

YOUTHS' ENCOUNTER WITH THE HUMAN JOURNEY: A STUDY OF LEARNING IN AN EXHIBITION OF THE SWEDISH MUSEUM OF NATURAL HISTORY

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Anna: I just wonder how the hair stops growing... in one generation.
Lisa: I think so... I think that is more...
Anna: I believe that depends on the climate...
Lisa: Aha.
Anna: ... *where* is. The warmer is the country...
Lisa: Aha.
Anna: ...the lesser hair you need.
Lisa: I thought so too, when it is colder they need more to protect themselves
Anna: Mm.
Erik: Look at me!
Anna: It should be like dogs, now.

This is a short fragment of the conversation between three sixteen year old youths during their visit to the exhibition *The Human Journey* at the Swedish Museum of Natural History in Stockholm, Sweden. This and many other videotaped conversations represent the empirical material of the research project *Youths' encounter with The Human Journey* which aims to study learning in the encounter with the exhibition. In this contribution we will use some preliminary results of the project research to show how we can analyze the learning process and what is learned in interaction with the object in an exhibition and interaction between the participants. Firstly, we will describe the exhibition and the educational activity where the study is imbedded. Secondly, we present the frame work of practical epistemologies analysis, used in previous studies of learning in museums (Piqueras & Edvall, 2008; Piqueras, Wickman & Hamza, 2012). Finally, we briefly discuss how this kind of analysis can be used to evaluate the educational activity and fine-tuning the museum exhibition.

The exhibition – The Human Journey

The exhibition *The Human journey* at the Swedish Museum of Natural History has three marked paths at the floor. The main path follows the major steps in human evolution, from the first upright forms in Africa to modern man, represented by eleven naturalistic models of

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early human ancestors. Every model is based in the reconstruction of a specific individual and has been created by the French artist Elisabeth Daynès (<http://www.daynes.com>). The models are placed in glass exhibition stands and can be observed and studied from different locations by the visitors with the natural environments where these hominids lived displayed on columns nearby the glass exhibit. For this study, we chose three exhibits along the main path. The first one in the time axe is a reconstruction of two grown-ups, a male and a female, of the species *Australopithecus afarensis* which lived in open forests of Central Africa for 3,3 million years ago (Figure 1). The female represents the most famous of all human fossils, Lucy, found in 1974 in the Hadar region, in Etiopia. The individuals of this species walked upright, had a small brain, long ape-like arms and pronounced sexual dimorphism (males were noticeably larger than females). The second exhibit displays a reconstruction of the species *Homo ergaster* that evolved nearly 2 million years ago (Figure 2). The reconstruction is based on the skeleton of a 10-12 year old boy found in Turkana, Kenya. He was a long an slender youth with the similar body proportions than people living in the same environment today, which it has been suggested to be an adaptation to the hot and dry climate of the savannah. In the last exhibit displays three individuals of the species *Homo neanderthalensis*, one of the few species of human ancestor evolved outside Africa (Figure 3). The Neanderthals died out less than 30.000 years ago and during the last 10.000 years they lived side by side with modern humans in Europe. *Homo neanderthalensis* was the first species to be adapted to cold climate conditions, which is suggested by the short and muscular body. The environment displayed nearby the Neanderthals exhibit is a European beech forest.

The educational activity – exploring and talking in groups

The data provided for the study comes from a videotaped activity of the educational program of the museum. This activity, developed by the museum educators (Edvall & Ek, 2008), is designed like a work-shop, where the school classes explore the exhibits in small groups. At the beginning of the activity, the students are asked to study one of the exhibits during few minutes and write down some questions elicited by the study of the exhibit. After that, the group discusses the questions during ten to fifteen minutes. During this process of observations and study, the exhibits texts are hidden and many ideas and interpretations about what is displayed arise in the conversation. In the last part of the activity, each group presents an account of their observations and questions for the rest of the class. During this

presentation, the questions elicited by the exhibit are reexamined and discussed with the museum educator. The activity has been inspired by pedagogical similar approaches used in museums of arts (Housen, 2002), but also from the museum educators experiences at the natural History of London. However, in the activity developed in the Swedish Museum of natural History, the own questions of the students developed from observations are the start point and the pivotal element for the development of the conversation, rather than an interpretation of the exhibit in term of scientific explanations. In this particular exhibition, The Human Journey, each group studied the three exhibits, *Australopithecus afarensis*, *Homo ergaster* and *Homo neanderthalensis*. Additionally, we asked to compare the exhibits and discuss the changes occurred in the human evolution in relation to environmental changes.

Youths meet the exhibition - studying learning

The theoretical framework that we have used in this study is the practical epistemologies analysis initially developed by Wickman and Östman (2002). Based on the work of Dewey, the later Wittgenstein and sociocultural perspectives, they suggested a theoretical mechanism for studying learning on a discursive level. Approaching learning discursively means focusing on how people act in order to take the activity forward a purpose. By studying what people do and say as part of whole activities having purposes, we can describe what they learn in terms of how they use previous experiences to cope with new situations. This description of learning can be done using four analytical concepts: *encounter*, *gap*, *relation* and *stand fast*. To exemplify our analysis, we use the short fragment of the conversation between Anna, Lisa and Erik when they met the exhibit of the *Homo ergaster*, after they have studied the hairy Neanderthals (Figure 4).

The *encounter* in this situation is with the model and the surroundings environments represented but also the explicit instructions of the activity. As a result of this encounter, a *gap* is noticed by Anna (“I just wonder how the hair stops growing... in one generation”). To fill a gap, the participants establish *relations* to those things which they are familiar with and they do not need to put in question at the moment. Thus, Anna establish a relation between the lack of body hair in warm climates (“I believe that depends on the climate... *where* is”; “The warmer is the country, the lesser hair you need”), meanwhile Lisa establish a relation between body hair and cold protection (“I thought so too, when it is colder they need more [hair] to protect themselves”). Finally, Anna establishes a relation to another species that

shows the same kind of adaptation (“It should be like dogs, now”). We can see here that Anna and Lisa establish relations to their previous knowledge and experiences to fill the gap, and Erik, apparently, is a passive listener in the conversation. However, we can see in Erik’s body expressions that he is confirming Anna and Lisa’s relations to fill the gap and, humorously, call their attention to his warm, hooded sweater (“Look at me”). In the conversation, the students establish relations to things and words that *stand fast* and are used without hesitation or questioning. For instance, when Anna says “where”, it is clear for Lisa and Erik that it is about a place as geographical location, or words like “climate” which is used by without further explanation.

Summing up, we can say that Anna, Lisa and Erik have learned something new in the encounter with this exhibit and in the encounter between them. To understand what these youths have learned, we analyze what gaps are noticed and how they use what stand fast in the encounter to fill the gaps with relations. By means of these analytical concepts, gaps, relations we can make detailed descriptions of learning, what we call practical epistemologies. Studying the learners practical epistemologies allow us to see if they are really learn more than isolated facts, for instance if they can link the observation they make in the exhibition with theoretical knowledge or which encounter with the exhibit can be problematic for their further reasoning.

A large-scale analysis of the conversation

The analysis of practical epistemologies allows a high-definition analysis of the learning process; however, in order to get a whole picture of the group activity visiting the three exhibits, we divided the conversation into a series of steps, where the criteria for segmentation are the themes discussed (Piqueras, Wickman & Hamza, 2012). For instance, the conversation of two youths, Filip and Max, can be described as a sequence of 31 chronological steps, from the first one when they started studying the exhibit of *Australopithecus afarensis*, to the last one at the exhibit of Neanderthals (Figure 5). Displaying the conversation as a series of steps allow us to identify which themes were revisited (e. g. hair) or to study specific relationships between different themes in the activity. An example of the latter is presented in the following excerpt which corresponds to the eleventh step (Figure 5), when Filip and Max talk about the body of *Homo ergaster*:

Filip: Yes... wait a moment... eh...how you say... this looks... how can I say... frailer out

than...

Max: Yes, I thought it too. He is a little bit slenderer.

Filip: Especially the legs, they look very frail and breakable out.

Max: Yes, especially this. But I guess that we become more mobile now.

Filip: Yes...

Max: This is a huntsman, so to say run-after-animal-style. That thing stand fast [points to *Australopithecus*]. Whatever it is called... they were more passive in his doings.

Filip: Yes, so they were certainly a lot more [points to *Homo ergaster*].

Max: Yes, a bit tribe-style [English expression].

Filip: Then... he holds a pebble, you see.

Max: Eh... or it is a flint?

The theme begins with Filip noticing a gap (“this looks... frailer out”), which is confirmed by Max using other expression (“slenderer”). It is clear that they are comparing *Homo ergaster* with the previously visited models of the bulky *Australopithecus afarensis*. Afterwards, Max and Filip establish different relations to fill the gap (“become more mobile”, “this is a huntsman” “run-after-animal-style”), grounded in their previous knowledge and experiences about modern hunting folks living in Africa. At the same time, Filip and Max establish relations to observations of the *Australopithecus afarensis*, for instance they suggest that these hominids are more passive and probably slower (“stand fast”, “more passive”). After these turns, a new theme begins (Pebble, step 12, Figure 5) when Max and Filip noticed a new gap (“he holds a pebble”). Interestingly, the relations established in the body theme of *Homo ergaster* (step 11, Figure 5) helped Filip and Max to fill a previous gap, noticed, in the first theme, at the beginning of the conversation, at the *Australopithecus* exhibit (Social, Step 1, Figure 5):

Max: Ok! Yes, what are the differences and similarities... mainly social... how? ... Were they in tribes, or were they lone wolves, or in packs?

Filip: Yes.

Max: Or, did they live at the same place, or went around and looking around?

Filip: I assume that it is a woman and a man.

From the last turn of the excerpt (“I assume that it is a woman and a man”), we can see that Filip and Max initiated a new theme (Sexual dimorphism, Step 2, Figure 5), without have been filling the gaps of this first step. These gaps linger until Filip and Max established relations when the exhibits were compared, but also relations to previous knowledge and new observations. It can be concluded that making comparisons between different exhibits of the exhibition, one of the purpose of the activity, help these to go proceed with their reasoning.

A tool for the museum educator and curator

It is important to point out that the analysis of practical epistemologies exemplified here is used as an analysis of the direction learning takes, but it does not automatically say anything about the significance (or correctness) of what was learned as accepted scientific knowledge. As stressed by Wickman (2004), this kind of description of learning is made first from the point of view of the learners, that is what they count for them in this specific activity with its specific purpose. For these youth, the specific purpose of this activity is stay questions when they study and compare these threes exhibits of The Human Journey. However, the museum educator or teacher can, afterwards in the group discussion revisit gaps, question and aspects of the exhibit that turn to be challenging or problematical. For instance, here it could be discussed if the changes of the human body in relation to climate changes, suggested by Anna, Lisa and Erik can possibly occur in one generation. In the case of Filip and Max, they can be challenge to explain what kind of evolutionary mechanism could be behind the morphological changes observed in the evolution from *Australopithecus* to *Homo ergaster*.

The analysis of the conversation can also be used for evaluating the activity, the instructions and questions addressed to the students. Similarly, an analysis of the gaps noticed in the encounters with the exhibits and the exhibition as a whole can be made, and these compared with the curational intent. For instance, from our preliminary results we can conclude that the presence of hair in the models is often used by participants as an evolutionary explanation for adaptation to the climate. This can be partially correct, but there is other aspect to take account behind the evolution of body hair in the humans. Furthermore, since that hair and other characters as skin or eyes color do not left do not left direct fossil evidence, it could be important to highlight in the exhibition text that some parts of the reconstructions are more tentative than others.

References

- Edvall, S. & Ek, C. (2008). See, interpret and understand. The use of museum exhibits in informal learning. *European Network of Science Centre and Museums Annual Conference 2008*. Budapest.
- Housen, A. (2002). Aesthetic thoughts, critical thinking and transfer. *Arts and Learning Research Journal* 18(1): 99-131.
- Piqueras, J., Hamza, K. M., & Edvall, S. (2008). The practical epistemologies in the

museum: A study of students' learning in encounters with dioramas. *Journal of Museum Education*, 33(2), 153-164.

Piqueras, J., Wickman, P.-O. & Hamza, K. M. (2012). Student teachers' moment-to-moment reasoning and the development of discursive themes – an analysis of practical epistemologies in a natural history museum exhibit. In E. Davidsson & A. Jakobsson (Eds.) *Understanding interactions at science centers and museums - A sociocultural perspective* (pp. 79-96). Rotterdam, SensePublishers B.V.

Wickman, P.-O. (2004). The practical epistemologies of the classroom: A study of laboratory work. *Science Education*, 88(3), 325-344.

Wickman, P.-O., & Östman, L. (2002). Learning as discourse change: A sociocultural mechanism. *Science Education*, 86(5), 601-623.