



Practice Manual

**Collaborative Partnerships
between Museums,
Teacher Training Colleges
and Schools**



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Teacher Training Colleges
and Schools**

Edited by Project Manager and Curator
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Learning Museum 2011-2013

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Contents

Forord	5
Collaboration and Network	7
Inter-institutional Collaborative Practice	8
Collaborative Partnerships in Practice	12
Peer-to-Peer Knowledge Sharing	14
Visibility and Communication Set the Wheels in Motion!	16
Evaluation	23
Learning Museum – as seen through the eyes of an evaluator	25
“How can we evaluate that?”	33
Educational Programs	39
Teaching – A template	41
Fieldwork – Biology and Didactics in the Informal Learning Space	43
Geography Workshop at The Workers’ Museum	46
Project Day for History and Danish at Funen Village	50
Mathematics at the Art and Design Museum Trapholt	54
Paraphrase of an Artwork from Sorø Kunstmuseum	57
A Course in Museum Mediation	60
Practical Experience Programs	63
Academic Internship	65
Collaboration	
Invitation: An internship at Museum Østjylland	67
An Internship at Tøjhusmuseet	69
Practicum	71
The “Practicum” scheme	72
A PE Practicum Project at Esbjerg Museum	73
Invitation: Practicum at the Fisheries and Maritime Museum, Esbjerg	77
The bachelor’s thesis	80
Learning Museum and MatchPol	81

Interviews	83
“A Loving Slap”	85
Power Users!	91
Increased Professionalism	92
An “Open” Space	95
Internships are Inspirational	98
Historical Artefact – or work of art?	100
Seeing – with fresh eyes	101
Competencies – the new teacher education and cultural institutions	102
 Articles	105
Introduction	107
The Museum as a Professionalized Learning Space	112
Much More than the Visual Arts	116
An Extended "Interdisciplinary" Practice	119
Innovation and Entrepreneurship Transforms Professional Positions	126
Mathematics at the Art and Design Museum	130
When a 125-year-old Packed Lunch Begins to “Tell”	133
Aalborg Historical Museum – from a third grader’s perspective	138
Creative, Innovative and Enterprising Citizens	141
On the Spot – The art museum, dialog and body in visual arts teaching	144
Can the Subject of Natural Sciences be Addressed and Made Accessible at the Museum?	150
The Museum as an Object of Study	154
Academic Internship at the Museum	157
 Project Learning Museum 2011-2013	
Additional Publications, Articles and Evaluation Report for the Project Learning Museum	161
Participating Museums and Teacher Training Colleges	163

Foreword

– From project to concept

Learning Museum 2011-2013 is a Danish national development and collaboration project involving 30 museums (cultural history, science and art museums) and 13 teacher training colleges. The goal of the project has been to encourage and develop future primary school teachers’ use of museums as learning spaces while further professionalizing and strengthening museums’ teaching of primary school pupils. An overall objective is that primary school pupils benefit from the many opportunities offered by art and cultural history institutions. Over the course of three years, museums and teacher training colleges have worked together on the development of educational offerings and academic internship programs for student teachers at museums. The project focus has been based on user involvement by incorporating student teachers as key resource persons in museums’ education departments. The museums have opened their doors to student teachers and have, through collaborative partnerships, developed critical knowledge and insight into their own institutions as learning spaces. This, in turn has strengthened their abilities to develop relevant and interesting teaching. The schools have been directly involved through internships, which have allowed student teachers to test their materials at the museums to an audience of real pupils.

Practice Manual

The objective of the practice manual is to inspire and guide teachers at museums, teacher training colleges, and schools as well as others who work within teaching and/or the museum educational field in general. During the project, participants have developed their own practices by working together to produce educational offerings, presentations, academic internship programs, and other products. The idea behind this publication is that other educators can be inspired by the materials, interviews, and articles contained herein, drawing on it to introduce new facets to their own teaching.

Communities of Practice

Based on evaluation results, inter-institutional and interdisciplinary collaboration focusing on the education of student teachers has revealed itself to be enriching for all involved. It has not only been the student teachers, but also the participating institutions and those within the students’ professional communities who have been able to develop skills within their disciplines and gain a greater awareness of opportunities offered by museums. Traditional roles have been redistributed and interdisciplinary interplay between museum didactics and general didactics has emerged.

The traditional barriers often found between specific disciplines and institutions become less significant when collaborative partners take on new roles and occupy new positions.

Passion and Knowledge

Getting to know one another's worlds takes time, but it also creates close ties and a greater understanding of *your discipline* vs. *my discipline*. Evaluation results have revealed that some of the most important elements for project participants have been personal meetings, establishing relationships, and working together. A platform for collaboration, dialogue and the exchanging of knowledge has been established by means of workshops and network meetings. Participants have all worked with their individual projects in different towns and regions across Denmark, and the project group has met regularly to exchange experiences and determine what works. The significance of networks should not be underestimated. It is likewise important to bear in mind that the ways in which the project is carried out can vary from city to city and region to region – we are all different individuals with different personalities and different disciplinary backgrounds.

There are also significant differences in goals and values at the individual institutions: from museum to museum, from one teacher training college to the next, or when comparing museums to teacher training colleges. These contrasts can, however, reveal the strength of collaborative partnerships. Working and maneuvering within this melting pot of new ideas paves the way for a concept which encourages the development and maintenance of good contacts and opportunities for development.

From Project to Concept

Learning Museum will now go from being a *project* to become a *concept*. This manual contains specific guidelines on how educational, internship and Bachelor's thesis programs can be structured as well as on how the museum can be incorporated as a qualified learning space. How does one write an internship invitation? How does one structure and carry out a visual arts educational session at a cultural history museum? How does one evaluate students' teaching materials? A crucial element for all collaborative partnerships is to ensure that regular meetings take place during which goals, expectations, the distribution of roles and the establishment of good working relationships are agreed upon by all participants.

We hope you will draw inspiration from the manual and delve into the project on several levels through the selection of interviews and range of comprehensive articles.

Tine Seligmann, Curator and Project Manager for Learning Museum,
Museum of Contemporary Art, Roskilde, Denmark

Collaboration and Network

The evaluation of the project Learning Museum has shown that some of the most important elements for successful inter-institutional collaboration are personal encounters, familiarity and doing something together – in practice! The workshops and networking sessions have created a platform for collaboration, dialogue and the exchange of knowledge. The importance of networking should not be underestimated, and there must, of course, be something upon which the network can focus its efforts and energy! During the Learning Museum project, the unifying focus has been "the organization of educational training programs for student teachers". There have been many instances along the way where roles have been redistributed and disciplines and didactics mixed. This way of working has contributed to the development of skills and competencies for all project participants, often paving the way for interdisciplinarity and innovation. We would like to share these ideas through this publication, which is based on the concept of peer-to-peer communication. Peer-to-peer communication is concerned with the dissemination of experiences between equals, typically located within the same professional community. One of the goals during the Learning Museum project was for professionals from various professional communities and with different disciplines to develop their practice by entering into collaborative partnerships.

Contents

Model – Inter-institutional collaborative practices	8
Mindmap: Communities of practice	12
Peer-to –peer Communication	14
Visibility and Communication	
Set the Wheels in Motion!	16

MODEL

- Inter-institutional Collaborative Practices

By Tine Seligmann, Project Manager

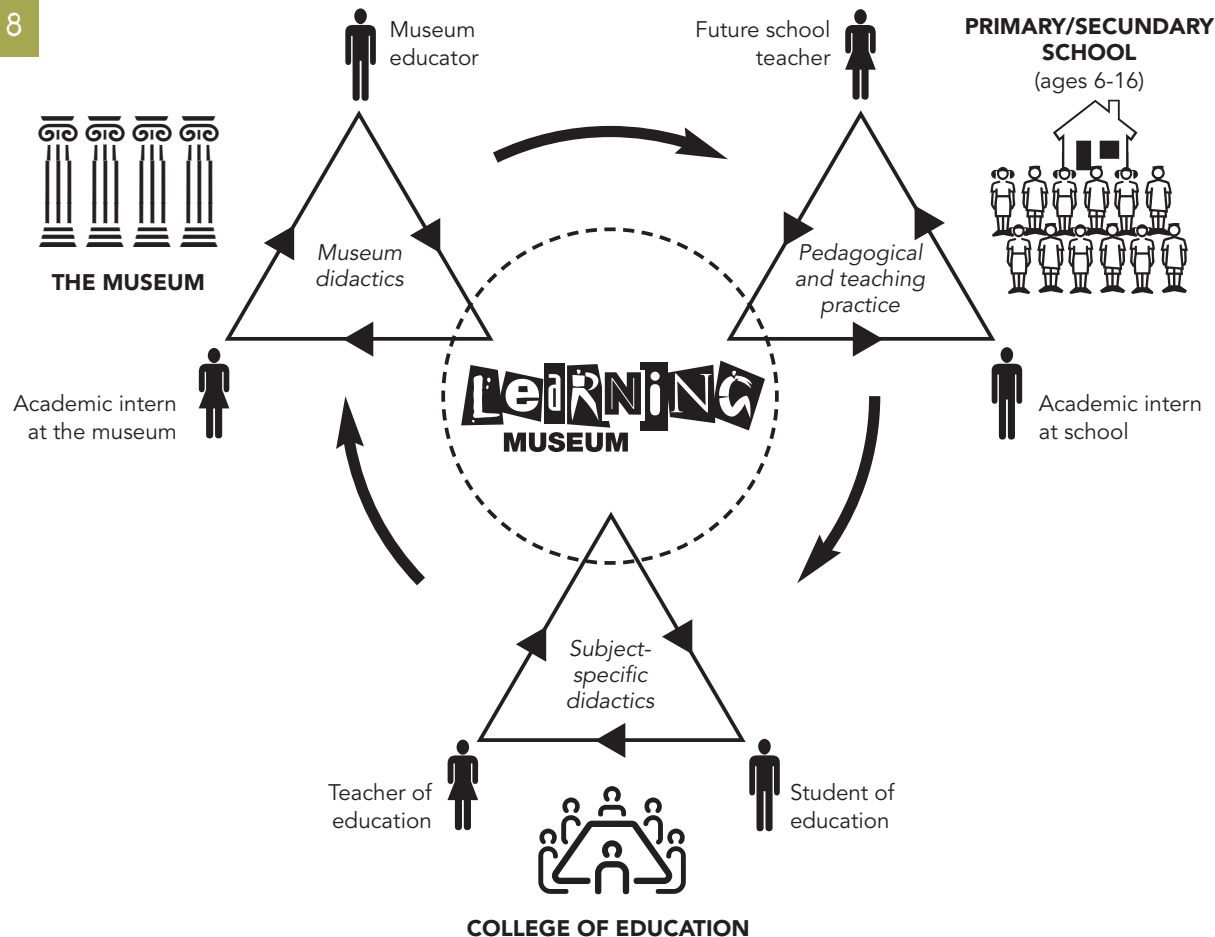


Illustration:
Tine Seligmann

The Learning Museum model is an example of how to facilitate and strengthen cross-institutional collaboration. The model shows how we have worked towards strengthening ties between teacher training colleges, museums and primary schools in order to achieve our goal of optimizing primary schools' use of museums.

The user as a resource person

Throughout the Learning Museum project, we have worked with a user-involvement perspective in which student teachers have been at the center of the development of educational offerings at museums. The goal was to facilitate collaborative practices between institutions and various disciplines. We have regarded the student teachers as key resource persons in the development of museums' educational departments.

Redefining roles

The student teachers are placed next to each of the institutions involved. At each type of institution they take on a different role depending on the institutions in which they are active and the individuals with whom they interact: they are student teachers, interns, or future primary school teachers.

A mix of disciplines and didactics

During educational sessions as well as in student teachers' interaction with teacher educators, museum educators and primary school professionals, a range of different disciplines and didactic practices are allowed to mix and circulate within this collaborative structure.

Developmental benefits and skills enhancement for all involved

The evaluation of close collaborative partnerships centered upon the realization of a common project ("the education of student teachers"), yet proved to contribute to the development of skills for all participants. Not only do student teachers benefit from collaboration, but so do the institutions and participants who are part of formal and informal networks surrounding the student. Teacher educators gain opportunities to put theory into practice, and the museum educator strengthens his/her pedagogical and practical teaching skills.

Interdisciplinarity and innovation

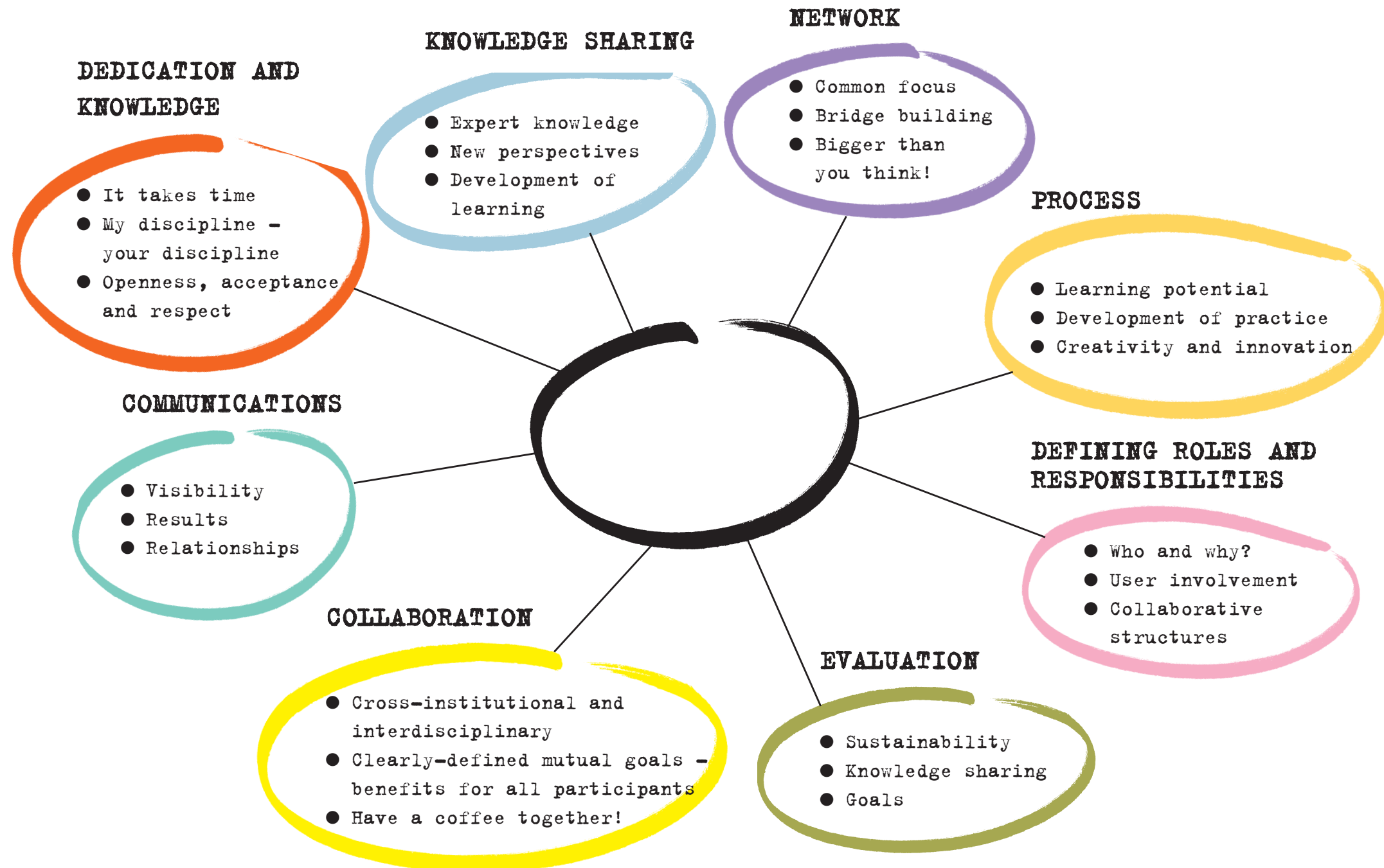
Interdisciplinarity is a natural focus for such a project. The traditional barriers often present between the various professional categories, subjects, and museum types become of lesser significance when collaborative partners take on new roles and occupy new positions. Innovation is strengthened when different disciplines work together.

Flexibility - involving other institutions, stakeholders and disciplines

The model can be implemented with a great deal of flexibility, allowing for a greater number of diverse institutions, stakeholders and disciplines to work collaboratively. The person(s) linking up the institutions, thereby driving user-involvement, might be a primary school pupil, a pre-school child, a family, a professional teacher, teens, and the like. The institutions shown here might be replaced by other educational institutions, as well as by clubs, libraries, galleries, sports and leisure societies, artists' associations and the like.

What matters most is that you define your mutual objectives, set up clearly-defined collaborative working structures, have a cup of coffee and do it together!

Collaborative Partnerships in Practice



Peer-to-Peer Knowledge Sharing

*By Dorte Carlsen, Associate Professor,
Centre for General Education, UC Southern Denmark,
Learning Museum Project Evaluator*

The project participants have worked on enriching and bringing innovation to their own practice. This has been achieved by developing educational offerings and presentations as well as by means of academic internships and Bachelor's thesis work. The main objective of this publication is to allow teachers and museum educators to draw inspiration from the various educational offerings and collaborative structures presented here when developing their own teaching practice. This presentation of the specific educational offerings and experiences from the project is in itself based on the idea of peer-to-peer knowledge sharing. Peer-to-peer knowledge sharing typically means that the dissemination of project experience takes place between equal individuals located within the same professional community. The goal of Learning Museum, and therefore also the current publication, is for professionals from different communities and disciplines to develop their practice through interdisciplinary collaboration. Because all project participants have participated on equal terms, we choose to refer to the methods and practice material as peer-to-peer knowledge sharing – understood as communication from professional to professional within the community which we will continue to refer to as Learning Museum – a community having emerged through the efforts of a number of institutions with the goal of teaching student teachers (and primary school teachers) to use the museum as an alternative learning space.

How to Use the Practice Manual

It is not the intention that readers simply adopt the specific educational offerings or end products presented in the manual. Rather, readers should process and transfer the knowledge obtained from the educational sessions and academic internships described here, making them fit their own specific practice and disciplinary context. In so doing, the reader can then ask him- or herself:

- What is the potential of this educational offering, internship or Bachelor project for me in my teaching (be it teaching at the teacher training college or at the museum)?
- How and to what extent does the description of the collaborative structure and execution support my own planning, implementation and evaluation of a similar work scenario?
- Does the collaborative process inspire me to develop new initiatives?
- Does the process inspire me to develop collaborative relations with teacher educators or museum professionals (as applicable)?
- What do the student teachers learn **by using** the museum as a learning space throughout this process?
- How do they learn **to use** the museum as a learning space during this process?
- How and to what extent does the process encourage student teachers to act creatively and innovatively in their work?

Enjoy!

Visibility and Communication Set the Wheels in Motion!

Learning Museum 2011-2013

*By Tine Seligmann, Curator and Project Manager for
Learning Museum, Museum of Contemporary Art, Roskilde,
Denmark*

Learning Museum 2011-2013 is a nationwide collaborative project involving 26 museums (cultural history, science and art museums) and 13 teacher training colleges. The goal is to strengthen collaboration between museums, teacher training colleges and primary schools. This is achieved by means of user involvement where student teachers are involved as active resource persons in the museum's education departments. Visibility, communication and knowledge sharing are central elements for ensuring the various projects' sustainability.

Visibility, communication and knowledge sharing

Visibility, visibility, visibility. That is the key. Visible, well-documented results, products, articles, educa-

tional offerings and evaluation processes are what set the wheels in motion. Focused facilitation of meetings, workshops and open seminars creates opportunities for the exchange of knowledge and experience obtained during the project, both internally and externally. Such an exchange involves, activates and motivates.

The process is the goal

Throughout the Learning Museum project we have made the process our goal. And have achieved this goal on many occasions. Collaboration is arranged, a contract drawn up, acquaintances made, an educational offering tested, a student teacher given an academic internship, an article published on the website, a newsletter launched, and an evaluation discussed. Visible results, no matter how big or small, are strong motivational factors. Knowledge sharing creates sustainability within the various stages of the project – before, during and after the end products have materialized. This applies both to the individuals who have conceptualized and conceived the product, and to the collaborative partners or wider knowledge community where the product becomes subject to processes of critical reflection and transformation, influenced by other disciplines. Let us call it Lifelong Learning.

When a discipline crosses its tracks

It cannot be emphasized enough that the aforementioned process takes time. This is a fundamental condition for working collaboratively in this manner, and it is our biggest challenge. However, time also helps establish close relationships and a deeper understanding of one another's worlds. This brings us to our other major challenge: learning to understand one another's disciplines; daring to open up to a new and unknown world, trusting that it will all turn out for the best – we are, after all, in the midst of a process.

The way in which the project is carried out in Aalborg will differ from Esbjerg or Vordingborg simply because, as participants, we cover a wide range of different individuals, personalities and disciplines. The goals and values of individual institutions vary greatly; from museum to museum, from one teacher training college to the next, and, naturally, when comparing museums and teacher training colleges. But this is precisely where the strength of these collaborative partnerships comes to the fore. This is the melting pot where key ingredients and new ideas are combined to make the perfect blend, resulting in a concept which allows for the establishment, development and maintenance of good contacts and opportunities for development.

Communication and Evaluation from Day One!

The project's communication and evaluation strategy has been a crucial element in the ongoing implementation processes and efforts to create project sustainability. The key has been perceiving the project as an easily relatable concept from which all can gain valuable experience – a concept not only for the institutions directly involved, but also for every museum and teacher training college nationwide. To achieve this end, we have developed and made regular use of a public project website as well as a newsletter and an open Facebook group. On these different platforms anyone interested can find educational offerings, articles and interviews with project participants and student teachers. It was not difficult to provide up-to-date information via these forums. The public visibility and conscious focus on knowledge sharing has made all project participants acutely aware of their goals, motivating them to transfer their experiences into useful and accessible end products. Throughout the project, we have applied the services of an external evaluator. She has been very valuable in the execution of an assessment plan that has supported the various project processes and continually maintained a focus on "what works".

All collaborative partnerships, project participants and student teachers have undergone ongoing evaluation. Even though certain "problem" areas encountered during the project – such as time constraints, internal communication and the like – may have come as a surprise, they have been illuminated, addressed and carefully examined by our evaluator. By continually maintaining a comprehensive overview of the project, she has helped us along the way with constructive methods and analyses of areas which we have, at times, had difficulty seeing in a broader perspective. This has continually supported us in moving towards project sustainability and maintaining realistic expectations for end products instead of simply sitting with a report when everyone has, so to speak, flown the nest.

Who learns what from whom?

Is it, then, all about project leadership, communication and visibility? Learning Museum is not a revolutionary, breakthrough project in its own right, but it has, nonetheless, created a framework for the development of collaborative partnerships and networks between museums and educational institutions which had not been established prior to the project. It is perhaps within the development of learning partnerships that the project's innovative energy is found, namely the insistence upon the fact that this is a process we complete together and not in isolation. What is the added value of developing things collaboratively? The Learning Museum project has a focus on user involvement that connects collaborative partners and establishes frameworks. Here, it is student teachers who are the "users" and the central focus of collaborative work at the museum. They are seen as key resource persons who will actively contribute to the development of museums' education departments. While they develop their knowledge and skills concerning the use of external learning environments, we at the museums are challenged to rethink our traditional work habits and practice. If we are to take on yet another challenge, it could be the following: Let us, at the museums, not simply perpetuate

20

the old habit of talking about all the things we are good at and feel at ease with, but let us also incorporate into our practice the creative and innovative knowledge and ideas contributed by student teachers. In doing so, we create new and different ways of meeting and different teaching scenarios. If a museum educator can see his/her teaching practice in a new light, future school teachers will, as a result, approach the use of museums as learning spaces much more actively. This will, in turn, yield great benefits for Danish primary school pupils. It is a win-win situation with far-reaching implications. For the student teachers are surrounded by their educators, who here have the opportunity to use the museum to translate theory into practice in a way they might have difficulty exemplifying in a classroom setting. By meeting collaboratively with colleagues from other disciplines through a mutual focus on "museum didactics", teacher educators also discover new potential embodied within interdisciplinarity. The project works on several levels simultaneously: Locally, within the individual institution, regionally, between the various institutions, and nationally, where we all contribute to the sharing of knowledge within a greater knowledge community, thereby taking the project to new levels.

Discover existing networks and resource persons

The focus on user involvement is exemplary in form and transferable to other user groups so that they too may benefit from intercultural and interdisciplinary collaborative partnerships between primary schools, teacher training colleges and museums. For example, primary schools can become involved in collaboration where teachers or individual pupils can act as resource persons and catalysts within the greater network surrounding them. For the real issue here is also about discovering existing networks, and it would certainly be possible to identify many intersecting pathways connecting schools, teacher training colleges and cultural institutions/museums which can be developed and maintained externally and internally, formally and informally, socially and profes-

sionally as well as individually and on an organizational level. Museums, teaching training colleges and primary schools do not necessarily need to build new networks, but should work with their existing networks and collaborative partners. Does this mean that one simply finds a network and that the rest takes care of itself? Certainly not. No matter how much experience an institution may have in building collaborative relationships, networks and collaborative processes demand habitual maintenance and facilitation. For when visibility, communication and process are the primary vehicles for project sustainability, these elements need constant support and encouragement. Perhaps this is the reason that we so frequently end up with projects and networks that are unsustainable. We don't recognize the fact that there needs to be someone who keeps the wheels in motion and that we need a specific case and framework around which our networking efforts can revolve.

How?

An important final goal for the Learning Museum project is to pass on our experiences, our concept: How do we do it? How does one plan educational sessions? How should the student teachers be involved? How can links be created between the teaching at teacher training colleges and at the museums? When and how should the participating institutions meet? This is why the end result and conclusion of the project Learning Museum 2011-2013 is a practice manual containing recommendations concerning collaboration and network building as well as a collection of articles. A concluding evaluation report is also provided, which examines collaborative structures, educational offerings, end products, academic internships and more. These are all important documents and tools in the further implementation of the program locally, regionally and nationally.

This article was published in MiD MAGASIN, no. 29, October 2013

Evaluation

Throughout the Learning Museum project we have maintained a "project-supportive evaluation plan" that has focused on process and development. We have continually posed the question, "what works?" in a conscious effort to support ongoing implementation and project sustainability. In the following two articles the project evaluator, Dorthe Carlsen, presents the criteria and perspectives that she has applied during her evaluation of the project.

The first text is a description of the project-supportive evaluation plan, including which methods and evaluation designs have been applied along with a selection of findings from the evaluation. What is the project's primary concept and innovative potential? How can close working relationships contribute to the creation of new practices?

The second article is a practical guide describing how the evaluation methods can be applied to one's own projects, educational programs or learning materials. The article is centered upon the following key questions:

What can we evaluate, and what do we wish to evaluate? Based on what sets of values?
How to evaluate? What can and do we wish to use our evaluation for?

Contents

Learning Museum – as seen through the eyes of an evaluator	25
“How can we evaluate that?” – a guide on how to carry out your own evaluation of projects, teaching courses, and teaching materials	33

Learning Museum

– as seen through the eyes of an evaluator

*By Dorte Carlsen, associate professor at UC Sydøstjylland,
evaluator for the Learning Museum project*

What duties should an evaluator perform? Within the Learning Museum project we have, right from the outset, applied a plan of “supportive evaluation” focusing on processes and development throughout the entire course of the project work. In this article I shall present the methods and evaluation designs used in this evaluation, as well as selected findings from the evaluations. What is the overall idea behind the project? What innovative potential does it entail? How may close collaboration and relationship building help create new practices? The evaluation work focused on a learning perspective. One of the conclusions is that the project participants have learned to use the museum as a learning space in more ways than one. The full evaluation report is available at www.learningmuseum.dk (in Danish)

Supportive evaluation

We have described our evaluation work as “supportive evaluation”, which is to

say that the purpose of our evaluation was not to pass value judgments. The objective was not so much to *judge* the practice as such, but rather to *develop* practices through ongoing assessment and input. In this context an ongoing dialogue about the project’s progress between the project manager and evaluator was of great importance. How are project participants involved, engaged, and facilitated throughout the process? This approach pulls the evaluation in the direction of an action learning perspective. In action learning (and user-driven innovation) the basic objective is – as is the case in the Learning Museum project – to develop and evolve practice through experiments with actual practice followed by subsequent reflection on that practice. In more general terms one might say that this is about learning *together* in a reflected manner, and that such learning is fuelled by projects that relate directly to the participant’s everyday work. Within the Learning Museum project, this meant that it was important to set up learning groups that take the form of close collaboration between museum professionals and teachers at teaching training colleges. These groups – which have been both local and national in scope – have been in charge of developing, carrying out, and evaluating specific teaching courses for and with

student teachers. The organization of the evaluation work has entailed the use of an external evaluator acting as a supervisor and advisor in relation to the overall efforts to build and adapt activities and initiatives in accordance with the project's overall concept and assumptions: That collaboration between museums, teacher training colleges, and schools can be reinvented, strengthened, and expanded in scope by testing education courses and internship that centre on student teachers.

“Learning is the overall point of all evaluation”

The overall evaluation design is inspired by what the realm of evaluation calls “impact evaluation”. One of the basis ideas of impact evaluation is to take its point of departure in the notions and expectations that project management and project participants have about the impact of a given initiative. The evaluators then examine whether those notions and expectations were in fact translated into reality. Their examination is conducted within the framework of a qualitative explorative design. This is to say that the evaluator has explored the project through an approach based on curiosity, adopting the role as someone who asks the following question: How do student teachers learn to use museums as alternative learning spaces in school teaching? Evert Vedung, a professor of social science, describes evaluation as “*an activity that reflects on other activities in order to extract information that may be useful for future improvements of these activities. Learning is the overall point of all evaluation*”.¹ Indeed, the evaluation conducted within the Learning Museum project has also been carried

out as an activity that reflects on other activities. The activities conducted in the Learning Museum project have included teaching and internships, BA projects, and collaboration between project participants from the various institutions. The objective of the evaluation work was to create an overview of these activities and to reflect on them. The evaluator's intentions were to have the evaluation contribute to the following:

- Making the project objective clear and obvious to all project participants and helping them maintain focus on that objective
- To provide insight into and focus attention on the activities tested – and why they are tested
- To visualize the project strategy and progress for all project participants on an ongoing basis and to contribute to the project participants' reflections on that strategy and progress

A four-stage process

The Learning Museum project comprises four overall stages. It should, however, be noted that these stages overlap, meaning that the project participants have continued certain activities throughout the project period; for example their work on developing and testing teaching courses.

1. **Definition of scope:** The first stage of the project involved clarifying the project participants' expectations². During the evaluation itself, the statements made during this stage are analyzed in order to demonstrate the project participant's preconcep-

tions prior to the project launch. What thoughts do the various project stakeholders entertain about the project before it actually begins?

2. **Experiments with teaching courses:** The second stage of the project involved experiments with a wide range of teaching courses/educational sessions conducted in collaboration between teacher training colleges and museums. These courses have varied greatly in terms of duration, content, and the degree of collaboration involved. Experiments with teaching courses have continued throughout the entire project period.
3. **Experiments with real-life practice/ internships:** The third stage of the project involved experiments with various forms of real-life practice and internships for student teachers at museums. Like the teaching courses, these internships have varied greatly in scope, duration, and nature.
4. **Consolidation and implementation:** This fourth and final phase focused on presenting the project results and reflecting on the lessons learnt in the project. Simultaneously, the teaching courses, collaborative formats, internships, and other activities from the project are conceptualized in a manner that allows them to serve as inspiration to others after the project has been completed.

Method of evaluation and data collection

When you spend three years working with supportive evaluation of a single project you get very close to the subject

you study! For this very reason it is important for the evaluator to make the method and data used for that evaluation very clear and explicit in order to ensure that a systematic approach is maintained throughout. It is important to be able to simultaneously immerse yourself in the project *and* be able to take a dispassionate view of it.

The evaluation is based on a combination of quantitative and qualitative data. The quantitative data consists of an inventory of the total number of specific, concrete activities involved in the project: a list of the number of teaching courses and internships completed, and an inventory of how many BA students have used the Learning Museum project as a framework for their BA work and for collecting empirical data. A total overview of this information is provided in an appendix to the evaluation report. Quantitative data provides specific information on the extent to which the Learning Museum project was carried out in accordance with the intended objective of establishing local collaborative projects between teacher training colleges and museums. The inventory shows that all participating institutions have been involved in collaborative projects, but it also shows differences in scope from one region to the next. Some college teachers and museum educators already enjoyed excellent and well-established collaboration prior to the launch of this project – whereas others needed to build up their collaboration first. This also means that the range of activities conducted has varied greatly in scope and content. It is interesting and quite telling to note that interdisciplinary collaboration has been successfully established, involving several different subjects from the teacher training college curriculum. This helps

enhance the project's focus on the museum as an alternative learning space for any subject.

The qualitative data has been generated through interviews, products, and descriptions of teaching courses and internships. At an early stage of the project we completed a brief written evaluation in cooperation with the project participants, focusing on their first experiences with the project. Towards the end of the project we carried out a more extensive written evaluation in which project participants had the opportunity to present statements about their project participation and their assessment of the organization of the project. These written evaluations constitute central documents in the analysis part of the evaluation. Finally, another important source of knowledge about the project consists of the statements made and the discussions held with the evaluator in connection with the presentation of analyses and perspectives at the two annual workshops held as part of the project.

The fundamental idea and innovative potential of the project

Development projects like the Learning Museum project are always based on an overall idea about what it takes to achieve your objective. Evaluation theory calls this overall idea a "program theory." The program theory is what you wish to achieve. Briefly put, the program theory of the Learning Museum project is the idea that developing and testing education courses and internships will raise the quality of future teachers' use of the museums and, in the long term, improve the Danish schools' use of the learning potential offered by museums while also

adding new qualities and nuances to their teaching. Steps along the road towards this objective include activities such as collaboration between teacher training colleges and museums – including visits and internships at museums and museums visiting teacher training colleges. This can be outlined as shown in the figure below.

Overall, a development project's program theory will typically be quite general in its wording, allowing scope for various actors to work towards their own interpretations. Within the Learning Museum project, this scope for ongoing adjustments and changes has allowed room for innovation and innovative collaboration. Associate Professor Niels Henrik Helms describes innovation as the creation of a new social practice: *"Innovation is about creating a new practice. This is to say that we must come up with something new and make it work. In our day-to-day activities we do not always distinguish between creativity and innovation, but we can separate out the two concepts by stating that creativity is about coming up with something new, while innovation is about making it work. This is to say that creativity is associated with individuals – although this should not be construed as individuals in the sense of isolated islands; rather, this is about human beings interacting with the world around them. By contrast, innovation is very much associated with creating and developing this interplay, which makes it a social process."*³

Many previous research and development projects have already taught us much about quality encounters between children/pupils and museums. The Learning Museum project incorporates this knowledge, but it also introduces a new per-

spective: it experiments with and explores what happens when several different players enter the field: museum professionals, teacher training college teachers, and student teachers. The unique aspect of the Learning Museum project resides in its focus on student teachers and on developing innovative collaboration between teacher-training college teachers and museum educators, enabling them to teach future teachers how to incorporate museums in their teaching. In a manner of speaking, the profession didactic relationship has been multiplied in scope; the student teachers are not the only ones to be challenged through their encounter with actual practice; here, museums professionals and teacher training college teachers are also challenged by the "whats?" and "hows?" of subject-related didactics when their subject is given concrete form in new contexts. This fact also makes everyone involved more aware of thinking in terms of *who* and *why* instead of being concerned only with the *what* and *how*!

Key findings of the evaluation

This section presents key findings from the evaluation which may be useful in future projects of this kind.

- The importance of collaboration
- The museum as a learning space
- About designing for learning

The importance of collaboration

Right from the outset, establishing close collaboration between museum professionals and teacher training college teachers was a central and fundamental concept behind the project. And the eval-

uation shows us that such collaboration has a crucial impact on whether the intended effect is achieved – in this case, the intended effect was to upgrade Danish schools' use of museums. The final evaluation demonstrates that the project participants consider the collaboration crucial for the final outcome of the project. In the final evaluation a total of 93 per cent of all project participants state that the collaboration between teacher training colleges and museums has been enhanced via the project. According to the project participants, the crucial factors are interpersonal encounters, familiarity with each other, time, and the fact that you are doing something together. Quotes such as this serve to illustrate that position: *"We have enjoyed good collaboration with teacher training colleges before, but this has earlier either involved shorter sequences or been associated with project funds dedicated to a specific objective or test. Here [in the Learning Museum project] we have been able to establish a format of mutual collaboration where we have tested new collaborative relationships with the student teachers."* And: *"Becoming personally acquainted with associate professors and student teachers from teacher training colleges was very important to us."* One might say that the physical encounter between project participants constructs a space for reflection and development. However, the evaluation also shows that it is not always easy to step into and out of this space; it can be difficult to always assign the necessary priority and time to this project when faced with everyday challenges. Hence, the project workshops and the specific collaboration on developing teaching courses for student teachers appear to be very effective tools. The joint workshops have proven to be

key devices that form an important organizational framework for the collaborative work. At the project workshops the participants' ideas and dialogues have been facilitated in various ways, e.g. through the use of Muvi-Cards, drawing exercises, group work, a speaker's corner, and presentations made by external speakers.

In this context it is interesting to note that participating institutions which had previously worked with teacher training colleges prior to the Learning Museum project also found that this collaboration was enhanced and expanded in scope. One example would be the Workers' Museum (Arbejdsmuseet) in Copenhagen: they have had many student teachers visit them through the years, and in the past their workshops saw them telling students *what they could use the museum for*; meaning that the reflective aspects were primarily allocated to the teacher training college. During the project period this relationship changed to become one of mutual benefit: *"We wanted to get away from the asymmetrical relationship between us and them to the point where we would meet up in a shared space for reflection. To achieve this, our workshops have now become engaging and involving workshops that address real-life issues and specific tasks that need solving in the exhibition."*⁴

The museum as a learning space

The museum as an alternative learning space is another pivotal hub of the project. Do we have grounds for concluding that student teachers have seen the museum as an alternative meeting space? Yes, we do. The students have not been systematically asked what they have learned from the project. Rather, they

have been asked about their experiences in various contexts (for example, student teachers who have undertaken internships have been asked about what they learned from that internship). The fact that we may nevertheless ascertain that student teachers have experienced the museum as an alternative learning space rests partly on the college teachers' and museum representatives' statements and on the project manager's interviews of student teachers, but particularly on the products and teaching courses for pupils that student teachers have produced for the museums' exhibitions and collections. Analyses of the teaching courses and products demonstrate that one may speak of at least two ways in which student teachers have learned to use the museums.

- Student teachers learn *by using* the museum
- Student teachers learn *to use* the museum

Learning *by using* the museum means that student teachers learn something about their subject by using the museum. In this context, "subject" may refer to specific subjects such as art, history, geography, or mathematics, but also to other subjects at teacher training colleges such as general didactics and citizenship. The fact that the teaching takes place outside of the classroom requires everyone involved to rethink the planning, execution, and evaluation of their teaching.

Learning *to use* the museum means that student teachers learn how to utilize the potential offered by museums in a teaching context. In order to fully utilize the museum's potential in their

teaching, student teachers must know something *about* the museum (about the museum as an institution), about the museum as a space for learning and didactic space, and finally about how to collaborate with other professions (e.g. with museum educators). Thus, the concept of "learning space" signifies a physical space (the museum space with its particular distinctive features and traits, including its exhibits) and a didactic space. One might also say that a learning space facilitates particular forms of teaching and learning, providing a framework for various kinds of interaction. The student teachers' planning of teaching courses are – generally speaking – based on principles such as dialogue-based teaching⁵, aesthetic learning processes⁶, and the three prerequisite factors defined by Merethe Frøyland⁷. Very briefly put, this means that the learning processes must be linked to the space and exhibition, incorporate many forms of representation (the body, visual imagery, language), and that there must be a link between the pupils' immediate experiences and subsequent reflections, e.g. through active dialogue and multivoicedness.

About designing for learning

One of the characteristic features of many of the collaborative processes has been that museum educators and teacher training college teachers have arranged teaching courses for student teachers which required student teachers to develop educational material or a teaching course/educational session for pupils, basing these on an exhibition, an object, or a specific setting. The teaching materials created were to be based on one or more of the principles outlined in the above, for example by inviting active dia-

logue or establishing aesthetic learning processes for the pupils. In many cases such teaching materials were required to be digital in nature or to incorporate digital resources. One might say that the museum educators and teacher training college teachers have designed courses that make student teachers *produce* things. Examining the materials and courses created by the student teachers shows us that they adopt this design strategy, prompting them to in turn create courses where pupils are called upon to do something similar; for example, the pupils may be asked to take their point of departure in an exhibit of their own choosing, using it as the starting point of a small film demonstrating their understanding of a given subject. This is to say that student teachers do as their own teachers do – and in this case the "teachers" include the educators at teacher training colleges and museums alike. As one zooms in, it became apparent that the courses created are propelled by specific design concepts. This is to say that it seems as if the courses where project participants truly learn something are those where the student teachers produce new designs themselves – i.e. in courses where teacher training college teachers and museum educators plan the courses for student teachers in such a way that the student teachers are called upon to produce didactic designs in the form of teaching materials (of any scope) or teaching courses. One might also say: Design makes things happen! In the Learning Museum project, teacher-training college teachers and museum educators create designs for student teachers who will, together with museum educators, design learning designs for pupils. Enabling student teachers – and pupils – to demonstrate their under-

standing through production is perfectly in keeping with recent design theory. When you apply a design theory perspective on learning you focus on how individuals use the resources available to them in order to create and demonstrate their understanding.

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² This examination was conducted by project manager Tine Seligmann.

³ Helms, Niels Henrik (2009). *Metodeudviklingsseminar*. Retrieved 23.01.14 at: [http://www.digitalelaeremidler.dk/media\(8135,1030\)/Metodeseminar_KnowledgeLab.pdf](http://www.digitalelaeremidler.dk/media(8135,1030)/Metodeseminar_KnowledgeLab.pdf)

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"How can we evaluate that?"

– a guide on how to carry out your own evaluation of projects, teaching courses, and teaching materials

By Dorte Carlsen, associate professor at UC Syddanmark and evaluator for the Learning Museum project

One of the key points of the Learning Museum project has been that that teacher-training college teachers and museum educators have developed courses for and with student teachers. During the project, many participants have asked how they might evaluate their own courses. This small article represents an attempt at very briefly guiding project participants on how to evaluate their own projects, educational sessions/teaching courses, and educational materials. The article is based on the following central questions that all evaluation designs should consider – regardless of whether the object under review is a project, a teaching course, education materials, or something else entirely¹:

- What is evaluation?
- What *can* we evaluate? And what do we *want* to evaluate?
- On the basis of what values will we evaluate?
- How do we carry out our evaluation?
- What can we use our evaluation for? And what do we want to use it for?

What is an evaluation?

There are several ways to define evaluation. This guide is based on the defini-

tion offered by Evert Vedung, a professor of social science. At a general level, Vedung considers evaluation to be *an activity that reflects on other activities in order to extract information that may be useful in future improvements of such activities*. He also accentuates that *Learning is the overall point of all evaluation*.² This definition has had a major impact on evaluations of projects and on evaluations of teaching and pupils' learning. Evaluations differ from individual and subjective experiences or attitudes by having its "reflections on activities" follow a certain system.

What can we evaluate? And what do we want to evaluate?

We must ask ourselves: What do we really want to know something about? Within the realm of evaluation theory we may distinguish between evaluating and assessing a project's **completion** (organization, framework, collaboration), **performance**, and **outcome** (the results ultimately achieved in the form of learning, education, quality of life).

If we take the Learning Museum project as our example, this is the result:

- **Completion**: How well did the collaboration work? Was it truly equal in

scope and execution? What were the ideas and intentions behind the planning of the course – and to what extent were these ideas and intentions realized in the execution? What has impeded and promoted completion?

- **Performance** may also be translated as “products”. For example, the Learning Museum project has prompted student teachers to produce a wide range of products. In this article I will focus on how the teaching courses created by student teachers may be evaluated as products – as may the educational materials developed by the student teachers.
- **Outcome:** Consider the various objectives set for the student teachers’ and the other participants’ learning; who has learned what? How and to what extent have the student teachers (or their target audience) learned the things they were meant to learn? Why did they learn it? How and to what extent have the various activities and initiatives contributed to learning? Do any activities and initiatives appear to be particularly useful in contributing to the students’ learning?

On the basis of what values and criteria may we evaluate?

The next question concerns the criteria behind the evaluation. Or, to put it in other words: An evaluation is an assessment governed by certain criteria. In our everyday lives we evaluate things all the time: Was it a good trip? Was it a good book? Did we receive good service? Does the new device we bought work well?

When you evaluate something in a professional capacity you need to explicitly state what you mean by “good”. What is good? What is important? How do we see that something is better than something else? This requires us to establish certain criteria for what is “good”. Such criteria are based on values and beliefs about what is important. During the Learning Museum project, the teaching courses produced by student teachers have been based on beliefs such as these: it is good for student teachers to be active, including physically active; it is good to make sensory experiences at the museum; it is good if student teachers collaborate on developing the teaching courses; the principle of dialogic teaching is good; it is good for student teachers to be allowed to test their teaching courses and materials on and with school pupils; it promotes collaboration to meet up physically – preferably at the teaching training college and at the museum alike. Such values are built on a range of notions and beliefs – including different perceptions on how we learn and on the subject at hand. The more explicit your criteria for assessment, the more accurate and useful your evaluation will be.

What actions constitute an evaluation?

It is difficult to offer a single, straightforward recipe for how to evaluate. Fundamentally, we may say that evaluation constitutes a set of actions. You need to:

1. Identify the field/subject to be evaluated and formulate appropriate evaluation questions. What do we want to know something about?

2. Collect and generate data. What can show me/us something about our field of study? How do I get access to that? Overall, we may distinguish between three methods (which may be more or less structured in nature):
 - I. Methods of questioning – e.g. interviews, structured dialogue, focus groups, questionnaires.
 - II. Methods of observation – e.g. supervision, observation forms, including video and audio recordings.
 - III. Methods of documentation, e.g. products created during the project – including the student teachers’ or pupils’ responses to or results of tasks. “Personal meaning mapping” and other mind mapping-like overviews are other examples of products (see e.g. Mortensen and Quistgaard, 2011).
3. Analyze and interpret data. Reflection and assessment of results correlated with the relevant objectives and values.
4. Follow up: What impact should these findings have on future collaboration and courses?

Finally, you need to consider what you can **use** your evaluation for – and what you want to use it for. Within the Learning Museum project and similar initiatives the obvious reply would be that the evaluation should help us look back, examining whether we have achieved what we wanted to achieve, and when we are looking ahead, considering what we want to do differently next time.

Evaluating teaching courses and evaluating education materials

As was mentioned in the above, the student teachers’ production of teaching courses/educational sessions and education materials was regarded as a central aspect by many. For this reason the latter half of this article is concerned with how one may evaluate teaching courses and education materials.

Teaching courses:

“The groups will prepare an outline for a teaching course on industrialization that incorporates the current exhibition. The group is free to decide on what grade levels to address, when, and how, but of course the rules stipulated for the subject must be observed and the didactic deliberations must be clearly stated. The group will come up with at least two activities that may be carried out by pupils in connection with the exhibition. Such activities should ideally stimulate the pupils’ creativity or give the exhibition a more innovative feel. During the day’s work, the groups will consider which three points to share with the rest of the class.”³

The above is an example of a task set for student teachers during the Learning Museum project. How may this task be evaluated? The teaching course can be evaluated as a **product**, prompting questions such as these:

- Are the student teachers setting up specific targets for their course? How

and to what extent are they translating the abstract official guidelines for their chosen subject into concrete targets?

- What is the connection between the targets and the activities suggested? What should the pupils *do* in order to *learn*?
- How is the exhibition incorporated?
- Does the teaching course include support for teachers, e.g. in the form of ideas about how to prepare and follow up on the museum visit?

One might also ask: What have the student teachers learned by creating a teaching course/educational session (**outcome**)? For this purpose one can regard the student teachers' teaching courses and educational materials as documents (data), analyzing them while looking for signs suggesting that the student teachers have in fact learned something they intended to learn, e.g. how to teach science subjects while incorporating alternative learning spaces. Evaluating the students' learning is closely associated with the question of whether objectives have been set for the student teacher's tasks. Within collaborative initiatives such as the Learning Museum project one might, for example, set up common targets that are relevant to teacher training colleges *and* museums alike. Such targets should share similar directions – they should be mutually agreed upon, but need not be identical. Museum educators, teacher-training college teachers, and student teachers can adopt separate perspectives within the same overall framework.

Evaluating educational materials

Student teachers have produced many different educational materials in connection with their visits to museums. The overall evaluation of the project shows that student teachers, their teachers, and museum educators all attribute great importance to the production of educational materials when it comes to meeting the objectives behind the Learning Museum project: Teaching student teachers how to use museums in their teaching. Here, the main question is: How can the many educational materials be evaluated?

This part of the article is based on research conducted by Læremiddel.dk, Det nationale Videncenter for Læremidler (The Danish Centre for Educational Materials). The list of references provided below indicates where any interested parties can read more about the theories behind the analysis and assessment of educational materials. Such materials may be evaluated as **products** or as **outcomes** (see the above regarding the evaluation of teaching courses as outcomes). What follows below is a guide on how to evaluate educational materials as products. Within the Learning Museum project several different types of educational materials have been produced: didactic materials aimed at school pupils, and materials aimed at teachers.

Such didactic materials are intended as tools that will help teachers plan, carry out, and evaluate teaching that helps pupils learn what they are supposed to learn. This is to say that educational materials may be evaluated on the basis of a study of the objectives behind the materials (including the overall perception of the subject at hand), and the pathways

Targets

What should the pupils learn? What are the reasons behind the targets set? To what extent do the educational materials create a direct link between the museum space and the targets set for the subject?

Expression

How do the materials approach the pupil? How do they seek to engage the pupil's curiosity and attention? Do they employ a mode of expression that is user-friendly and motivational to the target group? Are the materials easy to use? Do they involve different modes of expression – or are they based exclusively on written language?

Contents

What should pupils be working with? How are the contents of the materials relevant to the nature of the museum? Are the contents relevant to teachers and pupils? Do the contents connect with the pupils' own experiences and everyday lives?

Activities

What should the pupils do? Which activities should they perform? What forms of representation are incorporated? The body, images, sound, language? What is typical of these activities? What is the ratio between individual work and co-operation? Can the teaching be differentiated?

Completion and evaluation

Do the materials help teachers/other student teachers carry out their teaching (at the museum and in the classroom – before, during, and after the visit)? Has a "teacher's guide" been prepared to support the materials? Are teachers and pupils supported on evaluating the efforts made in relation to the targets set?

Legitimacy

How and to what extent are the educational materials in keeping with the Common Objectives (Fælles Mål)?

For further inspiration (in Danish), please visit www.laeremiddel.dk (a collection of evaluation models is available at www.laeremiddeltjek.dk).

indicated by the materials: What should the pupils do in order to learn the things stipulated in the targets set?

Additional inspiration

Inspiration on how to evaluate educational materials can also be found in the publication *Evaluering af e-museum* by Rikke Ørngreen and Karin Levinsen. Their report comprises a range of examples of

evaluations of digital educational materials prepared to support teaching for 0-9th grade pupils and upper secondary students. In their evaluation of the digital educational materials the authors have examined how factual content is presented, whether the materials include innovative use of media, and whether they include solutions that invite the use of mobile media.

The Danish Ministry for Education's

website offers more information about various evaluation tools (e.g. portfolio studies and observation); links are provided in the list of references. These tools may help interested parties choose their field of study and method of data collection. If you need to evaluate large or long-term projects you may find inspiration and specific advice in a handbook published by Danmarks Evalueringsinstitut: *En lærerig vej til resultater. Håndbog i evaluering ved hjælp af indsatssteori*.

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Educational Training Courses

Developmental projects such as Learning Museum are always built upon the fundamental idea of discovering what steps have to be taken in order to achieve the desired goal. In the professional language of evaluation this is called "program theory". Briefly put, the program theory for Learning Museum has been the idea that the development and testing of educational training courses and academic internship programs will qualify future primary school teachers to use museums. In the long term, it will also strengthen and professionalize primary schools' use of museums' learning potential, improving and developing the museums' educational offerings to primary school pupils. One step towards achieving this goal is the organization of activities such as training courses and internships at museums as well as visits to teacher training colleges by museum professionals. The project has allowed for the ongoing testing of various types of educational training courses and has led to the development of a general model for the planning and structure of a course. Good planning ensures that both parties fulfill their goals of ensuring that students get the most out of their time at the museum, that evaluation is understood as an integral part of the process from the start, and – not least – that both parties take on their share of the responsibility. It is, however, important to emphasize that location, resources, time, academic discipline, etc. means that the content of the courses will quite naturally differ. Here, you can draw inspiration from selected courses from the project period 2011-2013.

Contents

Educational Training Courses – Template	41
Fieldwork: Biology – discipline and didactics	43
Geography Workshop at the Workers' Museum	46
Project Day for History and Danish at Funen Village	50
Mathematics at the Art and Design Museum Trapholt, Kolding	54
Paraphrase of an Artwork at Sorø Kunstmuseum	57
A Course in Museum Mediation, four museums and the Teacher Training College in Aarhus	60

Teaching – Template

– to organize educational offerings,
academic internships and undergraduate
work etc.

General:

- Title of the collaborative course + description of type of collaboration
What is the concept / structure of the session (Is it a workshop, an educational sessions, an academic internship. How will it be carried out in practice etc.)

Overall Goals / Objectives of collaboration:

- What is the goal for the teacher training college (For ex. subject-related enrichment, the development of didactics or educational materials, etc.)
- What is the goal of the museum? What are the approaches / methods needs or product requirements?

Participants: Who, what graduating year, etc.

Duration: A few hours, a week, several months, continual contact over a longer period, repeated sessions

Preparation before the museum visit:

- In the pre - phase, a meeting is held concerning the framework of the visit. This includes a discussion of goals, content, and which activities are to be carried out beforehand at the teacher training college, during the visit to the museum and afterwards back at the teacher training college. The visit length and dates of subsequent submission are agreed upon as well as an exchange of literature and theory.

Literature:

- What literature should be read in conjunction with the collaboration work? Are there any relevant literature or mediation texts from the museum? It is often a good idea for the museum educator to have knowledge of texts dealt with at the teacher training college, so that it is possible to discuss an exhibition based on a text which both parties have read.

During the visit to the museum:

- Which activities are to be conducted? Who will say what? What are the tasks, planning needs, subsequent involvement of students from primary schools or the student teachers' internship classes?

The phases following a visit:

- What will happen after the visit to the museum? Will the students have to return and follow up on their work? Is there a need for advice from the museum educator during the follow-up phase?

Evaluation:

- How is evaluation to be carried out? To whom, where and how will students present their results? It is often a good idea that the presentation of the final products of the collaboration (for ex., learning materials or educational offerings) takes place at the museum. What is important is that the museum educator be able to return to the teacher training college or school for follow-up work. It is likewise important that the students receive feedback from the teacher training college as well as the museum educator. Does the material function in practice at the museum?

Perspectives / additional comments:

- Can the collaborative partnership be applied in another context, in another subject, at another museum or by means of other theoretical approaches? How can the collaboration be developed in order to encourage and make accessible internship and undergraduate work collaboration, etc.?

Completed by: The person who fills out the form, name, date

Fieldwork

– Biology and Didactics in the Informal Learning Space

General:

- The School Services at the Natural History Museum in Aarhus have for years been working in collaboration with lecturers and student teachers from the subject area of biology from the teacher training college in Aarhus. It has been a collaboration consisting of mutual exchange and learning, where students and teachers have contributed to the development of learning materials and evaluation of their teaching at the museum. The museum has provided input to be applied in instruction at the teacher training college through the educational offering "Evolution" and the introduction to "The Informal Learning Environment" at the museum. In connection with this initiative and under the auspices of the Learning Museum Project, another element was added to the existing collaboration: A 3-day course at Mols Laboratory focusing on biotope studies.

Participants: Students of biology in their year of studies.

Duration: Approximately 4 consecutive days.

Objectives of the teacher training college:

- Student teachers specializing in biology get the opportunity of participating in consecutive days with natural history and fieldwork on the agenda and not just theory. They can get their fingers dirty.

Museum objectives:

- To give the student teachers the opportunity to get out into the field and strengthen their knowledge and field skills, become familiar with using "out-door spaces", get to know Mols Laboratory's possibilities as a learning space.

Preparation before the visit to the museum:

- Teacher educators and museum educators meet and establish a plan for content and objectives.

During the museum visit:

- In August 2012, 15 student teachers spent three days (and nights) carrying out field-related activities at Mols Laboratory, a part of the Natural History Museum in Aarhus located in the Mols Hills. The days were committed to helping students familiarize themselves with teaching which focused on different habitat studies and have the opportunity to immerse themselves in the classification of insects and spiders. The students were given professional presentations and help with field work and classification work, an introduction to the geology and natural surroundings and, finally, an orientation concerning the care and the preservation of the area.

In addition to building knowledge of nature and field work, the students were assigned to develop educational sessions for Mols Laboratory for students in grades 7- 9 based on biology, but using a multi-disciplinary approach. The sessions had to include field work and activities that engaged students, preferably including the application of digital tools.

After the visit to the museum:

- The students continued working with didactic tasks and had to ensure that the session they developed came into use at Mols Laboratory.

Evaluation:

- Field days and training sessions were evaluated in October, while the students presented their work. There were many fine and thorough examples of collaboration, and it was obvious that the students had taken the job very seriously - despite the fact that it fell outside of their required curriculum. An edited form of the presentations will be integrated into the educational offerings developed for primary schools at Mols Laboratory.

Perspectives / additional comments:

- It was an exciting and mutually fruitful collaboration which shows that museums and teacher training colleges have much to offer one another. Museums gain inspiration by having their practices put to the test and regarded with a critical eye as well as by allowing old habits in their didactics practice to be refreshed. Students are challenged in areas where there is not always time for reflection during their studies at the teacher training college – namely the part of biology that deals with our nature, species and ways of perceiving the natural world. These are elements applied in the classical understanding of education, comprising the basis of biology teaching. The collaboration builds relationships with future biology teachers who will hopefully return to the museum with their classes either during a teaching internship or when they've become certified teachers. All in all, it has been a great pleasure to be part of such a process. Both the museum educators and teacher educators can benefit from a departure from old habits of thought. It has been rewarding and exciting to work at the crossroads between biology and didactics in an informal learning environment. The students were positive and constructively critical of the process and said that it was highly motivating that the educational offerings that they developed would be taken seriously and put into practice "in the real world." The students even wished afterwards to test their offerings with school classes invited from Southdjurs Municipality.

Completed by: Pernille Mølgaard Andersen, Head of Education, School Services at the Natural History Museum, and Associate Professor of Biology
Benny Lindblad Johansen, Teacher Training College in Aarhus .



Geography Workshop

at The Workers' Museum

General:

● The purpose of the workshop was to see the museum's exhibition "Industrial Labor" in the light of a larger process of industrialization and globalization in the subject of geography. In addition, the visit should enable students to see their main subject in a different, more interdisciplinary context than the one they were used to.

Finally, the visit to the exhibition should make the students aware of the options available in collaborating with the school services, museums and other educational programs, and generally give students experience of how an "informal learning space" can be integrated into their teaching practice, encouraging visits to external learning spaces and subsequent follow-up work back in the classroom.

Participants: Two classes with the specialty subject area of geography from Zahle's Teacher Training College. Both groups consisted of second- and third-year students.

The first group participated in 2012 and the second in 2013.

Duration: The workshop lasted three hours (see detailed program below), but the workshop was included as part of a collaborative course lasting three weeks.

Objectives of the teacher training college:

● To work with subject of industrialization in an unconventional way and thus try to think the planning and structure of the teaching in ways which departed from the obvious. In the process, the workshop should act as a prelude to the visit, to working with creative learning processes and to working innovatively in education. To gain insight into the opportunities that an exhibition can offer in teaching, and an insight into how collaboration can occur outside the classroom.

Museum objectives:

● To obtain an interdisciplinary and critical look at educational opportunities in the exhibition and give student teachers insight into the possibilities of using the museum and the opportunities provided by the school services in their own practice.

Preparation before the visit to the museum:

● Before the students' visit to the museum, the museum and the teacher training college organized a session and choosing topic, structure, scale and the like. The students worked with museum education and didactics in external learning spaces. This work was carried out based on, among other things, articles from UP's (Young Educators) special issue "Museum Education" 2011. In addition, they were asked to orient themselves on The Workers' Museum's website and the special exhibition "Industrial Labor" which was what they would be working with at the museum. The students had also worked with aspects of geography studies that deal with industrialization and globalization.

During the museum visit:

● The workshop schedule:

12:45p.m. - 1.00 p.m.

Quick exercise 2 > < 2: Discuss what your first impression of the exhibition is and find three questions to ask the exhibition, which you would like to know more about. The questions can be subject-related and/or didactic in nature.

1:00 p.m.-1:15 p.m.

A short presentation of the project Learning Museum and our ideas about the day's workshop and future collaboration. Among other things, information about how the project can be formally incorporated into teachers' education (internships, undergraduate work, etc.) and how student teachers can be a resource for The Workers' Museum (developing teaching materials, generating new ideas, etc.). Summary of the initial exercise and presentation of the structure for the rest of the day including the tasks to be solved by the groups.

1:15 p.m.-2:45 p.m.

Introduction to the exhibition and initial work with assignments. You have posters, markers, models and us available as advisors.

2:45 p.m. – 3: 45 p.m.

Presentation of each group's work.

3:45 p.m. – 4:00 p.m.

Summary of the day and discussion of how to proceed. Arrangements for continuation of tasks at a later time. For example, we could choose to write an article, work on lesson preparation, develop materials for the exhibition or make recommendations as to how we can work better collaboratively.

● Tasks worked on during the day which must be completed and ready for collection by 2:45 p.m.:

Each group prepares an outline for an educational offering on industrialization, where the current exhibition is involved. Each group determines the grade level of the pupils they want to have as a target audience as well as the structure and methods for carrying out the tasks, but the academic material must, of course, be actively involved and didactic considerations must be made clear. The groups have to design at least two activities that a class can do in conjunction with the exhibition and which activate the participating pupils. It is a plus if the activities stimulate pupils' creativity or give the exhibition a more innovative touch. The groups then reflect upon the day's work and focus on three issues, which they will share with the rest of the team.

After the visit to the museum:

● The students' ideas were compiled in a catalogue which is intended to be used by the class when they go out and teach.

In addition, the choices made by students in completing the tasks varied greatly. One group wrote an article for *Geografisk Orientering* (Geographic Orientation), others were inspired to participate in an academic internship at The Worker's Museum following their initial experience.

Evaluation:

● Afterwards, the form and content of the workshop was evaluated and the students also evaluated the workshop back at the teacher training college.

Perspectives / additional comments:

● The workshop was held two more times. Based on the evaluations from the first workshop in 2012, another was held in 2013. The new framework for teacher education in Denmark, which has been set in motion, is structured through a series of modules which are pieced together to form new teaching subjects. In addition, students must choose among a number of additional specialized modules which can have both theoretical or didactic objectives. There is, for example, module work which focuses on the active use of external learning spaces and modules that shed light on collaborative work bridging different subject areas. In both types of modules, it is natural to include a workshop similar to the aforementioned, possibly as a part of an internship or a repeated session where school pupils become part of the process.

Completed by: Ane Riis Svendsen, Education Employee, Linda Nørgaard Andersen, Head of School Services at The Workers' Museum and Ditte Marie Pagaard, Associate Professor of Geography at Zahle's Teacher Training College in Copenhagen.



Project Day for History and Danish

at Funen Village Open-air Museum

General:

● Project Day at Funen Village focuses on an issue the museum is currently facing: They are, upon managerial request, required to convey the village through the narratives of Hans Christian Andersen. This is also the challenge that student teachers specializing in history had to take up while using their knowledge of history didactics, curriculum requirements, interdisciplinarity, practical experience and their backgrounds as trained Danish teachers (more than half of the students had completed their Danish module).

Project Day is part of the general development of museum education at Odense City Museums. During the meeting with the students, museum educators obtain an increased awareness of the significance of museum education. Work carried out, also contributes to the development of concrete educational offerings which support teachers' abilities to prepare a museum visit and follow up on the material covered during the visit back at school. Project day helps to introduce student teachers to the museum and present the many opportunities that it has to offer.

Participants: Two groups with history as their specialty subject area in their third and fourth years of study, in all approx. 50 students. A teacher educator of history as a teaching subject; a guest lecturer and tutor from Danish as a teaching subject Danish; two museum educators as advisors.

Duration: The project day lasted one day from 10 a.m. – 3 p.m. Additionally, two weeks prior to and following project day.

Objectives of the teacher training college:

- Reflection on and use of different perspectives in interpretations of the past and learning materials for the subject of history through work with a specific coupling of a "historical figure's history" (in this case, Hans Christian Andersen) with the structural history (Agriculture)
- Working with historical awareness in practice
- Skills and knowledge in academic and didactic use of non- textual expression in education
- Development of a critical eye in regard to the analysis of sources and historical interpretations
- Working with local history

Museum objectives:

- Materials that can complement the village's mediation framework: "A Village from Hans Christian Andersen's Era "
- How do we use Hans Christian Andersen to convey developments taking place in Denmark in the 1800s?
- How do we connect the general history of Denmark with a specific historical actor (Hans Christian Andersen)?

Product Requirements:

A proposal for a guided tour, with or without a museum guide which mediates the village through the eyes of Hans Christian Andersen. The tour will include a balance between four historical perspectives and stimulate students' historical awareness. The tour may involve IT.

Directions: Presentations of the products will be made at The Funen Village on project day as well as back at the teacher training college.

Preparation before the visit to the museum:

● In the pre-phase, a meeting was held to determine the framework of the visit. This included goals, content, and the activities that would be carried out prior to the museum visit at the teacher training college, during the visit to the museum and afterwards back at the teacher training college. The duration of the visit and specific dates of subsequent submissions were determined. The exchange of literature and theory was also carried out.

Before the visit, museum staff and the responsible teacher educator from the subject of history met to establish fixed dates for the project collaboration. They also discussed what The Funen Village would like to use the students' resources for. The educator then drafted a program and a vision for the collaboration, which was edited back and forth until agreed upon by both parties. A few weeks prior to the actual visit to the village, students were presented with the program and read, as a part of their course curriculum, articles in the Danish publication *Unge Pædagoger* (Young Educators), a series of articles from Young educators release: "Museum Pedagogy". In the class, they also worked with didactic theories regarding the use of objects and artifacts in history teaching. A lecturer in Danish was invited onto the project, and was granted eight hours to devote to the project.

During the museum visit:

● Program:

10:00 a.m.

We meet at Funen Village Visitors Centre. Presentations by Curator Lise Gerda Knudsen on The Funen Village and 'A Village from Hans Christian Andersen's Era'. Stig Gissel, Associate Professor of Danish, general advice on the Danish subject-related aspects.

Coffee Break.

10:45 a.m.

Guided tour of Funen Village in two groups.

12:00 p.m.

Lunch and time to see Funen Village on your own and work on your project in The Old School. Guidance and questions.

1:30 p.m.

Coffee and cake at The Old School

2:00 p.m.

Summary of the day's events and closing remarks. You are welcome to continue work on your projects until 3 p.m.

Evaluation:

● After the visit, the students had approximately three weeks to complete their products. During this period they were free to come and go in Funen Village, and they had access to advising at the teacher training college. After delivering their products, they were given feedback by both the teacher training college and the museum. The museum then chose two to three projects for which they requested continued work by the responsible students in order to result in a finished product. Production of the product was integrated into the student teachers' coursework and mandatory attendance requirement.

Perspectives / additional comments:

● We envisage that this project model can be used by all subject areas, and become a fundamental structure for collaboration between teacher training colleges and museums, especially for those who have not yet worked together.

Completed by:

Loa Bjerre, Associate Professor of History at The Teacher Training College on Funen, Benedikte Jeppesen, Head of Mediation at The Funen Village, Lise Gerda Knudsen, Curator at Odense City Museums, Stig Toke Gissel, Associate Professor in Danish at The Teacher Training College on Funen.



Mathematics

at the Art and Design Museum Trapholt

General:

- Development of educational materials for mathematics teaching for students in grades 4-6 in collaboration with the Art and Design Museum Trapholt and The Teacher Training College in Jelling. The collaboration was twofold:
- To investigate how to activate the museum's resources and the museum as a space for mathematics teaching in primary schools. By opening the museum for non-traditional disciplines, the museum's potential and relevance to society as a whole is brought to the fore. The more professional skills that can be put into play, the greater the relevance.
- To give the student teachers the opportunity to try their hand at developing educational materials on the basis of the real-world experience.

Participants: First-year student teachers.

Duration: First a day at the museum with subsequent work at the teacher training college followed by a return visit to the museum.

Objectives of the teacher training college:

- For the teacher training college, collaboration with Trapholt functioned as a developmental project giving students very important insight into how to collaborate with an external partner, who comes from a completely different world than public schools. The participating class was presented with the project as a kind of contract, "We as experts in mathematics and mathematics education have been hired by Trapholt to develop learning materials, so it is important to give the customer a well-developed product, that they can use in their business and which contains meaningful mathematics."

Museum objectives:

- Central to the exhibition profile of Trapholt is special the interface between, design and crafts and an investigative mediation practice. Trapholt's exhibitions are designed to move guests to perceive, think and reflect on issues such as innovation, sustainability, aesthetics, process and material use. Therefore, The School Services at Trapholt are very aware of the possibilities of opening the application of the collections to subjects other than the "traditional" museum-related subjects such as The Visual Arts and Danish. In so doing, the museum's knowledge is put into play in a variety of relevant contexts.

Preparation before the visit to the museum:

- Prior the student teachers' visit to Trapholt, Kirsten Jensen, from Trapholt and Mie Engelbert Jensen, a Lecturer in Mathematics from Jelling, talked about the different expectations and opportunities of collaboration. The initial meeting between student teachers and the museum was very open, where students, the lecturer and the museum exchanged ideas, expectations and opportunities.

During the museum visit:

- In the Spring of 2012, the group of math students from the teacher training college in Jelling visited Trapholt for a guided visit. Kirsten Jensen introduced to the museum collection and the museum's school services. The visit to the museum was a new and different experience for the students, during which they all got the opportunity to expand their knowledge about art, design and photography.

After the visit to the museum:

- The group decided to establish a team of three students charged with the task of turning the ideas into three actual learning resources during the summer. The materials had to meet specific criteria in relation to mathematical learning potential as well as the museum's guidelines, for example, on the handling of delicate items and active engagement of students in the learning process.

During the developmental phase, the team posed a few questions to Kirsten Jensen concerning the precise measurements of the buildings and the names of chairs. One of the challenges that emerged along the way was

the seemingly contradictory process of developing hands-on investigative teaching materials in a museum where one is not allowed to handle the objects in any way. This necessitated, that the teaching materials be based on Trapholt's *handling collection* of chairs as well as the architect Arne Jacobsen's summer residence, located on the museum grounds. From the students' perspective, there was an strong desire to depart from the image of the museum as a boring, alienating environment.

Evaluation:

- Kirsten from Trapholt and Mie from Jelling evaluated the institutional collaboration and the products were evaluated in collaboration with a sixth grade class from Lyshøjsskolen in Kolding, who tested the various tasks the student teachers had developed.

Perspectives / additional comments:

- **From the museum:** Collaboration with the math students was extremely interesting and giving. We now see that Trapholt offers the potential for an infinite number of mathematical tasks. Only the student teachers' imaginations were the limit. Therefore, the collaborative structure can be applied for further use in working with another group of math students or with a completely new subject, altogether.

- **From the teacher training college:** Collaboration could be seen as a representation of a future job choice. Although the majority of students go on to become math teachers in primary schools, there are also career opportunities within the fields of consultancy, publishing and the like, a fact which we perhaps neglect to incorporate in the daily teaching. Collaboration with Trapholt has meant that students have become better prepared for a wider range of tasks than they would have been without having participated. At the same time, collaboration has meant that the teacher has also gained valuable experience in organizing and developing educational activities more closely associated with institutions outside of schools.

Completed by: Kirsten Jensen, Audience Development Manager at Trapholt and Mie Engelbert Jensen, Associate Professor of Mathematics at The Teacher Training College in Jelling.

See article: Mathematics at the Art and Design Museum, Mie Engelbert Jensen, Associate Professor of Mathematics at The Teacher Training College in Jelling and Kirsten Jensen, Audience Development Manager at Trapholt. Under the chapter Articles.

Paraphrase of an Artwork

at Sorø Kunstmuseum (Sorø Art Museum)

General:

- Student teachers in the Visual Arts from The Teacher Training College in Vordingborg, UCSJ, visited Sorø Kunstmuseum.

The visit focused on linking a specific practice to image analysis. To allow the students to, so to speak, "create an understanding of the work." To create an understanding of art history or the development of art by allowing students, themselves – physically – to establish a dialogue with an artwork and comment on it. Including the awareness that one often meets works or advertisements that refer to the works of others, so that you may find that you recognize some aspects, but not everything. To open the students' eyes to the benefits of the use of other learning spaces than the school, for example, the art museum.

Objectives of the teacher training college:

- To allow students, first-hand, to experience what it means to see and experience art in real life rather than just meeting it online, in books, magazines, etc. – thereby giving them the desire to take their pupils to an art museum. To give students the feeling that an art museum in Denmark today is anything but dusty and has the potential for numerous and varied forms of communication.

Museum objectives:

- To let students learn at first-hand what it means to see and experience art in real life rather than just meeting them online, in books, magazines, etc. Giving them the desire to also take the kids to an art museum. To give students

the feeling that an art museum in Denmark today is anything but dusty and has the potential for numerous and varied forms of communication.

Participants: Student teachers specializing in the subject of The Visual Arts (third- and fourth-year students).

Duration: Two visits of two full days at the museum over the course of three weeks. In addition, workshop sessions over the course of three weeks.

Preparation before the visit to the museum:

- Presentations and exercises on art history and image analysis. Studies of literature from these areas as well as concerning the use of museums in education. Studies of a variety of well-known -isms and imitation of their characteristics in a hands-on assignment using small-format work where students worked on “speaking the language of a variety of imagery” based on the same photograph. Presentation on paraphrasing with a focus on a wide range of forms, styles and content paraphrases. Discussion in plenum of selected works.

During the museum visit:

- The students saw video footage of children’s reactions to works of art from the museum’s collection as well as presentations and discussions of mediation approaches. Dialogue and activity-based guided tour of the museum. Group work concerning different periods and individual artists with subsequent presentation to the rest of the group. The students selected a work, themselves, which they were to work with in depth back at the teacher training college. They took pictures of and, if possible, bought postcards of the work. At the teacher training college, the students worked with content-based paraphrases of large paintings in acrylic on cardboard.

Evaluation:

- Reflective sessions at the museum after each exercise. Presentation of the painted paraphrases back at the college. Exhibition of paraphrases for fellow students. Final evaluation of the overall progress along with the museum educator who visited the teacher training college.

Perspectives / additional comments:

- Several of the students subsequently incorporated paraphrase work into their own teaching practice. Many also mentioned the significance of the museum collaboration in their final examination paper. Similar collaborative partnerships are ideal for interdisciplinary work with Danish as the subject area and awareness of genre as a focus area. Several students also worked with paraphrase and “tableau vivant” in an attempt to identify with different character positions, a process in which there is a further construction of a paraphrase of the paraphrase. In this case, the task was carried out with planar images, namely paintings, but students were allowed to develop a plan as well as a spatial and a digital paraphrase of the same work as the starting point.

Completed by: Birgit Brænder, Associate Professor of Visual Arts at UCSJ, Teacher Training College, Roskilde, Tanya Lindkvist, Curator, Head of Education, Sorø Kunstmuseum.



A Course in Museum Mediation,

four museums and the Teacher Training College in Aarhus

General:

● During this course, participants are provided with a practical and theoretical introduction to the museum as institution and mediator of field-specific and knowledge-based materials. The course is aimed at students who are interested in working with museum education in schools as part of their teaching profession. The course was conducted in collaboration with 4 museums in Aarhus: ARoS Aarhus Kunstmuseum, The Women's Museum, The Old Town Museum and The Natural History Museum. Cases will be incorporated into the course curriculum during the students' development of their own educational offerings and materials in order to more closely explore collaborative opportunities between museums and schools.

Participants: 2nd - 4th year student teachers, all specialty subject areas.

Duration: 30 hours.

Objectives

● The course aims to provide participants with insight into and understanding of various museums' mediation and teaching practice and gain a practical and theoretical understanding of how to communicate field-specific and knowledge-based materials in the museum sector. The course also aims to open opportunities for future collaboration between the students, as future primary school teachers/museum ambassadors, and museums.

Objectives of the teacher training college:

Participants will acquire the following skills:

- Insight into various museum environments.
- Inform and disseminate the museum relevant data for public school students, including evaluating and selecting different communicative methods of presentation/learning materials in relation to the target group's prior knowledge, development and grade level, life experience etc.
- Select and reshape a professional, interdisciplinary content for different teaching situations in relation to objects, exhibitions, etc. .
- To understand and comprehend the museum as an institution and a learning space, as well as to teach about exhibitions and mediate information on museum education in professional primary school contexts.
- To act as a teacher, entrepreneur and partner to the museum.

Museum objectives:

- To disseminate knowledge concerning the educational and experience-based opportunities that are present at museums. To receive future teachers' responses to our educational offerings. What works well and where can we do better? To discuss ideas for future educational programs with students.

Preparation before the visit to the museum:

- The course is designed as a combination of professional presentations and group/individual work and educational visits to museums with examples and active issues under the course's three main headings: the museum as an institution; Didactic and educative issues; Collaboration in practice and resource person.

During the museum visit:

- The students visit all four museums where they are introduced to each museum as an institution, their collections, and how the institution works with children and young people. Then they get a small task relating to an educational offering for a select exhibition, work or object. They could also try out some of the museums pre-existing educational offerings themselves. The students then choose one of the four museums with which they would like to continue working. They then prepare an educational offering for a specific target audience.

After the visit to the museum:

- Concluding presentations at the respective museums with participation on behalf of all students, museum educators and teacher educators.

Evaluation:

- The course was repeated twice and evaluated by the student teachers, the participating museums and the teacher training college.

Perspectives / additional comments:

- The idea can be adopted by other institutions. It assures a continual sharing of knowledge and experience between the city's teacher training college and the city's museums. The course, itself can be further improved when we determine an even more appropriate time frame and act as an efficient path of communication between student teachers, teacher training colleges and museums.

Responsible for collaboration:

Marianne Axelsen, Associate Professor of History & Ole Kristian Petersen,

Associate Professor in the Visual Arts, Teacher Training College, Aarhus

Marianne Agnete Birger Madsen, Museum Educator at The Women's Museum in Denmark

Birgit Petersen, Curator, AROS

Marianne Bager, The Old City in Aarhus, Pernille Mølgaard Andersen,

Head of School Services, The Museum of Natural History, Aarhus.

See article: *An Extended "Interdisciplinary" Practice – Collaboration between teacher training colleges and museums.* Under the chapter Articles.

Practical Experience Programs

Academic internship, practicum and the bachelor's thesis

The new Danish teacher education curriculum includes three academic internship periods. However, in order to strengthen connections to practice, the curriculum also refers on a more general level to the term "practical experience programs". This refers to various forms of collaboration, larger or smaller in scope, between educators, student teachers, institutions and student teachers' future potential employers. Traditionally, primary schools have been thought of as student teachers' primary future employers, but the potential field of employment should be seen in a broader context. Learning Museum's many projects involving educators, student teachers and museums are a perfect fit for these "practical experience" requirements. In this context, practical experience programs can be understood as flexible tools which provide student teachers, museums and primary schools with ideas on how to carry out collaborative work in connection with the compulsory internship periods of teacher training education, even as they also help uncover future opportunities presented by such partnerships.

Long-term collaboration gives rise to a deeper understanding of one another's disciplines and new ways of meeting. Collaborative partnerships and internship contracts can be tailored to match the specific museum's resources, location and field of interest with the student teacher's particular field of study. There will be valuable time and opportunity to test theory in practice with primary school pupils – research that will benefit all involved. In the following pages, we will take a look at internships, practicum and bachelor's thesis work as ways of creating closer collaborative relationships.

Academic Internship

During the Learning Museum project, we have tested various forms of academic internships for student teachers at the museum. Which particular internship structure can be applied to a museum internship and whether it is even possible to carry out one's academic internship at a museum varies from one teacher training college to the next. It is, therefore, important to discuss opportunities with the internship supervisors at the teacher training colleges and the internship advisors at schools and to contact the museum in question. Learning Museum has, for example, tried to link the museum internship with student teachers' school internship (e.g. three weeks out of the seven-week internship), so that student teachers have the opportunity to take their pupils out to the museums and test the educational offerings and learning materials with which they have become acquainted and perhaps have even developed themselves. Student teachers who have undergone internship training at a museum become highly qualified museum users who are able to carry out relevant didactic considerations and are also predisposed to using the museums actively before, during and after a visit with their pupils.

Contents

Collaboration between KUNSTEN museum of modern art and the Aalborg Teacher Training College	65
Invitation: An internship at Museum Østjylland	67
An internship at Tøjhusmuseet	69

Collaboration

between KUNSTEN museum of modern art and the Aalborg Teacher Training College.

Stinna Toft, curator at KUNSTEN &

Hanne Nissen Bøgesvang, teacher of visual arts at Aalborg Teacher Training College

Three student teachers have completed a special internship at the museum. The results of this process have included new educational sessions/teaching courses, an exhibition, and mutual exchanges of input and observations.

Concurrently with the student's internship the museum has been used as a space for tests, learning, and experiences.

Preliminary meetings and planning the collaboration

At a preliminary meeting between the art teacher from the Aalborg Teacher Training College, the internship counselor for the subject of Art, and KUNSTEN's curator with particular responsibility for education, learning, and mediation, the parties agreed to carry out an internship process at KUNSTEN in the autumn of 2012. The exact terms and conditions of this internship were discussed at a subsequent preparatory meeting with the three student teachers who would be involved in the process, and they stated that they wished to carry out their internship while affiliated with a school

and on the basis of teaching courses that included museum visits and the direct use of the museum collections. The project assigned high priority to ensuring that the student teachers were given a thorough introduction to KUNSTEN and the museum's collection, and that they built a basic understanding of the museum institution as such.

Tuesday sessions: What's special about the museum space?

A guided tour of the museum and the collection formed the basis for the individual sessions, and during the period that preceded their internship the three student teachers and the curator held a number of "Tuesday sessions"; these were informal meetings held in the museum café, each lasting approximately one hour. Here, the student teachers had the opportunity to discuss their chosen subjects, engaging in a dialogue on form and content of their planned teaching courses. These discussions included a look at dialogue-based teaching taking its basis in the theories of e.g. Olga Dysthe.

The three student teachers received several tutoring sessions with their own art teacher, exploring the contents pre-

sented in art classes and the didactics associated with the subject. The student teachers also tried out various materials relevant to their final educational sessions.

Gathering inspiration at the museum – and field studies

Two days were set aside for the student teachers to visit the museum and gather inspiration. These days involved a mixture of preparation time, studies at the museum library, meetings with the curator, and finally a presentation of the student teachers' individual projects to the teacher-training college teacher and the curator. This presentation served a dual purpose: it prepared the student teachers for their exam and also served as preparation for the exhibition that was one of the intended end results of the project.

The two days also included "field studies" where the student teachers had the opportunity to experience the museum's various education and learning offerings for themselves. On one of these days they joined the museum educators on a classic guided tour, attended a session for kindergarten children based on a conversation about specific pictures, and had the opportunity to talk to KUNSTEN's museum educator. They were also introduced to the museum's workshop, ArtLab, which focuses on dialogue and processes as the children work with the help and supervision of an artist.

Planning and testing educational sessions at KUNSTEN and at the school's art room

During their internships at their respective schools, the student teachers then

went on to visit KUNSTEN with their classes, using the museum collections to provide inspiration for working with forms and color. The student teachers had prepared a range of possible topics of conversations as well as a range of tasks, all based on the learning targets set for their sessions. Olga Dysthe's work served as part of the student teacher's theoretical point of departure: *"During my sessions I use KUNSTEN to create openings for something new, for what Olga Dysthe calls 'det ulige' – 'the unequal' (UP, 2011, no. 1). In doing so it is possible to imbue the picture with meaning through the pupils' own voices by allowing them to demonstrate their knowledge and feelings, by introducing a specific issue or steering the conversation in certain directions by other means, and by observing how the pupils' definitions and concepts change in response to the content they are presented with – and, very importantly, in response to each other."*

End result: An exhibition

It was agreed that the entire process involving the student teachers and their internship classes was to be concluded by a month-long exhibition staged in the museum foyer. The exhibition was officially opened on 7 December to the great pleasure of everyone involved: the student teachers, the museum, the proud parents, and the delighted children, who were tremendously pleased to see their artworks exhibited at the museum. Staging an exhibition is an excellent way of capping off the process, and it also offers great learning potential: the internship process is anchored in a concrete reality, in a real-life situation, and in a direct encounter with visitors at the museum.



Invitation: An internship at Museum Østjylland

Are you a student teacher? Would you like to develop educational sessions aimed at 1-9th grade pupils in an alternate learning space? Would you like to see what museums can bring to your future work as a teacher?

Museum Østjylland offers a three-week internship where successful applicants will try their hand at teaching within an informal learning space, thereby gaining insight into alternative forms of educational practices.

Museum Østjylland is one of Denmark's largest museums of local history, presenting exhibitions in museum buildings in Grenaa, Ebeltøft, and Randers. The museum works with the history and culture of the Randers region and Djursland – right from prehistoric times to the present day.

An internship at Museum Østjylland is an obvious choice for student teachers specializing in History. But Art, too, may be addressed very well within this museum setting, for example within "The Buhl Family Salons" ("De Buhlske Stuer") – a complete interior from an old *haute bourgeois* home, complete with an excellent collection of art. The museum is also home to a museum of crafts, allowing student teachers to work with the subject of Material Design.

During your internship you will:

- have the opportunity to develop and test your own educational sessions.
- gain insight into the museum's work, its organization, and various fields of study.
- become acquainted with the day-to-day work carried out by the museum's department for Play and Learning ("Leg og Læring").
- grow familiar with the different opportunities for learning offered by the museum.
- be given free rein to use the physical settings of the museum, its objects, exhibitions, and environments.
- get the chance to gather empirical data and receive input on exam-related tasks and your BA thesis.

Your project may be based in or build on existing museum offerings aimed at schools, or it may take its point of departure in a new subject or a new exhibition. The muse-

um wishes to develop more educational materials aimed at 7th-9th grade pupils – perhaps that might be a task for you?

You will be associated with the museum's section for Games and Learning, which is part of the department "Publikum og Udvikling" ("Visitors and Development"). Games and Learning manages the museum's education and learning activities aimed at schools and other institutions. You will be assigned a contact from Games and Learning, who will mentor you during your internship. Overall, you will work with us during the museum's usual working hours from 8.30 to 16.00 Monday to Friday. Your internship will mainly take place at the museum in Randers.

Your internship will comprise:

- an introduction to the museum and its departments – including a half-day "internship" in each department.
- a more in-depth presentation of the Games and Learning department; here, you will attend and monitor educational sessions aimed at schools as well as other education and presentation activities.
- your own independent work as you develop and carry out your own educational sessions aimed at schools.

The museum expects all interns to:

- prepare a synopsis outlining the didactic, method-related, and educational thinking behind your educational sessions
- prepare an internship report
- comply with the working hours described above

As an intern you can expect the museum to provide:

- One 1-hour mentoring/counseling session per week
- relevant input on your subject and didactics
- assessment and evaluation of your work

Museum Østjylland is part of the "Learning Museum" project. The objective of this project is to actively involve student teachers in developing the museum's educational offerings, and to ensure that the museums can serve as learning spaces for future teachers.

You can read more about existing offerings aimed at schools at our website www.museumoj.dk under Leg og Læring (In Danish).

Yours faithfully

Helle Lebahn Bentzen, curator, Museum Østjylland

An internship at Tøjhusmuseet

Camilla Stougaard Pedersen is a 3rd year student teacher at the Zahle teacher training college (UCC). Here she speaks about her internship at Tøjhusmuseet (The Royal Arsenal Museum).

What did you do during your internship?

I was responsible for developing my own educational sessions. I created sets of tasks that pupils will receive as part of POP-UP 1864, the Tøjhusmuseet's new educational offering aimed at 7th-9th grade pupils. My materials will be part of the museum's new special exhibition about the 1864 events. I was involved in the project on an equal footing with everyone else: I attended all meetings, and I was put in touch with the other developers working on the project. The scope and outline of my project was determined in co-operation with Mette Liv Skovgaard, the manager of the museum's school services. Having a carefully delimited project to work with was very helpful to me. We took our point of departure in my particular fields of interest and in what the museum needed help for. Prior to my internship we held a pre-

liminary meeting where we settled on what I would be doing. During the course of my internship we held two mentoring meetings.

I spent approximately two days a week at Tøjhusmuseet. They were very flexible about times, allowing me to accommodate my other work.

What do you take with you from your internship?

It was very reaffirming for my professional confidence to be given real responsibility – to find that my work was taken seriously and will actually be used by the museum. I was not simply asked to do a theoretical assignment, or to carry out work that would then be passed on to others for further development. During my internship I was given quite free rein. At first, this high level of freedom was slightly unsettling; it was markedly different from the way in which we work at teacher training college. But you end up really liking it, seeing potential instead of limitations in having to rely on your own creativity. The internship has given me a lot of new information on how the Tøjhusmuseet view and work with didactics. I have become more aware of my own museum didactics, and of all

the potential this form of teaching offers. I think my internship has been very project-oriented and has promoted independence, development, and insight into new museum didactics.

Words of advice to those considering an internship at Tøjhusmuseet

1. You must thrive on responsibility. For your work will actually be used by the museum.
2. You should enjoy working with others.
3. Prior to applying, it would be a good idea to give some thought to how the museum may be used in your teaching.

The internship may take place at any time during the school year. You are very welcome to form small groups of interns who carry out their internship concurrently.

Practicum

Practicum at UCSYD – The Esbjerg Teacher Training College and the museums in the region

Practicum is an example of a course of study which shows how museums and cultural institutions can strengthen and develop the field of practice at teacher training colleges. Practicum projects may range from individual students monitoring a music class at a primary school once a week, to a PE class participating in an educational session at Esbjerg Museum, or a student who wants a to carry out his/her practicum at the Fisheries and Maritime Museum in Esbjerg or Ribe Art Museum. In Esbjerg, the museums are regularly invited to internship meetings at the teacher training college where students can learn about the existing opportunities at the museums. The museums also hold preliminary informational and development meetings for students, during which specific proposals for tasks the museums want addressed are presented and discussed. In the following unedited documents and examples you can gain insight into and draw inspiration from how they work at the teacher training college in Esbjerg.

Contents

The Practicum Scheme	72
A Physical Education (PE) Practicum Project at Esbjerg Museum	73
Invitation: Practicum at the Fisheries and Maritime Museum, Esbjerg	77

The Practicum Scheme

Practicum at UCSYD
The Esbjerg Teacher Training College

The point of departure is to involve student teachers and practice-oriented issues in projects that have a direct practical application. Practicum is not the same as an internship; rather, the term denotes interaction and exchanges between persons and individuals from the practical field and teachers and student teachers from teacher training colleges. Practicum projects can vary greatly in type and scope: they may, for example, consist of individual students sitting in on a weekly music class at a school; a PE class staging educational sessions at Esbjerg Museum, or a student teacher wishing to carry out a practicum project at the Fisheries and Maritime Museum in Esbjerg. The interplay between the practical field and the teacher training colleges ensures strong foundations for quality assurance at the institutes of education while also making knowledge and insights from teacher training colleges available to a wider field. Practicum projects may also provide current empirical data and real-life dilemmas that can be addressed in BA theses.

In Esbjerg, museums are regularly invited to attend Practicum meetings at the teacher training college. Here, student teachers can learn more about the opportunities available to them. The museums also host information and preparatory meetings for student teachers, presenting specific proposals for tasks they would like to see solved. For example, Esbjerg Museum might want some new educational sessions and teacher's guides enabling teachers to take their pupils on a museum visit without the assistance of a museum educator. Someone might want to work with Math for 7th to 9th grade pupils, or with Ancient History for the youngest pupils. Or student teachers might discuss art criticism and museum didactics, exploring art via iPads at Ribe Kunstmuseum (Ribe artmuseum). The possibilities are almost endless, but people need to learn of each other's existence first if anything is to happen at all!

A Physical Education (PE) Practicum Project

at Esbjerg Museum

By Tine Hedegaard Bruun,
head of Practicum at the Esbjerg Teacher Training College

General overview

● A visit to Esbjerg Museum's special exhibition *Tidens Spejl – Idræt mellem vi og jeg* (*Reflecting its Time – Physical Education between We and I*) (March–September 2013) formed part of the "Idrætsfagets basis" (PE 101) class for a group of 2nd year student teachers. The museum visit was intended to act as a link between the "Physical Education basis" course and the Practicum initiative, which aims to link up the teaching conducted at the teacher training college with the student teacher's future field of practice. At the museum, the student teachers were asked to assess and offer feedback on the education materials the museum had created for schools visiting the exhibition alone.

Objectives

● The "Physical Education basis" course addresses a range of subjects, including the values, qualities, history, and diversity of physical education and sports. In connection with the museum visit, particular emphasis will be placed on two competency areas:

1: Physical Education for 0 to 3rd grade pupils, 4th to 6th grade pupils, and 7th to 9th grade pupils.

2: The values and culture of physical education and sports, diversity in sports, athletic disciplines, and different forms of movement-based activities.

The project aimed to achieve the following objectives:

- Giving student teachers knowledge of teaching associated with the body, with physical activity, and cognitive skills.
- Giving student teachers knowledge of educational terms and concepts relevant to the teaching of Physical Education.
- Giving student teachers knowledge of the *raison d'être*, form, and content of the subject of Physical Education in schools from an historical, cultural, and social perspective.

- Giving student teachers insight into the results of research and development work conducted in Denmark and abroad.
- Giving student teachers the ability to actively use a broad definition of Physical Education in their work.
- Giving student teachers the ability to use a range of forms of movement and movement cultures – including historic, present, and future forms.

Prior to their museum visit the student teachers were assigned the following tasks:

- Prior to your museum visit, decide on which era you wish to address in your study groups (each group comprises 3 to 5 student teachers).
- While working with your historical theme, identify distinctive traits for your chosen era within the following fields: athletic wear, rhetoric, exercises, activities/formations, body image, society, and school. Provide a brief description of the evolution of PE in schools.
- Demonstrate knowledge about the evolution within the PE subject: its objectives, its view of education, and its most significant contents.
- Prior to your museum visit you will also work with the educational materials prepared by the museum to accompany its exhibition. You will complete the exercises that the ma-

terial asks school pupils to complete prior to their visit.

During the museum visit

The student teachers visited the exhibition on their own without receiving any introduction from museum staff. The visit was intended to examine the extent to which a teacher would be able to bring their class along without any prior contact with the museum's department for education, working solely on the basis of the material available for download from the museum website. The student teachers spent two hours at the museum.

After the visit the student teachers were assigned the following tasks:

- Taking your historical theme as your point of departure, you will create a performance that demonstrates typical traits of that period's Physical Education and movement culture. You will give your performance to the rest of the class.
- Your work with the questions set by the museum will serve as the basis for a 10-minute presentation that introduces your historical theme to the rest of the class.
- Your discussions – within your study groups and in class – will form the basis for qualified feedback on the museum's educational materials for the exhibition. Do the materials help teachers teach well?

- While working with the materials, assess whether they would be useful for you in your future work as teachers. Apply relevant theory to your assessment.
- Consider how the targets set down in the "Fælles Mål"/"Common Objectives" are incorporated in the materials presented by the museum.

Student teachers' assessment upon completion

The student teachers were asked to evaluate the materials available for download from the museum website as well as their museum visit. Their evaluations were conducted in groups; below is an excerpt from one group's evaluation.

Having visited Esbjerg Museum, where we worked with the exhibition 'Tidens Spejl', we have been tasked with evaluating our experience on the basis of Hilbert Meyer's criteria as set out in the book 'What is Good Teaching?' (2006)

The material is very good and certainly prompts discussion. The questions and subjects addressed in the materials are highly relevant in relation to society as such, culture, and the pupils' development. We believe that these educational materials tie in well with the targets and objectives set out for Physical Education in Fælles Mål/Common Objectives 2009. Those targets include:

- **Target upon completion of the 2nd grade:** Being aware of and able to perform old and new games.
- **Target upon completion of the 5th grade:** Being able to work with Physical Education in interdisciplinary contexts (Physical Education and History)
- **Target upon completion of the 7th grade:** Being aware of the role played by Physical Education/sports in society
- **Target upon completion of the 9th grade:** Being able to reflect on ethics and morals in sports and being aware of the functions and significance of Physical Education and sports through the ages.

However, we would like to see a stronger link to the exhibition itself, enabling pupils to see the connections and giving them specific questions to work with at the museum. There is no direct link between the tasks and the targets set insofar as we believe that the tasks set for the exhibition could have been solved without visiting the museum. Hilbert Meyer believes that a clear structure and a red thread running through your teaching are prerequisites of good learning. Here, there is no clear red thread, as there is no obvious route of transition from one exhibition area to the next.

We also thought it was difficult to see the link between the activities in the lobby and the exhibition itself. Our suggestion would be to collect it all in one place and then offer descriptions for each activity, describing how that particular activity was used in the 1930s or 1980s, respectively. This would establish

a direct link between the historical aspects and the activities themselves.

The activities at the museum would be highly relevant to 7th to 9th grade classes if a link was established between the activities, exhibition, and preparatory materials. We believe that the written texts featured in the exhibition are too complex for 1st to 6th grade pupils. The language used in the various texts is too difficult, which will cause pupils to lose focus and concentration as they explore the exhibition. On a positive note, the museum's use of pictures and clothes/equipment from the various decades is excellent; it provides pupils with a visual image of sports and Physical Education through the ages.

Hilbert Meyer also points to the importance of ensuring clear correspondence between targets, content, and methods. In this respect we feel that things get a little imprecise: it is difficult to identify the start, middle, and end.

We believe that working with this subject in a museum setting is highly relevant; it offers a clear overview of the evolution of PE and sports through the ages. We also applaud the emphasis put on the 1930s and 1980s; it offers a great way of putting the overall developments into perspective.

Additional perspectives/ comments from the teacher-training college teacher:

Prioritizing your time is always a key issue for any teacher. Cutbacks are everywhere, and we must be able to justify all teaching with references to the official targets set. For this reason it is crucial to have clear targets specifying the value and benefits of taking part in the project and a museum visit. Given that time is of the essence it is also important for teachers and educators to be helped on their way by museums. One option is to prepare materials (for schoolteachers and other educators) that may be used actively during the visit. Another option is to have museum staff in charge of the actual teaching at the museum. For the project described here, I myself, as college teacher, needed to make a preliminary visit in order to form my own impressions and prepare. Doing so is demanding in terms of resources, but also necessary because no teacher's guide was provided for the exhibition itself.

If schoolteachers are to visit the museum it is crucial that their visit must add new dimensions to the learning process that cannot be achieved in other ways, e.g. by solving the tasks online.

Invitation:

Practicum at the Fisheries and Maritime Museum, Esbjerg

Would you like to use the Practicum option in your education?

- Got a good idea? Interested in informal learning spaces? Now you have the opportunity to carry out a Practicum project at the Fisheries and Maritime Museum in Esbjerg.
- You can present your ideas for educational sessions, exhibitions, projects, and activities that can be carried out in real life at the Fisheries and Maritime Museum – with particular relevance to e.g. your specialist subjects, specific grade levels, methods, or educational and didactic theories on teaching in informal learning spaces. You can also take your point of departure in existing activities at the museum. Perhaps you have been thinking about some specific issues associated with taking pupils to a museum or into other informal learning spaces? The museum educators are happy to help you with advice and input if you are considering whether a Practicum project might be relevant for you in 2013/14.
- You can have any specialist subject. All subjects can be addressed in projects and activities at the museum. Similarly, pupils of all ages may be included, as may any method – and you are also welcome to develop new activities or educational sessions if you wish.
- You may also want to consider incorporating Practicum aspects into your BA project.
- Naturally, you must ensure that an agreement is entered into between a teacher at the Esbjerg Teacher Training College and the Fisheries and Maritime Museum in order to carry out a Practicum project here.
- Below are some examples of issues addressed in previous projects; perhaps they can be useful as inspiration:
- Why should you bring your pupils to a museum?
- How do you prepare your pupils for a museum visit? Must you do so?
- How can IT-based educational sessions be used at a museum?
- What learning processes take place during a museum visit – with or without teaching?
- Is it relevant to use the museum for games and gamification in teaching?

1-1-2013

FISKERI- OG
SØFARTSMUSEET

PRAKTIKUM



Praktikum-invitation | Formidlingstjenesten/FIMUS

- What view of nature would you like to pass on to your pupils?
- How do pupils respond to hand-on activities, and do they entail any real learning?
- How can educational sessions at museums be evaluated?
- Do pupils learn anything from task sheets?
- What kind of activities would you choose to let 7th - 9th grade pupils participate in when considering the targets set in Fælles Mål/Common Objectives?

If you want to hear more about Practicum at the Fisheries and Maritime Museum, feel free to contact Robert. E. Jepsen (Esbjerg Teacher Training College) 7266 3058 rjep@ucsyd.dk or Asbjørn Holm (Fisheries and Maritime Museum) 7612 2000 ah@fimus.dk.

The Bachelor's Thesis

During their participation in Learning Museum several student teachers wrote their bachelor's theses in connection with theoretical and practical studies at selected museums. See the following four articles: "Creative, Innovative and Enterprising Citizens – The teacher's role in the external learning space," "On the Spot – The art museum, dialogue and body in visual arts teaching", "Can the Subject of Natural Sciences be Addressed and Made Accessible at the Museum? – Reflections from a bachelor's thesis" and The Museum as an Object of Study in which undergraduate students describe the basis of their thesis work and fields of interest. In the new teacher education curriculum it is no longer compulsory for a bachelor's thesis to be linked to a specific discipline; it can now be written in connection with research and development projects. This makes it possible for museum collaboration to become an integral element in the students' bachelor's thesis work where collaboration revolves around specific issues that both parties want to address and remedy. One way of implementing such collaboration as standard practice is by inviting cultural institutions to bachelor's thesis "introductory bazars" or café days, where they present research and development projects they want executed, and in this way enter into a dialogue with student teachers on specific opportunities. In this context, representatives from museums will also provide "an ounce of reality" so that students can see a definite connection to their fields of practice. The following article about MatchPol is an example of how the Department of Schools and Learning, Metropol works to match student teachers with relevant opportunities for practice.

Contents

Learning Museum and MatchPol

81

Learning Museum and MatchPol

By Nina Troelsgaard Jensen, Metropol

At Institut for Skole og Læring (The Department of Schools and Learning) at the Professions-højskolen Metropol, the Learning Museum project – a successful collaboration between many Danish teacher training colleges and cultural institutions – has mainly focused on the potential offered in relation to student teacher's BA projects.

At Metropol, student teachers have had the opportunity to work with their BA projects in close co-operation with external representatives from the practical fields. Contact is facilitated through the project MatchPol¹.

MatchPol offers a framework and tools for carrying out projects that allow student teachers to "challenge, explore, and change real-life practice" while collaborating with a representative from the practical field and receiving tutoring from their teacher training collage. A MatchPol project takes its point of departure in a concrete problem or issue relating to the profession's current or future needs, and in conjunction with the bachelor project it will include proposals for specific and relevant steps that may be taken.

Under the auspices of the Learning Museum project, cultural institutions of all kinds can offer up issues they would like to see explored, developed, or challenged by competent student teachers. The student teachers apply their professional and didactic competencies to the task, introducing a new level of relevance to their work on their BA theses.

Student teachers can also pursue their own particular interests, approaching a cultural institution of their own accord. They can bring new potential to the table, suggesting opportunities for development that have hitherto been neglected due to lack of time or attention.

One student teacher has worked on determining how visiting pupils actually used the museum's worksheets while exploring the exhibition. One of the results of this work was a very interesting finding about the differences between how girls and boys approached the worksheets. This insight can be used by the museum in its future planning of tasks and exhibitions. Another student teacher made recommendations on possible didactic choices and prepared a pupil's guide in support of a museum's set-up of a new exhibition.

In both of the cases mentioned above, and in many more, the student teachers and their external partners – the cultural institutions – have both reaped great benefits from the collaboration. Student teachers have benefited because the collaboration adds extra depth and relevance to their BA thesis, improves their prospects for their future careers, and creates an excellent network on which to build. The cultural institution benefits because the collaboration applies a fresh perspective on their practice, gives them updated insight into the teacher's work and everyday life at schools today, and because they have specific, relevant tasks solved by a competent (and free) student teacher.

Such collaboration also lays down the foundations of more wide-ranging and better co-operation between schools and cultural institutions. At present, the two parties know too little about each other in a wide range of fields. Such lack of awareness may easily prevent pupils from deriving the maximum learning benefit from trips to museums, etc. Quite contrary to the school's and the cultural institution's objectives behind the visit.

Together, the Learning Museum and MatchPol projects give teacher students and the participating cultural institutions unique opportunities for improvement. And this is true within their own separate fields *and* jointly.

¹ www.matchpol.dk

Interviews

Why does it feel like receiving a loving slap to have a group of student teachers for a visit? And what are the benefits of having an intern constantly present? Museum professionals, teacher educators and student teachers give their personal views on what is important to them in collaborative partnerships between museums and teacher training colleges. This series of stories is about the importance of more formalized collaboration and how collaborative partnerships can open our eyes to other ways of using museums.

Interns describe how museums feel less musty than the familiar classroom. Does this provide a better aesthetic experience? Interns report that they have been responsible for organizing educational offerings for an exhibition on industrialization. Does this make one more creative? Teacher educators report that they have obtained a more nuanced and expanded perception of their discipline through the mediation of a historical artifact as a work of art. Does one learn from this? Museum professionals describe how, if you take a fresh look at things, you can also work with mathematics at the Den Gamle By open-air museum in Aarhus. Do you believe that? Finally: Do you become a better student teacher by repeating an educational offering at a museum five times? And can special "talent programs" also be implemented at museums?

Contents

A Loving Slap	85
Power users!	91
Increased professionalism	92
An "open" space	95
Internships are inspirational	98
Historical artefact - or work of art?	100
Seeing	101
Competencies	102

Interviews af Tine Seligmann

Interview with Karsten
Vad, Museum Education
Manager at the Natural
History Museum

A Loving Slap

- collaboration helps develop
frameworks and networks

You have at one point said that working with student teachers is like receiving "a loving slap". What do you mean by that?

When we have student teachers visiting the museum in one context or another, we find that we all share many of the same goals. We focus on the pupils, on learning and on creating good experiences. So, generally, we have the same objectives. The student teachers are often quite curious and genuinely interested in the museum. But they have barely gotten through the museum doors and into this new learning space before they begin to question what I say about our educational practice, the museum learning space, and so on. It's really beneficial for our educational practice that we meet individuals who can challenge us. At times, the criticism can be quite direct, which is why I compare it to receiving a "loving slap". It's because they truly have good intentions that they

86

give such direct criticism of our educational practice. And I think this is something particularly characteristic of student teachers. We don't experience the same from the teachers who bring their classes to visit the museum – even though they come from the same educational background as the student teachers. This can perhaps be attributed to the fact that student teachers are in the midst of a developmental process where they are finding their own teacher identity. So they are in the midst of shopping around, so to speak, and therefore attempt to reflect their own practice in people like us. When I speak to them about how we carry out teaching at the museum, they take in the information as they would any other part of their teaching education and follow their normal practice of providing criticism and feedback.

Now, I do not know how many loving slaps I've received in my life, it's probably not that many, but the feeling you get after you've had such a group for a visit is truly like having received a loving slap. Now we've been given a wake-up call that puts us on our toes, perhaps forcing us to rethink some of what we've presented to them, based on their responses.

What has been the impact of being involved in the project Learning Museum as well as being in contact with other museums on Zealand, Funen and in Jutland and with several teacher training colleges?

In our day-to-day work, it has led to me receiving inquiries from other teacher training colleges than I would normally expect to hear from, for example an inquiry from Funen. The networking opportunities which arise from participating in such a project should not be underestimated. During the Learning Museum project period, a reform of the general teacher education was also taking place. This meant that I was unable to apply much of my prior knowledge about teacher training colleges, which I had acquired through practical work experience at a college, in the collaboration. Things had changed all of a sudden. So, getting a program director from one of the major teacher training colleges to come and talk about what was

going to be happening due to the reform was something I would never have been able to set up otherwise.

I also believe that things such as our internship collaboration might in fact – now that the various internship structures and opportunities are being changed – simply have been shelved here at the museum for lack of time to familiarize ourselves with the changes. Familiarizing themselves with a completely new teacher education curriculum and practical framework is not something that a museum, whether small or large, can simply just take on. So there is both the networking part of it, but also the very real challenges that have arisen. So, I would also say that one thing I've learned in the context of this collaborative project, of which I was surely unaware at the start, is the need to formalize collaboration. To make it clear to others that it is truly something you wish to pursue as well as explain the hows and whys. Earlier, I would very much do things based on my own initiative, contacting the persons I happened to want to contact and so on. Collaboration became, then, too dependent on an individual person. That is not the way to build lasting, fruitful collaboration. The day that I am no longer at the museum or take leave, or whatever it might be, or the day my contacts from the teacher training college are no longer where they used to be, then the whole collaboration falls apart. And that is simply too fragile. I have been very aware of our need to apply systems to such collaboration. It is not enough to have one's own initiative and desire.

How have you implemented collaboration with teacher training colleges here at the Natural History Museum?

We've done it incrementally, and the process has not been at all straightforward. I would say that I have had a personal interest in teacher education, partly because I, myself, am a certified teacher, but also because I have taught at a teacher training college. So for me it has always been a personal thing, this wanting to see collaboration become more conceptualized and formalized, cer-

tainly within our own set-up. But this has not always been as obvious a choice to others in the organization, so at the beginning it was essential to find good arguments as to why it is important for our museum to have good collaborative relations with teacher training colleges and thus get the student teachers to come to the museum. Explaining this has been an ongoing challenge. And now I think I have some well-established arguments which I can use. Among other things, there is the food-chain argument: "Well, if we are to have many school children visiting us in 5 years, it's a great idea to have gotten hold of all these teachers during their training so they know the place, come back to it, and develop a desire to use it actively." This is one of the arguments you can use when addressing management and the museum as a whole.

Then there are some things that have come about on their own. We are a large and very well-known museum, so we've had many requests for academic internship collaboration without having specifically to reach out to the student teachers. Therefore, there was no initial need to make a website with a goal of specifically establishing such contact, but later such a need arose when we could see that academic internship schemes were being abolished. So I have prioritized making a website that gives information on who you can contact, what arrangements can be made, how many student teachers are required in order to be considered for an internship, and the like.

I've also put together a decidedly didactic course for biology teacher training. The course specifically concerns the teaching of evolution, and in many ways it resembles the method of instruction they receive at the teacher training college, but it makes particularly good sense within the framework of The Zoological Museum. I had to work a little harder to make time to carry out such a task, but the Learning Museum set-up allowed me to prioritize it timewise. It may sound as though it has been a struggle – it has not, but it's always good to have strong arguments in place when you are prioritizing such an exciting project.

You have also had several undergraduate students working on their bachelor's theses at the museum. How does this collaboration work at your museum? What have they been in charge of, and how would you rate the collaboration?

We have had two undergraduate students this past year, and there are two more who have just contacted us. We came into contact with one of the student teachers through the teacher training colleges' project Metropol MatchPol. The reason I mention it is because they have some passages in the internship contract with Matchpol which clearly shows how the distribution of roles should be handled. It states, for example, that we as a museum should not guide the students in their task, but should rather, in the early stages, clearly define the roles. We have done so with the two undergraduate students we have had so far. We've established a dialogue with them about the issues that they were interested in, and we've given them access to the museum, both physically with key and card, etc., but also in relation to our booking system so that they can see which team or classes have booked which topics, etc.

We also made some of our employees available to them, providing the student teachers with contact information and encouraging them to make contact. This has worked well and the students have been enormously self-motivated, but they haven't just gone off on their own; rather, they have continually reported on and assessed the process. We have not had to spend a lot of hours on them. They have not needed to be coached through anything. They've produced results that we can use internally and probably also externally, in connection with fundraising and the like, helping us document that we are doing something right.

The undergraduate students also give us a lot of response regarding our teaching practice, which we can apply to make improvements. I have, personally, had to consciously avoid becoming their teacher training supervisor; that has been quite an exercise for me. But it works really, really well when I don't act as their supervisor.

What recommendations would you give to others who want to set up collaboration between teacher training colleges and museums?

It's very, very important to meet people face to face. I have also mentioned it several times that institutions such as university colleges (teacher training colleges) are large systems and can be very closed to the outside world: an e-mail can disappear or a phone call may never be received (if you can even find a phone number). So it is about seizing the opportunity to meet people where they are. Learning Museum has obviously made it easier to meet up, but if you don't have access to that kind of network you can go to conferences, etc.

You must also do what you can to encourage the teacher educators to visit your institution. Make them a good offer, one they cannot refuse. It is not certain that they know your museum, and even though they may know it, it is not certain they have ever thought about it in relation to their students. They have perhaps not made the link that compels them to say: *Hey, you can also use it for this too!* So the thing to do is to get them out to your museum and open their eyes to what you have to offer. Also, museums must be acutely aware of what it is we can provide that is not already offered at the teacher training colleges. And you should, of course, familiarize yourself with the teacher training curricula in order to be able to contribute something unique. It is of no use trying to contribute something that is already a well-established part of the curricula at the teacher training college. They must see the necessity or extra dimension in coming out to us. Make sure that you have management on board as well, so that you don't end up promising yourself away to projects that you are unable to prioritize and get implemented. The teacher training colleges are often busy, fast-paced environments, so if you want to set up collaboration, you have to find time to prioritize it within their system. If it is at all possible, you can also try to involve student advisors or other who can say: *This is a great idea! There are some great experiences we can draw upon at our institution. Let's make the time for it!* That's certainly my experience.


Interview with Pernille Haugård
Jensen, Head of Education and
Development, Zoo Education
Service, Copenhagen Zoo

Power users!

- Interns bring new knowledge with them

You have had many student teachers participating in internships here at the Zoo Education Services. Why do you prioritize this?

The reason why we have chosen to have interns here at the Zoo Education Service is that we find that the interns have a lot of new knowledge about how learning takes place out at the teacher training colleges, as well as about the current teaching within the fields of the natural sciences, science and technology, biology, physics and chemistry. In addition, we get lots of input from student teachers about how our teaching actually works. They look over our shoulders when they follow us around on the various educational sessions for school groups. They ask a lot of questions because they are so curious. So we get lots of good questions that we must answer, and this keeps us on our toes and aware of how our instruction actually materializes in practice. Finally, I would say that we know that the interns who have chosen to hold their internship here will become the most frequent users, returning with school classes. After an internship at the zoo for three weeks, they are also very qualified users. They have gained strong didactic knowledge and skills in working with instruction and subject-matter before, during and after their visits here at the Zoo.



Interview with Henning
Brinckmann, Associate
Professor of History,
Teacher Training College
Hjørring, UCN

Increased professionalism

– When practice meets
theoretical frameworks

Henning, for a number of years you have been working with the School Services at Vendsyssel Historical Museum. What has been most important for you in participating in Learning Museum?

Several things, really. Firstly, it has been very important to us that we simply were forced to work on the basis of theoretical frameworks for the practical tasks we carried out – and this applied to myself, the museum employees, and the teacher training college. I also believe that it has been of great benefit to the student teachers to visit the museums and see the many opportunities inherent in teaching in a museum space, learn about museum collections and such. In this way, student teach-

ers get to see that the theoretical approaches they apply at college are actually consistent with the theoretical approaches used at museums. We find that the two institutions think similarly in a vast number of areas.

We have also eliminated some myths. Myths that museums tend to think in one direction and we who work in the school system in another. It has of course been a great advantage for us to work with Learning Museum in the process of establishing network ties. We have gained insight into many different museum categories. The student teachers discovered that museums are not just historical museums, but that other types of museums exist. So networking has enhanced our knowledge of museums in a broader perspective.

What did your collaboration entail, and what did you do specifically?

Specifically, we have had collaboration between the School Services at Vendsyssel Historical Museum and group of student teachers with history as their specialty subject area from the teacher training college in Hjørring. First, we worked with the knowledge we have about how children work with history and how it should be mediated. We examined various research results in this area and found out, very generally speaking, that children like to be active when working with history. They are interested in stories and varied methods of teaching, and in exploring possibilities outside the classroom. And just as importantly, we know that children like to work with something they recognize from their everyday lives and something they can use in their everyday lives.

That was the starting point for our collaborative project. Very specifically, we wanted the project topics to be something that was included in the primary school history curriculum and which was also covered by the museum collection. The beginning of the 1900s and the regime change of 1901 is part of the canon of the curriculum of history in Denmark, and the museum owns a small farm from the same period. So we began to try to figure out how the

student teachers could create an educational project for 9th graders out at the farm house. We held that incorporating a variety of teaching types and styles was essential, and as a form of reflective category, we used the different learning styles and intelligences that Howard Gardner has outlined. The students would then select and develop some learning styles that could form the basis of an educational offering for ninth grade pupils. It proved to be a success when they applied the different learning styles to a ninth-grade class out at the museum. Subsequently, we evaluated the project, and one student teacher continued the work and wrote their bachelor thesis based on the collaboration.



Interview with
Kristian Jeppesen, student
teacher, Teacher Training
College, Odense, UCL

An “open” space

– away from the musty
classroom

Kristian, you spent three weeks of your seven-week internship at Møntergården, Odense’s cultural history museum. What do you think the difference is between serving as an intern at a museum as opposed to at a primary school?

It certainly involves two different ways of using the knowledge you acquire at the teacher training college. In a primary school, there are specific curriculum objectives that the teaching has to meet. You are able to assess reasonably quickly whether or not you have succeeded in meeting them. When participating in a museum internship, you do not need to spend as much time on conflict management as a pedagogical approach. You can, instead, spend your time on developing teaching materials, immersing yourself in history, and working more in-depth on things that we also work with at teacher training college, such

as knowledge of methodology, source criticism and the like.

There is much more ample opportunity to work theoretically and in depth with various subjects at the museum compared to the primary school. But there are also elements of the primary schools that we enjoy. That is why we have chosen to become teachers with all that this entails in terms of conflict management. But serving as an intern at a school and at a museum are quite clearly two very different things.

What do you think the museum space can give you, and what opportunities does it provide in relation to teaching?

I'll divide it up in terms of what it can give me as a student intern, and what it can give the pupils: The pupils can first and foremost – and I suppose it's somewhat the same for me as an intern – be inspired by the fact that it is an open space. Aesthetically they are presented with a completely different learning space, a contrast to the musty, smelly classroom back home. It is something else entirely, and this is also what you enjoy as a student teacher/intern. You get inspired by being here in the museum space and in the exhibitions. It helps generate better ideas that you can take with you in your continuing work.

What task were you given at the museum, and how have you applied it in your bachelor's thesis?

I was instructed to develop teaching material for primary school grades seven to nine. At Møntergården they already have material for high school students, and they would like to develop materials for primary schools: one set for grades 0 to three, one grades four to six, and another for grades seven to nine. I teach grades seven to nine, so it was only natural that I be commissioned to develop material for these grades; material that can be used be-

fore, during and after a museum visit here. In addition, many of the answers that I received during the development of this teaching material also tie in well with the main focus of my bachelor's thesis. From two diverse ways of working the same answers to the same questions could be found, so that's really good.



Interview with Eva
Björk, student teacher,
Zahle's Teacher Training
College, Copenhagen

Internships are inspira- tional

- prompting greater
creativity in teaching


Eva, you have participated in an academic internship at The Workers' Museum, and you received the task of drafting teaching material for an exhibition about industrialization. What skills do you think that you have gained during the internship?

I have become much more aware of my craft, and of how I myself will organize my teaching before, during and after a museum visit. I have become particularly aware of how I want to take part in the educational session when students are being taught or receiving a guided tour of the museum, and then use that to draw some parallels to my own teaching. This was especially the case when I had to develop my own teaching materials. I have now become more aware of how I will use teaching materials in follow-up

sessions in the classroom. In other words, I will be aware of how I will apply a critical approach to them, but also of how I might incorporate them into e.g. a reading lesson, spending two minutes on making a kind of reader's guide, making it easier for students to see how to get from A to B. For example, what are the different graphs used for? Are there any diagrams that need to be explained? And so on.

I think I have been particularly inspired to think a little more creatively, because I had to prepare various series of tasks for the teaching material. For example, when I give the students a text for class, it need not just be a text that we read and subsequently discuss. Now I've begun to think more out-of-the-box, incorporating more senses and generally exploring how to be creative through the use of other working methods.





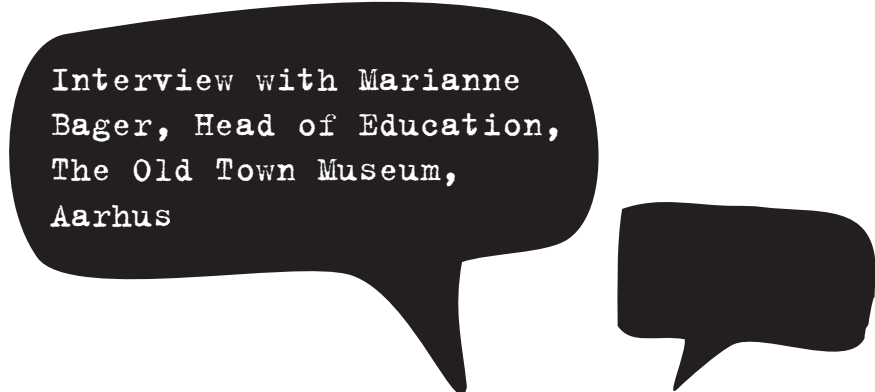
Interview with Marianne Axelsen Leth, Associate Professor of History, Teacher Training College, Aarhus, VIA UC

Historical artefact

- or work of art?

Marianne, you are a history teacher, and during your museum course, which has involved four different museums, you have worked with your colleague Ole, who is a Visual Arts teacher. You've expressed that this collaboration has, in some way, influenced your didactics. What influence has it had?

Being introduced to a range of aesthetic and theoretical approaches on how to mediate a work of art has compelled me to incorporate quite different theories when mediating certain cultural historical objects – as well as historical periods and subjects in general. By opening a “teaching toolbox” filled with historical artifacts, Ole has prompted me to use new theories and expanded my approach to mediating cultural historical artifacts or discussions on cultural history, approaching them in some instances as you would approach a work of art.




Interview with Marianne Bager, Head of Education, The Old Town Museum, Aarhus

Seeing

- with fresh eyes

Marianne, you had a group of mathematics students out at the museum, who were charged with the task of organizing educational sessions. How did it go?

It was really exciting, because they brought their mathematical approaches and perspectives to bear on the museum and developed mathematical tasks based on the past. For example, they designed tasks about converting old units of measurement into new. One fun task was to figure out the height of a chimney on top of a house, how many panel sections there were between beams on a half-timbered house, and lots of other mathematical perspectives. One might discuss what this has to do with a museum of cultural history, but applying subjects different from those normally used compels us to look at the past in new and different ways. In my opinion the two different perspectives contrast one another in truly exciting ways.



Interview with Lars Kettel,
Educational Director at
Metropol, Department of
School and Learning,
Copenhagen

Competencies

– the new teacher education and cultural institutions

The new teacher education is based upon the development of competencies, knowledge and skills. Can it lead to increased collaboration between teacher training colleges and cultural institutions?

Yes, when presenting the curriculum our Minister of Education, Morten Østergaard said – with some bravado – that *from now on students would no longer be measured by what they know, but by what they can do*. This is what lies at the basis of the new competency requirements and our efforts to fulfill them. There should be a conscious focus on students' practical skills, meaning what they can achieve in a given context. This also means that teacher training colleges are going to have to work more with practical skills. Here at Metropol, we talk about strengthening the students' performativity, and this can refer to their knowledge of their chosen subject, but also to their body language and didactic skills on a general level.

Here, museums and cultural institutions offer a very special framework and physical space which makes them quite different to perform in than schools. The museums' vari-

ous educational offerings are typically tested again and again for different audiences. This gives the student teachers, at least those who I've talked to about it, some amazing opportunities to practise and to be constantly made aware of their own strengths and weaknesses, continually refining minute didactic nuances which they wouldn't have the opportunity to address in a primary school setting – or for that matter back at the teacher training college. At the museums it is possible to say, *today we have a the fifth grade class from Brøndby, tomorrow a fifth grade class from Hvidovre, and the day after a fifth grade class from Copenhagen, but we will use the same lesson with each group*. Whereas at a primary school, it may take years before you can repeat a teaching session. At the museum, we are dealing with a very finite didactic session where you can truly go in depth and practise. This is how didactics at cultural institutions differ from those in primary school education.

Do you have any concrete examples of how collaboration between cultural institutions and teacher training colleges can become sustainable, e.g. by being implemented as part of the set curriculum or other parts of teachers' education?

Well, first of all, and on a general note, the curricula are very focused on ECTS credits [ECTS is short for European Credit Transfer and Accumulation System and is an international scoring system that indicates the workload by which a course is measured and rated]. These credits have to be fulfilled, making it perhaps a bit difficult to introduce specific frameworks into the curricula that will tie down the teaching in future. But having said that, one can still take steps to get it into the curriculum, such as via MatchPol, a system in which we, here at Metropol, match undergraduate students working on their bachelor's thesis with another educational institution, cultural institution or a museum. For example, a student teacher could work on his/ her bachelor's thesis in collaboration with a cultural institution, addressing specific issues and finding solutions together within a

more formalized and legally binding framework. We have good experience with this working structure. [1]

One of the things we need to work on in the new teacher education curriculum is the development of a talent program. I have been very interested in how we can create talent programs that not only reward the academically talented students who have a future in research, but also one that rewards the skilled practitioner or pedagogical developer. I believe that you could try to create a program in which cultural institutions can contribute issues they would like student teachers to look at. It need not necessarily be a bachelor's thesis that takes half a year and requires a 25-page report. It could, for example, simply involve a student teacher entering the museum, looking at and responding to "something" and taking something with them from the experience. I think it could be really interesting if you could put it into some kind of talent-nurturing setting, something where you do something special, in collaboration with someone who is very practice-oriented and not only strong academically. This would also ensure that more and more future teachers would be able to gain insight into cultural institutions. I hope that student teachers will regard it something that can strengthen their resumé, realizing that the more contact you have in practice, the better your resumé when it is time to look for work. We know that there are many student teachers who would like to work at a cultural institution, so there is every opportunity for launching such a talent program.

1 : Read the article in the section Practice: Learning Museum and MatchPol, Nina Troelsgaard Jensen, Associate Professor, Department of School and Learning, Metropol University College.



Articles

Here, we present 12 articles written by museum educators, teacher educators, student teacher undergraduates and academic interns. The authors have all been deeply committed to creating visibility and concretizing the many aspects, academic, didactic and pedagogical, inherent to the development of learning in external learning environments.

The project's communication and evaluation strategy has from the outset been an important part of the ongoing implementation and efforts to create project sustainability. The project should be a concept that everyone can relate to and draw experiences from.

We have, therefore from the outset made use of a public home page, regular themed newsletters and a Facebook group. It hasn't been difficult to provide up-to-date information via these fora. The public visibility and conscious focus on knowledge sharing has made all project participants acutely aware of their goals, motivating them to transfer their experiences into useful and accessible end products.

This collection of articles is part of the experiences and results gathered during the entire project period, and were written for publication in this practice manual.

Read the introductions to the various articles and select any article that piques your interest.

Contents

Introduction	107
The Museum as a Professionalized Learning Space	112
Much More than the Visual Arts	116
An Extended "Interdisciplinary" Practice	119
Innovation and Entrepreneurship Transforms Professional Positions	126
Mathematics at the Art and Design Museum	130
When a 125-year-old Packed Lunch Begins to "Tell"	133
Aalborg Historical Museum – from a third grader's perspective	138
Creative, Innovative and Enterprising Citizens	141
On the Spot – The art museum, dialogue and body in visual arts teaching	144
Can the Subject of Natural Sciences be Addressed and Made Accessible at the Museum?	150
The Museum as an Object of Study	154
Academic Internship at the Museum	157

Introduction Articles

The Museum as a Professionalized Learning Space – How does one convey the difficult living conditions of a working class family or the everyday life of the soldier?

*By Ane Riis Svendsen, Head of Education and Development,
The School Services, Copenhagen's Fortifications*

Based on my own experience as head of school services at The Workers' Museum and Copenhagen's Fortifications, the article intends to show how cultural institutions can be perceived as professionalized learning spaces. The main question is how museums' school services can establish a relevant learning practice for school children, student teachers and teacher educators. This article will give specific examples of educational programs based on didactic models, educational approaches and psychological learning theories.

Much More than the Visual Arts – The art museum as interdisciplinary learning space

By Tine Nielsen Fabienke, Curator, Fuglsang Kunstmuseum

In the article, the art museum will be viewed as an interdisciplinary learning space and as a space for new collaborations between different disciplines. Based on Fuglsang Kunstmuseum (Fuglsang Art Museum) and its exhibitions, location, history and heritage, it will be made clear how a 'locality' can influence the museum's educational offerings, pointing them in an interdisciplinary direction. It can also further strengthen the ties between art museums and the future primary school teachers' use of the museum as an educational space.

An Extended "Interdisciplinary" Practice – Collaboration between teacher training colleges and museums

*By Marianne Axelsen Lethbridge, Associate Professor of History,
Teacher Training College in Aarhus, VIA UC*

The Teacher Training College in Aarhus, under the auspices of the Learning Museum project, organized two elective courses on museum communication in collaboration with four of the city's museums. Here, we present how the courses have taken inspiration from outdoor schooling, didactics and how theory and practice in museums has been linked to the student teachers' education. Collaboration across disciplines in the education of teachers and across museum genres has been truly inspiring and has led to new insights and didactic perspectives. Projects have been working on extending the understanding of the concept of "interdisciplinary" practice, which, if it is to be sustainable, requires a high degree of commitment and expansion of the practice of cross-institutional collaboration.

Innovation and Entrepreneurship Transform Professional Positions

By Frants Mathiesen, Associate Professor of Visual Arts, Teacher Training College, UCC

Innovation and entrepreneurship raise challenges for two long-existing institutions, museums and schools. They both manage and safeguard the country's cultural heritage, and both have an obligation to the future. For both institutions, an opening for innovation may be found in examining the positions that teachers, student teachers, museum staff, and pupils occupy in relation to one another. Social entrepreneurship is about new forms of collaboration, particularly if we focus on learning or participation in museum events that can be beneficial for the educational and the museum world alike.

When a 125-year-old Packed Lunch Begins to "Tell" **– A workshop on general didactics outside the classroom**

By Linda Nørgaard Andersen, Head of School Services, the Workers' Museum

Whatever main subject area student teachers choose, they will become acquainted with the subject of general didactics. This fundamental subject serves as the backbone of their future work as teachers, for it is in this course that student teachers must acquire theoretical knowledge and practical skills within the areas of planning, implementation and evaluation of their teaching. The trends embodied in the Danish concepts "New Nordic School" and "Make a good school better" invite more teaching outside the traditional classroom. With this in mind, the Workers' Museum and Zahle's Teacher Training College embarked on a collaborative project centered on the subject of applied didactics.

Aalborg Historical Museum – from a third grader's perspective

*By Bodil Christensen, Associate Professor of Danish,
College of Education in Aalborg, UCN*

You learn something when you do something. You learn something when there is meaning in what you are doing. You learn something when there is a need for the project that you are involved in. This is the fundamental learning theory behind the nationwide Learning Museum project. In this project, museums across the country seek to involve pupils in museum education in such a way that learning and museum visits become more than just guided tours and a glance at stone and flint axes in glass display cases.

Creative, Innovative and Enterprising Citizens **– The teacher's role in the external learning space**

*By Lonnie Warren, undergraduate student at Odense Teacher Training College, UCL
(now a certified primary school teacher)*

Society is constantly evolving, and with the new school reform the Danish government seeks to adapt the Danish school system to the global world. Meanwhile, today's youth culture requires teaching that is rooted in reality and sufficiently different to motivate pupils to learn through curiosity and wonder. The article will give my personal views on how real-world and alternative teaching can take place in external learning spaces. I emphasize the role of the teacher and how he or she can help to strengthen teaching before, during and after a visit to the museum.

On the Spot **– The art museum, dialogue and body in visual arts teaching**

By Diana Fade and Mette Skovsgaard Sørensen, BA Students, Aalborg Teacher Training College, UNC

This article describes a specially developed art teaching session for 2nd and 5th grade classes from Skipper Clement School in Aalborg. The sessions were developed by two student interns from UNC – Teacher Training College, in collaboration with KUNSTEN, Museum of Modern Art in Aalborg, Denmark, as a part of their BA thesis. Here they describe how the incorporation of the art museum as an environment for visual arts teaching in schools can enhance and contribute

to classroom instruction when working with paintings while using a sensory-based, dialogic approach to teaching.

Can the Subject of Natural Sciences be Addressed and Made Accessible at the Museum?

– Reflections from a bachelor's thesis

By Mille Kathrine Krüger Jorgensen, undergraduate student at the Department of School and Learning at Metropol (now a certified primary school teacher)

"I thought it was pretty boring to read about those rocks because I think it's only fun for those who know a lot about it. For those of us who don't know so much, it's not so fun just to look at some rocks." These are the words of an eighth grade pupil from Sølvgade School in Copenhagen after visiting the meteorite collection at the Geological Museum. This article is based on my bachelor's thesis, completed in February of 2013. The project was the conclusion of my teaching education from the Department of School and Learning at Metropol. The project was developed in collaboration with the Geological Museum, based on the exhibition *The Solar System* and Learning Museum.

The Museum as an Object of Study

– Experiences from a collaborative partnership in the context of bachelor's thesis work.

By David Russell, undergraduate student at Metropolitan Institute for School and Learning (now a certified primary school teacher)

While working on my bachelor's thesis at the Department of School and Learning at University College Metropol, I carried out a study of how pupils work with worksheets at science museums. During my internship and student employment at the Nature Centre Vestamager, I had observed that there was often a disparity between the museum's intention with specific worksheet assignments and how pupils actually solved them in practice. After much consideration, I managed to narrow down the topic of my thesis to a realistic scope so that it could be carried out within the available time frame. Examining the problem area required gathering empirical data, making it an obvious choice to collaborate with museums.

Academic Internship at the Museum

– An educational offering with dramatic narration, research teams and educational missions

By Sara Kornerup Fog, student teacher at Odense Teacher Training College, UCL

During our academic internships in 2013, we, a group of three student teachers, developed a series of learning materials in collaboration with the natural science museum Naturama in Svendborg, Denmark. The materials consisted of a dramatized narrative, a website intended for active use by pupils, and various materials to assist on carrying out practical tasks. The material, entitled "Mission 'Bank Vole'", was tested at the museum on pupils from third and sixth grade classes. Disguised as scientists from the future, "Professor Hydrogen Hilde Born", science teacher "Lark Bird" and archaeologist "India Jensen", we took pupils on an adventurous mission: They would be exploring the life of the bank vole and its importance to nature, thereby building an awareness of their own responsibility to the environment and the world around them.

The Museum as a Professionalized Learning Space

– *How does one convey the difficult living conditions of a working class family or the everyday life of the soldier?*

By Ane Riis Svendsen, Head of Education and Development,
The School Services, Copenhagen's Fortifications

Based on my own experience as head of school services at The Workers' Museum and Copenhagen's Fortifications, the following intends to show how cultural institutions can be perceived as professionalized learning spaces. The main question is how museums' school services can establish a relevant learning practice for school children, student teachers and teacher educators. This article will give specific examples of educational programs based on didactic models, educational approaches and psychological learning theories.

External learning environments are unique

In the education department where I work, we continuously work to develop an educational profile that makes use of didactic models, pedagogical approaches and psychological learning theories. Together, these tools designed to ensure that the museum's educational vision

materializes into educational offerings – educational offerings which can act as a supplement to teachers' daily instruction when they want to take education beyond school walls and into an alternative learning environment. The learning potential contained within external learning environments is unique, because a variety of new things, not possible to execute in classroom teaching, can be carried out. Creating relevant and professionalized learning is about utilizing the museum spaces and objects to their full potential. They must be actively applied in the teaching sessions and be the focal point of the activities we do with pupils. We do not believe that learning can take place within the exhibitions by means of experience alone. The learning that can and should occur must be articulated and reflected upon by working with objects and spaces and establishing an active dialogue between the learners, their teacher and the museum educator. The planned teaching session must meet schools' curriculum requirements and thereby act as a useful supplement to daily classroom teaching before, during and after a museum visit. Herein lies our understanding of the

museum as a professionalized learning space. In the following, I will give examples of the didactic and pedagogical tools that we use when developing and carrying out museum teaching at the Workers' Museum in Copenhagen and Copenhagen's Fortifications.

The difficult living conditions of the working-class family

"On the trail of the Sørensen family" is our newest educational offering based on the exhibition *The Sørensen Family* at The Workers' Museum. During the teaching session the family is brought to life as we visit them in their apartment, sit on their beds and hold their chamber pots in our hands. Through the activities of the exhibition, pupils work with individual members of the Sørensen family. They explore the exhibition, look at and handle objects in order to piece together knowledge about the everyday life of the family. In so doing, the conditions of everyday life in the past are made accessible and personal, creating opportunities for "hands-on" insights into the ideas, dreams and thoughts of historical figures. During the teaching session pupils carry out investigative tasks which are designed to make the material more easily relatable to their everyday lives. This method of working and choice of subject matter creates highly relevant learning outcomes and gives the pupils the desire to learn more. The sessions follow a before-during-after structure, meaning that there are preparatory and follow-up materials, exercises and a teacher's guide which prepares teachers to work with the subjects previous to and following a museum visit. The objective is to have our educational offering provide the teacher with a learning pack-

age from which they can select relevant materials of their choosing or use as a whole.

Another important goal for us is that the visit should pave the way for "transfer potential" which connects pupils' encounter with the museum objects during a museum visit to the teaching at home in the classroom. They should be able to recognize what they learn at school at the museum and vice versa. For example, they can recognize the chamber pot from the Sørensen family's home when reading Christian Christensen's renowned Danish work *A Rhubarb Boy Grows* (1961). Or descriptions of the cramped living quarters of workers, which the museum exhibition enables them to visit for themselves and walk around in. Their work at the museum is reinforced through the educational materials they work with during a museum visit, which will be followed up back in the classroom after their visit. Learning is situated, and it is necessary to address "transfer potential" during the planning process if learning is to take place.

The everyday life of the soldier at Garderhøj fort

At Garderhøj fort, close to Jægersborg train station, we explore what lies hidden in the physical space between the villas and trees: the fort. Pupils walk around in the authentically decorated rooms, which together with the relics of the past testify to the soldiers' everyday life at the fort during World War I. The fort thus forms the foundation of our educational offering "Soldier for a Day". It is about the security force which was set up to defend Denmark in the event of a possible attack from the Germans. Pupils

are enrolled as soldiers, must lie in soldiers' bunks, examine their haversacks, cook in their kitchen, and be on the lookout for the enemy. We also incorporate letters and memories which connect feelings and thoughts with the everyday tasks they are now trying out for themselves. The soldier's life is, by these means, made relevant and relatable for today's pupils.

We use the experience and exploration of this vast area where the fort, with its secret passages and strange towers, becomes the basis for learning. When actual experience is allowed proper space for reflection and becomes the basis for teaching, it fosters pupils' curiosity and desire to learn. The activities in the course thus provide students with a picture of how life was for the soldiers. At the same time, the exploration of the fort begs the explanation of the history of an intact fort without ruins and bullet holes, a fort that looks exactly as it did upon completion because it never came into use. The fort is a physical site that arouses pupils' curiosity and generates lots of questions: "Why are there no bullet holes?" "Why was it not used?" "Wasn't it boring for the soldiers that there never was a war and they just had to wait?" Such questions establish a natural opportunity for discussion of the domestic issues of the First World War, when Denmark with their policy of neutrality never went to war, and the international aspect of the war where prolonged trench warfare resulted in many casualties. In both of the aforementioned examples of educational offerings the focus is on having pupils actually "do" history: through activities during the sessions they gain "hands on" experience of historical events, encouraging reflection.

It is through these processes that learning opportunities are created.

Mutual reflection among student teachers, teacher educators and museums

The Workers' Museum has, over the years, had many student teachers in training and received many groups wanting to go further in depth in their subjects of specialization. In the past, we organized workshops and courses in which we told the students how they could use us. Thus, reflection primarily took place at the teacher training college, where students would, before and after a visit, prepare themselves and write papers on the challenges and opportunities of the museum as an external learning environment. We heard parts of these reflections when the students were visiting, but not enough that they could truly contribute to the museum's educational practice.

It was only when we, by means of the Learning Museum concept, established closer collaboration with teacher educators on the planning and structuring of the workshops that the student teachers' critical curiosity and questioning approach to the outside world and to their own future position as teachers lead us to rethink the format of our workshops. We had to depart from the asymmetric "us and them" relationship, and to meet in a common reflection. Therefore, participatory workshops with real-world problems and practical tasks to be solved within the exhibits became the concept behind the workshops we now hold – whether it be a workshop on Geography, General Didactics or History – at The Workers' Museum or Copenhagen's Forti-

fications. In collaboration with teacher educators, we find opportunities where by students can put their academic and professional skills to the test. This is done by providing them with real issues and tasks that we want solved as an institution. For example, the Workers' Museum held a workshop with a team of student teachers from Zahle's Teacher Training College, specializing in Geography. They were charged with task of integrating geography into the development of a new educational offering for seventh to tenth grade pupils. In this way, collaboration with teacher educators has a genuine objective of developing the best workshops possible, and the meeting with student teachers is one where new ideas can occur, and where past ideas must be laid to rest or adjusted.

For our part, Learning Museum has become a new tradition and a new model for the way in which we collaborate with colleges of education and student teachers. We do not offer pre-structured collaborative concepts the way we do when offering firmly established teaching sessions; rather, we offer the option of different types of collaborative partnerships. Collaborations which have built on our experience to the point where they now serve as flexible structures, dynamic processes that shape themselves to match the involved participants, whether it be in connection with workshops, internships or undergraduate projects. Each collaborative partnership is a new meeting, a new reflective space which develops the museum's potential as a professionalized learning space for us as museum educators, for the student teachers, and for teacher educators. We look forward to many new types of partnerships and collaborations in the coming years.

Much More than the Visual Arts

– The art museum as interdisciplinary learning space

By Tine Nielsen Fabienke, Curator, Fuglsang Kunstmuseum

In the following text the art museum will be viewed as an interdisciplinary learning space and as a space for new collaborations between different disciplines. Based on Fuglsang Kunstmuseum (Fuglsang Art Museum) and its exhibitions, location, history and heritage, it will be made clear how a 'locality' can influence the museum's educational offerings, pointing them in an interdisciplinary direction. It can also further strengthen the ties between art museums and the future elementary school teachers' use of the museum as an educational space.

Museums, History and Cultural Heritage

The Danish Agency for Culture is a public organ within the Ministry of Culture which interprets and executes governmental cultural policy in a wide range of areas, including museums. On the Agency's website you can read that the Museum Act applies to eight state and 100 state-subsidized museums in Denmark, whose speciality areas are within

the fields of art history, cultural history or the natural sciences.¹ The museums receive operating funds from the state and must meet certain statutory requirements in the areas of collection, registration, preservation, research and dissemination. Under the heading "Knowledge and experience", The Danish Agency for Culture emphasizes that, "museums' activities are undergoing rapid development, not only within the exhibits at the museum itself, but also increasingly in the mediation of our history and heritage, which is a focus area. This will help museums in the areas of educational and cultural development."² This also true for Fuglsang Kunstmuseum, which I will use as an example of how an art museum can act as interdisciplinary learning space for student teachers, primary school teachers and their students. The starting point is works of art which, during selected teaching sessions, tie into the museum's placement, history and heritage – its locality.

The art museum as an interdisciplinary learning space

The Danish state-governed and state-subsidized art museums cover a wide range of subject areas. The institutions are spread throughout the Danish landscape, each boasting its own history, tra-

ditions and strategies. However, common to all these institutions is the obligation to fulfill the requirements laid out by the Danish Museum Act, requirements which necessitate a certain degree of museum professionalism, conducted in accordance with recognized standards and methodologies. Another common factor is the continued development of museum teaching for primary school pupils with offerings that incorporate the museums' permanent collections and special exhibitions. The educational offerings are wide-ranging in regard to the artists as well as the art forms and topics presented, and jointly contain great interdisciplinary potential. Examples from Fuglsang Kunstmuseum which can be highlighted include *The Mirror of the Sky. Clouds and weather in Danish painting 1770-1880* from 2003, which focused upon the synthesis of the arts, literature and meteorology; *ARS UNA. Johan Rohde (1856-1935) – silver – furniture – book art – painting* from 2006, which examined the visual arts, crafts and a zest for life; and *Health – Beauty – Strength in Danish Art 1890-1940* from 2008, on the relations between the visual arts and body image.³

The interdisciplinary nature of these educational offerings provides the opportunity for their application within a wide range of primary school subjects and for the establishment of collaboration between, for example, the subjects of Art and History, Danish, the Natural Sciences and Physical Education. Collaborations between student teachers and art museums can help develop new and improved educational programs for primary schools. It can be specifically in relation to the organization of the educational offerings and materials into which students contribute in their didactic and

pedagogical disciplines in relation to the museum's field of study – in this case art. This sharing of knowledge and experience gained through such mutual working relations does not only educate the art museum about its many audiences and their needs, but also educates students about the many learning opportunities present within external learning spaces.

Fuglsang Kunstmuseum – landscape, art and identity

Fuglsang Kunstmuseum's collection of Danish art from the 1750s to the present day was established in the late 1800s. In 2008, the collection moved into a new museum building on Fuglsang Herregaard's grounds, where the easternmost point of Lolland-Falster meets Guldborg Sound. The museum's modern architectural setting is beautifully in keeping with the picturesque manor with its rich tradition for visual arts, music and landscape design. With focus areas that include landscapes and motifs from the local geography the museum's artistic identity is intrinsically linked to the area's unique history and heritage, the locality of Fuglsang. The museum has also developed interdisciplinary educational offerings with a focus on the surrounding manor and its landscape, Fuglsang Park and Gardens and the area's natural conservation area and Storstrøm's Chamber Ensemble/Orchestra, which has its base in the manor's main building. During its first years as a museum, Fuglsang developed a workshop where children could create their own album covers inspired by their experience with the Chamber Ensemble, the ensemble's musicians and then afterwards the museum's art collections. The collaboration has since ex-

panded to include the local cultural history museum, Museum Lolland-Falster – particularly in the interdisciplinary offering *Find the landscape*, where, by focusing on the subjects of history art and music, pupils discover different types of landscapes in Fuglsang's historic setting, in the live music, and in the original art at the museum.⁴ The museum's temporary exhibitions have also been the focus of educational offerings combining the subjects of art and landscape. These have most recently included *Horizons in Danish landscape art 1950-2000* in 2012, *William Kyhn & the Danish Landscape* and *AS BLUE: Works by landscape architect Torben Schønher* in 2013. These educational programs, including the workshops created for the latter, where children prepare their own landscape architectural models, meet the required educational objectives in a number of subjects.⁵ This has allowed for several teachers to go simultaneously, each of them benefiting from the same offering, either individually in their own teaching or based on a common shared theme.

YES to interdisciplinarity and collaboration

Organizing interdisciplinary offerings provides prime opportunities for involving student teachers. When the museum field enters into dialogue with the theoretical basis, skills and experience of another field, fertile ground is laid for the development and professionalizing of the museum's "products". Such collaborations are motivated by the opportunity to directly sharpen the student teacher's awareness of interdisciplinary potential and the desire to use art museums on a general level in connection with different school subjects, first as a part of their

own education and later as part of their own teaching. In addition to incorporating the museum as a democratic educational institution for primary school subjects,⁶ its incorporation as an interdisciplinary learning space provides clear incentive for increased future collaboration between art museums and the future primary school teachers.⁷ In the case of Fuglsang Kunstmuseum, such collaboration might be centered around the museum's art collections and temporary exhibitions focusing on the institution's unique location, rich history and cultural heritage.

¹ A number of Danish museums are neither state-governed nor state-subsidized, but the examination of these institutions is beyond the scope of the current article.

² www.kulturstyrelsen.dk/institutioner/museer

³ All three exhibitions were created in close collaboration with Funen's Art Museum.

⁴ The original idea for *Find the Landscape* was conceived by the circle behind KULTURTJENESTEN Lolland-Falster, of which Fuglsang Kunstmuseum is a part. For more information on this development project, which brings together separate municipalities and institutions, please visit www.kulturtjenesten.dk

⁵ The exhibition *Horizons* displayed works from the museum's permanent collection and was, therefore, only shown at Fuglsang Kunstmuseum. *Vilhelm Kyhn* was created in close collaboration with art museums in Randers, Ribe and Herning, while *AS BLUE* was realized in close collaboration with Ribe Art Museum.

⁶ Fabienke, Tine Nielsen: "Skal vi mødes i Medborgerskabet?" See Learning Museum's website under ARTIKLER: <http://learningmuseum.dk/archives/922>

⁷ See e.g. Learning Museum's newsletter for June 2013 with the theme, *Er du TVÆRS?* See the web site under Newsletter.

An Extended "Interdisciplinary" Practice

– Collaboration between teacher training colleges and museums

By Marianne Axelsen Leth, Associate Professor of History, Teacher Training College in Aarhus, VIA UC

The Teacher Training College in Aarhus, under the auspices of Learning Museum, organized two elective courses on museum communication in collaboration with four of the city's museums. Here, we present how the courses have taken inspiration from outdoor-school didactics, and how theory and practice in museums has been linked to the student teachers' education. Collaboration across disciplines in the education of teachers and across museum genres has been truly inspiring and has led to new insights and didactic perspectives. For future teachers, these courses have led to a higher degree of interdisciplinary thinking and openness to the incorporation of educational activities outside of the classroom, especially in regard to the new primary school reform. Projects have been working on extending the understanding of the concept of "interdisciplinary" practice, which, if it

is to be sustainable, requires a high degree of commitment and expansion of the practice of cross-institutional collaboration.

For years, educators at the Teacher Training College in Aarhus have worked with a number of the city's museums as part of the training, focusing on museum use and the use of informal learning spaces in the various subjects. Participation in the Learning Museum project has meant that several educators have been given a more focused insight into museum didactics and have begun working together on it as a common interdisciplinary field. Here, inspiration was taken from a number of fields and across different pedagogical traditions, including everything from physics and biology to history, material design and art. This has led to the development of a multidisciplinary elective course in museum studies in collaboration with four of the city's museums: ARoS, the National Women's Museum, The Natural History Museum, and The Old Town Museum with the goal of training student teachers to use the museum and become museum ambas-

sadors for their future schools. The course slogan and name was: "More museums on the agenda! Become a good museum ambassador – at school and at the museum. How can Danish museums be used in school education?"¹ In this article, I will present didactic reflections concerning the outcomes of these courses for student teachers as well as in regard to future collaboration between museums and teacher training colleges from a the college's perspective.

Inside – Outside – Inside concept

In the following, I will focus on these areas:

- The interdisciplinary perspective on museum didactics
- How to "open up" an exhibition
- Presentations at museums
- Collaboration between teachers and museums
- The need for an extended collaborative practice

The teaching conducted at the courses was inspired by outdoor schooling. From a practical standpoint, this was because two of the participating teachers, from the subject areas of history and material design, had worked together on an interdisciplinary elective course on outdoor schooling. In terms of theory, combining museum didactics with the applied didactics of outdoor schooling also proved fruitful. The course framework was the Inside – Outside – Inside concept. We have been inspired by outdoor schooling theorists such as Arne Nikolaisen Jordet's

and learning theorist and professor Mads Hermansen's different conceptual models. Mads Hermansen deals with the concepts of a "pre-phase" (feed-forward, where work is focused on expectations and goals), a 'middle phase' (where work is focused on the case at hand) and a 'post-processing' phase (feedback when working with an evaluation and review of what you have learned).² Arne Nikolaisen Jordet, one of Scandinavia's leading theorists in the field, has formulated an outdoor schooling didactics where he argues for relocating some teaching outside of the classroom. He backs his theoretical arguments with elements from experiential pedagogy, critical social constructivism, and case study data originating from number of specific studies of Norwegian schools that use outdoor schooling.³ His objective in incorporating these theories is to discuss and expand the concepts of pupils' performance, mastery, collaborative skills, knowledge and ethical and aesthetic learning in the interest of developing critical thinking skills and action competences as educational ideals for schools today. This is, in itself, nothing new, but Jordet notes that critical thinking and action competence is something that is much discussed, but dealt with very little in teacher education and in schools. One way to work towards developing critical thinking and action competencies is to relocate part of the teaching out of the classroom, in the authentic surroundings of nature and society. In so doing, the instruction can more easily be linked to action in the pupils' reality. His learning loop consists of three situations of widely varying duration: Acquisition situation "inside", experimental situation "outside", and consolidation situation "inside".

If you relate this very action-oriented

approach to museum didactics, the question becomes: What happens when Jordet's experimental situation or Herman's "middle phase" takes place at a museum during a museum educational session?

Interdisciplinarity in museum didactics

It is a theoretical and practical challenge to establish successful collaborative relations between four museums covering such a wide range of fields: culture, nature, and art. However, it has proved extremely inspiring to work within this interdisciplinary field and to be challenged to transfer and interrelate different academic terms, concepts and theories from one area to another. As a starting point for the various analyses of the exhibits, we took into account the following questions: How do the visitors experience the exhibition? And how do the visitors create meaning? The central issue is the creation of relationships and differences: the object in relation to reality, text and visitors. At The Old Town Museum, where relationships are created with figures from 1864 within a restored authentic backdrop containing a plethora of objects, this kind of relational thinking becomes quite apparent in the journey through time and space. Just as pure history didactics captures experience and relationships by means of the concept of historical awareness. The same can be said for the relationship to the children's portraits which were part of the exhibition Girls' and Boys' Stories at the Women's Museum. In the exhibition, we reflect upon our own lives and experience it in relation to the lives of real individuals. This point of view shifts perspective when attempting to establish a relationship to a painting or a

mounted animal, as when we visited the Natural History Museum. One poses different questions to the various museums' exhibitions in these varying situations and experiential spaces. From an interdisciplinary perspective, it can be inspiring to apply and mirror these questions and perspectives across the four museum scenarios. We have sought to highlight these "changes of glance" and shifts in perspective while also attempting to expand the interpretational and practical uses of the museums in all their diversity.

How do we "open up" an exhibition?

Is it possible to "open up" the learning potential in "a cultural history suitcase" or sensory-loaded exhibition at the Natural History Museum as one does a work of art? What learning potential can be uncovered in a painting or a mounted crocodile? What do boys learn and do at a women's museum? The Old Town Museum: an "authentic" drama-based educational setting or a commercialized trivialization of history education? The diverse nature of the didactic specialty areas and concepts applied in an attempt to "unfold" the four museums' exhibitions and activities were approached through the application of various artistic, historical and scientific perspectives. This work has greatly contributed to the development and expansion of student teachers' and teachers' museum didactic vocabulary and understanding of concepts, which proved useful in the student teachers' final teaching assignments. The aforementioned cultural history suitcase is a suitcase containing objects from Kenya which, in history teaching at the teaching training college, is usually approached through the introduction of

different concepts of culture. In this context, it was opened up through the application of various art historical methods and visual art concepts. Applying these diverse perspectives to the same object resulted in discussions of choices of method and the consequences of those choices.

Theory and practice

The structure of the courses proceeded as follows: A review of concepts at the teaching training college associated with to Jordet's acquisition situation or Herman's feed-forward phase, followed by the application of those concepts and methods at all the museums during the "outside phase"/Herman's middle phase and in the testing of educational sessions at the museums.

During this process, concepts from the realm of arts were applied in other fields, concepts from drama pedagogy used at The Old Town Museum were applied at the Natural History Museum, etc.. This cross-disciplinary way of working would not have been possible had the courses focused on a single teaching subject or the involvement of only a single museum. For student teachers, these discussions encouraged interdisciplinary thinking in regard to museum education as opposed to, for example, using teaching at the Natural History Museum solely in connection with the subject of biology, or sessions at The Old Town Museum and the Women's Museum solely in connection with the subject of history, or ARoS solely with the visual arts.

One of Jordet's objectives in moving a portion of the teaching outdoors is also to redistribute the pupils' usual roles by breaking up habitual collaboration pat-

terns, requiring more varied sets of skills to be applied than is possible in a classroom setting. At the same time, this places specific demands on the teacher's pedagogical competencies in regard to carrying out such activities: the teacher must learn to initiate pupil productions and let the pupils work outside of his or her control during the experimental situation. Hermansen emphasizes the same point in his "middle phase" at the museum, where "adult participation ...is reduced to a minimum". Helene Illeris and Lise Sattrup examined pupils' learning outcomes from museum educational sessions at ARKEN. In this context, the concept of situational competence was applied as a means of measuring pupils' learning outcomes at the museum. The path to situational competence is through the independent pupil productions: pupils will not only have an aesthetic experience, they must also make a production on the spot! "adult participation ...is reduced to a minimum". Helene Illeris and Lise Sattrup examined pupils' learning outcomes from museum educational sessions at ARKEN. In this context, the concept of situational competence was applied as a means of measuring pupils' learning outcomes at the museum. The path to situational competence is through the independent pupil productions: pupils will not only have an aesthetic experience, they must also make a production on the spot! "Having situational competence means that you have a living, sensory-based awareness of your surroundings enabling you to reflect upon them in such a way that you can contribute with suggestions for change or perhaps a complete reshaping of them."⁴

When the class is out, pupil productions are not centered around strict

teacher control – but not without prior preparation work in the classroom. This principle has (also) been one of the ideals pursued in the courses. We also attempted to maintain Olga Dysthe's (the Norwegian learning and classroom researcher) concept of pedagogy with an emphasis on multivoicedness.⁵ This required us to address specific questions during teaching at the college as well as at the museums: How should tasks be set and questions be asked in order to emphasize multivoicedness? Most teachers have carried out educational sessions at museums where pupils follow a route through the exhibition while filling in a worksheet, but how is it possible to have an aesthetic experience and learn something at the same time – and what is learned? How do you avoid taking the "inside" with you when going "outside"? Or more specifically: How do we avoid transferring classroom teaching habits to a museum setting? How do we change the teacher's role and function in the situation at the museum?

Presentations and results

So have the courses met its objectives as far as the student teachers are concerned? Have they gained an understanding of museums as institutions and alternative learning spaces? Have they, themselves, gained situational competencies and have the concepts of inside-outside-inside/feed-forward/middle phase/feed-back had the desired effect so that these future teachers are able to coordinate educational sessions with and at museums? After introductory visits to all the museums, the student teachers – working in groups – each selected one museum with which they would develop a concrete educational offering for a spe-

cific grade level and subject area in collaboration with a museum educator. The students' choices of museum were by no means limited to their main specialty subject areas, but spanned a wide breadth of subject areas. A few examples of tasks were math problems at The Old Town Museum, visual arts combined with Danish at ARoS, Physics and Danish at the Women's Museum, and Danish and Science and Technology at the Natural History Museum. Some chose to work on digital solutions such as at The Old Town Museum's Street Museum, where pupils are led by digital means around the historic sites in the center of Aarhus, or the Women's Museum digital guides, where you can follow a personal story around the city of Aarhus. Here the focus was on preparing specific tasks on-site in the city, so that pupils are "forced out there." All student teachers were required to relate the concrete tasks to the applied theories.

The sessions partly took place at the teacher training college and partly at the museums, where museum educators and teacher educators taught collaboratively. During the second course, the final presentations were held at the museum, where the participants themselves tested the material on-site. This was a marked improvement. Here, the follow-up phase (feedback phase) in Herman's terms took place during the "outside" phase in Jordet's terms. This is an important point if the student teachers are to actually display their own situational competencies and test the dialogic nature of their work in a multivoiced perspective as understood in the aforementioned quote. Returning to the concepts of "changes of glance" and shifts in perspective, it was critical, in the current context, to demon-

strate it in practice. What we were not yet able to achieve within the scope of the current project was to test the materials on school classes. However, the courses, as well as an ongoing collaboration with the museums, has prompted student teachers to make more active use of the museums' educational programs in connection with their academic internships at the teacher training college.

A broader understanding of "interdisciplinary" practice

The Learning Museum project has meant that teacher educators have begun to think and act interdisciplinarily in terms of museum didactics. We do not intend to formulate a general museum didactics, but we are now able to apply didactic concepts from different subject areas and the various museums to other subjects and museums' mediation practice in order to develop and expand didactic perspectives. Call it inter-disciplinary or multi-disciplinary. Specifically, we have based our work upon experience from voluntary interdisciplinary courses in outdoor schooling, meaning that the concepts and lines of thinking found within the field of outdoor schooling have set the theoretical and practical framework for the museum mediation courses. A more rigorous focus on interdisciplinary museum collaboration has been developed, which will have a bearing on the choice of elective modules in the new teacher education. The collaboration with several of the participating museums will ultimately lead to permanent working relationships and well-established learning partnerships. This can be realized through the innovative relationships that have developed between

passionate and innovative minds at the teacher training college and the museums.

Expanded collaborative practice

When the teacher training college, along with the center of education for pedagogical and social workers, physically relocate to the center of Aarhus next year, all three centers of education will have moved closer to the city's museums. This will provide even greater opportunity to collaborate with the city's cultural institutions on the training of future teachers, as required by the coming school reform. However, this will also require the expansion of collaborative practices which, for teacher training colleges, has traditionally meant collaboration with schools. The new teacher education has a strong focus on all subjects being combined with practice. This field of practice should be extended so as to include museums and other cultural institutions that receive pupils. At the teacher training colleges we come across a number of schools that have become overwhelmed by internship collaboration with student teachers and instructors. The museums' school services could play an important role in promoting the museum as an expanded field of practice for teacher training and an expanded learning space for schools. The evaluation of the courses suggests that such collaboration is possible and even very meaningful for student teachers, museum educators, the student teachers' internship coordinators, as well as for student teachers and pupils at internship placement schools. The Learning Museum project has gathered valuable experience in regard to interdisciplinary and cross-institutional collaboration that is of great value in the

establishment of future learning partnerships on a local level.

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- ² Hermansen, M. (2011). "Historiefortælling som hovedvejen i livet og benchmark for: Museumsdidaktik" in: Hyllested, T. (2011). *TEMA: Museumsdidaktik*, Unge Pædagoger, no.1//2011
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Innovation and Entrepreneurship Transforms Professional Positions

By Frants Mathiesen, Associate Professor of Visual Arts, Teacher Training College, UCC

Innovation and entrepreneurship raises challenges for two long-existing institutions, museums and schools. They both manage and safeguard the country's cultural heritage, and are both obligated to the future. For both institutions, an opening for innovation may be found in examining the positions that teachers, student teachers, museum staff, and pupils occupy in relation to one another. Social entrepreneurship is about new forms of collaboration, particularly if we focus on learning or participation in museum events that can be beneficial for the educational and the museum world.

Innovation and entrepreneurship

The extensive discussions on the issue of innovation in Denmark raises the question whether we can no longer keep pace with regard to developing new products and especially new social technologies. Are cultural institutions such as schools

and museums equipped to support innovation? Innovation is often mentioned in connection with entrepreneurship. The idea behind entrepreneurship was originally to promote independent entrepreneurial ventures in order to increase production and create new jobs. This approach has been defined by the Foundation for Entrepreneurship – Young Enterprise, www.fye.dk as “doing something that others can benefit from.”

One can combine innovation and entrepreneurship in a broader effort to re-think and act in relation to other people in a way that interests them or that they enjoy. This may be reflected in the way in which we invent new solutions to problems; solutions that can be put into production, but one can also speak of social entrepreneurship where the product created is new forms of collaboration. A prime target for social entrepreneurship is the professional positions we take with one another. The distribution of power in society is reflected in the positions we occupy. Museum people choose what is relevant to exhibit, teachers decide how it is relevant to teach, and students and pupils are expected to receive and appropriate the selections made by museum curators and teachers. This is

done within a framework set by politicians. This works fine when the focus is on the organization of exhibitions and education. But if we focus on learning or participation in museum events, a passive recipient role does not work. If teachers and museum staff want to allow for more independent and active positions for pupils or museum visitors, then they might need to consider their own positions first. The task is not easy! The teacher must solve a variety of psychosocial tasks while learning takes place, and museum staff is also subject to certain limits. Conversely, pupils and museum visitors must also acquire and develop new forms of behavior and interaction. If successful, this would correspond to us refining a set of competencies that we have had for many years in Denmark, namely the power to listen, establish a dialogue, and to take an independent stance and make independent decisions in life, no matter where we may find ourselves in the social hierarchy. These competencies are important cultural products, and they contribute both to the development of democracy and to our ability to continue to succeed in a globalized world.

What is the challenge for museums?

Museums have shared their knowledge and cultural heritage for a few hundred years now, employing a variety of agendas on the way. In the 1800s, the development of Danish history represented an important national identity project that was documented in the National Museum. Other museums documented the history of our national approach to art, knowledge and culture. Today, when we in Denmark are part of a globalized world in countless ways, the importance of “the

national” is unclear. At the same time, many museums have become market-oriented entertainment venues. That transition involves a role change from representing Danishness to being fast-paced and entertaining. I presume that many museums find themselves caught in the middle between the values that underlie, respectively, the construction of national sentiment and adapting to a (relatively small) market. Here Learning Museum offers an alternative by involving the learning approaches used in Danish schools. In elementary schools, the focus on learning is on what pupils can do with the knowledge and skills that teachers convey. Pupils must be able to, in their future adult life, acquire and process knowledge and be equipped to orient themselves within many different kinds of communities. The museums have met the same challenge as post-modern tendencies have questioned canonized perceptions of historical causation. If knowledge is not firm and sure, the focus then moves to the people who have to deal with uncertain knowledge. One of the places this happens is through the dissemination of contemporary art; art that asks more questions than it gives answers. The task here is to have an awareness of what you see, how you see it, and what preconceptions an encounter with an object actualizes in the participant. This creates new positions. The museum educator creates frameworks, and visitors are actors. In principle, one could take the next step and turn museums into user-led event locations. Today, there are many trends in action simultaneously. Museums still have a heritage to manage, the question of who defines what is to be stored and conveyed for posterity still exists, and museums are more or less dependent upon entry fees. One way

to ensure future patronage may be working toward an opening of the positions that various actors can come to adopt towards one another.

What is the challenge for teacher education?

School subjects and school education have roots that reach far back in time, but teacher training educates teachers to teach 40 years from now, and the children they end up teaching will draw on their schooling 60-70 or more years into the future. In this perspective, the need for skills such as innovation and readiness for change are obvious. The new teacher training set-up in Denmark includes innovation in the newly introduced modules. For example, within the subject of visual arts, Module 2 (Visual Culture) is described in these terms:

Having completed this module, the student can:

"...plan, implement and evaluate visual education to develop pupils' skills in working with aesthetic, innovative and enterprising work."

Teaching according to the above requirements has not yet started, and the understanding of what innovation and entrepreneurship is will have to be developed over the coming years. But we have over a couple of years tried various possibilities that point towards innovation.

What did student teachers at Blaagaard / KDAS, UCC do?

At the teacher training college Blaagaard / KDAS, UCC, student teachers have collaborated with various museums. At ARKEN Museum of Modern Art they con-

ducted a two-day seminar with ARKEN's art educators on how ARKEN's permanent collection could be presented better. Other student teachers have worked with the National Gallery of Art, Willumsen's Museum, The Workers' Museum, and KØS Museum of Art in Public Spaces. At the beginning of 2014, collaboration was established between ARKEN, Usserød School and Blaagaard / KDAS, where we focus on how the Instagram app establishes frameworks which enable communities of people who *like* images in varying categories defined by *hash tags*. The project includes an introduction to a cultural technique, namely how to choose one's subject (including determining angle, distance and various filters), how to crop and perform further image editing as well as selecting, categorizing, publishing, commenting on and being sympathetic to others' images. School children acquire this cultural technique quickly, throwing themselves into the social processes that occur on Instagram. The goal of this collaborative project is to have children and pupils justify their choices and thus become aware of how they develop their taste within this particular framework – Instagram – with its millions of users worldwide. ARKEN is interested in how children and young people experience the entire museum visit, so they facilitate visits where student teachers and pupils show what they *like* in a closed Instagram forum. In their subsequent work student teachers apply their pedagogical knowledge to the museum field. We are working with the positions adopted by teachers and museum staff when schoolchildren meet the museum world.

Collaboration is entrepreneurship

When students take on the challenge of justifying why they like certain images, or of making rather inaccessible artworks exciting for pupils of different ages, it changes their role from being "viewers" to one of practicing how to use works of art to reflect and understand life. In the longer term, student teachers may use the artworks to question the school's understanding of the world, and they can use their insight into pupils' learning processes to raise new questions about the artworks and the museum's mediation of them. If such mutual curiosity becomes widespread, the idea of entrepreneurship – creating something that others can benefit from – may lead to an innovative process that creates lasting change in schools and the museum world alike.

Mathematics at the Art and Design Museum

By Mie Engelbert Jensen, Associate Professor of Mathematics at the Teacher Training College in Jelling, and Kirsten Jensen, Audience Development Manager at Trapholt

Can math classes and museum visits be combined so that it makes sense for the math teacher, the museum, and especially for the pupils? The Teacher Training College in Jelling (University College Lillebælt) and the Art and Design Museum Trapholt in Kolding set out to investigate this very question. In 2012 they entered into a collaborative partnership on the development of educational materials for teaching mathematics at the middle level – all while taking their point of departure in Trapholt's permanent collection.

The objective of this collaboration between the teacher training college in Jelling and Trapholt was to investigate how to activate the museum's own resources and the museum as a space for mathematics teaching in primary schools. By opening the museum to disciplines not traditionally associated with museum teaching, the museum's greater potential and relevance to society as a whole is brought to light. At the same time, student teachers have the

opportunity to try their hand at developing educational materials based on real-world experience. A central element in Trapholt's exhibition profile is an interdisciplinary focus on the meeting of the visual arts, design and arts and crafts and an investigative mediation practice. Trapholt's exhibitions are designed to encourage guests to perceive, consider and reflect upon issues such as innovation, sustainability, aesthetics, process and the use of materials. Trapholt's ambition is to provide museum visitors with 1) aesthetic challenges and innovative power, 2) historical roots and global vision, and 3) debate and dialogue on the present with bearing into the future. For these reasons, the school services at Trapholt are also occupied with the task of exploring the educational potential of the museum collections in subjects other than the "traditional" museum subjects (such as the visual arts and Danish), allowing the museum's knowledge to come into play in various relevant contexts.

The first visit

In spring of 2012, a group of student teachers specializing in Mathematics from the teacher training college received a guided tour of Trapholt. The museum's

audience development manager, Kirsten Jensen, presented the history of the museum and the museum's many exciting objects and spaces, which explain the history and legacy of design almost on their own. The visit to the museum was a new and different experience for the students, during which everyone was able to expand their knowledge of art, design and photography. All 36 members of the group participated in the visit, and it was the start of a reflective process on developing educational materials for the museum, which took place partly at Trapholt during the guided tour, as well as in the classroom back at the teacher training college.

The development of educational materials

No problems arose until the students attempted to put theory into practice and draw up concrete learning materials which could be applied in the teaching of school pupils. It turned out that it was reasonably easy to generate a lot of ideas. It was, however, somewhat more difficult to sort through the ideas and find those which could be carried out in practice during a visit, and likewise pose interesting mathematical challenges. The group decided to establish a team of three students charged with the task of turning the ideas into three actual learning resources during the summer. The materials had to meet specific criteria in relation to mathematical learning potential as well as the museum's guidelines, e.g. on the handling of delicate items and active engagement of students in the learning process.

During the developmental phase, the team posed a few questions to Kirsten

Jensen concerning e.g. the precise measurements of the buildings and the names of the chairs. One of the challenges that emerged along the way was the seemingly contradictory process of developing hands-on investigative teaching materials in a museum where one is not allowed to handle the objects in any way. This required the teaching materials to be based on Trapholt's *handling collection* of chairs as well as on Arne Jacobsen's summer residence, located in the museum grounds. From the students' perspective, there was a keen desire to break away from the image of the museum as a boring, alienating environment. There was, therefore, a lingering doubt as to whether it would even make sense to carry out the educational sessions in this manner. For Trapholt it was a unique experience to be removed from the development process, but equally exciting to see how students would approach the process and what results the work would yield. What would their views be of the learning opportunities provided by the collections with which the museum staff worked every day? In principle, anything could happen. This in itself almost anarchic process – and the fact that it was allowed to take place at all – contributes to the museum's fundamental relevance and importance to this day. In this respect, the significance of the collections was expanded in scope, not only in the context of mediating design history and theory, but also in taking learning to a tangible level incorporating concrete, useful and tangible opportunities and tools that can be applied in real life. The learning materials were sent to Kirsten in October 2012 and were tested on a group of students in 2013. After the trial period, it was concluded that two of the three learning materials could easily be

incorporated into the museum's collections of teaching materials with a few minor adjustments.

What has the collaboration meant?

As a developmental project, collaborating with Trapholt has given the participating student teachers very important insight into how to collaborate with an external partner from a completely different professional world than the school system. The team presented the project as a form of contract: "We, being experts in mathematics and mathematics education, have been hired by Trapholt to develop learning materials, so our objective is to provide our customer with a professional product which they can use in their company, but which still contains meaningful mathematics." In this sense the project was, in fact, a representation of future job scenarios: Although the majority of students go on to become math teachers in primary schools, there are also career opportunities within the fields of consultancy, publishing and the like, a fact which we perhaps neglect to incorporate in day-to-day teaching. Collaborating with Trapholt has meant that students have become better prepared for a wider range of tasks than they would otherwise have been. At the same time, the teacher also gained valuable experience in organizing and developing educational activities more closely associated with institutions outside of schools.

For Trapholt, the final tasks of the collaboration were truly eye-openers, and this is where the relevance of a project such as Learning Museum truly stands out. The collaboration between the museum (which has well-defined professional and field-specific traditions) and student teachers from disciplines that are not traditionally associated with the museum contributed to expanding and illuminating the potential of the museum. At the same time, the museum itself is challenged by the outside world to look at its collection through new sets of eyes. It is, however, not only the museum which is challenged in its own self-perception. This, likewise, applies to the pupils who will work with the educational materials. They now have the opportunity to put mathematics, the museum, and the learning potential of both into a new context. The student teachers' instructor, Mie Engelbert Jensen, and Kirsten Jensen, Audience Development Manager at the museum, had some fruitful discussions which led to an agreement upon future collaboration for similar projects in the future. In the spring of 2014, for example, plans are in the works for a group of math students and a group of German mathematics students to participate in a day where they will concentrate on the analysis, development, and improvement of existing learning materials at Trapholt as well as on developing new ideas for materials. Once you have created a good working relationship, there is every reason to continue. The collaboration benefits Trapholt, visitors to the museum, and student teachers in the region.

When a 125-year-old Packed Lunch Begins to "Tell"

– A workshop in general didactics outside the classroom

By Linda Nørgaard Andersen, Head of School Services, The Workers' Museum

Whatever main subject area student teachers choose, they will become acquainted with the subject of general didactics. This fundamental subject serves as the backbone of their future work as teachers, for it is in this course that student teachers must acquire theoretical knowledge and practical skills within the areas of planning, implementation and evaluation of their teaching. The trends embodied in the Danish concepts "New Nordic School" and "Make a good school better" invite more teaching outside the traditional classroom. With this in mind, the Workers' Museum and Zahle's Teacher Training College embarked on a collaborative project centered on the subject of applied didactics.

Imagine a team of first-year student teachers at a teacher training college. They are eager, talkative, ready to debate, and curious about the field of study and the professional world that is opening up to them. They arrive with many notions about learning and about being a teacher. All of their attention is focused upon the knowledge that they will help to create within the walls of the classroom and when meeting with students. How should they organize the teaching? What about differentiated learning styles? What about all the knowledge and the experience that students are unable to acquire in the classroom setting?

General didactics is a primary subject that supports the student teachers' attempts at finding answers to these questions. The objective of the subject is for students to acquire theoretical knowledge and practical skills within the areas of planning, implementing and evaluating teaching. In the winter of 2013, all 50 first-year student teachers from Zahle's Teacher Training College in Copenhagen participated in a workshop at The Workers' Museum. All of the student teachers had Danish and English as their first and second specialty subject areas. The work-

shop content was, however, not directly based on their areas of concentration, but rather on general didactics. The workshop was the result of collaboration between Hanne Schneider (Associate Professor at Zahle's Teacher Training College) and Linda Nørgaard Andersen (School Services, Workers' Museum, Copenhagen). Right from the start the goal was to increase student teachers' awareness of the potential and challenges involved in working with and using museums in their daily practice as primary school teachers. It was especially relevant to illuminate these points for this particular group owing to the fact that their specialty subject areas traditionally have no direct connection to the areas explored at a cultural history museum.

We carry our experiences with us

The student teachers all had personal experiences from field trips and museum visits from their own schooling. These experiences led both to positive and critical perspectives on how museums can be used. Several students recalled the sensory-based experiences from their visits such as, "I will never forget the taste of the stinging nettle soup!" or "My classmate was laced into a corset, and I remember thinking 'at any moment she's going to explode!'" The majority of students were certainly positive to the idea of taking their students to museums or involving them in other "recreational learning" activities. There were, however, also critical questions and reflections such as "Can you be sure that what is going on at the museum is professionally anchored?" or "Museums are only relevant for the subject of history, aren't they?"

It is not the first time that museums have been seen as places reserved for the history teacher, which is precisely why the basis for this workshop course was the subject of General Didactics. We deliberately chose not to focus on theoretical didactical questions, but instead on general didactic questions such as: How can you use the museum in interdisciplinary contexts? How can the museum support different preconditions for learning? And, knowing that variety in teaching is crucial for increasing learning potential, how may the museum support such variation? The objective of this was for student teachers to be able to see the museum as complementary to their teaching in their future work, and to make them see museums in general as a means to differentiate and diversify their teaching.

The future math teacher may discover that practical mathematics can easily be carried out at a museum, or the future physics teacher may consider how a science museum could be a good setting for introducing new technical concepts. The Danish teacher could incorporate the old apartments at the Workers' Museum in her teaching to give students inspiration for writing their own stories. Above all, future teachers can, as a group of professionals, perceive museums as common learning spaces for the unfolding of academic competencies. In the student teachers' independent work after the workshop, they were tasked with incorporating at least three disciplines into an educational offering based on a single object. The choice of concrete objects turned out to be an eye-opener for the students and their understanding of the museum's many possibilities.

When a Packed Lunch "tells"

In order to illustrate the interdisciplinary potential offered by the use of museums, the workshop was structured around the museum's greatest strength – the object. Objects have great learning potential as they can be involved in all disciplines and used to achieve a number of objectives. With the proper framework, any object can incite wonder and curiosity and create visual images of a historical period or context: a knowledge that can perhaps seem abstract, or challenge our imagination, making it possible for learning to take place. The students had no prior knowledge of the first object with which they were presented. They were shown the object and were then asked a series of questions inspired by Eilean Hooper-Greenhill's questionnaire for object-based teaching. The questions were for example: What is it? Who made it? How does it smell or taste? What purpose did it serve? And what associations you have about the people who made it?

The students quickly discovered that the object was a packed lunch, and that it was not practical as the ink from the newspaper used to wrap the contents would have seeped into the grease of the food inside, and the contents would have become wet and inedible in rainy weather. However, it was when we posed the question, "What does it tell us about the people who've owned it?" that their ideas and stories truly began to emerge. "It is wrapped in *The Social Democrat*, so it must have been a worker who owned it", "It must have belonged to someone who could not make it home for lunch," "It's probably a woman who made it for her husband, she didn't have much to work with", "Perhaps it wasn't even made

in a kitchen. I read that there weren't always kitchens in every apartment back then." When asked about what the place where the packed lunch had been prepared looked like, the students began a heated internal debate.

The packed lunch is one of the Workers' Museum's most famous objects. The student teachers' dialogue and reflection about the object was largely the same as the responses made by school pupils when taught at the museum. The packed lunch communicates with us. It is tangible and when it is seen in the historical context regarding the link between material living conditions and everyday life around 1900 it can support the recollection of the subject matter. The fact that the packed lunch makes an impression can be witnessed in one of the student's evaluations, in which she describes: "... the presentation of the packed lunch wrapped in the newspaper practically sets a film in motion in my head ... the use of objects in teaching can really help to create more varied, catchy and exciting teaching."

A self-guided visit from an interdisciplinary perspective

The student teachers were presented with several objects as we focused on the importance of creating a learning framework, and how to do this at different levels depending on the grade. Creating relevant frameworks for the objects is crucial in giving pupils the impression that they are now working with something completely removed from books or digital media. One example was the museum's Christmas educational offering during which pupils sit in a circle on the floor with dim lighting and soft Christ-

mas music from a crackling gramophone in the background. Meanwhile, the story of the Hansen family's three children in 1950s Copenhagen unfolds, every year waiting for the night when their father would bring down the Christmas decorations from the attic. A suitcase containing their advent calendar from the previous year, the jumping jack figure they had wanted for so long, and the Christmas baubles. The old suitcase is then brought forth, and the pupils are asked whether they would like to see the contents. The children always look longingly at the items as they are taken out, and they are allowed to handle them.

Naturally, the student teachers would try out and integrate the use of objects in an educational session. Divided into groups, they were sent out into the museum collections to find an object that they believed they could use as the basis for an interdisciplinary educational offering. The session had to be centered upon a specific museum object, include a visit to the Workers' Museum, and should target students in grades 4 to 6. The students' imaginations were fertile and the choice of subjects wide as they explored the permanent exhibitions. The groups selected: The ballroom, a gramophone, a Madam Blue-style traditional coffeepot, and an election poster from 1953. The workshop day ended with a short presentation of the individual objects as well as a discussion and exchange of ideas in regard to specific objectives, contents, and working methods.

Despite the first-year student teachers' relatively limited experience within their field of study, it turned out that they had a good understanding of how to find the interdisciplinary potential of their cho-

sen objects. The Madam Blue coffeepot was, for example, used for the subjects of Home Economics, History, Danish, and Mathematics. In math, the pupils were asked to work with scope, measurements and scale to produce word problems based on the coffee pot. In home economics, they worked with historical meals that might have been eaten in a working class family with a Madam Blue coffeepot. In Danish classes, the pupils had to carry out creative participation on the basis of the coffee pot, where the coffee pot became personified and could tell its life story. These processes gave way to a common working method based on specific museum objects. The student teachers completed the course with presentations and an analysis of each process involving both the student teacher and the museum educator from the Workers' Museum. The entire process, including the workshop at the museum, had duration of 10 regular lessons in general didactics.

We are all role models

"I believe it is essential that student teachers experience education in schools that is conducted in collaboration with the surrounding community, including our museums. And in this context it is important that the student teachers feel that their teachers at the college team up with museum educators so that such collaboration serves as inspiration, a role model in regard to their own future teaching assignments," said the students' teacher, Hanne Scheider.

Within the School Services at the Workers' Museum, we agree with Hanne. Collaboration is essential in order to ensure that all participants reap the optimum

benefits from the process. Much of the follow-up and assessment work connected to these workshops focuses on how to maintain the collaborative relationships with the students that have been established during Learning Museum. During the project, we have become far more aware of the opportunities for establishing collaborative projects with student teachers who would not typically use us as an educational space. Student teachers who, due to their subject-areas of specialization, do not regard a cultural history museum as a natural supplement to their future work and teaching.

Teachers today are bombarded with countless opportunities to establish partnerships and collaborations with all kinds of Danish associations and interest groups. It is, therefore, essential to establish contact and show future teachers the potential of museum education during the first year of their teacher training. For us, it has given rise to an ongoing discussion about how to ensure that the museum's meeting with student teachers through a workshop do not become isolated occurrences, but can be connected in some way to a specific project, internship, or bachelor's thesis and thus provide visibility throughout their entire education.

Aalborg Historical Museum

– From a third grader's perspective

By Bodil Christensen, Associate Professor of Danish, College of Education in Aalborg, UCN

You learn something when you do something. You learn something when there is meaning in what you are doing. You learn something when there is a need for the project that you are involved in. This is the fundamental learning theory behind the nationwide project Learning Museum. In this project, museums across the country attempt to involve pupils in museum education in such a way that learning and museum visits become more than just guided tours and a glance at stone and flint axes in glass display cases.

Student teachers at the Teacher Training College in Aalborg have a long tradition of collaborating with museums in the local area. Aalborg Historical Museum has been a partner in the current project, which has had two focal points: 1) The creation of a digital or analogue fiction and fact-based approach to the current exhibitions at Aalborg Historical Museum; and 2) giving student teachers an eye for what sort of concepts a third-grade class can handle, and knowledge of the level of complexity that can be used in the dissemination of both facts and fiction. The process has been quite exemplary in relation to Aristotle's approach to learning: First, a knowledge

base was established using Curator, Inger Kirstine Bladt's lectures on museum education along with a focused tour of the museum's exhibitions. Next came a hands-on introduction to website production, the combination of books and pictures, information on children's language development, and finally, a task which would give the student teachers the opportunity to apply their knowledge and craftsmanship in practice.

The process was largely driven by the student teachers' own preferences. One could choose to work with the museum's exhibition of C. W. Obel's tobacco factory, an exhibition on the Renaissance, or a temporary exhibition on Aalborg and the Resistance Movement. The task was to create teaching materials that included a factual and a fictional text. The language and syntax as well as the images chosen had to be adjusted to a third-grade level. You could select any media you preferred. This resulted in five websites and three "books" which very successfully reached the target audience. Arranged by exhibition headlines the results were as follows (links to the websites can be found under references).

C. W. Obel's tobacco factory and child labor

The sounds of the tobacco factory add a special atmosphere as the audio backdrop for the website's information about

child labor at C.W. Obel's tobacco factory. The smoke pulses from the tall chimney, and the tobacco-brown color scheme emphasizes the thematic focus. Anne, Kirstine, Laura and Pernille's website uses sound, pictures, facts and fiction to inform visitors about life as a child laborer at a tobacco factory in Aalborg. You meet the boy Lui, who introduces you to the site's information. You can learn that the tobacco factory was founded in 1787, that it was declared the country's largest employer in 1870 – and that it was closed long ago. Small fact boxes tell of snuff, chewing tobacco and pipe tobacco, three items which are now rarely seen in the shopping carts of modern Danish supermarkets. Historical dates and additional facts can be found under the headings "Child labor" and "Everyday life", and the "Story" area gives you access to a touching picture book about the life of Søren.

"Søren was only 9 years old, but times were hard." Told in rhyme in the original Danish, the story of Søren's life unfolds until it reaches a moral, school-friendly ending:

*Søren loved to go
to school where he should
be ready to learn grammar
before he again met at the factory*

*Søren loved to go to school
Thought that it was very cool
To learn and really use his brain
Before he went to work again*

Finally, the pupils are presented with a classic shooting game in which Søren and the grumpy men give the pupil the opportunity to play "shoot the cigar." As on other websites, there is also a teacher's guide which relates the website content

to school curriculum requirements. Another website tells the festive story of Tove and Bak who work from dawn to dusk at the tobacco factory. On this site there are crossword puzzles and quizzes that help third grade pupils learn about and understand life as a child laborer at a tobacco factory. Another tobacco-brown website includes a letter from Thomas to Klaus: "Dear Klaus. I have now been working at C. W. Obel's tobacco factory for a year. Mother is happy that I am working at the factory. Mother is really happy that I am working at the factory." These texts focus on working with repetition within an easy-to-read text while also disseminating knowledge about a tobacco factory from a child's perspective.

Renaissance – new times, new knowledge

On the website on "The Renaissance" you can find factual knowledge on an entire era in Danish and European history, which may be difficult to convey at a third-grade level. However, with the help of illustrations, artworks from the period, fact boxes and the picture book "Little Karl got lost", the most important historical highlights of the period are told in child-friendly language. Here you can also meet the witch Luca, who flies across the green (here symbolizing the color of hope) Renaissance website. By clicking on a link, the fictional story is read aloud, and teachers can also get good advice on using the material. There are many fun details that help to maintain a high level of pupil motivation.

The Middle Ages

"Do you know about The Middle Ages? Have you heard of the Middle Ages? I

know a lot of exciting things about The Middle Ages. Actually, I know TONS! SO much that I 'm happy to be living today. I can get food when I 'm hungry. I have a warm bed at night. I have a television." This is the blurb on the back cover of the book on The Middle Ages. The book is a must-read. Then you will be aware of how happy you should be not to be served porridge every day.

The Danish Resistance Movement during World War II

Aalborg Historical Museum has an exhibition on World War II, where you see everyday items such as ration books and various creative means of reusing materials, which you can also get an impression of in the iconic Danish TV-series Matador. World War II is very extensive historical field, and the (analogue) book produced by the student teachers focuses on the resistance movement. Here you can read the story of Jens, who is 10 years old and living in the country. His father is part of the resistance movement, and it is a difficult secret to bear.

These various tools attempted to contribute to solving the classic issue faced by teachers: How do pupils gain maximum knowledge in the time available? The responses from the student teachers are given here. The key is a large portion of fact, much fiction, many pictures and entertaining tasks in appropriate quantities. You can see the projects here as prime examples which can – to a certain extent – be copied by pupils. The student teachers have learned much about the Renaissance, child labor and the resistance through this mediation project. Similarly, pupils can be given the task of communicating information to their

peers through the production of websites, Prezi presentations, or a classic textbook format. What remains central is that specific sets of knowledge are required in order to mediate a subject area creatively. You cannot write a book for third graders without having knowledge of the language appropriate to the target audience. You cannot select images for illustrations without knowing anything about the images' symbolism or idiomatic significance. You cannot select facts from a large body of knowledge without knowledge of the pupils' conceptual reality.

The new school reform will, hopefully, provide more opportunities for pupils to "come out into the world". Local and national museums are very adept at making theoretical knowledge approachable in practice. It is always better to see the Renaissance room at Aalborg Historical Museum with its Gothic lettering and dark carved furniture before you read more about the period, and if you want to gain a true understanding of child labor in the late 1800s, try "stripping" tobacco leaves at a work table.

Website for reference:

annehjorth7.wix.com/cwobelsfabrikboernearbejde
 marielaauritzen2.wix.com/tredje-klasse#
 heidihampenberghoeje.wix.com/tobaksfabrikken
 joachimmarcherjensen.wix.com/sandie
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Creative, Innovative and Enterprising Citizens

– The teacher's role in the external learning space

By Lonnie Warren, undergraduate student at Odense Teacher Training College, UCL (now a certified primary school teacher)

Society is constantly evolving, and with the new school reform the Danish government seeks to adapt the Danish school system to the global world. Meanwhile, today's youth culture requires teaching that is rooted in reality and sufficiently different to motivate pupils to learn through curiosity and wonder. The article will give my personal views on how real-world and alternative teaching can take place in external learning spaces. I emphasize the role of the teacher and how he or she can help to strengthen teaching before, during and after a visit to the museum.

We live in a society where creative, innovative and entrepreneurial skills are in demand on the global market. At the same time, the new Danish primary school reform will encourage teaching outside of the walls of the classroom. The local sports and cultural facilities and organizations will be involved to a higher degree, and there will be increased focus on interdisciplinarity. But how can we create educational opportunities outside

the structured and secure school environment and still provide learning that supports pupils in becoming the best versions of themselves, equipped to handle the society of tomorrow? Museums are ideal external learning spaces as they contain a wide variety of art history and culture of which student must build an awareness in order to understand the foundations of the society of which they are all a part. Art and cultural history also give ample opportunity to support the development of creative and innovative skills. In fact, studies show that visual phenomena activate associative processes in those who see and observe, thus offering opportunities to find new ways of combining knowledge and experience. Involving museums and relevant tasks can, thereby, clearly contribute to strengthening pupils' general education and development of innovative skills.

The role of the teacher

As a part of my bachelor's thesis work at the teacher training college on Funen, I chose to collaborate with Funen Art Museum, examining how the museum can be used as an external learning environment in the subject of visual arts and in relation to pupils' general education. I

142

developed various educational sessions which I subsequently tested in schools in Odense. The final product was a complete set of inspirational and instructional material that schools can download via the museum's website before visiting the museum. The material should be seen as a tool to support the link between teaching at the school and the museum visit itself. The tasks presented in the material offer opportunities to gain knowledge in new ways compared to what can be achieved in the classroom alone. During the test run of the material, I experienced great success in the courses that focused on dialogue and conversations centered on the pupils' experience of visual images. Pupils were allowed to express their expectations of the museum visit and the selected subject matter before we embarked on the actual educational session, e.g. on The Modern Breakthrough in Scandinavian art. Their reflections were recorded and used for the final evaluation of the sessions. In this way, the progression was made clear to the pupils, and they were also better able to express their immediate impressions, attitudes and experiences. The entire teaching material maintains a focus on the multivoiced classroom and experientially-centered dialogue on visual imagery.

What I found interesting in this whole process was the role of the teacher during an educational museum session. When the teacher chooses to use an external learning space such as the museum, he/she most often makes use of the museum's guides and educators. They are experts in the particular field of knowledge in question and can inform pupils about the museum's exhibitions. As a teacher, you might be have a

propensity to let the expert take the reins at the museum and remain a passive spectator, hushing pupils if required. However, it is my impression that it is in this very situation that great attention should be paid by teachers. We are the teachers, and we are the ones who are responsible for organizing teaching – so we should, of course, also be active participants during the entire process. In my view, we should ensure close collaboration with the experts we choose to involve in different learning contexts. We must inform ourselves about the subject matter and the thematic issues that the pupils will work with, and we must support pupils in being active participants.

Multivoicedness, shared responsibility and pupil involvement

Topics and thematic issues are not of much use if you do not manage to get the best out of the pupils during a teaching session. Whether inside or outside of the classroom, dialogic interaction and multivoicedness must be in focus. Pupils should be involved and learn how to express what they feel in an external learning environment. By allowing pupils to express their immediate impressions and ideas, they will not only develop a greater awareness of what they see and how they can express themselves, but will also find it easier to concentrate on the subject at hand because they share in the responsibility for a successful overall classroom dialogue. The pupils' shared decision-making and responsibility should be main keywords during such a session in order to strengthen pupil concentration, motivation and commitment. They will not only be supported in becoming responsible and committed

young people, they will also be supported in thinking creatively and innovatively in relation to planning, implementing and evaluating a learning experience taking place in an external learning space.

Creative and innovative partnerships between schools and museums

We need to unlock the imagination and open up new paths to innovative thinking. We must explore this land of opportunity. A museum is not only useful in relation to the subjects of art and history. What about math? Or woodwork, for that matter? It is about thinking outside the box and daring to be creative. The government calls for more interdisciplinarity in primary schools. Interdisciplinary courses are intended to give pupils insight into how different subject areas can be applied in various contexts. So why not go to a museum and talk about art history, have a dialogue with a work of art, be inspired? Look at the exhibits and interior design of the museum. The possibilities are many, but they do not

stop when you leave the museum. The purpose of my material developed for Funen Art Museum was to create a link between the external learning space and classroom teaching. One can, for example, work in a particular subject area, find inspiration at the museum and then further develop specific knowledge and skill sets back in the classroom. After a museum visit one can, for example, return to the classroom and build easels and frames for the art works that pupils create inspired by the museum visit. They can also write poems based on concepts that they have taken note of at the museum, on acquired historical knowledge, or the works they have seen. They can even build a miniature museum model. External learning spaces, when used in conjunction with the school's general teaching, can pave the way for a renewed curiosity about everyday life. If we are to support pupils in becoming creative, innovative and entrepreneurial citizens in this globalized society, we ought to "practice what we preach" and put on our creative and innovative thinking cap ourselves.

On the Spot

– The art museum, dialogue and body in visual arts teaching

By Diana Fade and Mette Skovsgaard Sørensen,
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This article describes a specially developed art teaching session for 2nd and 5th grade classes from Skipper Clement School in Ålborg. The sessions were developed by two student interns from UNC – Teacher Training College, in collaboration with KUNSTEN, Museum of Modern Art in Ålborg, Denmark, as a part of their BA thesis. Here they describe how the incorporation of the art museum as an environment for visual arts teaching in schools can enhance and contribute to classroom instruction when working with paintings using a sensory-based, dialogic approach to teaching.

It's a Thursday morning, and the two of us – fourth-year student teachers – are at KUNSTEN, Museum of Modern Art in Ålborg. We're in the midst of planning our upcoming academic internship, into which we will be incorporating the art museum. Suddenly a group of school children come running into the exhibitions. They are active, quite noisy and obviously excited. Some of them get quite close to the paintings – they want to look

but also want to touch. Some of them take pictures with their mobile phones and others strike poses imitating what they see in the pictures. The scene is, however, quickly quelled by an adult, "This is not how we behave at an art museum!" We considered how the pupils' physical energy and excitement could be actively applied as an element in our internship. Was there an unseen potential for it in this special context – the art museum?

Visual arts education in schools today – feeling, experience and analysis

The official curriculum objectives for visual arts education in schools states that the goal of visual arts education is for pupils to develop the ability to observe, reflect, use and understand pictures as a form of communication and means of expression "by producing, experiencing, and analyzing pictures." This makes working with pictures, visual analysis and image-based communication key concepts within the subject. In other words, we express ourselves in, about and by means of images.

Having such well-developed skills in the understanding and use of visual imagery is an important prerequisite for

operating in a society in which we are bombarded with pictures and increasingly communicate through systems of cultural symbols—visual imagery. Visual imagery is a language, and just like any other language it must be learnt to be properly understood. It is a tool, a skill which students must be able to employ to understand themselves and the world around them.

According to Hans Jörg Hohr and Kristian Pedersen, an aesthetic learning process such as this is grounded in three categories of experience – feeling, analysis, and processual experience. Feeling is defined as a pre-symbolic form of recognition, closely connected to sensory and motor activities and operations. One meets and interacts with the world, so to speak, by means of tactile, visual and sensory stimuli. Analysis is the opposite form of experience and connects experiences and feelings through language and concepts. One verbalizes the experienced feelings and in so doing reflects upon that which has been experienced. Processual experience is the third form of experience and emerges during the active process of creating an artwork. One acquires knowledge through the creative process. One learns about a flower by drawing a flower, about a landscape by painting it, about the human body by forming it through sculpture. These three forms of experience must be incorporated into visual arts instruction at schools and at the museum in order to fulfill the requirements of the aforementioned curriculum objectives. This theoretical view of art as a subject in schools has laid the groundwork for the development of a museum educational offering and our bachelor's thesis work.

Three prerequisites for a good educational session at the art museum

KUNSTEN in Ålborg is a place where one has the opportunity to see authentic, original works of art and acquire an in-depth sense of every brushstroke, color and nuance. The objects constitute the art museum's central content. It is these objects and their meanings which strengthen the pupils' understanding of art within a cultural context.

With this in mind, we began to develop our educational offering, On the Spot. During sessions, groups of 2nd and 5th grade pupils would work with paintings, describing the mood of particularly works, and they would also experience the art museum as a physical learning space. The sessions are based on a dialogic, sensory-based and tactile approach to art and on Merethe Frøland's (lecturer in Natural sciences at the Center for Natural Science in Oslo) prerequisite factors for ensuring a museum visit fulfills its full learning potential:

- Pupils must work with tasks that can *only* be solved at KUNSTEN.
- The tasks *must* be completed through group work.
- The tasks *must* have a direct relevancy for pupils' classroom work.

As regards the third of the aforementioned prerequisites, it was by means of preparatory work carried out in the classroom prior to the museum visit that the pupils obtained the necessary fundamental tools to be able to participate in the museum session. At the art muse-

um, pupils had to look at, sense, and talk about paintings. It was, therefore, an important prerequisite that they had already seen, experienced and talked about paintings in the classroom prior to their visit.

The preparatory instruction prior to the museum visit made it possible for pupils to move freely through the three phases of the aesthetic learning process. Inspired by painter and author Mogens Hoff's approach, pupils honed their abilities to sense colors and understand the use and effect of color by working with colored chalk. We combined these color blending exercises and a focus on line with color-related exercises on wallpaper – pupils leave their mark, but the material also does something to them. During this process, the pupils painted, experimented and experienced. Automatically, they began to verbalize the process which we later discussed together as a class. Based upon the pupils' work with color and understanding of line in their own works, we began to gradually look at the mood expressed in paintings and what kind of feelings they generated in the pupils' bodies. In this way, pupils had obtained important fundamental bodily experiences and a budding understanding of the skills and concepts which would be the basis for their experience at the art museum.

When teaching moves to the museum

The actual museum visit was structured so as to serve as two supplementary lessons that would take the place of two of the pupils' regular visual arts lessons at school. As the school was located close to the museum, it would be possible for us

to go back and forth between KUNSTEN and the school within the time span of one lesson. In total, we took three lessons out of a normal school day for each class. The session itself incorporated the following exercises, which we adjusted to match the two different grade levels:

- A mirroring exercise
- A discussion of selected paintings with emphasis on line, color and mood
- The incorporation of a "sensory suitcase" which encouraged an intuitive, dialogic analysis of the paintings
- The "snapshot method" (Seligmann, 2008)
- The production of a sketch of the paintings with a focus on color, line and mood
- A concluding discussion of the day's events – what did we learn?

On the day of the visit the pupils were excited and energetic and stood ready to go before the school bell had rung to summon them to art class. Upon arrival at KUNSTEN, we talked to the students about the art museum as a place, their prior experiences, first impressions and museum rules. We then began the session with a mirroring exercise where students had to try to act as one another's mirror image. The objective was to warm-up the pupils' sense of sight and observation skills, activating their senses for what was to come. The exercise was also intended to have a calming effect on the pupils who were very excited to be in a new learning environment.

The class then proceeded to work with three selected paintings – H.A. Brendekilde's *Forår* [Spring] (1889), Edward Weie's *Livsglæden – tre dansende figurer* [Joy of Living – Three Dancing Figures] (1911) and Jens Sønnergaard's *Marine* (1928). All three paintings were chosen based on the criteria that they should include a place within the painting in which the use of color, line and mood differed from the rest of the work to such a degree that it was possible to identify and discuss the differences. Our initial thought was to allow the pupils' first impressions to establish the basis for a dialogue-based approach to the paintings. It proved, however, too abstract for pupils to comment on these differences without having been provided with any special focus for their attention beforehand. We chose, therefore, to help them carry out a more controlled observation of the painting by asking them to turn their backs to the work and then, while remembering the key words from our class discussion – line, color, and mood – observe the painting again. We then asked the pupils to "move within the painting" by allowing them to get acquainted with the "sensory suitcase" filled with physical objects relating to the specific paintings. While working with H.A. Brendekilde's painting *Forår* [Spring] (1889), pupils were given a bag filled with dried, snapped branches; a bag of moss, which smelled of forest; a bag of dried leaves, which rustled; and a section of tree trunk on with roughly textured bark. Most of the pupils had, of course, been in a forest before – touched a tree and smelled the scents of the forest, but here we were attempting to focus their attention on something in particular. We attempted, through smell, sound, and touch, to activate their mem-

ories of earlier experiences in the forest and to make them put these experiences into words. The pupils, hereby, experienced how focusing their attention and skills of observation could help them relate to the paintings.

The dialogue's multivoiced perspective

In this dialogue we, as teachers, encountered a multivoiced dialogue as defined by Olga Dysthe, professor of education. For example, when pupils were in disagreement about the interpretation of a specific painting, it would be tempting for us as educators to make use of our expertise, choose sides and give the pupils a final, correct answer. Instead, we made use of the disagreement as a learning resource which opened the floor for an engaging debate where pupils argued for and defended their opinions. All the while, the teacher functioned as a supplementary mediator for the debate, making use of Olga Dysthe's pedagogical concepts of *authentic questions* [*autentiske spørgsmål*], *uptake* [*optag*] and high-level evaluation [*høj værdsætning*]. In so doing, pupils experienced that respectful disagreement can, in fact, be a potential form of consensus – they did not need to reach an agreement, but through dialogue they heard varying points of view which could give them a more nuanced perspective on the subject.

From experience to form

After having examined the forms of experience associated with *feeling* and *analysis*, we moved on to address *procedural experience*. Here the pupils translated experience into form. Pupils chose a painting which they would work with

using the “snapshot method”. With this method, students worked in groups, photographing each other in front of the selected work as a form of documentation, and then imitating the painting's overall mood and the positioning of one of the figures from the painting. In so doing, they established a relationship with the work and also related to it physically. This physical approach appeared to differentiate the teaching all by itself, making it accessible to the entire class. Physical expression was a language they all spoke. Using this method, they could all experience, for example, the cheerful dance and stretching of the figure's arms and body in Weie's painting, or the wild and threatening mood of Sønnergaard's *Marine*. Thus, their interpretations became embedded in the pupils' bodies. They obviously drew on this during the final part of the session, where they prepared a sketch of the selected work. This sketch would subsequently form the basis for further work back at the school, which focused on capturing artistic line, color and mood. The visit was, therefore, not separate from everyday instruction, but an important and integral part of it.

Why use the art museum as a part of visual arts teaching in schools?

We evaluated the visual arts teaching session at the art museum through the Constructivist evaluation method known as “personal meaning mapping”. This method assumes that all learning is unique to each person who learns insofar as no individuals bring the exact same level of knowledge or experience with them into the learning experience. The pupils all approach the learning situation with different sets of know-

ledge and qualifications, and their new knowledge is constructed on the basis of these distinctive elements that. The method consists of two steps. Firstly, evaluation of pupils' existing experience and knowledge prior to the museum visit, and secondly an evaluation of how the pupils' knowledge, thoughts, and opinions have changed after the museum visit. This is done using a mind map, which is subsequently analyzed.

Our evaluation of the pupils' mind maps showed that, for a number of pupils, the scope, depth and mastery of the subject of painting had been expanded – they had shifted their focus from a predominantly technical view, relating to their own productions, to focus instead on the artworks' imagery and their critical views on the subject. The art museum and the authentic surroundings it provides also made it possible to strengthen connections between theory and practice, as pupils experienced paintings and objects on the spot in the contexts within which they actually belonged. In addition, we saw a stronger inner motivation among students owing to the physical relocation to the museum. Here, even the quiet pupils were vocal as regular classroom routines and role distributions were put aside. The pupils' work was in this context also more exploratory and experimental, motivating them for learning.

The evaluation of the dialogic and sensory-based teaching also showed us that such an approach – based on visual input and the incorporation of Dysthe's pedagogical concepts of *authentic questions* [autentisk spørgsmål], *uptake* [optag] and *high-level evaluation* [høj værdsætning] – offers the opportunity to further investigate visual imagery, observa-

tion and reflection. The teacher's incorporation of objects that pupils can interact with, and the active use of the museum spaces and exhibitions with a view to physical, sensory-based interaction, has the potential to focus pupils' attention and observation skills, contributing to the development of fundamental skills in their understanding of visual imagery.

The article is based on the authors' bachelor's thesis reports.

“On the Spot – The art museum's potential in visual arts education” and “The Art Museum, Dialogue, Body and Image in Visual Arts Teaching”.

Both reports can be found in their entirety on Learning Museum's website under BACHELOR (In Danish).

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Can the Subject of Natural Sciences be Addressed and Made Accessible at the Museum?

– *Reflections from a bachelor's thesis*

By Mille Kathrine Krüger Jorgensen,
undergraduate student at the Department of School and
Learning at Metropol (now a certified primary school teacher)

"I thought it was pretty boring to read about those rocks because I think it's only fun for those who know a lot about it. For us who do not know so much, it's not so fun just to look at some rocks." These are the words of an eighth grade pupil from Sølvgade School in Copenhagen after visiting the meteorite collection at the Geological Museum. This article is based on my bachelor's thesis completed in February of 2013. The project was the conclusion of my teaching education from the Department of School and Learning at Metropol. The project was developed in collaboration with the Geological Museum, based on the exhibition The Solar System and Learning Museum.

The goal of the natural sciences is "a theory of everything", as modern physics puts it. This refers to the production of theories that are as abstract, theoretical and general as possible. The subject should teach students about scientific working approaches and methods of perception, which includes abstract thinking. So when pupils experience difficulty in understanding science, teachers cannot provide adequate answers because the very essence of science is that it is abstract. The natural sciences employ a great number of highly abstract models and theories. A prerequisite for understanding these is, to a large extent, the ability to think abstractly.

"Considering the opportunities, students have not flocked to the study of science in the numbers predicted." (Dewey 1910). The natural sciences are suffering because young people do not find the subject interesting and exciting. It is a 100-year-old problem, now confirmed in the ROSE study, that if science is to capture pupils' interest it must relate very directly to everyday life. The ROSE study is an

international research project based on a questionnaire containing 250 questions about scientific and technological topics and aimed at 15-year-old pupils. The study investigates which scientific interests, future plans, and attitudes pupils have in relation to the natural sciences. My bachelor project was intended to highlight what I see as one of the reasons for the lack of interest in the natural sciences, and to provide insight into children's ability to learn about abstract concepts such as the models and theories that are an integral part of physics/chemistry teaching. I chose to investigate whether it was possible to include museums as learning spaces when teaching abstract concepts. I wanted the project to contribute to the work carried out at the Geological Museum, and for the museum to be able to apply the results to improve their practices. The Geological Museum faced a major renovation in 2013 and had itself expressed a wish to get a new didactic perspective on their exhibitions. I got in touch with the Geological Museum through "MatchPol".

MatchPol

MatchPol is a collaborative partnership centered around the organization of one's bachelor's thesis between, for example, a cultural institution or a museum and the teacher training college at Metropol. After having visited the exhibition The Solar System several times and discussing science education with Karsten Elmoose Vad, Education and Development Manager at the Copenhagen Museum of Natural History, the issue was clear. Based on my theory of science as an abstract field, I chose to study abstract thinking in children as a prerequi-

site for understanding science, and how this could be mediated through artifacts at the Geological Museum. The Geological Museum has found that children nearing the final grades of their primary school education (ages 13-16) are not diligent visitors, and even those who visit the museum tend to do so without enthusiasm or excitement. Therefore, I involved another aspect in my study, namely museum didactics. My research showed that visiting pupils found it difficult to maintain concentration after approximately 15 minutes and only remembered very little of the information provided in the exhibition. Not only did pupils have to understand the technical language and relate to this, but they also had to navigate the exhibition space in order to obtain the knowledge that was intended for them. This new "learning space" also played a role in pupils' learning outcomes.

Theory in Practice

In order to explain the link between the lack of interest, the lower level of academic achievement and a lack of concentration, I chose to include the theories of Vygotsky's "Cultural-historical school". The ways in which a pupil thinks is characterized by the activities and ventures that he or she participates in in collaboration with others. By setting a framework, the outside world becomes an active participant in how to operate and understand reality. In the exhibition The Solar System one must read and listen. The exhibition's many information boards and videos create a framework for visitors to play the role of 'silent observer', encouraging a kind of self-imposed quiet behavior. This is inconsistent with the fact that abstract thinking is strength-

ened through dialogue-based teaching. In my interviews of pairs of pupils, a clear trend became apparent. The knowledge that pupils could retell had been mediated through artifacts, through physical activity, or through narratives formulated in everyday language. In other words, pupils gained greater learning benefits from the artifacts which actively involved them in the exhibition through physical activity or initiation of dialogue among the group.

The children's guide

Based on the observation of these trends, I developed a solution in the form of a "children's guide". The idea was that it would create activity in the exhibition and be available to all visitors. However, it was primarily aimed at children in the final grades of their primary school education (ages 13-16). This format was chosen based upon the following considerations:

- The museum was facing major renovations, and the exhibition was not permanent.
- Museum guides were already in use, so it would be easy to implement.
- The material must be easy to understand and should appeal to all children ages 13-16.
- It should not add more knowledge to the exhibition, but rather "activate" the knowledge that was already present within the exhibition.
- Last but not least, it should take into account abstract thinking as a prerequisite for learning science.

See the guide on Learning Museum's website under "Bachelor": <http://learningmuseum.dk/archives/2144>

Physical activity makes scientific artifacts more accessible

The children's guide and the BA project were well received by the Geological Museum, which will be incorporating the project's results into their upcoming renovation of the museum and the new exhibition. The project, in addition to having contributed to self-reflection at the Geological Museum, also strengthened my profession as a teacher. From the study, it is apparent that pupils sought out mediating artifacts that enabled them to participate in the exhibition, for example by having to carry out a specific activity. It was also possible to conclude that pupils used artifacts that mediated stories to gain knowledge. The artifacts with the least impact, were information boards and the glass cases containing the meteorite collection. The reason that students did not use the information signs was that they found the form, text layout, and language overwhelming. Based on this fact, I concluded that the knowledge being mediated was too far removed from pupils' pre-existing cognitive schemata. It was too far removed from pupils' "zone of proximal development". The artifacts that had the greatest potential for the dissemination of abstract knowledge, as understood in the context of the natural sciences, were artifacts that encouraged physical activity on behalf of the child or viewer, and the artifacts that the child could best relate to by creating a connection to the child's existing cognitive schemata. This could be achieved through the incorporation of everyday concepts. Knowledge is

shared between people in a community, and their different understandings are necessary to achieve full understanding. This also means that there are requirements for the physical environment in which learning processes take place. In order to make a museum suitable for teaching, the museum must give thought to the layout of the exhibition. This applies to the location of works, and whether, for example, the physical exhibition space can accommodate an entire class where pupils are able to participate in an active dialogue with one another. In relation to the exhibition content, the museum must also reflect upon whether the exhibition's theme encourages contemplation or physical participation. The museum must relate to the identity shift from having been a classic national educational institution to being an alternative learning space with the potential to develop active citizenship.

Prepare pupils for a museum visit

Using museums as learning spaces can be useful. However, based on my empirical data, the teacher must be responsible for preparing his or her students for a museum visit to ensure that it does not just become another field trip. If the museum is used as a learning arena for schools, users (in this case, pupils) will come from different sectors of the population. The fact that pupils have the opportunity to come to the museum does not, however, mean that schools always take advantage of this offer. If a teacher chooses to use the museum as a learning space, it is not certain that the teaching offered makes it possible to get the desired learning outcomes out of a visit. No one is ordered to visit a museum, but public museums have obligations to provide a framework that can potentially accommodate everyone. One of the unique traits of the museum as a learning space is that it can provide the opportunity to combine practical, aesthetic and discursive learning processes. If these learning processes relate dialogically to one another, they will, in turn, help to complement and enrich one another.

The Museum as an Object of Study

– *Experiences from a collaborative partnership in the context of bachelor's thesis work*

By David Russell,
undergraduate student at Metropolitan Institute for School and Learning
(now a certified primary school teacher)

The article deals with pupils' use of worksheets in science museums and the disparity that exists between the museum's intentions and pupils' actual working practices. Furthermore, it explores more specifically how student teachers and museums can collaborate on projects to the benefit of all involved.

While working on my bachelor's thesis at the Department of School and Learning at University College Metropol, I carried out a study of how pupils work with worksheets at science museums. During my internship and student employment at the Nature Centre Vestamager, I had observed that there was often a disparity between the museum's intention with specific worksheet assignments and how pupils actually solved them in practice. After much consideration, I managed to narrow down the topic of my thesis to a realistic scope so that it could be carried out within the available time frame. Examining the problem area required

gathering empirical data, making it an obvious choice to collaborate with museums. During the study, I gained valuable experience that I believe can help to make future attempts within the same discipline easier and more rewarding for all involved. Moreover, my investigation demonstrated that this is an area which merits further investigation.

Collaboration with museums

I chose to collect empirical data from several places, thus ensuring that a specific museum type did not become an overshadowing influential factor that determined pupils' working methods. I contacted Denmark's Aquarium (DA) and the science museum Experimentarium (Exp.) to collect the empirical data. The choice of these two institutions was motivated by the fact that at Exp. the public has the opportunity to interact with the exhibitions in contrast to the DA where observation occurs primarily through the sense of sight. Both sites were helpful in creating access and contributing good ideas. The School Services at DA were particularly interested and helpful

in finding literature and acting as consultants on the project. I had selected the focus of my project myself, with the museums becoming involved later in the process. Due to time constraints, it was difficult to draw upon the museums' experience and suggestions or give the museums a sense of ownership of the project. In order for museums to reap the greatest possible benefit from collaboration, I feel that it would be most advantageous to start collaboration already during the concept phase. In so doing, the museums' professional experience can be incorporated early on in the project, making it easier to determine the scope of the study. Another possibility is that museums present a problem area they would like to have examined so that student teachers and the museum can work together to determine the structure of the research. In this way, the museum has the opportunity to study an area that hopefully will lead to improved practices while ensuring that student teachers have the opportunity to examine a problem area that is relevant to their teaching practice.

The project

Informal learning spaces often present pupils with a wealth of information, and worksheets can assist in helping pupils to focus on a specific academic subject and fulfill curriculum requirements and specific learning objectives. The sheets can also be a great tool for preserving the impressions from the museum visit so that they can be used in follow-up work back at the school. With impressions from the day preserved through the use of worksheets, there is less risk that the content learned becomes context-bound. In my study, I observed 187 pupils at the

two museums (87 boys and 100 girls). Before carrying out my observations, I had identified certain signs and patterns that indicated different approaches to working with worksheets. From my observations, I could see that the pupils worked very differently with the sheets. The boys were often more interested in exploring the exhibitions on their own and some, therefore, did not use the worksheet at all – others used it only as a loose guide. The girls, however, were very focused on answering the questions on the sheet. For them it was the school's explicit requirements that had to be met. They wanted to do the job so as to meet the teacher's requirements. The boys were somewhat more autonomous, and as such lived up to the rather more implicit requirements of the school.

Consequences

The consequences of the boys' and girls' differing approaches were the same: The learning outcome of the visit was not optimal. The boys studied a lot, but did not follow up. This increases the risk that learning becomes context-bound, or that they interpret their observations incorrectly. The girls' focus on correct answers and solving questions in the correct manner meant that they did not investigate the exhibition or stop and wonder. The girls answered correctly, but did not always understand what exactly they had answered or why the answer was what it was. This is underlined by an observation I made in Exp. where a girl (who had all the answers correct on her worksheet) said: "I do not know what this is about." The observation suggests that the worksheet was designed so that it could be solved without the student having to actually use the museum, or

certainly without having to reflect upon the observations carried out. If at all possible, the worksheets should be revised so that tasks can only be solved by using the exhibition and reflecting on what is observed or what happens when pupils interact with the installations.

The teacher's role

Unfortunately, the worksheet does not work on its own. The events and instruction surrounding the worksheet play an important role. By gathering and checking pupils' worksheet responses at the museum, the pupils' work becomes more focused, and any misunderstandings can be addressed while still in the exhibition. At the same time the teacher gets a picture of what pupils get out of the museum visit and what needs further work in follow-up sessions back at school. If pupils are prepared for their museum visit and work with the worksheets, there is less risk that the pupils just see the sheet as a chore that has to get finished. If the worksheet deals with topics that have been addressed prior to the museum visit, pupils can put the visit into a school context, thereby reducing the risk that what they learn at the museum becomes purely context-bound. Furthermore, it is important to follow up on what was learned during the museum visit, back in the classroom. The worksheets are useful for recalling what subject matter was covered during the museum visit, and for providing pupils with answers to any questions that may have arisen along the way.

Perspectives

However, if pupils approach the worksheets in a manner that is different to

their intended purpose, what happens when they work with other didactic tools?

This is, generally, a field that has attracted little research – but one with enormous potential. Pupils rarely do as one might expect during an educational session, so continual evaluation of the processes are necessary in order for pupils to obtain maximum learning outcomes.

I am confident that, through collaboration between student teachers and museums, much knowledge can be generated. This knowledge will benefit student teachers, museums, and pupils' learning. My thesis is the equivalent of shining a light through a keyhole into a large room. There are a number of aspects concerning the use of worksheets, pupils' working habits and museum didactics which have never been the subject of research, but which could contribute to improving pupils' learning outcomes even more. I encourage both student teachers and museums to make use of one another. It is a truly rewarding process that both sides can learn greatly from.

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Academic Internship at the Museum

– An educational offering with dramatic narration, research teams and educational missions

By Sara Kornerup Fog, student teacher at Odense Teacher Training College, UCL

During our academic internships in 2013, we, as three student teachers, developed a series of learning materials in collaboration with the natural sciences museum Naturama in Svendborg, Denmark.

The materials consisted of a dramatized narrative, a website intended for active use by pupils, and various materials to assist in carrying out practical tasks. The material, entitled "Mission Bank Vole", was tested at the museum on pupils from third and sixth grade classes. Disguised as scientists from the future, "Professor Hydrogen Hilde Bom", science teacher "Lark Bird" and archaeologist "India Jensen", we took pupils on an adventurous mission: They would be exploring the life of the bank vole and its importance to nature, thereby building an awareness of their own responsibility to the environment and the world around them.

In the first year of my studies, I heard these memorable words: "Entice children into the world of learning." We need to entice them with all our knowledge of and fascination with our wonderful world. We must encourage them to be curious, active and self-driven. The driving force behind the development of our learning materials was simply considering what leads children to act and engage in the world around them. We were three student teachers from UCL Funen, specializing in the natural sciences, who were fortunate enough to get internship positions at Naturama in Svendborg. At Naturama, they use a dramatized form of storytelling to convey knowledge about the natural world. For this reason, narrative would also have a central role in our teaching sessions. Our advisor and head of education at the museum made a point of showing us how he communicates and mediates by means of storytelling. He also gave us advice on how to establish a rapport with the audience. In his words: "I have made all the mistakes you can make, so I speak from experience." He then passed the task on to us and we were given free rein to decide which product would be the result of our efforts.

“Mission Bank Vole”

We chose the bank vole as our narrator and front man to personalize and simplify the issues. The bank vole is a key creature in our ecosystem, of great importance to the food chain and seed dispersal in the wild. In an attempt to simplify the complexity of nature, we presented the pupils with scenarios involving the bank vole. For example, we explored what would happen to seed dispersal if there were no bank voles, highlighting the influence that voles and humans have on one another. Our goal with these fictional scenarios was to give pupils insight into the interconnectedness of the natural world as well as human interaction with it and influence upon it. This understanding was ultimately intended to lead them to a greater sense of responsibility for their surroundings and get them to actively take part. We set some clear guidelines and goals for how we would approach the project. This led to the creation of the learning material “Mission ‘Bank Vole’”. The target group was pupils from inclusion classes at the third and sixth grade levels. In inclusion classes, emphasis is placed on how different individuals work and learn differently as well as on creating greater social cohesion. The learning materials would, therefore, have to involve an easily accessible platform which pupils could use actively at any time, wherever they happened to be.

Therefore, we created a website where pupils could retrieve information in the form of film clips, download assignments, and upload photos and homework/task results using iPads. Additionally, the material had to meet curriculum requirements for the natural sciences

and include a narrative. “Mission Bank Vole” would not be reserved exclusively for use at Naturama; it can also be used in primary schools, nature centers, and other science museums.

Help! Something’s gone terribly wrong in nature

The session began at the museum where the pupils were introduced to three scientists from the future, Professor Hydrogen Hilde Bom, science teacher Lark Bird and archaeologist India Jensen, who had traveled back in time to get help from young researchers (the pupils). Something had gone horribly wrong with nature in the future. The only thing the researchers knew was that it had something to do with the bank vole, but they did not know the exact nature of the bank vole’s significance to the environment or even why it had disappeared. The scientists’ narratives were enhanced by dramatic music and images. With this information, pupils were sent on a quest to find answers to this enigmatic mystery.

Research teams, the learning process, and pupil mediation

Having been introduced to the mission and tasks, pupils were sent out to explore the museum, armed with iPads to take notes and pictures and blog along the way. They were to work in research teams on a mission to solve the mysteries of the bank vole. “Mission Bank Vole” consisted of five stations in various locations around the museum, each of them posing specific questions and practical tasks. Every station contained written, audio and visual information, each with its own subject-specific themes and terminology. All stations included a practi-

cal assignment where pupils’ senses came into play, and three to four questions which were intended to give learners insight into how he/she had solved the practical task. The questions also gave the teacher insight into the pupils’ understanding of the academic content of the mission. The practical tasks and related questions were intended to supplement one another throughout the pupils’ learning process.

To get started, pupils were asked to find stations one to five, which were located in different spots at Naturama. Each station had x number of QR codes that linked to the website. These links contained short film clips where the bank vole and other animals that share its ecosystem gave their views on how nature is interconnected. For instance, the owl discussed the food chain, while the fox explained how it catches voles and their pups for itself. The squirrel explained how he and the bank vole are responsible for seed dispersal, which is of critical importance to the plant kingdom. The tasks were also designed to relate to the pupils and their daily lives. For example, pupils were asked to compare their own senses with those of the vole and to compete with it, leading to a discussion and comparison of survival skills. They could also build models of the vole’s habitat or make a packed lunch for it. Throughout the process there was a focus on pupil-to-pupil instruction in which they had to use each other to exchange knowledge, provide feedback, and help one another through the various tasks. The session concluded with the pupils delivering a brief report to the scientists who would then take the information back to the future to solve the bank vole mystery. In this report, the pupils used the know-

ledge they had gathered during the mission to provide the scientists with answers on the role that the bank vole plays in the natural world and why they believe it had disappeared.

Evaluation of “Mission Bank Vole”

When the pupils had completed “Mission Bank Vole”, we asked them what they had gained from the visit to the museum and the mission they had been on. The majority were very excited that they had been given so much responsibility in carrying out the mission. Over half of the pupils also felt that having to help one another through the various tasks had helped make the process of learning new things easier. The tasks had neither been too easy nor too difficult, and the balance between written assignments and hands-on tasks was perceived as well-balanced. Pupils did, however, express that at times there was excessive noise and too many distractions from the interesting surroundings and sound effects coming from the exhibits, which disturbed their concentration.

The way in which pupils worked together differed from class to class, as did the degree to which they were accustomed to helping one another complete assignments. All in all, we could see from their answers to the assignments and their resulting reports that they had understood the tasks. The task where pupils had to remember a sequence to find QR codes and carry out practical tasks on their own took some getting used to for many. Had the sessions been longer in duration, it would most likely have been possible for pupils to get better accustomed to solving tasks of this nature, resulting in their completion of more stations.

Challenges and lessons learnt from the academic internship

Being an intern at Naturama was truly interesting and educational. The special thing about being in an internship at a museum is having a unique body of knowledge, objects, and numerous professionals within the same field in the same place all at once. This was particularly inspiring for me, as I share their enthusiasm for nature. Naturama was of great help during the development of our learning materials, and it is most definitely not the last time that I will be developing learning materials. In my four years at UCL I have worked several times on the development of teaching materials, and in my final year I enrolled in a newly-created area of specialization: Learning Material Design and Entrepreneurship. What I find most interesting in

the development of learning materials is that one truly challenges oneself to think outside the box. While carrying out "Mission Bank Vole" I was able to develop my IT skills and use my specialist knowledge of pupils' learning processes. This was especially true when it came to designing tasks to be solved using auditory, kinesthetic and visual learning channels.

Another thing that I take with me from the internship, and which I will most definitely integrate into my future teaching, is storytelling. It was fantastic to experience how a good story can capture the listener, engage the emotions, and get one involved in the situation at hand. I certainly see myself using this approach when introducing classes in future, regardless of whether it applies to a course on mammals in a science class or a Danish class on how to write a horror story

Additional Publications, Articles and Evaluation Report for the project Learning Museum published between 2011-2014

All publications, articles and the project evaluation report can be found at: www.learningmuseum.dk

Publications:

Learning Museum, 2011.

Tine Seligmann (text/ed.) 32 pp., ill., in collaboration with Skoletjenesten på Sjælland/The Danish School Services, Zealand. (in Danish)

Learning Museum: More Museums on the Agenda!

Tine Seligmann & Learning Museum project participants (text/ed.): 2012, 16 pp., ill. in collaboration with The Danish School Services, Zealand. (in English)

The project is presented in "**Policy Handbook on Creative Partnerships**":

The handbook gives an analysis of several creative partnerships in Europe.

The examples illustrate how one creates, organizes, evaluates and finances creative partnerships. Published by The European Council 2014.

Articles:

Museer som læringsrum for kommende folkeskolelærere.

By Tine Seligmann, Danske Museer nr. 2. April 2012

(English version on the Learning Museum website) www.learningmuseum.dk

The Museum as a Learning Environment for Future School Teachers

Den varierede undervisning – et eksempel fra Hjørring.

By Henning Brinckmann & Per Vestermark Nielsen, Danske Museer nr. 2. April 2012.

Arbejdermuseet – tidsrejse og geografisk udfordring

By Maja Riise-Jensen, Camilla Vandsted & Peter Jervin,

Geografisk Orientering 2012 nr. 3.

Geografi på Arbejdermuseet – nye åbninger og skæve vinkler?

By Ane Riis Svendsen & Ditte Marie Pagaard, Geografisk Orientering 2012 nr. 3.

Learning Museum – samarbejde mellem museum, læreruddannelse og skoleverden.

By Thomas Thomsen, Tine Nielsen Fabienke & Tine Seligmann,
Medlemskommunikation, Læreruddannelsens Religionslærerforenings medlemsblad,
nr. 1, 2012.

Samarbejde mellem museer og læreruddannelser skaber motivation og læring

By Tine Seligmann. **BØRN KUNST KULTUR – i en hverdag der dur, 2012**, chapter
3, Børnekulturens netværk. (Web publication).

Learning Museum: Learning and Creative Partnerships between Cultural and Educational Institutions, Tine Seligmann. Best Practice 2. A tool to improve museum education internationally. Edited by Emman Nardi & Cinzia Aggelini, Edizioni Nuova Culture – Roma 2013. CECA/ICOMs homepage: <http://network.icom.museum/ceca/publications/best-practice/> .

Synlighed og kommunikation sparker processen i gang!

Learning Museum 2011-2013

By Tine Seligmann, MID Magasin, nr. 29, oktober 2013.

Learning Museum: A meeting place for pre-service teachers and museums,

By Tine Seligmann. Journal of Museum Education. spring 2014.

Evaluation Report:

A comprehensive evaluation report on Learning Museum 2011-2013 is also available. The report was completed by Learning Museum Project Evaluator Dorthe Carlsen, Associate Professor, Center for General Education Pedagogy and Mediation, UC Southern Denmark. The report can be found in its entirety at www.learningmuseum.dk (In Danish)

Project Partners 2011-2013

The Danish School Services, Zealand
MUSKO, Museumsundervisning Syd (2011-2012)
Museumsundervisning MidtNord (2011-2012)

Evaluator: Associate Professor Dorthe Carlsen,
Center for General Education, Pedagogy and Mediation, UC Southern Denmark.

Participating Museums and Teacher Training Colleges – Learning Museum 2011-2013

Art Museums:

KUNSTEN, Museum of Modern Art
Ribe Kunstmuseum
Trapholt
Fuglsang Kunstmuseum
Museet for Samtidskunst
Sorø Kunstmuseum
ARKEN
KØS – Museum for kunst i det offentlige rum
Fyns Kunstmuseum
Vejle Kunstmuseum

Cultural History Museums:

Arbejdermuseet
Danmarks Tekniske Museum
Danmarks Borgcenter
Koldkrigsmuseum Stevnstøtten
Roskilde Museum
Den Fynske Landsby
Møntergården
Den Gamle By
Arkæologi Haderslev
Lemvig Museum
Museum Østjylland
Museet for Varde by og omegn
Kvindemuseet
Aalborg Historiske museum
Vendsyssel Historiske Museum
Sydvestjyske Museer
Københavns Befæstning

Science Museums:

Naturhistorisk Museum
Statens Naturhistoriske Museum
Naturama
Fiskeri- og Søfartsmuseet
Zoologisk Have
Geomuseum Faxe

Teacher Training Colleges:

Copenhagen:

Copenhagen and region:
Læreruddannelsen Metropol, Kbh.
Læreruddannelsen Blaagård/KDAS, Kbh.
Læreruddannelsen Zahle, Kbh.
Læreruddannelsen Vordingborg
Læreruddannelsen Campus Roskilde

Funen and Jutland:

Læreruddannelsen Odense
Læreruddannelsen Jelling
Læreruddannelsen Aarhus
Læreruddannelsen Nr. Nisum
Læreruddannelsen Hjørring
Læreruddannelsen Aalborg
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the Learning Museum website:
www.learningmuseum.dk

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The practice manual is intended to inspire and guide teachers and students at museums, teacher training colleges, and schools as well as individuals working within the fields of education and museum mediation. During the national developmental and collaborative project Learning Museum 2011- 2013, 30 museums and 13 teacher training colleges worked together to develop and innovate their practice by combining efforts to produce educational offerings, academic internship programs, and Bachelor's thesis programs. Read the specific recommendations on how these collaborative partnerships can be structured in order to strengthen future primary school teachers' use of museums as well as develop and professionalize museums' educational offerings and teaching practice for primary school students.

How does one write an internship invitation? How does one structure and carry out a visual arts educational session at a cultural history museum? How does one evaluate student-produced teaching materials? Find examples of how individual teacher training colleges in cooperation with museums create sustainable strategies and collaborative working models.

We hope you will be inspired to delve into the project on several levels through the selection of interviews and range of comprehensive articles.

For further information:
www.learningmuseum.dk