



Conflicts between Learning in Natural History Museum and School

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Abstract

The project practical is a biology teacher education course at University of Vienna with more than 15 years of development and experience. The overall aim of this course is to work on specific learning environments with teacher students including teaching practice in schools. So far different learning environments were offered for teacher students. The latest development is learning in the Natural History Museum in Vienna. Learning at museums was already in focus of research. Museum learning is described as constructivist oriented, self-determined; it is authentic due to the objects displayed. At the opposite school learning is regulated by the state curriculum and very often teacher centered. Many studies show a lack of consciousness about the possibilities of the museum as a learning environment by the teachers coming from school. Very often the conception of learning is transferred directly from school to the museum; therefore the strengths of museum learning are ignored. In this paper we focus on teacher students who create learning environments in the natural history museum for students.

Therefore our questions are: How do teacher students and students learn in a museum during an excursion? How do they conceptualize learning?

Three classes with teacher student teams were visiting the museum for 3 hours, 4 school lessons were dedicated for preparing and debriefing the museum visit. The dataset consists of participatory observations in the museum, and artifacts from the whole process.

Analysis was conducted with qualitative content analysis to find out about the learning.

It was found out that there are a lot of conflicts between school learning and museum learning and not only the teachers have problems but the students as well. Even if the strengths of museum learning are included into the planning, students have difficulties to adapt to this special learning environment. We conclude that learning in the museum has to be prepared separately with the students as well. Overall there have to be more efforts done to work on conceptualizations in integrating different learning approaches between such different institutions like schools and museums.

1. Introduction

Learning biology can take place in a lot of contexts and learning environments. Therefore initial biology teacher education should include courses on learning outdoors as well as including informal science learning institutions into the teacher education curriculum for biology teaching [1]. Very interesting for teaching biology are natural history museums. Gupta and Adams [2] suggest creating museum-university-partnerships for giving the teacher students the opportunity to experience how to support learning in those informal learning environments.

At University of Vienna there is one course named 'project practical' in the curriculum since fifteen years and it has been further developed since then. This course is dedicated to work on specific learning environments with teacher students including teaching practice in schools. So far different courses were offered for teacher students: from learning in interdisciplinary research groups to authentic student-scientist partnerships to exploratory inquiry learning as well as learning with living insects. The latest development is learning at the Natural History Museum in Vienna (NHM).

The objective for this paper is to look at the conception of learning of the teacher students participating in the present course.

2. Theoretical Background

Museum learning compared with learning in school is often described as more constructivist oriented, much more self-determined; it is more authentic due to the objects displayed [3]. School learning on the other hand is regulated by the state curriculum and very often teacher centered [cf. 4]. As a consequence of these two different learning conceptions it can be problematic when teachers decide to go to museums with their students. Previous studies have shown some of these problems. In a study where worksheets of teachers were analyzed Kisiel [5] concludes that teachers are uncertain how to use the museum best. Some articles state that student preparation is a key for successful



learning of the students, but this does not happen regularly (6; 5; 7; 8]. Therefore teachers seem not well prepared for this special learning environment. They show a lack of consciousness about the possibilities of the museum as a special learning environment. Very often the teachers' conception of learning is transferred directly from school to the museum. As a consequence Gupta & Adams [2] pose a strong argument for university-museum-partnerships because in university based teacher preparation programs the pre-service teachers do not have enough chance to work on alternative views on learning and the museums can offer such a new perspective. Their suggestion is that teacher students should make practical in museums to get to know the diversity of learners and to engage in a lot of different activities that they can enrich their methodological and practical repertoire of teaching for their later classroom teaching.

Engaging with objects in an informal science learning institution was empirically and theoretically framed in the contextual model of learning [3]. The factors of effective learning are described in the personal context (motivation, expectation, prior knowledge, interests and beliefs as well as choice and control), in the mediation (by peers or others) and finally the design of the exhibit, the organization and support of orientation in the museum and context of the museum visit.

Our guiding question is: How do teacher students learn about museum learning and organize themselves learning for students in NHM?

3. Methodology

In the 'project practical' the teacher students were prepared as follows: the first task was a literature review with different papers about learning in museums (including some of the cited papers). In a second step we went to the museum to explore it as an informal learning environment for ourselves and to make first attempts of how to use it for school and students. The teacher students were paired and each pair was matched with a teacher and a class. The learning sequence included two lessons of preparation, visiting the museum for three hours, and two school lessons debriefing.

The conceptual framework for our research is an evaluation of the 'project practical'. The teacher educators (authors of this contribution) taped the courses and made participatory observations in the museum. Artifacts of the course itself and the planning processes were collected in an e-learning platform; therefore the whole process of students' learning is documented.

Analysis was conducted with qualitative content analysis[9]. Analysis was guided by our exploratory research question. The theoretical conceptions of museum learning were used as deductive categories; inductive categories were applied as well.

4. Results

In the beginning of the course the teacher students extracted effective components for successful learning in the museum from the research literature. There were already discussions going on about potential conflicts in this course. One question of the teacher students was about overall guidelines from the teachers. We asked the teachers to provide seven school lessons for the project, so the teachers wanted to determine content areas they could use for fulfilling the state curriculum. It turned out that in two cases the students were asked to cover difficult topics: organ systems and evolution in one class and invertebrates in another. These two topics are difficult to arrange in the museum because the respective exhibitions in the NHM were quite old fashioned and not easy to use. In the third case – evolution of hominids – the exhibition was renewed two years ago and therefore well-structured with a lot of interactive and intuitive exhibits.

In the following section results of the participatory observation are presented:

Evolution of the hominids: Five topics on worksheets were given to five student groups. Each group had to work on all topics, but was selected for one to prepare in depth to work on in the debriefing session. The strategy of the students differed according to the topics and the respective exhibits. At one interactive display at a digital table a skeleton had to be investigated. The students could apply several techniques (e.g. microscopy or x-rays) to find out the sex, the age, the nutritional condition etc. The students did not coordinate their work, but each student tried to find out individually. In total they enjoyed this activity. Other tasks were more directed to read texts or identify objects. There the students sometimes shared the overall task into sub tasks and then copied the results from each other. Copying between groups could be recorded very often.

The teacher students tried to help the student groups to intensify the interactions with the objects e.g. asking them to visit a photo box where the students could warp a photo of their face into an ancient Homo species. On the other hand, the teacher students tried to hinder the students' efforts in copying the worksheets.



In another class – the invertebrates' topic – copying was not a big deal, although the system of smaller student groups and the rally through the topics was nearly the same. The teacher students made the work on the topics competitive; therefore they hindered the copying.

Analysis of the tasks in all classes showed, that the teacher students intended to mediate the interaction of the students with the objects in the museum. But it seemed that the students did not that much like to engage with the objects directly but to finish the tasks quickly.

Rather seldom recorded was interaction with exhibits outside of the worksheets. One example of the hominids evolution unit was astonishing: during the organization of the groups and the explanation of the tasks two students watched a video about the evolution of different Homo species and their way out of Africa. The students commented the video, talked to each other about it and therefore were repeatedly admonished by the teacher students and the teacher. But one student was so interested, that he started to film the display with his phone, still mumbling to himself: "*he died, he survived, the other two died before ...*" always pointing at different species.

5. Discussion and Outlook

Copying worksheets was described by Griffin and Symington [6] as a social phenomenon. They interpret it as a habit that students brought from school to the museum, because it is not typical for free choice learning in the museum.

Based on our data and analysis we would like to enlarge the field of conflicts between school learning and museum learning. Copying is one very prominent example. Due to the fact that teachers in general or student teachers in our course have to meet the state curriculum, the free choice learning is strongly limited. The preparation before the museum visit helps students to focus on respective exhibits related to the content, but at the same time they are bound to it. Very seldom, even in times when no task had to be solved, self-directed engagement with objects could be observed. Therefore free learning by chance and strictly out of personal interest seems not possible. On the opposite: when a student is very interested in an exhibit this can also be disturbing, because maybe this exhibit is not part of the tasks in the worksheet. Then the teacher and the teacher students intervene and try to bring back the student to the given tasks. We guess that not only the teachers' conception of learning at school is therefore transferred to the museum, but the students do this as well and every breakout is a disturbance.

Therefore a preparation for students with a focus on the special features of the learning environment can be recommended and the teachers should negotiate with the students to enable both: staying focused on the tasks that are needed for further classroom teaching and self-directed and individualized learning by the students. This conflict could be seen in our analysis: the teacher students were aware of the special aspects and tried to incorporate them into the tasks, but in some aspects the students were not able to adapt to these tasks. On the other hand the students were disciplined, even when they were deeply engaged learning with exhibits. Gupka & Adams argue that the teachers should act more like museums educators [2]. We can support this on one hand, but at the same time we understand, that the teachers and teacher students have to take responsibility for the overall learning process in the school curriculum. This responsibility is unique compared to museum educators who do not have such responsibilities but can concentrate on a single moment. Therefore a strictly dichotomous view on the contrasts between the learning in school and learning in museums is not helpful. More effort is needed to further develop museums as fruitful learning environments for schools and students.

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