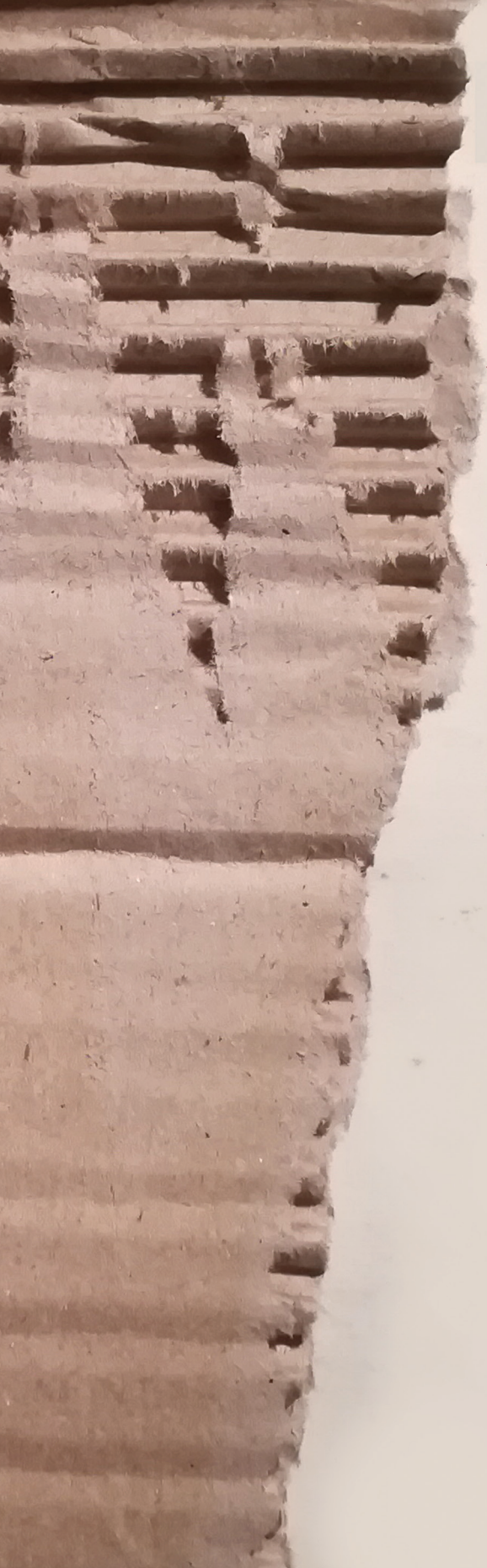

Erasmus+

INTRFACE EUROPE

A EUROPEAN METHODOLOGY FOR MUSEUM-SCHOOL COLLABORATION AND COURSEWORK

INTRFACE
EUROPE

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About the intrface europe project, an erasmus+ project 2015-2017

The intrface europe project was a groundbreaking project, the results of which have been transformed into a handbook containing a completely new methodology for European museum-school collaboration and co-creational educational activities. The project and the resulting methodology originated in our experience that learning is an ongoing process of social participation involving and benefitting students, teachers and museum professionals differently but in equal measure.

Inspired by the success of intrface denmark, a national association of museum-school collaborations, the Danish partners initiated the intrface europe project and invited the Italian and Irish partners to join. The partners from the three participating countries had years of experience in museum-school collaboration, but joining forces in a European project allowed us to learn from each other and discover ways for museums and schools to collaborate in a European context, something that had never been tried before.

A main aim of the intrface europe project was the creation of a European methodology for securing pedagogically and didactically sound, innovative and productive partnerships between museum professionals and schoolteachers, who collaborate on an equal basis to create and carry out museum-based coursework for students, innovating and strengthening their own professional practices in the process. The intrface europe methodology provides teachers and museum professionals with guidelines for establishing long-lasting partnerships. It offers suggestions about how teachers and museum professionals can design and engage in concrete joint enterprises, e.g. co-creating educational activities for students.

Bringing schools and museums into productive contact with each other and meshing the formal learning environment of the school with the informal learning environment of the museum challenges both groups of professionals to re-think their usual practices, thereby giving them a fresh perspective on their daily work routines. Partnerships where the partners work together on concrete projects that are relevant to their professional lives and practices ensure an effective form of life-long learning and the formation of a new community of practice at the interface joining their organizations.

Coursework that involves using the museum as a knowledge and learning resource allows students to work in a new and innovative learning environment

that calls for and enhances creative thinking, a variety of learning styles, and gives them an awareness and understanding of the multidisciplinarity of knowledge. Museums become accessible and relevant to students when their coursework takes place there, with museum staff and teachers working together to provide an immersive learning experience for them. Coursework like this also promotes learning within the eight EU key competences.

The first step for the partners was to pool our own experiences in school-museum partnership collaboration. Where was the common ground between how museums and schools collaborate in the three European countries? We used this common ground as the basis for the formulation of a draft methodology dealing with collaborative practice that would work in all three countries.

We also pooled our own experiences regarding co-creating and carrying out museum-based coursework for students. Once again, we used this common ground to extend the methodology, formulating guidelines for coursework planning and implementation that would work in all three countries. As part of the methodology, we chose to adapt a concept for planning and evaluating learning outcomes at museums called Generic Learning Outcomes or GLOs.

As part of the overall intrface europe methodology, the GLOs provide teachers and museum professionals with a common terminology to use when collaborating on creating and carrying out coursework.

Then the national partnerships tested the viability of the draft methodology by collaborating according to its guidelines to plan and implement museum-based coursework for students from the schools.

Following an evaluation of the test results, the partners once again pooled their experiences to formulate the final methodology for collaboration and coursework in a European context for the intrface europe handbook. The coursework they developed and tested makes up the best-practice guide in the handbook.

The results of the follow-up research associated with this project are also included in the handbook.

Sally Thorhauge

Introduction

intrface europe: Advancing and supporting European museum-school collaborations that create learning experiences for students

Why?

Here is a table showing the benefits of museum-school collaborations

BENEFITS

Infant-school children	Students	Teachers	Museum professionals
Positive personal, social and cultural learning experiences within the 8 EU key competences	Positive personal, social and cultural learning experiences with the 8 EU key competences	Strengthening collaborative, pedagogical and didactic practice, skills and competences	Strengthening collaborative, pedagogical and didactic practice, skills and competences
Multi-disciplinary learning,creative thinking, experience with inquiry-based learning	Multi-disciplinary learning, creative thinking, experience with inquiry-based learning, increased self-awareness a learners	Re-thinking their usual teaching practices using Generic Learning Outcomes	Re-thinking their usual teaching and/or interpretative practices using Generic Learning Outcomes
Learning to learn by carrying out activities in different learning environments	Learning to learn by applying different learning strategies in a formal and an informal learning environment	Learning through collaboration about their own community of practice and that of the museum	Learning through collaboration about their own community of practice and that of the school
Strengthening combinative, social, motor and language skills in a new, object-based learning environment	Strengthening critical thinking by working with a topic from different perspectives in two learning environments	Gaining the opportunity to bring their students into meaningful, learning contact with a learning environment outside of school	Becoming proactive agents of pedagogical and didactic change in learning for children and young people
Becoming familiar with an important cultural heritage institution	Close contact with and learning about an important cultural heritage institution	Expanding their teaching resources to include all that museums have to offer	Learning about their museum through the eyes of children,young people and teachers
Exploring a new learning environment	Everyone is equal at a museum ⟶ every student can contribute with his skills and compeyences	Observing their students in a different learning environment ⟶ noticing previously undetected skills and competences	Deepening their knowledge about how children and young people interact with and learn in the museum
Becoming an “expert” guest at the museum and guide for their families	Prolonged contact with and learning from academically trained experts who are not their teachers	Learning through collaboration about how to use museums in other European countries for educative purposes	Learning through collaboration about schools, curricula, teachers and students from other European countries

What?

- Teachers and museum professionals collaborate to produce exciting learning opportunities for children and young people that combine the best of both learning environments
- Inquiry-based learning for children and young people
- Book-learning is combined with concrete, object-based experience and knowledge
- Children and young people learn to learn
- Children and young people get first-hand, authentic experience with culture, science and history
- Children and young people learn to work innovatively and independently to create products that have real-life significance

Who?

- Infant-school children
- High school students
- Teachers and museum professionals

How?

This publication includes a thorough description about how to establish a school-museum partnership and make it work. The methodology is generic and works not only in your own country but also across national borders in Europe.
It also includes best-practice cases that illustrate how to work together to develop and carry out museum-school coursework including how to use Generic Learning Outcomes to plan and evaluate it.
Check out our methodology pamphlets for a quick introduction to collaboration and coursework.

What you need...

- A museum-school partnership
- A topic that is relevant for both teachers and the museum
- Openness and willingness to learn from one another about - and to share responsibility for - students' learning experiences
- Your management's support

Think about...

- Becoming familiar with the Methodology and Best-practice cases in this publication
- Becoming familiar with and using Generic Learning Outcomes in your collaboration as a common vocabulary about children's and young people's learning
- Telling your colleagues and management about the benefits of your partnership collaboration and the students' learning
- Sharing the responsibility of preparing the students for their work at the museum and reinforcing their learning afterwards

Links:

http://www.artscouncil.org.uk/measuring-outcomes/generic-learning-outcomes ,
http://www.artscouncil.org.uk/defining-learning

How-to Template

A checklist of practical things to remember when planning a transnational museum-school collaboration

- Budget, permission from parents, insurance, release form for photography/filming
- Location of the school and the museum, i.e. what is the geographical location and is it easy to visit the organisations?
- What is the time schedule of the school and opening hours of the museum? When is the best time for both school and museum to contact each other as they differ greatly in structure e.g. timetabled classes, etc.
- School and museum rules including child protection and police vetting
- What is the language proficiency of the students and museum?
- Find commonalities that resonate with both the school and museum through a key theme as reflected in the museum collection and curriculum
- Use the GLOs for planning and evaluating activities/lesson plans
- Cost for the workshops, i.e. facilitator fee, materials, etc.
- Is there an existing coursework or workshop template that can be recycled/reused? E.g. the storytelling workshop template on the Chester Beatty Library blog.
- Some existing coursework or workshops in the past may have worked well – it is important to adapt them per group as each learner has different learning needs/styles/cultures etc.

Please feel free to contact the contributors to the best-practice examples if you need more help and advice regarding how to use the methodology.

Launching the coursework

First meeting

New partnerships should set aside ample time to negotiate their coming collaboration and joint enterprise. It is a good idea that the first meeting takes place at the museum, and that the partners go on a walk-and-talk tour of the museum in order to become familiar with it. The main purpose of the tour is to start talking about the coming coursework and about how the museum can be incorporated as a learning resource and space. This leads up to agreeing on a focus topic and discussing how to create coursework that will enhance students' learning within this topic.
During this meeting, teachers and museum professionals express their aims and balance their expectations and responsibilities. The teacher and museum professional start to learn about each other's practice and experience their own practice through the questions and reactions of their partner.
Update meetings should be organized from the outset of the collaboration.

Mature partnerships should re-negotiate their practice regarding their new joint enterprise based of their evaluation of their shared repertoire: How can their collaboration be improved, how can the output (coursework for students) of their collaboration be improved, etc.?

Mature partnerships with a new member or new members should initiate the new member(s) into the partnership's shared repertoire of collaborative experience and output. The most successful way of doing this is to repeat the process described under new partnerships above. This has the additional value of giving the "older" partners a chance to (re)view their own joint practice through the eyes of the newcomer.

Following meetings

At the following meetings leading up to carrying out the coursework, the partners should agree on the details of the coursework. This is where the GLOs (see below) can be used as a framework for discussing and agreeing on the learning outcomes the partners intend for the students experience when doing the coursework.
Practical considerations when carrying out the coursework that need to be discussed: Student transportation to and from the museum, food and refreshments, where to rest, internet access, workspace for the students, opening the museum early or closing late, sharing the responsibility of attending to the students while they are at the museum, providing resources and utensils (if necessary) for the students, agreeing about how to share the evaluation of the students' products, etc.

1st and following meetings: Coursework, evaluation and sharing

Schedule of process

Prior to the 1st meeting	1st meeting	Following meetings	Coursework	Evaluation	Sharing
- Ensure that the management of all partners is informed of the collaboration and will support it for the duration.	- Needs and expectations emerge. - The topic of the coursework is decided. - Walk-and-talk at the museum and initial discussion of the coursework. - Subsequent meetings are scheduled. - Make plans how to involve local press and municipal and district educational and cultural authorities.	- Teachers and museum professionals visit each other if possible. - Coursework is planned in detail. - Both partners' learning environment is given equal attention. - The GLOs can be used as a framework for planning learning outcomes. - Check up on how well press and local authorities are informed.	Both partners participate equally in planning and carrying out the coursework.	Immediately after the conclusion of the coursework: - Evaluate students' learning using the GLOs (questionnaire). - Evaluate collaboration and the results of the coursework and agree on improvements for next time.	- Partners share their experience with colleagues at their own institutions. - If possible, partners appear at each other's institutions to share their experiences. - The students' products should be exhibited at the museum or online and an opening event organized. - Local press and municipal and district educational and cultural authorities are invited to the event.

Research has shown that the most effective museum-school coursework, which ensures the broadest array of learning outcomes for students, is coursework that is planned and carried out by a partnership whose collaboration is characterized by a desire to advance mutual learning and has a true sense of accountability regarding their joint enterprise. The most successful partnerships are "the ones who are truly acting as learning partners, bringing whatever they can from their practice to the table" (Etienne Wenger, interview in Thorhauge (2014), Interface learning - New goals for museum and upper secondary school collaboration, dissertation, p. 193)

Planning the coursework Generic Learning Outcomes

http://www.artscouncil.org.uk/search/Generic%20learning%20outcomes?f

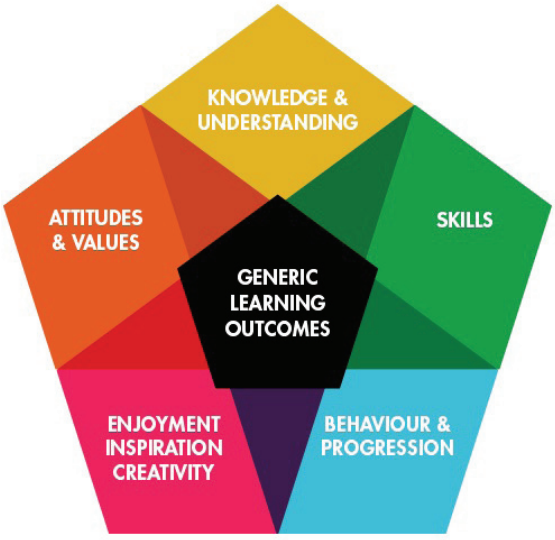
There is an extended definition of each of the GLOs immediately following the General Considerations. There are suggestions for **planning learning outcomes for coursework** that have been made on the basis of these definitions. The definitions are from the above website.

General considerations

The **most important** consideration is how to ensure that the students are intrinsically motivated to do the work. Here are a few suggestions about how to do this:
- Ensure feelings of ownership and self-determination by making the students responsible for the work process and the product at the museum.
- Make sure that the tasks that the students are required to do in the coursework are authentic, e.g. the students are required to produce something that is useful to others (not just their teacher and / or their classmates). The evaluation of and feedback regarding the students' products should be shared by the teachers and the museum staff.
- Make sure that the students' products are given an authentic afterlife at the museum, e.g. an exhibit that will be shown at the museum for a real audience, a digital presentation that will be uploaded to the museum website for real viewers, a program for their families at the museum about subject-related matter, etc.
- Set tasks that encourage the students to draw upon familiar AS WELL AS little-used learning strategies in order to do them, e.g. examining, researching and communicating their findings regarding museum objects and relating them to relevant "book-learning" from school.
- Make sure the students are given time to become familiar with the museum before doing their coursework there, either by visiting it or checking it out online.
- Let the students observe and experience how their teachers and the museum professionals work together to support their learning.

The Generic Learning Outcomes - extended definition

NB: The points under each GLO clarify the essence of the GLO. The GLOs can be adapted to fit the learning outcomes you and your partner plan for the students.



GLO 1 Knowledge and Understanding - for example

- Knowing what or about something
- Learning facts or information
- Making sense of something
- Deepening understanding
- How museums, libraries and archives operate
- Making links and relationships between things

GLO 2 Skills - for example

- Knowing how to do something
- Being able to do new things
- Intellectual skills
- Information management skills
- Social skills
- Communication skills
- Physical skills

GLO 3 Attitudes and Values - for example

- Feelings
- Perceptions
- Opinions about ourselves (e.g. self-esteem)
- Opinions or attitudes towards other people
- Increased capacity for tolerance
- Empathy
- Increased motivation
- Attitudes towards an organisation (e.g. a museum, archive or library)
- Positive and negative attitudes in relation to an experience

GLO 4 Enjoyment, Inspiration, Creativity - for example

- Having fun
- Being surprised
- Innovative thoughts
- Creativity
- Exploration, experimentation and making
- Being inspired

GLO 5 Behaviour & Progression - for example

- Changes in behaviour or actions in oneself
- Changes in behaviour or actions in others

As the model illustrates, the GLOs overlap. Several of the suggested tasks and activities below can be categorized as belonging to more than one GLO. An educational activity can inspire learning within all GLOs. Please remember that the GLOs can be adapted to fit your needs, and the age of the students should always be taken into consideration. Although it is important that you include all five GLOs in your plans, you can place more or less emphasis on each of them, depending on the aim of the coursework.

Suggestions for planning learning outcomes for coursework

Please find a few **suggestions** for planning for each of the GLOs after the box.
All suggestions are based on research and the experiences garnered in the intrface europe project.

Here are three suggestions for activities that are relevant for all the GLOs
- It is a good idea to develop tasks for the students that allow them to work creatively, e.g. make a video or photo series or a digital presentation, build up an exhibit, curate an exhibit, put on performances, etc.
- It is recommended to organise the students in groups and make sure that they represent different strengths and competences so that when they work together on the tasks, they discover how each member of the group is necessary and makes important contributions to their joint efforts.
- Let the groups work autonomously part of the time to let them experience, talk about and act upon their own curiosity.

GLO 1 Knowledge and understanding

- Create coursework whose subject-matter makes it necessary for the students to draw upon and use both the curricular resources of the subject and the learning resources (objects, exhibits, archives, curating strategies, collection procedure, etc.) at the museum.
- Develop tasks for the students that activate their natural curiosity by inspiring - and making it necessary for them - to ask questions and to search for answers at the museum as well as in their curricular resources.

GLO 2 Skills

- Develop tasks that make it necessary for the students to find and use information on unfamiliar websites, e.g. the professional online platforms the museum itself uses.
- Create tasks that make it necessary for the students to communicate with people outside their "normal" school sphere, e.g. various museum staff, their grandparents, kindergarten or primary school students, museum volunteers, museum guests, people in the local area, municipal politicians, the press, etc.
- Create coursework that makes it necessary for the students to communicate their results / products to people outside their "normal" school sphere.

- Develop tasks that make it necessary for the students to explore and use the museum grounds, the local area around the museum, archaeological excavations, or to do physical activities such as treasure-hunting, archery, sword-fighting, building things, carrying things, measuring things, etc.
- Develop tasks that make it necessary for the students to learn and practice new skills, e.g. laboratory work at school using archaeological testing methods, handwork, curating exhibits, analyzing exhibits, classifying objects, etc.

GLO 3 Attitudes and values

- When working together, be visible role models for the students through body language, enthusiasm, open and obvious collaboration.
- Develop tasks for the students that make it necessary for them to communicate with various museum professionals, thus nuancing their attitude about museums and museum staff.
- Develop coursework topics that open the students' eyes to themselves in/and the world, e.g. by making tasks that let the students make connections between and understand historical topics and current, local issues.

GLO 4 Enjoyment, inspiration and creativity

- Develop tasks that make it necessary for the students to make creative use of analogies, especially between very distant domains such as science and art.
- Create tasks that make it necessary for the students to devise experiments and carry them out. Also to devise and make physical products. Examples of products: art works, drawings, multimedia products, storytelling.

GLO 5 Behaviour and progression

- Make sure that the learning inspired by the coursework is reinforced several times in school, e.g. immediately following the coursework, a couple of months later, at exams, a year or so later (if possible).
- Ask each student to make a diary entry at the beginning of the coursework about how they expect the topic will affect their behaviour and/or actions. Some time after the coursework, ask them to make a new diary entry where they reflect on whether or not their behaviour or actions were changed by the topic and the coursework, and why.
- Recall the learning activity: Identify changes in students' behaviour in class, in relation to their classmates, to the teacher and / or to the museum professional.
- For students: Recall the learning activity - Identify changes in teachers' behaviour, e.g. torwards their students.

Evaluation guide for the collaboration between teachers and museum professionals

Three areas of focus:

1. Learning
2. The collaboration
3. The future

Names of school and museum in the partnership:
Names of teacher/s and museum professional/s:
Subject(s) in the coursework:
Class/number of students involved in the coursework:

1. Learning

What have you learned from working with the other institution:

- In relation to the museum person or teacher?
- In relation to your colleagues?
- In relation to the students?
- In relation to the coursework?
- Didactically?
- Pedagogically?
- Professionally?

2. The collaboration

What are the similarities and differences between the two institutions? And how are these utilised?
Characterize the collaboration between the museum and the school:

- During the preliminary planning (phase of development)
- During the coursework at the museum
- Afterwards? Any follow-up
- Management involvement and support

What were the most important causes of the collaboration's success? Or lack of success?

3. Ideas for the future

What must be and can be improved?
How should the partnership be developed?
What is important to tell colleagues and potential partners about your museum-school collaboration?

Sharing experience and knowledge

It is important to share your museum-school collaboration and coursework experiences with your colleagues and other people, who are associated with both institutions. Here are some suggestions how this can be done:

- Put up a bulletin board in one of the busy corridors of your place of work that shows photos, assignments, project descriptions, products from the coursework and graphs of student learning outcomes. Call colleagues' and students' / guests' attention to it, e.g. during lunch breaks, when showing guests around, etc. Take a photo / photos of the bulletin board and upload it to the activity or event page of your institution's website, adding a more detailed description of the project and especially the students' learning outcomes.

- Ask your management / communication staff to invite the press to come to the school/museum, where partners tell about the coursework and their collaboration and student learning outcomes.

- Depending on the age of the students, they, too, can share their experiences on the bulletin board, the institution's webpage or Facebook, or with the press. You might choose to let the students do this as part of their product.

- Make the intrface europe methodology and best-practice handbook available to your colleagues and on your institution's website. Ask your management to inform the board of directors about it as well as about student learning outcomes.

- Sharing outside the institutions: Get together with your partner and write an article about the coursework, collaboration and student learning outcomes for relevant professional journals.

Extra material
More about the GLOs

http://www.artscouncil.org.uk/search/Generic%20learning%20outcomes?f

This website does not include all the templates, charts, diagrams and boxes from the original Museums, Libraries and Archives website. The following chart is from that original website.

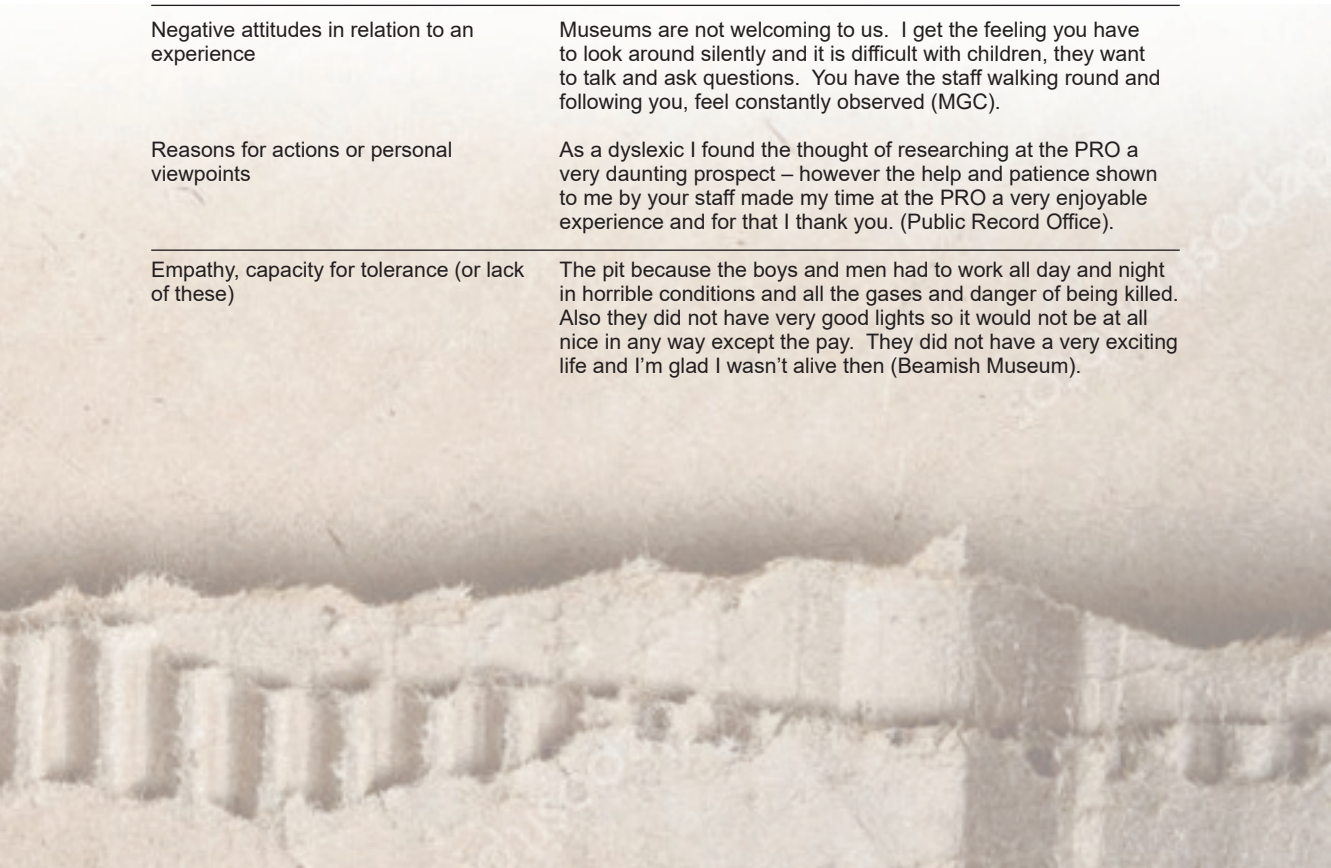
KNOWLEDGE AND UNDERSTANDING	EXAMPLE STATEMENT
Knowing about something	Given me an understanding of using computers. The Internet is the only way I can find the information I am after (Warwickshire Libraries).
Learning facts or information which can be: - Subject–specific - Interdisciplinary / thematic - About museums, archives, libraries - About myself, my family, my community, the wider world	I liked going down the mine because in the Victorian times they had to work a long way down and they had a mashin [machine] that was 7 times louder than a drill (Beamish).
Making sense of something	The photographs and slides made everything come alive for us after our initial research about the Victorians from books (Somerset Archives and Record Office).
Deepening understanding	I learned that you can die of AIDS and nobody will want to play with you or even they probably won't want to be your friend (Arizona Science Center).
Learning how museums, archives and libraries operate	I do not usually like museums and listening to head sets but I found this trip very different. I enjoyed and wanted to understand how people could be so awful (Imperial War Museum).
Giving specific information – naming things, people or places	When you went to sketch that rock did look very like a sandwich. I can remember their names they are Hook Norton limestone and clypeus grit (St John's Museum Warwick).
Making links and relationships between things	Eating disorders are usually the consequence of other problems – I'm glad that I have a stable family (Poole Library Teenage Reading Group).
Using prior knowledge in new ways	Made the children more aware of the simplicity of Victorian leisure time. No electricity or TV. Quiz reinforced things that they had learnt about the Victorians (Prescot Museum, Knowsley Borough).

SKILLS

Knowing how to do something	I think this is a good way to encourage children to read, this also encourages visits to the library and shows children how to get information for themselves (Big Summer Read 2002).
Intellectual skills – reading, thinking critically and analytically, making judgements…	I have learnt to look at the artefacts and reflect on why they are there and their importance (Imperial War Museum).
Key skills – numeracy, literacy, use of ICT, learning how to learn…	My grandson of three had no interest whatsoever in writing, reading or drawing. Since using this scheme he has started to recognise words, write his name on his own and draw (Big Summer Read 2002).
Information management skills – locating and using information, evaluating information, using information management systems…	Taught me how to use the Internet for census records. I was able to find my apparently "non-existent" grandfather using the census records.(Warwickshire Libraries).
Social skills – meeting people, sharing, team working, remembering names, introducing others, showing an interest in the concerns of others…	Through a reading group you can gain more insight into the book and see deeper meanings that you otherwise would have missed (Poole Library).
Emotional skills – recognising the feelings of others, managing (intense) feelings, channelling energy into productive outcomes…	The first step for me was the Trongate Studios and the projects after that have made me realise that I do have rights – I am a human being and I am allowed to express myself (Open Museum).
Communication skills – writing, speaking, listening…	I learnt how to debate my ideas and give my opinions on artists (Harewood House).
Physical skills – running, dancing, manipulation, making…	The children enjoyed the hands-on experience of slates, flags, dressing up, blackboard etc. It was different from what they usually do – it felt as though they were in 1897 (Prescot Museum, Knowsley Borough).

ATTITUDES AND VALUES

Feelings and perceptions	The book made me feel glad that I have a stable family but sad that many people go through what Carmen went through and ashamed that I tend not to think about people with eating disorders (Poole Library).
Opinions about ourselves e.g. self-esteem	At first I thought standing up in front of people and reading our poetry would be difficult but they didn't laugh or anything like that, they supported you instead of laughing. I got more confident because other people felt the same as I did when I was reading mine – before I didn't read out loud in class, I said no. Now I can read in front of everybody (Harewood House).
Opinions or attitudes towards other people	This is a brilliant exhibition – so stimulating and thought provoking – so diverse. I've never seen Joe (my 7 year old son) write so much poetry before – fantastic. Thank you – it showed a window into Joe that I'd never seen before – didn't know it was there – the exhibition opened up that window (Sainsbury Centre for the Visual Arts).
Attitudes towards an organisation e.g. museums, archives and libraries	My son has been visiting the library since he was three weeks old, it didn't have a big impact on his enjoyment of books. What it did do was give him a safe audience outside his own family with whom he could share his enjoyment – a big step forward for a shy little boy (Big Summer Read 2002, Essex Libraries).
Positive attitudes in relation to an experience	Today I met an amazing woman…a mother of eight. We stood and looked at Susan Hiller and Suzanne Lacy's work and when she left I listened. The way this woman had talked so openly about her life, about her pain, was echoed on the words in the Suzanne Lacy performance – my faith has been restored in the gallery as a resting place, a site of discussion and dialogue – a place of learning (Leeds Art Gallery).
Negative attitudes in relation to an experience	Museums are not welcoming to us. I get the feeling you have to look around silently and it is difficult with children, they want to talk and ask questions. You have the staff walking round and following you, feel constantly observed (MGC).
Reasons for actions or personal viewpoints	As a dyslexic I found the thought of researching at the PRO a very daunting prospect – however the help and patience shown to me by your staff made my time at the PRO a very enjoyable experience and for that I thank you. (Public Record Office).
Empathy, capacity for tolerance (or lack of these)	The pit because the boys and men had to work all day and night in horrible conditions and all the gases and danger of being killed. Also they did not have very good lights so it would not be at all nice in any way except the pay. They did not have a very exciting life and I'm glad I wasn't alive then (Beamish Museum).

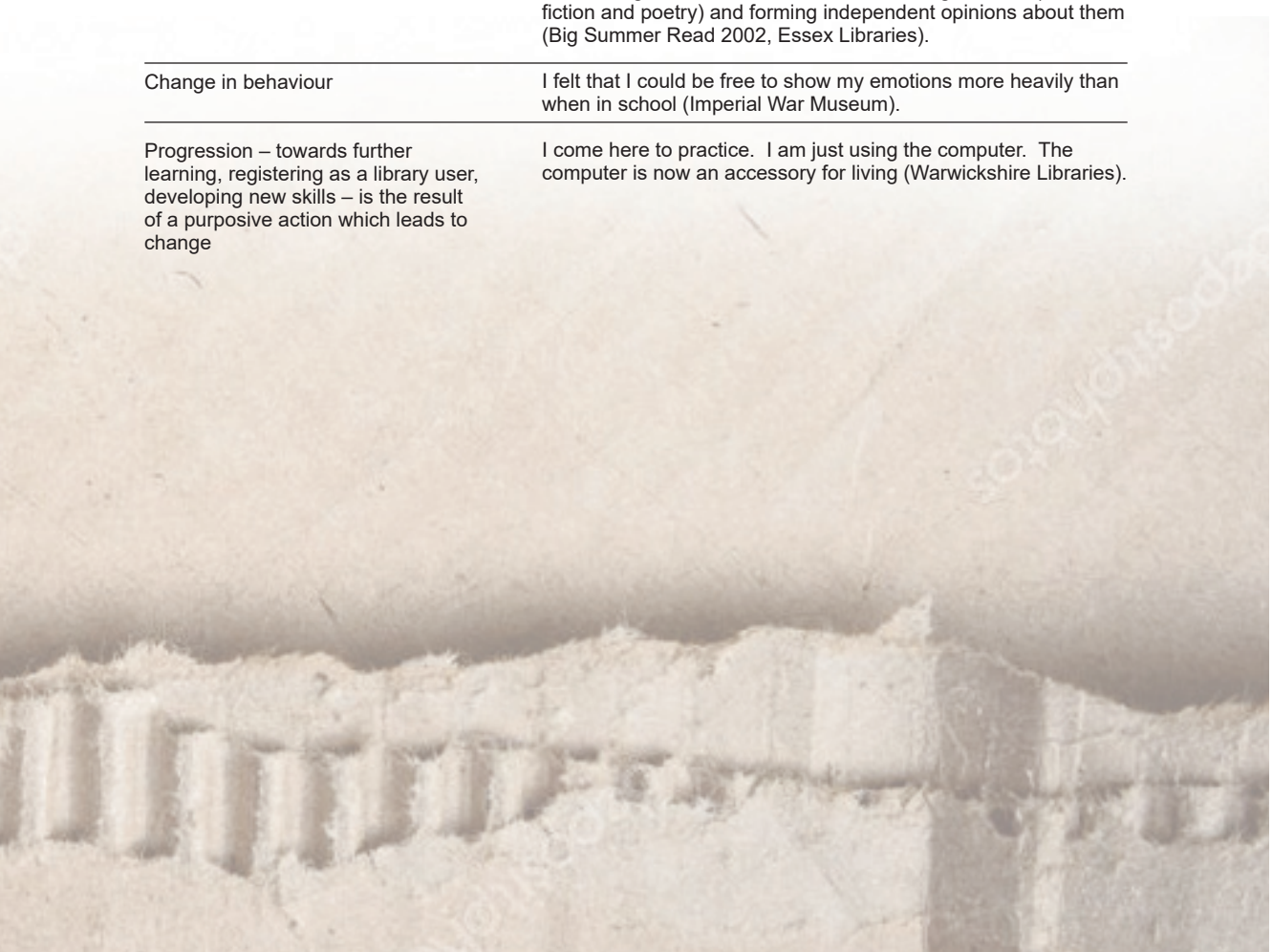


ENJOYMENT, INSPIRATION AND CREATIVITY

Having fun	My son has really enjoyed the Jeremy Strong books, they make him laugh out loud and want to read bits to me (Big Summer Read 2002).
Being surprised	Almost without exception the children thoroughly enjoyed the day – one particularly hard to please pupil claiming it was the best trip he had ever been on! It inspired some excellent recounts of the day prompting some to write more than ever achieved in class (St John's Museum Warwick)
Innovative thoughts, actions or things	I think there are lots of connections between the Holocaust and moral/political issues but what is horrible is that the Holocaust used horrible ruthless modern methods to murder large numbers of people (Imperial War Museum)
Creativity	The children enjoyed making pots and looking at the skeleton at the dig. They also enjoyed the jewellery making (Essex Heritage Services).
Exploration, experimentation and making	Learning to draw and paint better – it inspired me to work harder and go and draw landscapes instead of working from pictures (Harewood House).
Being inspired	What was very apparent was the fact that the children had not realised that the people of Taunton were Victorians at the time and they have since begun to research any family histories of their own (Somerset Archives)

ACTION, BEHAVIOUR, PROGRESSION

What people do	I enjoyed wearing the corset because I felt how Victorian people felt it was uncomfortable. The fact that I had to wear a hoop hurt me and I found that it was tough for Victorians (Birmingham Museums and Art Gallery).
What people intend to do (intention to act)	Thank you for your interesting and enlightening presentation- we all enjoyed it immensely and came away thinking we must get back to dig deeper and find out more about our heritage and the homes we live in (Essex Record Office)
What people have done	It's probably one of the most memorable weeks of the children's school life. They have learned a lot about their own skills and capabilities. I have learned a lot about their capabilities. This workshop brought out talents which we don't always see in the classroom. The emphasis on English, maths and science means that we don't always give enough time to areas of the children's characters (Prescot Museum, Knowsley Borough).
A change in the way that people manage their lives including work, study, family and community contexts	Before the session I depended on others to get info. Now (I have access through work) I feel more independent (University of Leicester Library)
Actions (observed or reported)	The Reading Planet has helped to hold my daughter's interest in reading during the school holidays. I have also found that she is choosing books outside the normal reading material (i.e. non-fiction and poetry) and forming independent opinions about them (Big Summer Read 2002, Essex Libraries).
Change in behaviour	I felt that I could be free to show my emotions more heavily than when in school (Imperial War Museum).
Progression – towards further learning, registering as a library user, developing new skills – is the result of a purposive action which leads to change	I come here to practice. I am just using the computer. The computer is now an accessory for living (Warwickshire Libraries).



Seven examples of coursework developed and carried out by museum - school partners

The Soil is Poisonous

Horsens Gymnasium
and the Danish Industrial Museum

Brief description of the coursework

The collaboration was about a special exhibition called "The Soil is Poisonous" at the Danish Industrial Museum in Horsens. The subjects were Mathematics (advanced) and Danish, and the students were18 to19 years old and in their last year of school at Horsens Gymnasium. The exhibition was about soil pollution and about how to decontaminate polluted soil. The museum is housed in a former power station and gasworks, and its grounds are heavily polluted and are monitored by Central Denmark Region for this reason.
The special exhibition was created by experts and could be understood by experts, but as an exhibition for ordinary museum guests, it fell short in a number of ways.The curator visited the school and gave the students an introduction to the museum and to the exhibition in question. During the visit to the museum, the students had been instructed to study the exhibition critically, using their knowledge about communication strategies and

The students enjoy trying out writing with pen and ink, chalk and slate in one of the Danish Industrial Museum's permanent exhibitions.

exhibition principles for museum exhibits. They had to come up with suggestions to improve the exhibition, so it would appeal more broadly to the museum's guests if the exhibition may become permanent in connection with an extension of the museum's existing buildings.
The students worked with the problem in groups both at the museum and in class. They had to write an assignment about their suggestions. The assignment had to contain an innovative part and a Meta part.
The innovative part: Make a proposal for a different interpretation of the exhibition: "The Soil is Poisonous" at the Danish Industrial Museum.
The META-part: Describe why you chose to design your proposal in the way you did.
The teachers gave written feedback to the group assignments. Each group presented its ideas to the museum professional who accompanied them throughout the project. The museum professional gave them oral feedback about their ideas.
In mathematics, the students worked in groups. Their assignment was to set up a mathematical model showing how the water in the harbor was polluted from the grounds. The model also had to take the tide into consideration. The students had to calculate a solution from realistic data found on the internet. Then the limitations of the mathematical model were discussed in class and the results compared with the results of professionals.

Generic Learning Outcomes - Learning goals and outcomes

GLO 1 Knowledge and Understanding:
- To learn how the Danish Industrial Museum operates, i.a. by exploring principles behind different exhibitions
- To learn facts about groundwater pollution in their own city
- To deepen their understanding of mathematical models and their strengths and limitations

GLO 2 Skills:
- To strengthen their communication skills in order to communicate their ideas to the director of the museum
- To strengthen their mathematical and physics skills by learning and practicing how to set up a mathematical compartment model from a simplified physical situation and calculate a solution

GLO 3 Attitudes and Values:
- To increase the students' motivation for writing both assignments
- To increase their motivation for learning about differential equations
- To learn how to analyze an exhibition, which was a completely new experience for the students

GLO 4 Enjoyment, inspiration, creativity:
- To explore the principles behind different exhibitions. To use their creativity when planning a new exhibition.

Evaluation of the coursework and collaboration

The first meeting between the math teacher and museum staff took place at the museum. It was a walk-and-talk tour in the exhibition of interest and a brainstorm session. The Danish teacher was interested in participating in the project. The second meeting was again at the museum, and again a walk-and-talk tour in the exhibition. The coursework was planned and a schedule was made for the museum person visiting the class in school and for the class' visit to the museum. The students presented their

ideas to the museum person and both teachers. It is very important in a project like this that it is the same person from the museum staff participating throughout the project. About 90 % of the students said that the cooperation with the museum had made them very or more interested in the assignment. The fact and that they had to present their ideas to a museum person made the assignment more relevant and interesting than ordinary school assignments.

Using this coursework transnationally

It was an advantage for this coursework that the distance between the museum and the upper secondary school is only a few kilometers. It was easy for the teachers and the museum staff to meet, and for both the students and the teachers to revisit the exhibition when necessary.
Studying and analysing an exhibition critically using knowledge about communication strategies and exhibition principles for museum exhibits could also a topic in a cross-border collaboration.
A visit to a museum and a specific exhibition with scientific content can be prepared from home by setting up scientific models and finding solutions. Sometimes realistic data are easy to find on the internet or you can get them through the museum. Coursework like this would also be interesting for teachers and students on study trips abroad.

The students in lively debate about the special exhibition The soil is poisonous.

The Gas trail. Reviving the old gas works and telling about its pollution to future guests at the museum

Aarhus Katedralskole
and the Danish
Industrial Museum

Brief description of the coursework
The collaboration was between the Danish Industrial Museum and an upper secondary school in Aarhus called Aarhus Katedralskole. The 25 students were 16-year-old first-year students from a class with a scientific focus.
The subject of the coursework was the former gasworks which was located on the same grounds as the museum is now. We focused on the importance of the location historically and chemically, previously and presently. The students made descriptions of the gasworks and of the pollution of the ground.
Their descriptions were used by the museum as virtual guides (found via QR codes) for guests at the museum looking for the "Gas trail".

The coursework consisted of three phases: Before, during and after the visit.

Before the visit: The students were introduced to the chemical processes and reactions taking place at gasworks and to the pollution aspects of these processes.

The students learn about a steam engine in the former electricity works.

During the visit: The students were given a guided tour in the collections of the museum. The focus of the tour was energy supply and its impact on daily life in the 19th century.
They were introduced to their assignments, and commenced their work. The assignments were in chemistry (4 groups) and architecture (2 groups). The students had access to archival material and old photos.

After the visit: The students spent two lessons finishing their assignments. The museum partner took part in one of them and demonstrated the virtual guide. There was only room for very short texts on guide. Most of the groups shortened their texts accordingly, while others preferred written poster presentations.

Generic Learning Outcomes - Learning goals and outcomes

We planned an authentic assignment in which the students had to make use of their creativity, collaborate with one another and do some independent research. The assignment asked them to combine knowledge and explain chemistry to the general public, more specifically the museum's guests.
We expected the students to be motivated by the fact that their product was to be used in real life. Their product had an authentic afterlife at the museum as an app for a museum virtual guide.

GLO 1 Knowledge and understanding:
- The students needed solid knowledge of chemistry and of the design of the gasworks to start their work. The first was obtained in the classroom before the visit, the second during the visit. Some of the students were given an assignment about industrial architecture, where they had to apply a new model for analysing architecture.

GLO 2 Skills:
- The students' communicative skills were honed when they had to transfer their chemistry knowledge into information for ordinary museum guests.

GLO 3 Attitudes and values:
- Working with old photos of people working in the gasworks trained their empathy and opened their eyes to the world.
- The students were compelled to re-write their texts several times. We insisted that written work from the school shown in public must be correct and to the point. This helped them to transform their results so that ordinary guests could understand the chemistry content and changed their attitude to how expert knowledge should and can be communicated. They also learned to accept that more and extra work was needed in order for the task to be accomplished successfully, which is also GLO 5 Behaviour and progression.

GLO 4 Enjoyment, inspiration, creativity:
- We designed the assignments so that the students were given the opportunity to make films, draw and be creative. This was a big challenge for some of them, others found their own way and even made chemical descriptions with poetry.

Evaluation of the coursework and collaboration

The coursework was a success because the students saw a connection between chemistry and real life. This was because they had to solve an authentic task as suggested in the methodology, which they did successfully, and they learned not to stop before the product was as it should be. The coursework helped them to get to know each other better, which turned out to be an advantage later in

In the Workers' Apartment from 1900, gas is essential for cooking and heat.

Chemistry lessons.
The collaboration was successful, though the fifty kilometres between the school and the museum made travelling back and forth somewhat challenging.

Using this coursework transnationally

In order to overcome the challenge of distance between the school and the museum, it is a good idea to repeat visits to the same museum with different students (be faithful to your partner). It is important to set aside sufficient time at the outset of the collaboration to clarify the roles of the teachers and museum professionals, and it is a good idea to have a status meeting halfway through the project to make sure that all aims and objectives are being fulfilled. Regarding the students, it is a good idea to tell the museum partner in the first meeting if there are any conflicts or problems in the class.

Preparations for project collaboration should take place at the museum or through a detailed picture of what the museum can offer if the distance between school and museum is large. Skype communication and photos from exhibitions would be helpful in achieving this. This type of coursework could easily be adapted as the main content of a study trip abroad for students in the future.

The time of Art - A masterpiece by Bernardino Lanzani, master of the Italian Renaissance

Treasure hunt at the museum.

Liceo Taramelli
and Pavia University
History Museum

Brief description of the coursework

In accordance with the intrface europe methodology, including the use of the GLOs (Generic Learning Outcomes), a class 4 E (22 students) of the Taramelli Scientific high school did coursework developed by teachers of History and Art History in collaboration with museum experts. The topic of the coursework – deepening the knowledge about historical and artistic heritage of the town – was decided together with the students and organised in such a way

that they could use both the curricular resources of the subjects, the resources of our partner museum as well as the church of the Carmine, which is situated alongside the school.
The students were divided into groups and two students were instructed to be in charge of the technical aspects of the their work. Each group shared the documentation work and periodically relayed the work to the class. The collected material was shared in cloud storage. The students were asked to test iconographic sources and compare them with works analysed in the picture gallery. A group of students worked on confirming the presence of the golden section and of the central perspective within the painting. Another group of students deepened the scientific study of the colours and mineral pigments. This led to the exploration and development of resources at the school. The pupils who deepened the theme of
colour also participated in the wax sculpture course organised by the Pavia University History Museum. In this way students were able to test in a practical seminar guided by an accredited artist the multiplicity of mineral and vegetable pigments used in the masterpiece. All the collected material was then viewed, selected and assembled in a single bilingual PowerPoint. We left students free to choose the form of exhibit that is most congenial to them. This deepens their motivation.

Generic Learning Outcomes
- Learning goals and outcomes

GLO 1 Knowledge and Understanding:
- Knowledge of the artistic heritage of the city (Pavia) in the historical phase of the highest splendour, the Renaissance.
- Analysis of a work of art representing the history of our city and also linked to our school.
- The study of the most important monuments of Pavia, geographically close to the partners in the project.

GLO 2 Skills:
- Use of software.
- Use of foreign languages.

- Use of traditional techniques of the past.
- Relations with museum staff and with other professionals.

GLO 3 Attitudes and Values:
- Enhance each other's ideas and abilities.
- To appreciate the complexity of ancient techniques.
- To meet with museum staff.
- The work of analysing and comparing the symbolic elements was challenging and engaging for all the boys in the class.
- The study of works in the museum, organised as a "treasure hunt", was appreciated and it was a "playful" aspect of this study.

GLO 4 Enjoyment, inspiration, creativity:
- Dividing the tasks in groups made it possible to make the most of students' personal qualities.
- The comparative study of works carried out at the Museum also had the purpose of soliciting students' curiosity.
- The organisation of work in groups allowed students to work together and encouraged them to make use of their own learning styles by developing their creativity.

GLO 5 Behaviour and progression:
- Didactically this coursework led to a flipped classroom experience. It is very important to let groups work autonomously some of the time to make them experience, talk about and act on their own curiosity.They all went to the Museum several times to look for works of the same era to discover analogies and symbolic elements that were later compared and studied.

Evaluation of the coursework and collaboration

The class was evaluated several times during the course of the project. Both the quality of the flipped class and the powerpoint presentations were evaluated. The assessment was included in the curriculum of the school year.
The collaboration between the teachers and the museum was strengthened by their use of the Generic Learning Outcomes as a common language to discuss and decide what the students' learning goals and outcomes should be.

Using this coursework transnationally

From a didactic point of view it is recommended to involve local authorities and to choose a theme related to the history of the school or city in which it is located.
The principles and framework of the coursework could be adapted to fit any upper secondary school visiting a similar cultural site. Using the GLOs as a framework for agreeing on learning goals and evaluating learning outcomes is a good basis for this process of adaption.

Class visiting the University Museum.

From Sound to Music in Museums - promotion of the cultural heritage of museum acoustic devices

Liceo Foscolo
and Pavia University
History Museum

Brief description of the coursework

Liceo Foscolo is a very ancient school which hosts a physics museum (physics cabinet), where 18th –19th centuries instruments are preserved, in particular mechanics and acoustic devices, since the time the school was part of the academic educational curriculum. Nowadays this instrumentation is not commonly used in class and most of it is lying under dust at the bottom of the closets.The same type of physics instruments are well- preserved and on display at the University Museum.

In order to develop interactive educational paths for students and let know people about the historical meaning of this equipment, we decided to choose, as our main subject, the study of acoustic phenomena. We started with the scientific and hystorical analysis of the devices for sound experiments which are at Liceo cabinet and at the University Museum. Moreover, acoustic phenomena study seems a good starting point for future museum exhibitions. It would be nice to have museum exhibits dressed in sound or music so that not only visitors' eyes are stimulated but their ears as well.
The class was divided into groups who worked together after school. Teachers

and museum staff prepared group work sheets. Each group had a different authentic task. One student also had the task of documenting the various activities. One group was responsible for putting together all the photos, videos and materials produced by groups into a final digital product. The chosen topic integrated with the school curriculum. In the first part of the Liceo 4th year curriculum, students learn about sound phenomena and physical quantities such as resonance, sound interference etc. and they learn about the physical meaning of sound properties.
During the months before the coursework started, teachers had preliminary meetings with museum staff during which the steps and the schedule of the coursework were organized. Teachers and museum personnel also shared which outcomes were to be expected: a multimedia product, an exhibit in a local city-university exhibition space and a re-creation of a historical experiment. During some of the meetings, high school teachers met infant and primary schools teachers as well, as younger pupils might represent a potential target for high school-museum collaboration. The focus of the coursework's initial meetings also concerned which micro GLOs of the GLOs' main areas would be more relevant, both for students' curriculum development and for school-museum collaboration.

Generic Learning Outcomes - Learning goals and outcomes

GLO 1 Knowledge and Understanding:
- Deeper comprehension about physics and its history through handling ancient instruments
- Information about how archives operate

GLO 2 Skills:
- Manual skills, e.g. cleaning up the instruments
- Being able to do new things, e.g. doing historical research
- Information management, e.g. searching on the web
- Social and Comunication skills, e.g. reporting to their classmates and interacting with museum experts

GLO 3 Attitudes and Values:
- Positive attitudes towards the museum, school and physics

GLO 4 Enjoyment, Inspiration, Creativity:
- Having fun working in groups
- Exploration, experimentation: trying new paths and taking responsibilty
- Discovering new things
- Being able to offer a solution to a problem: Some intruments were not functioning properly at the beginning.
- Producing something new: an e-book

GLO 5: Behaviour and progression:
- Interviews with the students
- Observation of students behaviour after some time, i.e. in the following school class.

Evaluation of the coursework and collaboration

A general plan was set for the timing and the setting of the activities.
The first phase of the coursework was a series of visits to the Physics section of the University Museum. The students were given the opportunity to meet the museum staff, to see the instruments and to do some experiments. Together with the museum staff, some acoustic historical instruments were chosen as objects of study. The second part of the coursework took place in the school laboratory in

Students' activities in the laboratory.

collaboration with museum staff experts. The students showed great interest in the activities, especially because they were given the possibility of asking and interacting with other experts besides their teachers. The project methodology provides the students with tools that make them remember the content of the studied topics in a more effective way. In addition, as students were able to succeed in all the project' splanned products, they gained more self-confidence.

Using this coursework transnationally

This coursework might be exported to any other school-museum partnership to be established in Europe.

Ampère's exploratory experiments: if a current flows into through coil, this one works like a magnet.

From Volta to Faraday. A journey from electrostatics to electromagnetism

Istituto comprensivo Acerbi (primary school G.Pascoli) and the Pavia University History Museum

Brief description of the project

The topic was decided during the first meeting in the partnership and expanded during the coursework.
The topic was analysis of electrostatic phenomena, magnetism, electric currents and electromagnetism. The class was made up of 24 children (11 years old).

Brief description of the coursework

The coursework took place both at the museum (guided tours and workshops) and at school, and at times with the participation of the museum staff.
We started learning something about some important scientists who studied electrostatics and electromagnetism through historical experiments and contextual visits and seeing the objects of collections.
We made extensive use of analogical thinking, strongly connected to creativity, of scientific methodology and of 'learning by doing' with a laboratory approach.

Activities at the Museum

- Electrostatics before Alessandro Volta: The electrophorus, the electrostatic generator, Leyden jar and first condensers.
- Volta's inventions: the battery, Volta's "inflammable air" gun, the first recordings of methane gas. We made a battery using copper coins (5 cents), aluminum disks (aluminum sheets) and cloth disks

soaked in lemon juice.
- Oersted's experiment:
An electric wire generates a magnetic field that makes the compass needle deviate.
- Ampère's exploratory experiments:
if a current flows into through coil, it works like a magnet.
- Faraday's experiment:
A variable magnetic field generates current.
- Electromagnetic induction, the dynamo.
- Construction of a small motor with a nail, a battery, and a magnet.

Activities at school

With the help of the museum staff, students made and studied a model of an electric generator using recycled material. We used a cardboard tube on which we wrapped the copper wire splines, a pen to fix the magnets that need to rotate inside the splines, a cut plastic bottle to create a propeller that, driven by the hairdresser, turns the pen with the magnets, and a LED (Light Emitting Diode) that lights up thanks to the generated current.

The museum organised a workshop for teachers focused on the use of graphic software and on the use of Unity, a game development platform (20 hours' workshop). Thanks to the help of the professional expert who led the workshop, the students made a simple interactive videogame. It retraces the historical experiments they made at the museum and the player is guided by Volta, Ampère and Faraday.

Generic Learning Outcomes - Learning goals and outcomes

GLO 1 Knowledge and understanding:
- Similarities and differences between electricity and magnetism .
- How everyday machinery can generate and use electricity.

GLO 2 Skills:
- To apply the scientific method.
- To act carefully, to perform. precision measurements that require a fine manual work.
- To employ problem solving techniques.
- To meet with the museum staff.
- To collaborate with classmates in performing the experiments.
- To enhance each other's ideas and abilities.

GLO 3 Attitudes and Values:
- To increase motivation.
- To improve self-esteem.
- To develop positive attitudes towards other people.
- To develop positive attitudes towards the museum.

GLO 4 Enjoyment, Inspiration, Creativity:
- To surprise students with the experiments.
- To stimulate their creativity with practical activities, the construction of models and the use of analogies.

GLO 5 Behaviour, progression:
- To increase the knowledge about the richness of the territory.
- To develop a positive attitude towards science.

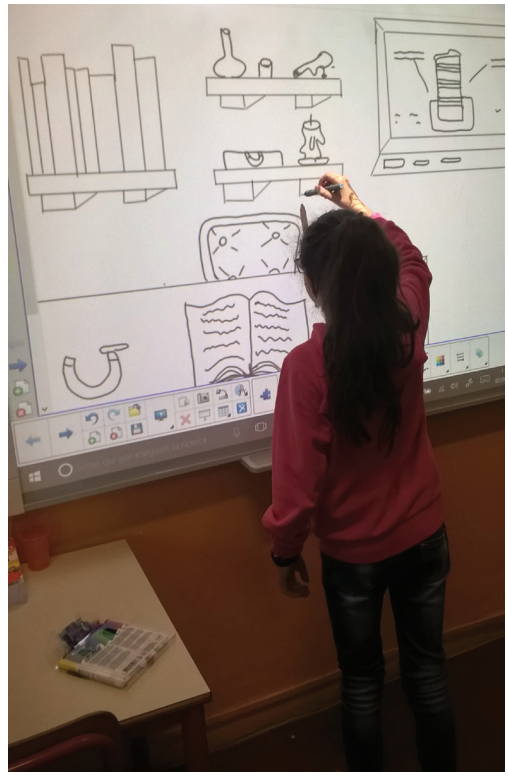
Evaluation of the coursework and collaboration

The children appreciated the contents and the workshop activities both at the museum and at school.
The workshop developed the children's ability to observe, experiment with curiosity and acquire skills that they can re-use and transfer to other contexts.
Students were facilitated in learning

by the constructive interaction among people with different backgrounds and educational methodologies. The tasks set at the museum made it possible for them to make use of different learning styles and different skills.
The organization of heterogeneous groups with different skills enables students to recognize their strengths and to use them for the success of a common project. "Giving the students an opportunity to be assessed outside the classroom, where more learning strategies can be brought into play, made it possible for many different types of students to draw favorable attention to themselves and not only those who normally do well in the classroom". (1)
Good relations between the participants by all institutions, lasting relationships between the trainers coming both from the schools and from the museums, students' growing interest and satisfaction. These were the most important reasons for the success of the project.
It was important for the school and museum to plan the coursework together from the very early stages, considering mutual needs, different background and the unique opportunity to overcome disciplinary boundaries. It was equally important to share museum and curricular topics, taking into account curiosities and passions of adults (teachers and museum staff) and students. The museum professionals were the first to be enriched, because they came into close contact with the enthusiasm of the young students and with their ideas, so different and often so new and fertile. (2)
From the teachers' point of view, the possibility to see the students work in environments other than traditional school environments gave them opportunity to know them more deeply, and to informally interact with them so that they discovered new abilities and aptitudes in their students. Moreover, the project offered teachers the opportunity to interact with colleagues from different disciplines and areas.

Using this coursework transnationally

The children of the primary school can contact museum staff and transnational students via Skype meetings. In this way, teachers can learn about other teaching methods and pupils can become motivated, as well as learn English or other foreign languages.



Creating video game: drawing of scenes, characters, objects.

(1) Thorhauge, S. (2014): Interface learning - New goals for museum and upper secondary school collaboration, PhD dissertation, Aarhus University, pp. 224-225.
(2) Falomo Bernarduzzi, L., Albanesi, G., & Bevilacqua, F. (2014): Museum heroes all. The Pavia approach to school-science museum interactions. Science & Education, 23(4), 761-780.

Museum visit: the compasses.

(In)finite spaces

Istituto comprensivo Acerbi (infant school L'Aquilone) and the Pavia University History Museum

Brief description of the coursework

The topics were Forms, Directions, Numbers, Maps, Orientation, and Magnets to learn planning and routing paths, orienting yourself at school, in the city, in your squared notebook, and with your imagination, locating objects and positions, filling spaces to create images, moving from mosaic to pixel and carrying out scientific experiments. The age-group was 4- and 5-year-olds. There were 23 children, including 3 children with disabilities and 3 children with special educative needs.

The educational program in science and art was conceived and implemented so that children could experiment with their own bodies and develop creativity and intuition regarding scientific phenomena. We planned the coursework with the museum staff; their role was fundamental because children addressed them as 'great experts'. They perceived the museum as an extremely fascinating place full of things to discover, a part of the richness of the city. Since they were very young children, we started laying the basis of knowledge according to a "common language", giving them the tools to be able to do, observe, hypothesize, experiment and associate by analogy until they came to find out "how things work". The challenge was to get the children to guess about the way an image, such as a drawing, could be reproduced by the computer. We had to begin with space perception and the conventions that govern it.
The path was organised as follows for convenience, but all the activities

overlapped and alternated, progressing almost simultaneously:
Forms. The first convention used to perceive and represent the space was the geometric form. Circle, square, triangle and rectangle were analysed in their characteristics. We searched for them and found them in the surrounding space, and represented them with our bodies and with different materials on the floor and on sheets. We distinguished between closed spaces and open lines, identified in labyrinths, where the lines detach and break margins, leaving passages. The next step was recognizing the spaces in the map of the school.
We then got a squared cellophane and created a pattern where we could move and move objects following directions and the number of steps, creating paths. Finally, we tried to fill the space creatively, in order to create images (a mosaic), or follow a series of conventional indications that would have brought up an image. Children behaved like computers that process and execute given inputs. We took the first step in computational thinking trying to program and write directions so others could fill the space in order to make an image appear or to follow a specific path.

Directions. We conventionally defined directions using different colours to represent right, left, up/straight ahead, down/turn back. On the squared paper-sheet we made pathways using a conventional code made up by numbers and directions. We also experienced the difficulty of defining right and left from the point of view of those who give directions and from those who receive them.

Numbers. Recognizing numeric symbols up to 10 and matching them to quantity was a daily job, carried out with different routines such as compiling the calendar, counting present and absent children, distributing snacks and glasses, learning to compare quantity, to quantify at a glance (something strategically useful in planning routes).

Maps. Using the cellophane we could define the position of the objects using two coordinates. We could then play the battleship game!We could use the map of Pavia during a walk: We identified peculiar elements (the river, the school, the bridge) with respect to the route. We oriented the map, taking into account the visible elements. What if there were no visible elements? In what direction should we go?

Orientation and magnets. We talked about sundials. We made an "Indian Circle" to define the North, observing the displacement of the shadow of the gnomon. In the absence of the sun, we needed something else. We visited the Museum and we discovered the properties of magnets and the compass. We made simple experiments, resumed and deepened at school, and shown to parents during a demonstration. We have learned so many things!
For the final exhibition, hosted in a municipality space in Pavia, the coursework was displayed to the public.

Generic Learning Outcomes - Learning goals and outcomes

GLO 1 Knowlege and understanding:
- To learn forms and directions (arrows and space grid).
- To find the North (musk, "Indian Circle", compass and magnets).
- The Earth as a big magnet.
- To understand conventions.
- To know the Museum.

GLO 2 Skills:
- To follow and plan routes.
- To make a compass; to read a map.

An experiment: We are observing the magnetic field.

- To relate with the Museum staff and with the group during the experiments.
- To retake the experiments for the public during the final exhibition.
- To move according to defined grids in an encoded space.

GLO 3 Attitudes and values:
- To work in groups, making new relationships with the museum staff, working with and for the public, increased students' values and attitudes.

GLO 4 Enjoyment, Inspiration, Creativity:
- Game-based activities motivate students and boost their creativity. They make games and pathways using analogies, with graphic and art activities.

GLO 5 Activity, behaviour, progression:
- To know the territory and to develop a sense of belonging.
- To develop a positive attitude towards science.

Evaluation of the coursework and collaboration

At the end of the coursework, which lasted several months and was transversal to all the activities planned this year, we realized that the curiosity and the needs of the children required some deviations from the original pathway. Pre-school has more freedom, so that even if we keep our eyes on the goal we want to achieve, we can also follow creative drifts, we can investigate and make discoveries together, according to the curiosity of the moment. We can extend or shorten the times spent playing.
The evaluation of the collaboration was shared among museum staff and teachers of "Istituto Comprensivo Acerbi" and relevant documentation was made available at the school.

Using this coursework transnationally

Children from infant school cannot travel across Europe with their class. However, the contact between museum staff and teachers can be fruitful. Teachers have to be more involved than primary and secondary school teachers in the whole process of mediation between school and museum.

Ways of Seeing II - Parables / Storytelling

St. Oliver's Community College
and Chester Beatty Library

Brief description of the coursework

The subject was storytelling. The class was a Transition Year class with students aged 14-15 years.
The art teacher and the Head of Education at the museum held an initial meeting to discuss the potential outline of the workshop and coursework based on an existing learning resource Ways of Seeing II.
The resource looks at the collections in both the Chester Beatty Library and Ulster Museum, introduces world faiths in a secular manner for teachers and support lesson plans to use in the classroom prior or after a visit to the respective museums.

Preparation in school

The teacher began the year with a brief introduction to the importance of storytelling in the main religions of the world. As some of the students originated from outside Ireland with at least three different faith backgrounds, the teacher encouraged the students to attempt to explain or at least list a story or parable

Facilitators and students working together to produce their group book projects.

from any faith system.
The teacher also used a book of Aesop's Fables for those who did not want to use any faith-based stories. Students worked alone or in teams and wrote a brief story or parable of their own. They developed images to represent their story. A second art teacher worked on a comic strip style of storytelling and asked the students to make a puppet to illustrate their story.

Museum Activity

Students prepared responses to story-telling and used the theme of manga (Japanese comics).
A facilitator from the Museum developed this theme and linked storytelling as reflected in the Museum's Islamic, East Asian and European collections as the follow-up workshop.
The group visited the Museum as part of the project activity. Students were introduced to the concept of critical thinking through key figures as represented in the main faiths reflected in the collections. They were then introduced to the idea of how these figures and others developed stories; what were the key ingredients needed. They were provided with group activities as well as a visit to the galleries and related stories on display.

School Activity

During the follow-up off-site visit, students were introduced to simple Japanese book-making. They were provided card, Japanese paper, thread and glue. Each student made their individual books and inserted their illustrated stories they created after the visit to the Library.

Generic Learning Outcomes
- Learning goals and outcomes

The five key generic learning outcomes were applied in the design and preparation of the activities.

GLO 1 Knowledge and Understanding:
- We assessed what the students already knew about stories and parables.
- We showed a video and Powerpoint presentation to solidify their understanding.

GLO 2 Skills:
- We assessed their verbal and creative skills, then demonstrated, simply, what we wanted the students to learn and to create.

GLO 3 Attitudes and Values:
- We discussed the use and importance of stories in general and of parables within any religious system.

GLO 4 Enjoyment, Inspiration, Creativity:
- We ensured a atmosphere of relaxation and encouragement to allow the students to enjoy themselves and inspire each other creatively.

GLO 5 Behaviour & Progression:
- By creating the correct environment within the art room in the school and the museum, we encouraged positive behaviour and pride in their work (they all displayed their finished storybook at their end of year exhibition).

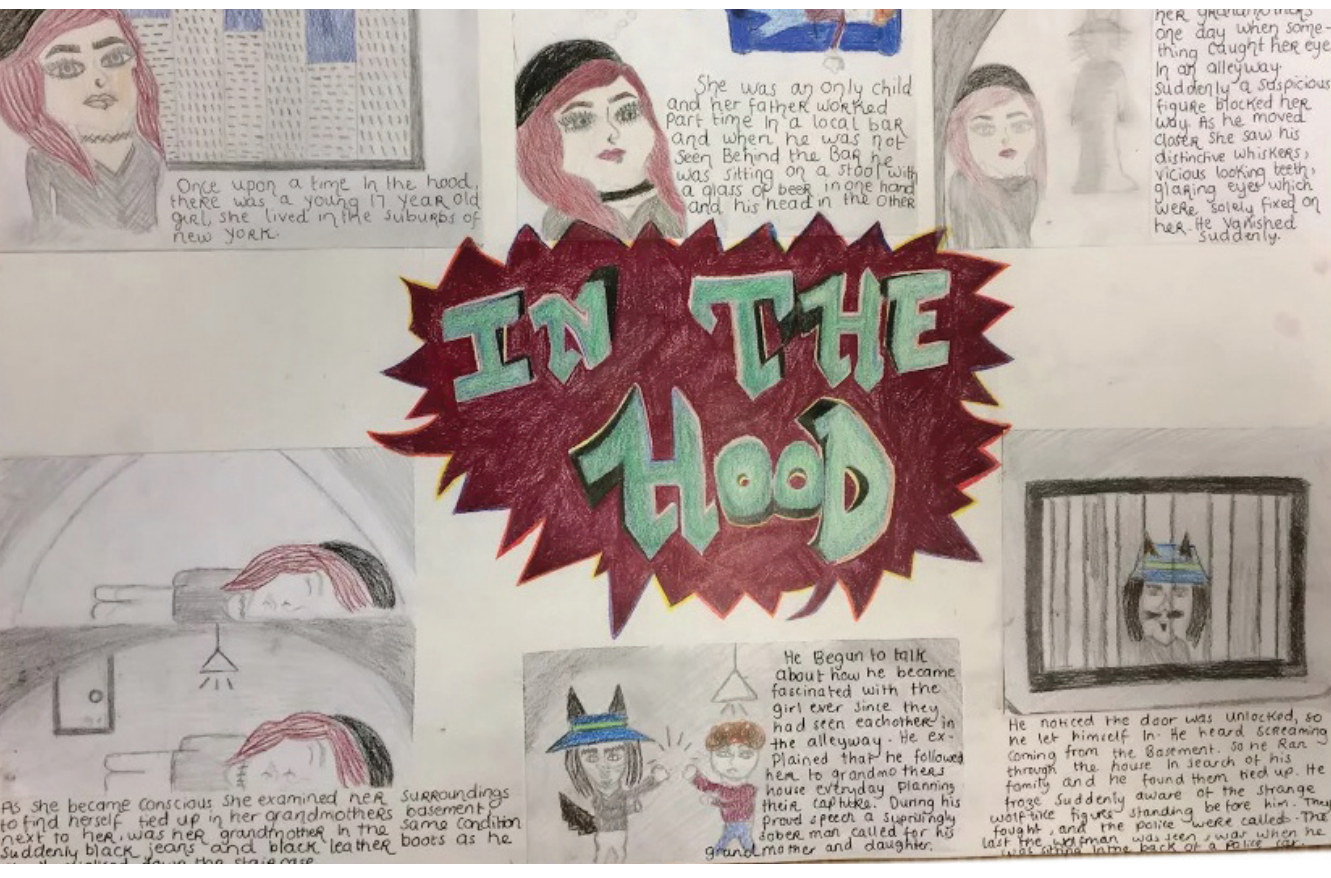
Evaluation of the coursework and collaboration

The Museum evaluated both workshops and a number of questions were

provided to the students.
In their evaluations, the students enjoyed the video and animation in particular, but some felt the workshop itself was too long / drawn out. In terms of take-away learning, the students mentioned the five guidelines to create a good story and how to analyse a story. They understood that the ingredients for the development of a good story are for the story to be simple, emotional, truthful, real and valid. The students used artistic and creative skills and expressed enjoyment, satisfaction and informative, experiential learning. They were able to recall the five guidelines and recount the activities of the workshop, at the follow up visit. The students built on what they had learned at the initial visit, during the follow up visit when they made the books with the facilitator.

Using this coursework transnationally

Storytelling is universal. It crosses all borders, from geographical to cultural to religious. Learning how to explain a story is vital, and learning the components of a good story and different ways of expressing and sharing that story is equally important.
Our coursework can be easily adapted to any museum, whether it be the story of a scientific discovery or the development of piece of industrial machinery. The story can be expressed in a multitude of ways, from a simple, single publication to a stop-motion animation.



One of the finished storyboards.

Motivations for and barriers against using the GLO-framework

This report accounts for the results of the follow-up research that was carried out by Aarhus University in the intrface europe Erasmus+ project, in which Aarhus University was a partner.

The title of this report refers to the research question about what kind of motivation, barriers as well as possible solutions teachers and museum workers articulated about using the GLO framework. This research question was formulated after observing two partner meetings during the intrface europe project. Here the researcher was an objective observer of the partners' work and discussions. At the meetings, the partners discussed their existing practices and experience in school-museum collaboration. All the partners had significant experience with school-museum collaboration. This gave rise to the basic research hypothesis, which was that teachers and museum workers might be more inclined to follow their usual procedures and less likely to incorporate the GLO-framework.
The research question is: What are the motivations for and barriers against using the GLO-framework in the intrface europe project?
The method for data collection in order to answer the research question was twofold:
First, observation and note-taking at partner meetings in Aarhus and Pavia at the beginning and end of the intrface europe project. Second, individual qualitative research interviews with museum professionals and teachers in the project, using a set guide of questions.
Observation- and interview-notes were coded using a understanding of grounded theory (Charmaz 2014), centered around line-by-line coding. Coding was done on the basis of the overlying themes in the research question.
As the data for this study is limited, this report also draws upon existing research within the field: Sally Thorhauge's PhD dissertation on museum and upper secondary school collaboration (1), a UK evaluation report on evaluating the GLO impact (2), Nordic research from NCK (3) as well as prior research on museum and primary school collaboration (4).

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2) (Graham J.: 2013) Evidencing the impact of the GLOs 2008-13, Learning Unlimited, Leicester University.
3) (Grut, S. et al. 2014) En omtolkad kultursatsning, Museerne och Skapande Skole, Jämtli Forlag.
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1. How the GLO-framework was used in the intrface europe project
The first step is to present the different ways in which teachers and museum professionals talked about how they used the GLO-framework:

Before the coursework:

A. In planning the coursework for students and pupils, partnerships used the GLO-framework in thinking ahead in terms of desired learning outcomes for the students.

B.The GLO-framework was used to train temporary museums staff in order to align their teaching activities with the museum objectives. A museum professional mentioned that the GLOs was a solid framework to base their teaching on, and helped temporary staff work towards the specific learning outcomes chosen by the museum-school partnership.

During the coursework:

The GLO-framework was used to re-think and adapt what a partnership had originally planned for the students, when students reacted differently than expected. The teacher and museum professional changed learning activities to encompass other learning outcomes from the GLO-framework than what had been selected originally.

Evaluating the coursework:

All the museum-school partnerships in the intrface europe project used the GLO-framework to evaluate the coursework done by the students. Evaluation was done in different ways depending on the age of the students:

A) At kindergarten level, teachers and museum professionals discussed the students' learning outcomes based on their observations of the children.

B) Older students were asked to evaluate GLO-related statements about the coursework. A museum professional recommended that time should also be set aside for a talk with the teacher to get his or her feedback; the teacher is an important source in the evaluation process, and his or her evaluation would make time-consuming formal student surveys less necessary. Working with older students and the GLO-framework, there were different experiences articulated by the partnerships:

1. In regards to upper secondary school students both in Italy and Denmark, respondents noted that it was a very positive experience to use the GLO-framework for evaluation. Teachers described students who had never been given the opportunity of thinking or expressing their

own learning outcomes. When they became familiar with the thinking behind the GLO-framework, the students were both critical about it but also quite motivated by it, and became related to their teachers in a more intense way than in normal coursework.

2. Upper secondary school students were found to be very open and skilled in assessing their own learning. Perhaps it is not necessary to use the GLO-language as this can encumber the discussion.

2. Motivational arguments for using the GLO-framework

There are five different main categories of arguments for using the GLO-framework: experience, adaptation, student collaboration, raised professional self-belief and the political context:

2.1 Experience. When the GLO-framework is perceived to be close to the museum's and school's normal way of working, it is easy to adopt. The museums and schools in Pavia developed the Pavia approach to museum-school collaboration, and they pointed to their positive experiences with this similar way of working: "We have applied a similar methodology for about 15 years; the only new thing is the GLOs' more formal way, the thinking is not new." (Italian museum professional).

2.2 Adaptation. The GLO-framework can help teachers and museum professionals to adapt to new developments in the learning activities, as one teacher said: "It helped us adjust to the students' reactions when they were different to what we expected [...] being able to reach a different goal than planned." (Italian teacher for infants of 4-5 years old). Furthermore, respondents saw the GLO-framework as a common language across professional and cultural borders, which made it possible for different professions to adapt to one another when developing coursework together.

2.3 Student collaboration with teachers and among themselves - the GLOs expanded the students' and teachers' view of student learning outcomes. "Our students liked it [the GLO-framework] very much. It gave a lot of interaction, much more than normal, where students can have the role of clients – here we reached a common understanding of their learning outcomes as being much more diverse." (Italian upper secondary school teacher). The teacher further articulated that because more responsibility was given to the students, making them work independently to reach specific learning outcomes, the GLO-framework gave a very positive interaction between upper secondary school students and their teacher.

2.4 Raised professional self-belief due to the inclusion of a theoretical model in teachers' practices. The use of the GLO-framework was new to all of the Italian teachers involved in the project. One teacher related how the GLOs "helped me

to believe in my own way of teaching and not feel like an underdog. [...] I believe that the GLOs gave me more confidence and self-belief and were a theoretical framework to point to if a colleague critiqued what I did" (Italian upper secondary school teacher). This highlights the GLO framework as a theoretical legitimisation of one's own practice within the organisation.

2.5 Political context. The political context in the specific country was also mentioned as a motivational factor to work with the GLO-framework since it resonates with a political urge to document outcomes and specific areas of teaching. As an upper secondary school teacher mentioned: "The political reform in Italy is very close to the GLOs", thus pointing to the political climate as a motivational factor in documenting students' learning outcomes in schools as well as at museums.

The intrface europe project has furthermore made it clear that there are great national differences regarding the possibilities for museums working with schools. What might be possible in one country is not necessarily feasible in another due to perceived constraints in the school's curriculum as well as the prevailing current political and organisational climate. It is now relevant to look at what barriers respondents pointed out during and after their experiences of implementing the GLOs.

3. Barriers against implementing the GLO framework

Implementing a GLO-framework was a change in the partners' existing practices. Significant barriers against implementing it became clear. The four main barriers are time and energy, mature collaboration, weak collaboration and lack of organisational support.

3.1.Time and energy

Implementing a GLO-framework required personal, professional, organisational resources, as the GLO-framework was new to many of the partners in the project. Partners talked about the GLOs being difficult to understand and work with.
In both schools and museums across the three partner countries, respondents experienced ongoing organisational changes and lack of time (and money) as the main obstacles to implementing the GLO-framework.
Furthermore, geographical distance between the school and museum exacerbates this, as it takes time to travel to meetings. Respondents pointed out that it is important to set aside enough time to thoroughly discuss how to use the GLOs, and suggested that a way around the problem would be to have virtual meetings between teachers and museum professionals, also via Skype.

3.2 Mature collaborations

Some of the respondents said that more mature collaborations between schools and museums were another barrier against implementing the GLO-framework. Partners that had collaborated for a long time before the intrface europe project

mentioned that they really had to make a fundamental commitment to change their usual work practices in order to incorporate the GLO-framework in the planning phase. In such partnerships, museum and school professionals reported that it felt easier to work as they normally did, without fully implementing the GLOs in their planning practice.

3.3 Weak collaboration ties

Weak collaboration ties were another barrier. This was when there was an unequal commitment to a partnership, with one partner being the hard-working part and the other partner not participating to the same extent.
As communication is absolutely essential for school-museum collaborations to be successful (Thorhauge, 2014), inadequate communication due to either personal or contextual factors was articulated as a cause for not fully implementing the GLO-framework.

3.4 Lack of organisational support

Some partners in the intrface europe project experienced a lack of support from their organisational leader and colleagues, and explained this to be another barrier against implementing the GLO-framework. School collaboration was presented by participants as being low in the hierarchy of priorities of museum management. Lack of managerial support was seen as a barrier that had to be overcome if the GLO-framework was to be fully implemented in a museum's way of working.

Also in schools, lack of organisational support was mentioned as a possible barrier against implementing the GLO-framework. One teacher explained how he went to his headmaster to explain the GLO-framework and that it was necessary to make changes to the timetable. Once the headmaster understood the GLO framework, it was no longer a problem to get permissions to change the timetable. This makes it clear how important it is to inform the organisational leader, who might otherwise be disinclined to make changes that influence the school's timetable. Colleagues were also mentioned as an obstacle in interviews. This barrier was removed once the colleagues saw the students' enthusiasm when they were doing coursework and using the GLO-framework.
The colleagues actually ended up asking the teacher involved in intrface europe project to come and help them with their classes.

When working to implement the GLO-framework in schools and museums, teachers and museum professionals must make an effort to explain the concept of the GLOs both to leaders and colleagues in order to gain support and understanding from within the organisation.

4. Overcoming barriers – suggestions from museums and schools in the intrface europe project

The museum professionals and teachers from Ireland, Italy and Denmark

accounted for the barriers they experienced but also suggested solutions and recommendations as to what to do about them. Here are their suggestions, which are also supported by other research findings:

4.1 Educating school and museum staff and leadership about the GLOs
The main suggestion was educating people about the GLOs. This can be done in different ways, such as organising in-house continuing education for teachers and museums professionals as a way of extending the GLO-method to the whole organisation. As noted by a teacher: "It should not be the individual teacher who is responsible for educating his or her colleagues". The organisational leader should also be invited to participate as a way of gaining leadership support. Respondents suggested that this would lower the barrier of time management issues and other political issues that might compromise the school-museum partnership. As a museum professional expressed: "There needs to be managerial buy-in". Furthermore, respondents suggested using regional and local teacher education centres as way of educating teachers about the GLOs.
The GLO-framework should also be taught to young teachers in training, as experienced teachers might be less likely to adopt a new framework such as the GLOs.

4.2 Translating the GLO-framework
Some of the respondents experienced the GLOs as a difficult framework to understand and implement in planning and evaluation. They felt that there is a need for a very accessible and easy-to-understand translation for those who do not have time to fully investigate the GLO-framework themselves. The intrface europe project provided an accessible tool for this. However, some respondents pointed to the fact that even though they thought they knew the GLO language well, it had not yet become internalised knowledge, which made a translation of the GLO-framework much desired.

5. Implications for practice and theory
The above suggestions point to work that needs to be done within the practical and theoretical field of the GLO-framework. Simple guides for each phase of using the GLO-framework when planning and evaluating coursework for students should be made. These guides could also be targeted different education levels. All three levels - kindergarten, primary schools and upper secondary schools - were present in the intrface europe project, and at each education level there were differences in how teachers and museum staff applied the GLOs. Respondents furthermore made the point that the three participating EU countries in the intrface europe project are very different in terms of national, cultural and educational systems, which makes the need for national guides on GLO implementation even more imperative.

A theoretical implication is how to solve the puzzle of doing simple translations of the GLO-framework for museums and schools. When both school and museum

professionals understand how to use it, it provides them with a common language that bridges the gap between schools and museums. It is one thing to explain the GLOs with words. However, a different approach is to refer to the GLOs in a more tangible way, for example by using PLUS PLUS bricks. PLUS PLUS bricks are children's toys that can be put together forming patterns of different colours - one colour per GLO, five colours in all. Teachers and museum professionals could use the PLUS PLUS bricks to make GLO-patterns, both during the planning and evaluation phases of a course work. The bricks are tangible and can be assigned specific words to show specific nuances and values within each GLO colour. More research is required in order to clarify if this or other tangible translations of the GLOs could facilitate understanding and working with them for museums and schools.

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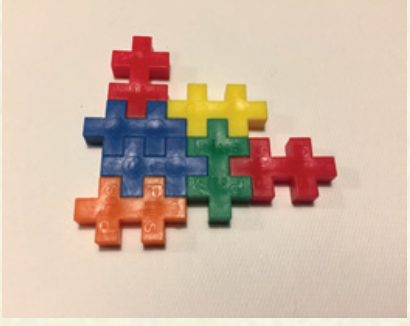

Pattern of GLOs can be made in planning or evaluation phases and an accessible tool for both children and adults

The five GLOs translated into tangible matter: PLUS PLUS bricks

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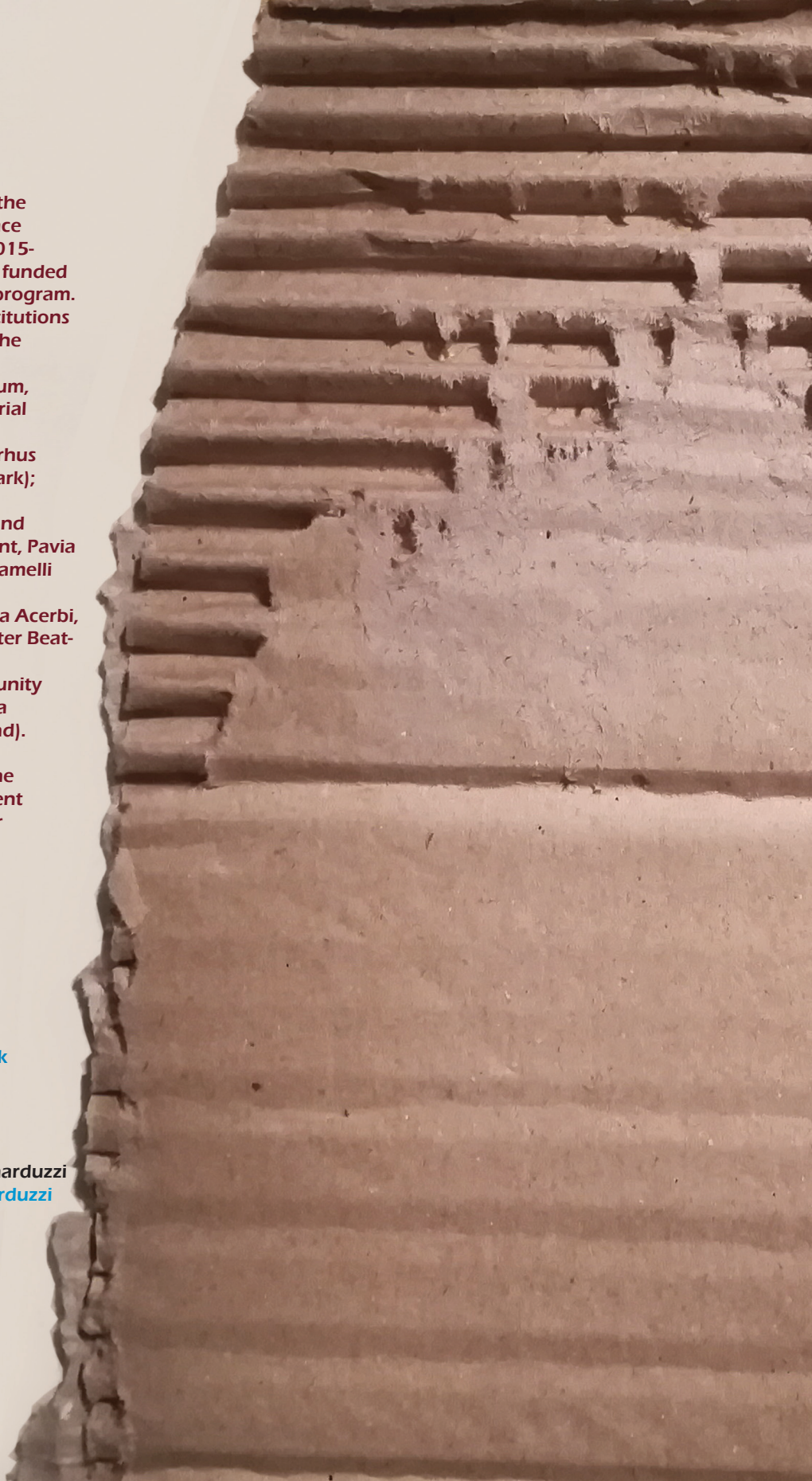

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