result of combining four observations: when 'tasting' you see the food, than smell the food, even touch and feel it with your tong, and finally you use your taste buds; that's why we say "it smells delicious" as it is a part of tasting).

Conclusion: Let's stick together

Museums could be considered as a unique species of marsupials that has been on the brim of extinction for a long time. We will have to stand up to placental competition with vigour in order to survive and defend our territory.

Maybe we need to organize (from within UMAC) a worldwide uniform university museum studies program to which we all contribute pending on our specific field and experience. This program could then be presented, and organized as a summer class curriculum, in our universities all over the world, making it an undeniable asset to the education of students. I would like to invite all of you who are interested in this and have constructive ideas on the subject to communicate with me, UMAC and each other: there is strength in numbers!

Something to think about

Procuring, distributing and sharing knowledge obtained by critical reasoning is the main objective of scientists. I'm convinced that it is our duty to share this knowledge with the general public, meanwhile conveying the strength of the scientific methodology and the importance of critical reasoning. But I have also observed that for some children or people 'science' can be a bit of a scary word. So, I would like to suggest using 'knowledge communication' instead of 'science communication' in the future.

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[10] Voorbereidende studie tot het oprichten van een nieuw universiteitsmuseum (Projects on science and community, call 2011; Preliminary study aiming to establish a new university museum).

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