MUSEUM OF TECHNOLOGY

Pienten paja

The Magic Carpet of Technology tales

AN OPERATIONAL MODEL OF TECHNOLOGICAL EDUCATION FOR MUSEUM VISITOR ACTIVITIES AND EARLY EDUCATORS

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MUSEUM
OF TECHNOLOGY

For the Reader

Maija Simo

Marianna Karttunen

JOIN US AND LEARN ABOUT THE MAGIC CARPET OF TECHNOLOGY TALES OPERATIONAL MODEL!

This operational model is primarily intended for the use of museum visitor services staff and those involved in early childhood education, but everyone who is interested in the possibilities of technological education in their work can also use the applicable parts of the model.

The operational model introduces the the Magic Carpet of Technology tales workshop model that focuses on technological education in a museum environment and is designed for children aged six to eight. Furthermore, it describes the experiments that have led to the operational model, its different applications and the ideas behind the operational model.

The operational model, and the design principles that have been recorded as a part of it, offer museum staff a new approach to planning and carrying out workshop activities.

The operational model is made up of several parts: an introduction that offers insight on the background of the workshop model; a description of the Magic Carpet workshop as a whole including information about its background and a detailed description of how to carry out a workshop and a conclusion, in which we reflect on and offer new ideas for possible further uses of the the Magic Carpet of Technology tales model.

We hope that the Magic Carpet will inspire you!

Marianna Karttunen
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Content

Introduction 5

Pienten Paja and the Magic Carpet of Technology tales 6
Museum as a technological education environment 8
Technological education for children in pre-primary and early primary education 9
Pienten Paja Project and technological education 10
Principles of workshop planning 11

The Magic Carpet of Technology tales workshop entity 12

Equipment 13
Goals of the activities and the selection of activity items 14
Children's own objects and children as the producers of their own museum 17
Which things can a single item represent? 18
Instruction and support for participation 19

Carrying out a workshop 20

1. Preliminary assignments 21
2. The Magic Carpet of Technology tales session 22
3. Ideas for follow-up assignments 26

Conclusion 27

What kind of impacts do the Magic Carpet activities have? 28
Different target groups – New operational levels 28
Conclusion 30
Links 31

Leading questions for making observations about technology.

Introduction

PIENTEN PAJA AND THE MAGIC CARPET OF TECHNOLOGY TALES

A development project of the Museum of Technology, the Pienten paja (Museum, kids & Technology) Project produces learning environments and operational models with the purpose of inspiring children in the pre-primary and early primary education stages (preschool and first and second year) to observe and understand technology as a part of their everyday life, from the perspective of their own developmental phase.

Children in this age group can, by the means of progressive inquiry, practice finding themes connected to, for example, the essence of technology, stages of invention and different changes that have taken place in technological environments, in their own surroundings.

The Magic Carpet of Technology tales that was developed in the course of the project is the mobile learning environment of the Pienten Paja Project: it can be carried in a shoulder bag and it creates an "element of an environment for experiences": simultaneously a service, a platform for experimenting methods and the project's business card.

With activities and discussion, the Magic Carpet encourages children to observe, experiment, understand, use and develop technology in their own living environment. The goal is that learning new things takes place through playing and experiences and it is fun and motivating.

An integral part of the ideology of the Pienten Paja Project is that Technology belongs to everyone: regardless of age, skill level or gender. It is, inevitably, a part of everyone's everyday life, and it should not be thought of as something unfamiliar, let alone intimidating.

The Pienten Paja, funded by the Ministry of Education and Culture, is a development project that the Museum of Technology has put it into practice in 2012–2015. The projectgoal is to produce a new, functional learning and experience environment that is intended for the Museum of Technology's visitors in the pre-primary and early primary education stages. In the course of the project, operational models have been developed at the museum with the intention of expanding the children's and educators' understanding of the themes connected to technology and to lower the threshold for addressing these matters at daycare facilities and schools.

Making historical continua and technology visible with the help of the museum environment.

Phenomena and an opportunity to examine them.

Effects that technology and its development have on people's everyday life.

Perspective of innovation: the birth of an innovation and the connected layers.

Making history real with authentic objects and associated stories.

Tools and environment that are made for learning by experiment.

Experiences and inspiration for the visitors.

Something new, pedagogic innovation to instruction information.

EXPLORING HISTORICAL CONTINUA AND CONTEXTS OPENS UP NEW POINTS OF VIEW WHEN THINKING OF CONTEMPORARY EVENTS AND UNDERSTANDING THE FUTURE OF TECHNOLOGICAL DEVELOPMENT.

Why offer technological education at a museum?

What can you find at a museum?

Pre-schoolers' thoughts about the museum

Art
Learning
Watching, when there is nothing else to do.
You see new things, and there might be old ones too.
Old things can also be important!

MUSEUM AS A TECHNOLOGICAL EDUCATION ENVIRONMENT

Museums are a great example of learning environments outside the classroom, the use of which is called for in the curriculum and offer opportunities of more versatile and in-depth instruction of various contents. Progressive inquiry tends to be a common method at museums; whether it takes place through mobile technology, studying the exhibits, different kinds of assignment materials or discussion.

In contemporary society, technology holds a significant role in all walks of life and in the everyday life of people. People are faced with technology, in its many forms, already in their early childhood.

In the upcoming, revised national curriculum of Finland, technological education is included in the learning module "I explore my surroundings" of the pre-primary education curriculum. The approach of this learning module is that technology is the outcome of creative human effort. In teaching, the aim is to integrate technology into children's world of experience and their everyday operational environments by using observations, examination, experiment, comparison, classification and independent discovery.

The goal of the learning module is to analyse the acquired knowledge and experiences, to process the reasoning and problem-solving skills and develop as a thinker.

In many cases, technological education is considered first and foremost future-oriented, its goal being for the child to learn to understand technology, to be capable of using it and realise that he/she can have an impact on the direction of technological development. (Source: http://users.jyu.fi/~paikonen/text/tgktutkim4.pdf) The museum context, however, is a natural environment for introducing a broader, historical approach to technological education, based on the museum collections: authentic technical objects of various ages and the many opportunities available at the museum environment.

The exhibits at the Museum of Technology reflect the changes that occur in technology and its importance in our surroundings and the layers involved in the invention process. Exploring historical continua and contexts opens up new points of view also in considering things that take place in the present and understanding the future of technological development. Past, present and future are all present in the museum environment.

Where can you find technology?

On airplanes.
In a stool.
In engines.
In films.
In clothes production.
In a bicycle.
In people!

"No there is not. I just wanted to fool you."

Technology is...

... a mobile phone
... a robot
... Christmas lights
... a macerator
... a car engine
... a remote control
... Electricity!

Electricity comes from the electric cord.
And lightning!
From the sky!
From a power plant.

Technology means a current.
The current passes through cables.
It is really powerful!

If there are no lamps, you can't see anything.
And you might trip.

Let's explore technology:

A rubber boot is not technology. Because it is not scientific in any way. There should be gas, petrol or something like that.

A rubber boot IS technology, because it can be used by people.

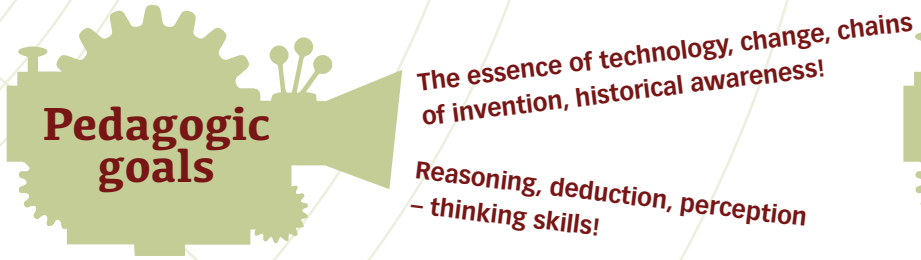
I am interested in how colour comes to paper. Or how something changes colour in water. Or glows in the dark!

Preschoolers' thoughts about technology.

TECHNOLOGICAL EDUCATION FOR CHILDREN IN PRE-PRIMARY AND EARLY PRIMARY EDUCATION

What does technology mean to the target group of the Pi-enten Paja workshop?
Technology and technical gadgets are a part of the every-day life and play of children. Understanding technology and learning to use it starts to take place in the early childhood years. Children in the pre-primary and primary education stages are the core target group for examining and learning by playing and games.

The experiences gained with the Magic Carpet and its pre-liminary assignments have shown that children have very different conceptions of technology. Some already possess a wide and comprehensive understanding of technology while some mix up technology with physiology and biology in their thinking. A large part of the children – perhaps after a discussion with their parents – seem to perceive tech-nology first and foremost as complex appliances that work with electricity, move or are manifestations of the modern communication technology.



PIENTEN PAJA PROJECT AND TECHNOLOGICAL EDUCATION

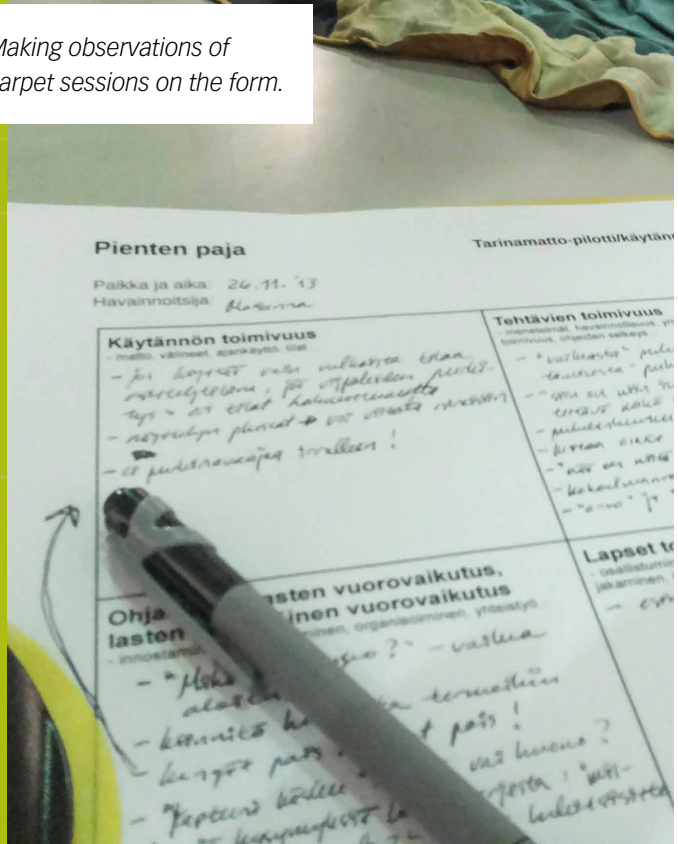
The purpose of the project comprising Pienten Paja and the Magic Carpet is to encourage the children to think of the essence of technology in a broader sense and from different points of view. Another important goal of the Magic Carpet project as a whole is building the child's museum visitor identity: to stir and promote museum curiosity.

One can think that museum curiosity comes naturally in children; curiosity about the wonders of the world, things they are unfamiliar with and things of the past. The question, indeed, is: how to feed and promote the children's inherent interest in the past and its manifestations?

You can react to this curiosity – as proposed in the curriculum – by approaching the subject in a child-oriented manner, so that the addressed topics become linked to their everyday life and experiences through interaction and the child as an independent and active doer and thinker. The activities seek to create a positive emotional experience and leave a memory trace: "It is fun at the museum" is an attitude that speaks of success.

The Magic Carpet of Technology tales pays particular attention to technological change and, through it, the historical continua. Another important theme is the various uses of technical appliances and the manifestations of technology in the everyday life of the individual. In addition to these, the Magic Carpet discussions deal with topics such as manufacturing techniques and materials. The children participating in the Magic Carpet sessions bring up their own topics and ideas; the discussion transforms according to their areas of interest. Each Magic Carpet session has a different approach to the technological themes based on the level of the participants.

Making observations of carpet sessions on the form.



PRINCIPLES OF WORKSHOP PLANNING

In the production of the whole the Magic Carpet of Technology tales project, researchers, designers and early educators have designed and modified the carpet and its functions together, tried out the activities in practice, developed and assessed them. Several methods helped in the assessment:

- Observations of the Magic Carpet sessions were made and they were recorded on a form during sessions.
- The sessions were photographed and videoed and the material was examined afterwards
- Teachers were sent a feedback survey on the contents and the experience after the carpet session.
- The groups that participated in the carpet sessions were monitored and some of them were interviewed before and after the session: learning and the experience were assessed based on the interviews.

This interdisciplinary, close cooperation is a new kind of method of producing exhibitions, workshops and activities for children in the museum setting. The multi-voiced working group, the assessment of the practical aspects and the processing based on the assessments integrated the voices and ideas of the children into the pedagogical development of the museum operations and museum environment.

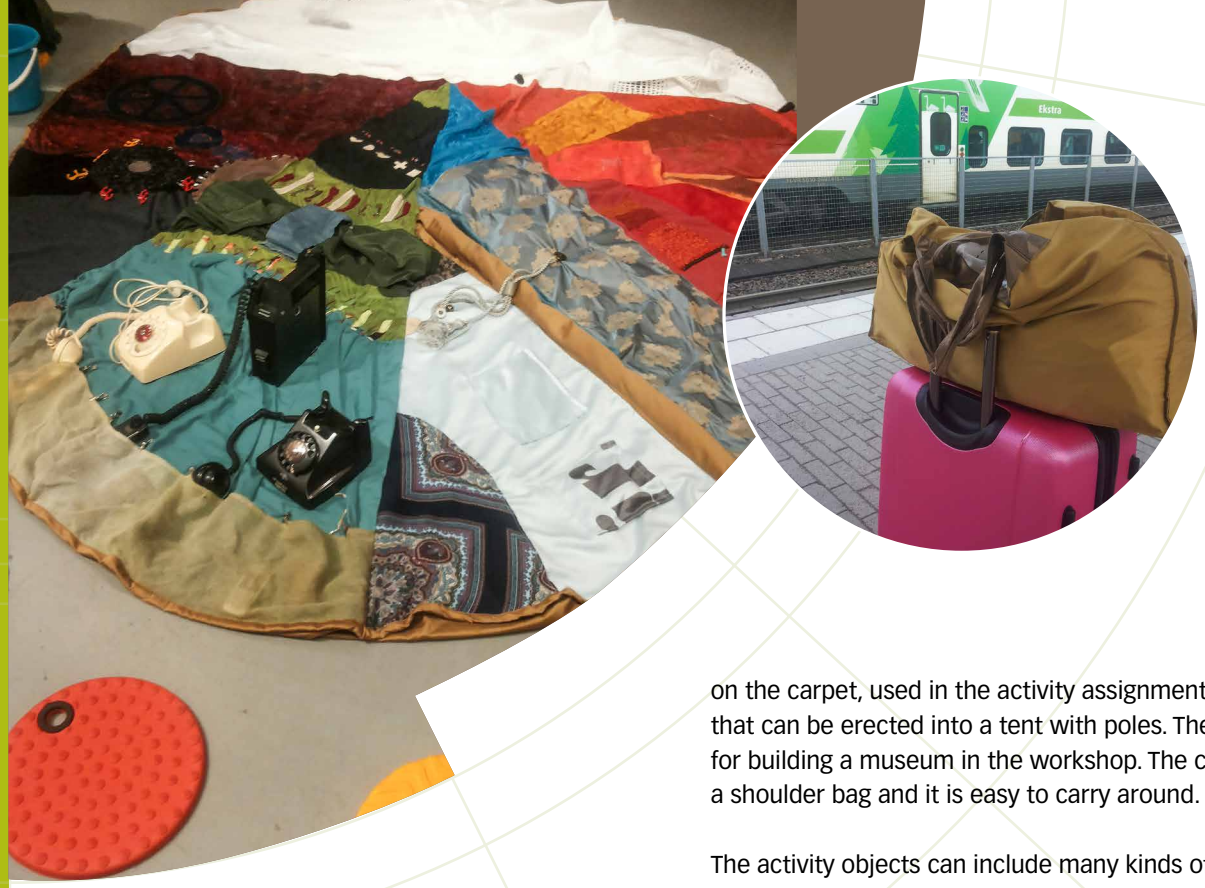
Through discussion and assessment, the following points were defined as essential elements that steer the development process of museum activities for young children:

1. **Multidisciplinary**
   Crossing scientific boundaries: technology, art, science…
2. **Multiple forms and multisensory**
   Many kinds of methods:
   • listening, watching, trying out
   • activity objects, media, drawing, storytelling…
3. **Appreciating the children's knowledge**
   Time for the children's exhibits, explanations, stories, experiences
4. **Supporting participation as individuals and community**
   Possibility for individual and community activities: setting meanings as individuals/together and creativity
5. **Combining everyday and scientific thinking**
   Explaining everyday phenomena, creative problem-solving, developing reasoning skills, understanding whole concepts
6. **Taking advantage of imagination and play**
   Imagination and playfulness have an important role in the activities.

(Source: http://www.tandfonline.com/doi/abs/10.1080/14626268.2014.904370)

The Magic Carpet of Technology tales workshop entity

The purpose of the Magic Carpet of Technology tales workshop is to support the children's understanding of technology, from their own starting point, and to stimulate interest in technology, everyday objects, history and the museum environment. Through functional activities and activity objects, children learn about the essence and change of technology and museum operations. The workshop activities take place on the Magic Carpet that has a special feature: it is mobile. A the Magic Carpet session can take place not only at the museum, but also at a day-care centre, school or any similar environment.



The Magic Carpet unfolded and packed in a shoulder bag. The equipment is carried in a suitcase.

EQUIPMENT

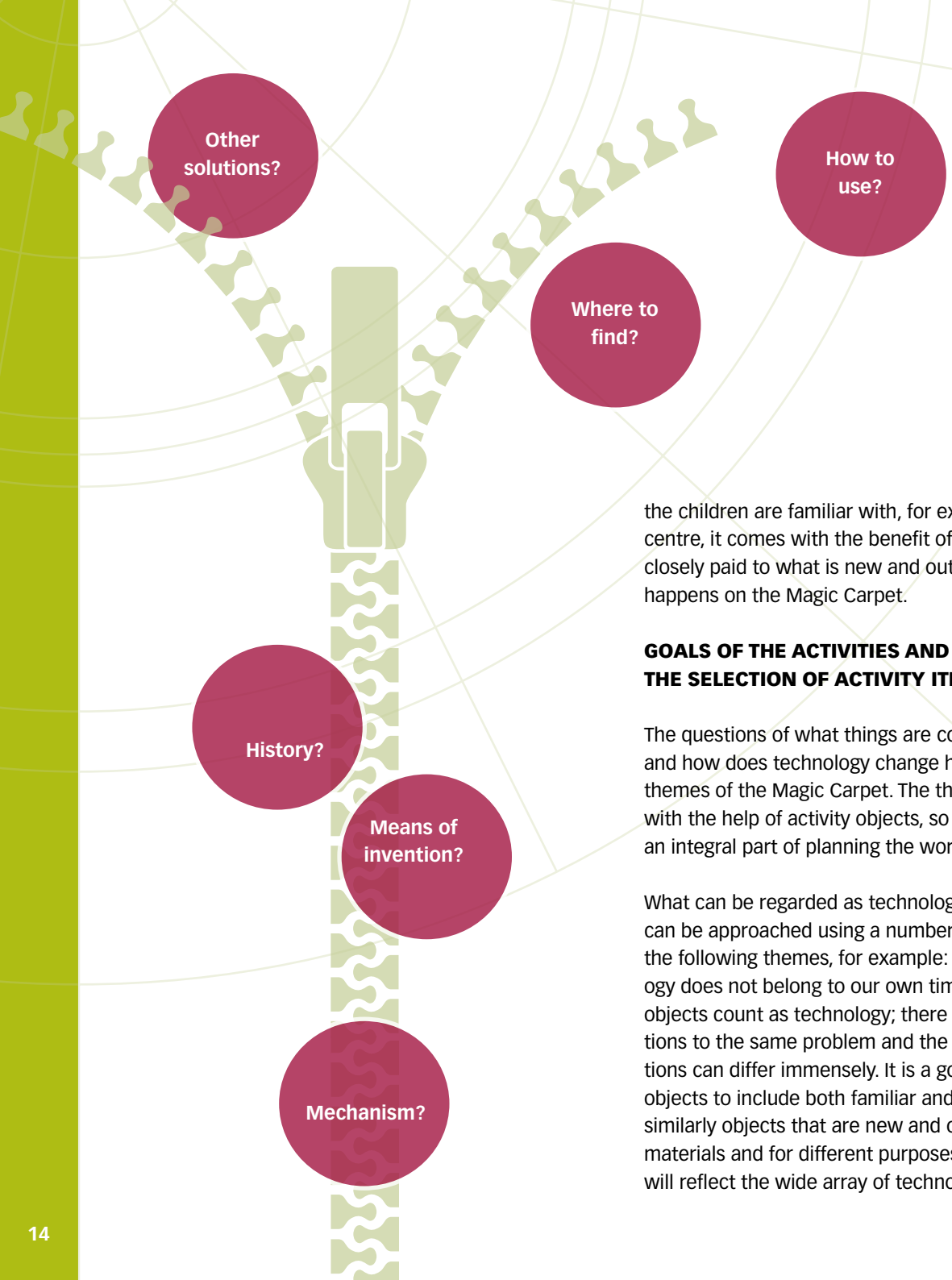
The Magic Carpet of Technology tales is an oval textile carpet, about 6 square metres in size, with room for 10–15 people seated around it. The top is made up of cloths of different colours and textures and attached to it are decorations in many colours and materials. There are pockets on the carpet, used in the activity assignments and a hood that can be erected into a tent with poles. The tent is used for building a museum in the workshop. The carpet fits into a shoulder bag and it is easy to carry around.

The activity objects can include many kinds of technology. The essential thing is to discover objects that reflect the many applications of technology and technological change. For the activity aspect, it is good to have objects that fit into the pockets and it is also important that they can be safely examined. The activity objects can be carried in a suitcase.

Additional materials needed for building your own museum are cotton gloves, torches, a camera and plastic domes and platforms. A loose cloth has also been used, with one side in one colour and the other side divided into two in different colours.

The Magic Carpet as a workshop platform outlines and focuses the workshop activities. However, proactive practical planning is still needed so that you will have a well-organised carpet session. The activity objects should be easily available, but they should only be visible when they are needed.
If objects are hidden in the pockets of the carpet, and the element of surprise is in a central role, their search should be carried out first. Feeling the objects with the feet has proved to be a great way of examining the objects with the sense of touch; if examining with the hands, the temptation to lift up the object gets too much and it is hard to keep up the suspense of the examination. Similarly, standing and walking on the carpet and, next, crouching down and crawling on all fours introduce offer different activity options and contents for the session; this should be taken into account as the session takes place in a limited space. Similarly, a seat cushion has to be reserved for all the participants around the carpet as the cushions make the situation more organised and giving instructions easier: you can instruct the participants or a part of them to get onto the carpet or go back to their place.

If the session takes place at the museum, visiting the exhibition is a good idea to include as a part of the session; it introduces an often welcome change in the carpet session. When the session takes place in an environment that



the children are familiar with, for example their day-care centre, it comes with the benefit of attention being more closely paid to what is new and out of the ordinary: What happens on the Magic Carpet.

GOALS OF THE ACTIVITIES AND THE SELECTION OF ACTIVITY ITEMS

The questions of what things are considered as technology and how does technology change have become the central themes of the Magic Carpet. The themes are addressed with the help of activity objects, so selecting the objects is an integral part of planning the workshop.

What can be regarded as technology? is a question that can be approached using a number of objects, highlighting the following themes, for example: the concept of technology does not belong to our own time only; many everyday objects count as technology; there can be multiple solutions to the same problem and the nature of technical solutions can differ immensely. It is a good idea for the activity objects to include both familiar and unfamiliar objects and similarly objects that are new and old, made of different materials and for different purposes so that, together, they will reflect the wide array of technology.

When making observations about the objects, attention can be paid to materials, mechanisms, purpose of use, children's own user experiences and knowledge and the history of inventions. There are plenty of options and it is up to the instructor to decide on the primary approach to the objects. It is a good idea to consider in advance the approaches from which it would be possible and productive to discuss these objects and how it should be done. It is important to leave room for the children's own ideas and experiences.

The definitions and decisions made in advance are important; otherwise, the activity easily becomes too heavy, especially if conversation takes place. The activity can be defined by limiting the number of objects: it is enough if there is one object to cover each approach. On the other hand, there should be enough objects so that all the participants have a chance to handle the objects. It is a good idea to have more than one of each object available.

Balancing between opening new points of view and limiting them is an integral part of the carpet sessions and the instructors must make the decision in each situation themselves. It is the goal of the activity to make it visible as to how many variations of technology are included and,

Rubber boot

familiar, everyday item, is not considered technology, material is essential: water proof and cleaning

Xylitol chewing gum

chemical structure, is found in nature; industrial production, Finnish invention, effects on oral health

Clothes pegs *3

different solutions to the same problem, comparison of operational mechanisms, connection of the name and the old type of clothes peg

Pedestrian's reflector

everyday, familiar, meaning in the Finnish setting, Finnish invention

Abloy lock

reliable everyday technology, innovative disc-detainers, finnish invention

Telephone,

leading to the next activity

Fishing net weight

old, unfamiliar object, surface made of birch bark, different uses of bark, all technology is not industrially produced!

Printing block

unfamiliar object, a part of a larger machine, works the same way as a stamp

Zip fastening

mechanism, a separate part of a whole, 150-year-old invention, but only became commonly used about 60 years ago with jeans

Horseshoe

very old technology, animals have been harnessed with technology, symbolic meaning

An example of an activity object

Phones of different ages.

on the other hand, to introduce the idea that an object is not explained with one meaning and, similarly, not even the most everyday things are one-dimensional; rather, they can be studied from different perspectives. For example, a zip fastener can be used to describe the history and meaning of the invention, to study the mechanism, find new solutions for the same purpose, try to think of all the contexts in which zip fasteners appear and what it is like to use them. The purpose is to practise making observations and to encourage questions and making observations of one's surroundings.

Technological change is discussed on the Magic Carpet with the help of phones of different ages. Phones have proved to be an excellent way of demonstrating the change because all children have some kind of experience of their own with them. On the other hand, so many changes have taken place with phones over the last few decades that you do not need to go too far back in history to demonstrate the change. The rapid transformation from a telephone into an everyday gadget that is mobile, individual and multifunctional is a productive starting point for discussing technological change.

Six phones of different ages have been used on the Magic Carpet – the oldest is a bakelite telephone that dates back several decades, while the newest example is a touch screen mobile phone from a few years back. In this activity, the age of the phones is estimated in relation to each other by placing them on a timeline from the oldest one to the newest, at the same time making observations of their features: how do you use the phone to make a call or answer it? Is it mobile? Where does it get its electricity? Can you do something else besides ring with it? Is it possible perhaps to change the ringing tone?

In addition to placing the phones on the timeline, it is important that the participants get to try them out and play with them. Dialling a long telephone number with a dialling disc, pulling out an antenna, chiming the bells inside the bakelite telephone or testing the weight of the Mobira phone from the 1980s all make the change tangible. Experimenting gives the participants a feel for the past and enables them to make comparisons between the technology of today and the past, based on their own experiences.

CHILDREN'S OWN OBJECTS AND CHILDREN AS THE PRODUCERS OF THEIR OWN MUSEUM

The second part of the Magic Carpet session focuses on the technological exhibits that the children have brought with them. As a part of the preliminary assignment, the children are given the task of finding an object at home that they consider technical and that they would like to place in the museum. The children's own Museum of Technology will be set up on the Magic Carpet using these objects. This activity pulls together themes that the children have learnt about during the project and using the children's own exhibits – ones they have thought up and selected independently or with their families – addresses the topic on a more in-depth level.

Selecting an object leads the children and their families to look more closely at the things found at home, both from the perspective of technology and a museum and, at the same time, it conveys information about the ideas that are associated with them. Sharing ideas of technology and museum exhibits also expresses values, emotions, information and stories. You could say that the objects always tell a story that is greater than they are alone: they are loaded with meaning and, yet, can be touched by hand. So, your first own possession, a robot dog which you have just received as a gift, Mum's first mobile phone or Grandpa's compass from the WWII years, all tell a story of their own and add to the overall picture of both technology and museum exhibits. Through the objects, new sides of familiar people open up: to the teacher of the children and their families; to the children of each other, their own parents and grandparents.

Introducing their own objects and building an exhibition together offers children a chance to be the experts of their own objects and try out the role of a museum professional. When introducing their own exhibit, each child gets to be the star of the Magic Carpet for a little while: no-one else knows the symbolism and meanings embedded in their object. Even small children possess a historical perspective to the objects they bring – the experiences and feelings connected to the object; its story.

You turn into a museum professional by putting on a pair of cotton gloves and, once you do that, the objects become museum exhibits that have to be handled with care. When planning the exhibition, observations of each exhibit are made from yet another perspective – when arranging the exhibits in place, both in relation to each other and the exhibition facility. How can the exhibits be linked to each other, do they or their stories share similarities or could they, together, create a whole new story? And what kind of groups or pairs could they be arranged into and what would be the best way to showcase them?

The objects can also work as a method for becoming a group: you can tell a lot of things through an object and learn new things about your friend. Through classification and organisation, everyone's own exhibits become a part of the greater whole of exhibits and together they gain, yet again, new meanings. Coming up with a name for the exhibition, lighting the objects, recording them by taking pictures and, finally, making a summary, complete the picture of the exhibition process as a whole.

Everyone gets a chance to be the star of the Magic Carpet.

Cotton gloves turn you into a museum professional. The objects are re-examined in relation to each other and the exhibition space.

WHICH THINGS CAN A SINGLE ITEM REPRESENT?

- Work of art
- Cultural item
- Design object
- Activity object
- Personal item
- Technical/ industrial object
- Everyday item
- Historical product
- Part of an innovation chain
- Commercial product

You can study a single object from many perspectives!

The instructor's task is to listen and encourage

INSTRUCTION AND SUPPORT FOR PARTICIPATION

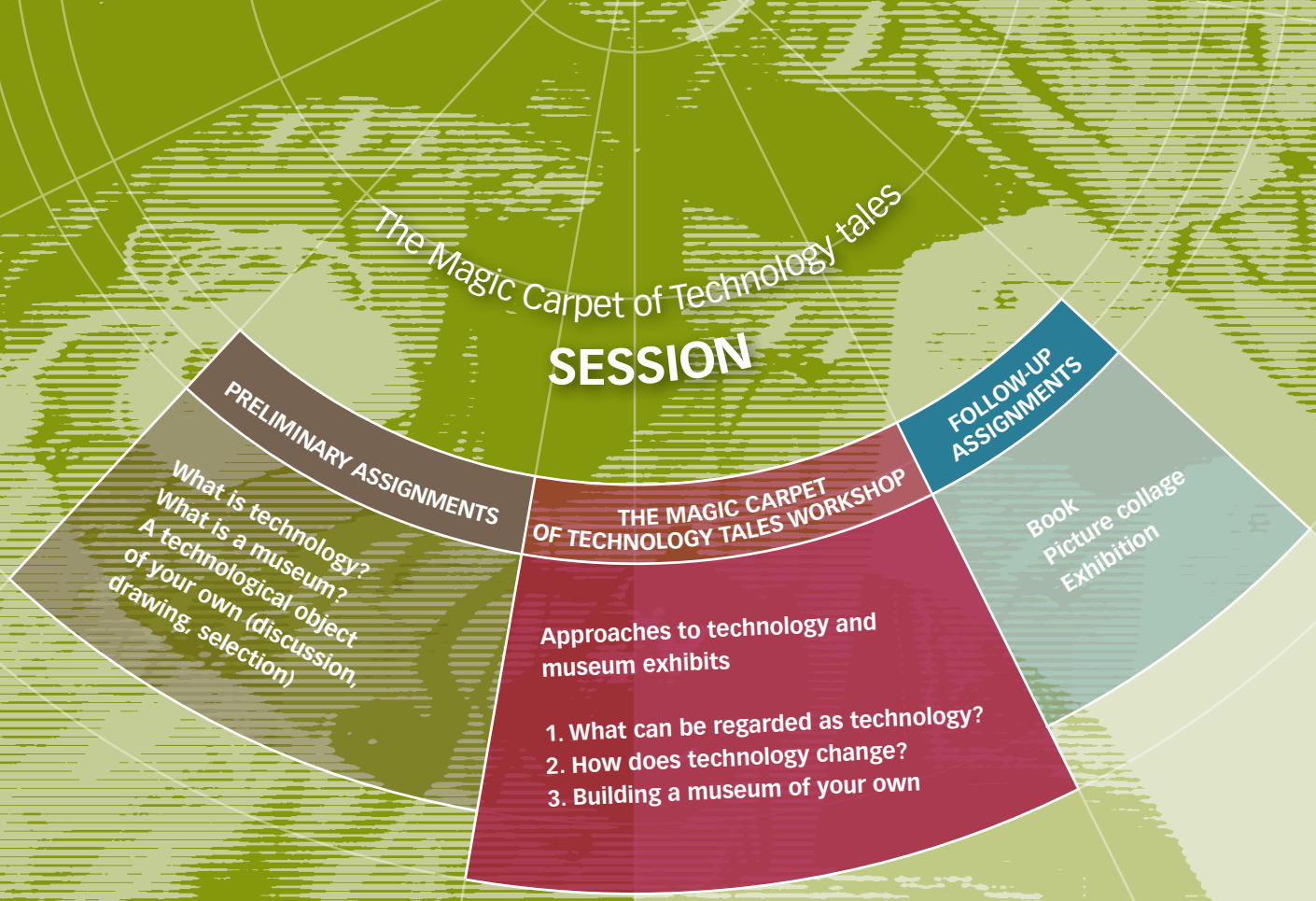
The children's own experiences and ideas of technology and museums are in the focus during the Story Carpet sessions. This starting point means that the instructor must be genuinely interested in the knowledge the children possess and have the skills needed to find it and stimulate new ideas from it. Keywords include a dialogic approach, group orientation and process qualities The goal is to inspire the children to make observations of their surrounding and objects, support their own assignment of meaning and reasoning skills and lead to making observations together. It is more important to start the learning process than to meet some predefined goals concerning content.

The structure of the the Magic Carpet sessions is quite broad and simple, with the aim of supporting the group-oriented approach. The sessions take shape according to each group and instructor, depending on the questions expressed and knowledge found in the group. As the sessions are never identical, the instructor must be present and listen, not to hurry, have solid expertise on the content, the skill to seize questions and ideas when they are expressed and the ability to build bridges between historic events.

The interaction between the group and the instructor and the instructor's ability to balance between the expertise of their own and that of the group are essential elements of the Magic Carpet session. Sometimes the instructor has to stimulate discussion, sometimes restrain or direct it; he/she offers information that complements the knowledge of the group and novel perspectives. The discussion topics can be very varied, and this should not be a cause for concern, as the goal is to perceive technology as a part of life, not to detach it from life. This means that perhaps discussing a gnarl and how it comes to be may, in connection to 'kuksa' cups, be an essential path that engages also participants who have not been active before. Any strange words that come up in the discussion offer an opportunity to learn new words and name concepts.

Discussion and learning are important methods on the Magic Carpet, but in addition to them, methods based on doing have a central role: touching, searching, finding, moving, showing, experimenting, arranging, photographing and lighting. The methods based on doing encourage the participation of many kinds of children, and it is important to hold on to these methods. In addition to the working methods, attention should be paid to the intensity of interaction and offering the more reserved participants the opportunity to get involved. For the instructor, a the Magic Carpet session is often easier to carry through when the group is active, but, similarly, those groups with a more reserved attitude have to be taken into account. In these situations, the instructor's task is to support the situation even more clearly and encourage involvement.

The instructor has a special task of helping the group to connect with the subject matter that has been planned and processed in advance and of which he/she is an expert. In addition to this, the task of the instructor is to support practising the other skills needed on the Magic Carpet, such as waiting for your turn and forming and expressing your own ideas and thoughts and giving reasons to support them. It is essential to support these efforts and be patient. Ask, encourage and be curious.



Carrying out a workshop

The Magic Carpet of Technology tales experience is divided into three parts:
1) **The preliminary assignment** that is completed at the day-care centre or school.
2) **The session on the the Magic Carpet** and
3) The optional **follow-up assignment**.

Many drawings feature the children's own inventions.

1. PRELIMINARY ASSIGNMENTS

The group has to complete the preliminary assignments before participating in a session on the the Magic Carpet. The goal of the preliminary assignments is to stimulate the children's ideas about technology and museums; the most important assignment is connected to the selection of their own objects. Instructions for the preliminary assignments are sent when the workshop is booked.

TIPS!
In connection with the discussion, you can use play in order to process the ideas of technology and a museum! It is a good idea to bring technological objects to be studied in order to stimulate discussion. The goal is to think of the concept of technology together with the children and the impacts that technology has, from their own starting point and understanding. "Right answers" are not what matters here, but stimulating ideas!

Preliminary assignments

- Stimulating ideas about technology and a museum.
- Processed at the day-care centre/school with the help of discussions, playing and drawing.
- At home, everyone selects an object they regard technical and want to place in a museum.

Discussion/game

- Discuss what "technology" may refer to and what kind of manifestations it has in everyday life. What do you think of when you hear the word technology? What is technology?
- Discussion on what "a museum" is and any possible museum experiences. What is a museum? Have you ever visited a museum? What kind of a museum?
- Which technical object would you like to place in a museum?

A good way of preparing for this part is to think about your own views of technology. More information is easily available online, using search words such as "technology" and "history of technology".

Drawing
Making name tags for the Magic Carpet session Draw a picture of something related to technology or museums on the name tag and write your name. You can continue drawing on a bigger piece of paper. You can also draw objects and things that you have come across during earlier discussions. Encourage the children to make their own inventions too!

Own object
At the end of the assignment, the children are given the home assignment of finding an object they regard technical and want to place in a museum. The teacher takes part in this assignment too! Everyone takes their own "museum exhibit" with them on the day of the Magic Carpet session the group's own museum to be set up! PLEASE NOTE! The objects will not be left on the Magic Carpet.

2. THE MAGIC CARPET OF TECHNOLOGY TALES SESSION

10–15 children can be seated around the Magic Carpet at a time. The Magic Carpet session takes **approximately two hours,** including a break for snacks (between Parts I and II).

GET ON THE CARPET/INTRODUCTION 15 min
Getting to know each and directing ideas to the subject matter.

At the museum: Meeting the group. Saying hello, introductions, short introduction of the workshop, the rules of the museum and the Magic Carpet. Getting ready to get on the carpet: the group takes off their shoes and outerwear at the coat racks and takes their nametags with them. Going towards the carpet together, at the same time making observations of the museum environment.

Outside the museum: Introducing the museum with words and pictures. Where is the museum located on the map? What do the surroundings and the museum island look like? What kinds of exhibits are showcased?

On the carpet: Children are directed to take a seat on the cushions. Remembering the things that the group has discussed in advance, looking at the nametags that have been prepared as a preliminary assignment and the ideas about technology and museums that you can see on them. What is your name? What did you draw? How did you come up with that? The instructor gives the drawings words in a larger context (for example a vehicle, a home appliance), possibly together with the kids and, if necessary, asks additional questions. This should be kept as concise as possible.

APPROACHES TO TECHNOLOGY AND MUSEUM OBJECTS 30-45 min

Deepening the understanding of technology and the properties of objects with the help of functional activities and activity objects. Two main themes have been selected for this part, and they can be complemented with related subthemes.

WHAT CAN BE REGARDED AS TECHNOLOGY? (15-25 min)
We will deepen our understanding of how broad a concept technology is with the help objects hidden inside the carpet. There are approximately 10–15 technical objects of different kinds and ages and made for different purposes of use, using different materials. There may well be more than one of the same object. Examples: horseshoe, printing block, fishing net weight, reflector, rubber boot, lock, zip fastening, different kinds of clothes pegs and xylitol chewing gum.

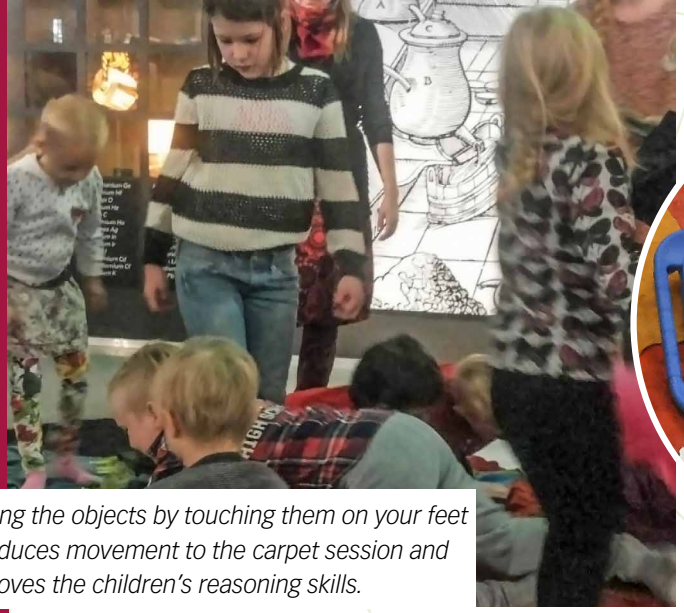
1) **Feeling the objects hidden inside the carpet and guessing what they are using the touch sense**

Direct the children to stand up and feel the carpet with their feet. When they find something, they should feel it carefully and try to guess what the object is. Children make guesses and the instructor can repeat or comment them and ask more about the objects.

Instructions to children: take care that, when you move about on the carpet, everyone gets to touch the items. Feel as many items as possible and guess what they are.

2) **Looking into the pockets and taking out the objects**

When all guesses have been made and the carpet has been thoroughly examined together, the instructor gives permission to take out the objects. Instructions for children: Please ensure that everyone gets to take out an object.



Finding the objects by touching them on your feet introduces movement to the carpet session and improves the children's reasoning skills.

Additional information can be hidden inside the Magic Carpet using mobile technology.

The discovered items are given to the instructor and once all have been found, the children are directed to get back on the cushions. The instructor places all the objects in the middle, so that everyone can see them.

3) Examining the objects found inside the carpet together

Were there any correct guesses? Are there any objects you do not recognise?

4) Dividing the objects into familiar and unfamiliar

The children are given the task of dividing the objects into familiar and unfamiliar objects. Instructions for children: Please make sure that everyone gets to move at least one object! There is a cloth divided into two colours underneath for the objects to be placed on. The idea is to concentrate on the purpose of use of the objects. If any of the objects are unfamiliar to some participants and recognised by others, these can be examined in more detail first.

5) Finding out what the unfamiliar objects are

Find out what the unfamiliar objects are. Make observations of the materials used in the objects and other properties that can be perceived and make guesses of what they could be. The instructor can give hints on the history, purpose of use or the name of the object to help in their identification and coming up with answers. It is also important to leave room for the things that the children know; if one of the children can identify an object that others do not know, let him/her tell the others what it is. It is also a good idea to make observations of the objects that the children already know and think of their uses and importance. The instructor can also share details about the history and mechanisms of these objects.

6) Redividing the objects: Which can be regarded as technology?

Redivide the objects based on which the children regard as being technology and which not. Study the division and the possible differences of opinion and discuss why all the objects could be considered technology. Additional questions: When and to whom each object is important? Are any of the objects unnecessary?

Using this assignment at the exhibition:

Find the objects inside the carpet, after which their stories, purposes of use and importance are examined together at the exhibition. Finding out what the objects are, where do the materials used come from, in which situations they could be needed and what kind of stories are connected to them. The objects can work as story-like introductions, for example: "And next, the horseshoe leads us into this direction..." Each child is assigned one object and he/she must take responsibility for the object. The objects can be drawn or the children may choose. The instructor can carry the remaining objects.

Using the assignment with augmented reality:

You can use augmented reality to help in identifying the objects.

EXAMPLE

The patterns on the Magic Carpet are trigger images for augmented reality that appears on a mobile device. Children look for the trigger images in small groups, one group at a time and make a guess of to which object the image or video that appears is a clue. The task is to take out the correct objects from the carpet, based on the clues. The Magic Carpet's images and videos have been connected to the following objects: horseshoe, printing block, fishing net weight.

Learning to recognise the differences in the phones from different periods and their uses.

HOW DOES TECHNOLOGY CHANGE? (15 MIN)

Six phones of a different age are used. The assignment is to date the phones, learn about their features and make calls on the phones.

1) Recognition by sound
The instructor asks the children to close their eyes and takes out three of the phones, one at a time, so that children cannot see them. While doing that, the instructor gives a sound signal of each phone (rotating the dialling disc, pulling out the antenna, bakelite phone bells). The task of the children is to listen to the sounds that the phones make, with their eyes closed, and try to identify which object is in question at each time. After the signals and guesses, everyone opens their eyes to see if the guesses were correct.

2) Examining the phones
Six phones of a different age are used. Demonstrating technical change through the features of the phones. What have you done with a phone? Do you think you can use all of these to play games/take photos/surf the Internet? Which ones can and which not? What do they have in common? Could you make a phone call with this phone? Can you show us how?

3) Putting the phones in chronological order
The phones are placed, one by one, on the time line. Which is the oldest? Indicate with your hand. Why?

4) Trying out the phones
Playing with the phones, trying them out and making up phone conversations in pairs or small groups so that everyone gets to try out the different phone. The phones can be arranged on the carpet as points for the children to go around. If the group is big, you can also get out more phones.

Shorter version
A shorter version can be done by using one of the phones as one of the objects in the previous assignment (What can be regarded as technology?) When, after the first assignment, the other objects are collected and put away, the phone is left out as an introduction to the theme of change. The transformation into the theme of change takes place by estimating the age of the telephone. Once the age has been discovered, with help from the instructor, a new phone is brought forward after the next and its age is estimated in relation to those already visible until all of the phones are placed on the timeline. The features of each phone are studied in the process. In the end, try out making calls on the phones.

EKSTRA 1
When technology develops, what happens with the old? What could a phone of the future look like?

EKSTRA 2
Let's travel in time using our imagination: what kind of phone conversations have people had on these phones? Have they been different from or similar to the present-day conversations? Let's play as if we are people from the past

One possibility for arranging the exhibits into groups is by their features: you can use the objects on the left hand side to take pictures; the objects on the right hand side have wheels.

You need precision to set up an exhibition and arrange the exhibits.

Lighting crew and documentarists at work.

Happy curators with their completed museum.

BUILDING A MUSEUM OF YOUR OWN

45 min

Let's create the group's own Museum of Technology on the Magic Carpet, using the objects the children have brought with them. Discussing museums in general and the children's own ideas of museums can be used to introduce setting up their own museum. At the museum, it is a great idea to visit the exhibition and see how museum objects are showcased.

1) Introducing the objects
All objects are placed in the middle of the carpet for everyone to see. Everyone is the expert of their own object and, on their turn, introduces it to the others. The others have the task of listening carefully. On their turn, everyone stands up, picks up their object and tells about it. The instructor asks defining questions: What is it? Who does it belong to? How old is it? Why do you regard it as technology and what makes it a museum object? How did you come up with the idea of bringing it? After the introduction, the object is put back in the middle.

2) Becoming a member of museum staff
The instructor hands out cotton gloves to everyone and describes their importance in the work at a museum. As the children put on the gloves, they turn into museum staff and the objects into museum exhibits. While this happens, they are reminded that museum exhibits must be handled with care.

3) Dividing the objects into groups
The objects are divided into groups for the exhibition. What kind of objects could be connected to each other and why? What kind of groups or pairs could we arrange? Use your imagination! An alternative approach is to set up the exhibition around a story: What kind of a story could the objects tell together?

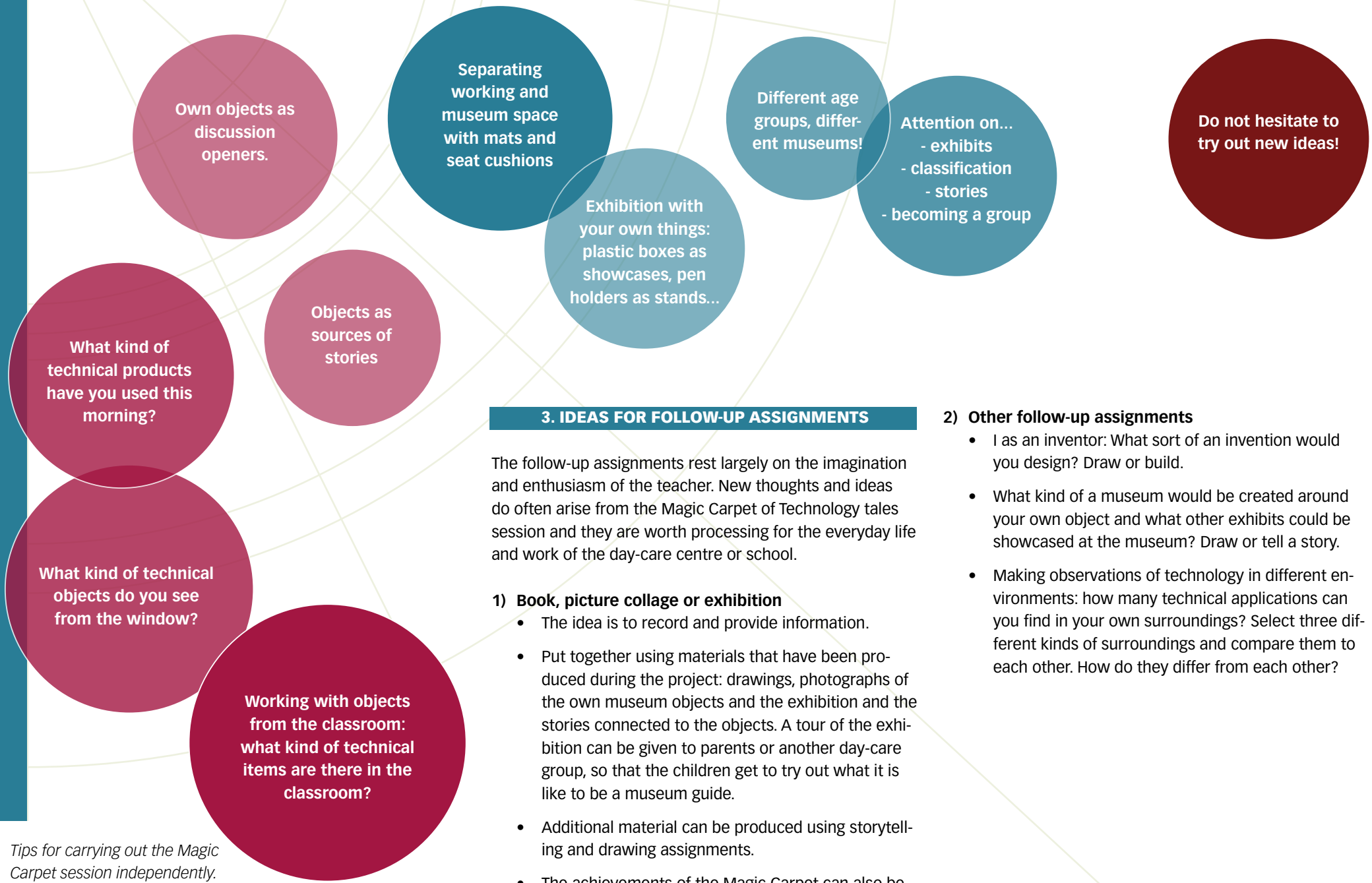
4) Placing the exhibits in the space
The children arrange the exhibits as groups in the space provided. How would they be best showcased? Showcases are used in the organisation of the exhibition for those exhibits that need to be protected or should not be touched as well as stands for some of the objects. After all the exhibits have been put into place, the exhibition is reviewed together to see if the children think changes should be made and the necessary adjustments are carried out.

5) Name and story
What could be the name of the exhibition? And could the exhibition tell a story; if so, what kind? As an alternative, you can go over the story made up of the objects and come up with a name for the exhibition and story.

6) Lighting and recording
Once the exhibition is ready, the lighting is completed and the exhibition is photographed. The group should be divided into photographers and lighting technicians, so that everyone gets to try out taking photographs and lighting the exhibits. For example, each child could take one picture. The photographer can request the lighting crew to create spot lighting. The instructor takes a group picture of the group and the exhibition.

7) Taking the exhibition down and workshop conclusion
The exhibition is taken down in an organised manner, a few children at a time. The conclusion of the workshop can be carried out before the exhibition is taken down by going through what was best about the workshop and exchanging mutual thanks.

After the workshop
The instructor sends the photos taken by the group to the teacher. Dropbox is a great tool for this.



Tips for carrying out the Magic Carpet session independently.

3. IDEAS FOR FOLLOW-UP ASSIGNMENTS

The follow-up assignments rest largely on the imagination and enthusiasm of the teacher. New thoughts and ideas do often arise from the Magic Carpet of Technology tales session and they are worth processing for the everyday life and work of the day-care centre or school.

1) Book, picture collage or exhibition

- The idea is to record and provide information.
- Put together using materials that have been produced during the project: drawings, photographs of the own museum objects and the exhibition and the stories connected to the objects. A tour of the exhibition can be given to parents or another day-care group, so that the children get to try out what it is like to be a museum guide.
- Additional material can be produced using storytelling and drawing assignments.
- The achievements of the Magic Carpet can also be collected by recording children's ideas about technology and museums after the project: any changes in the thoughts?

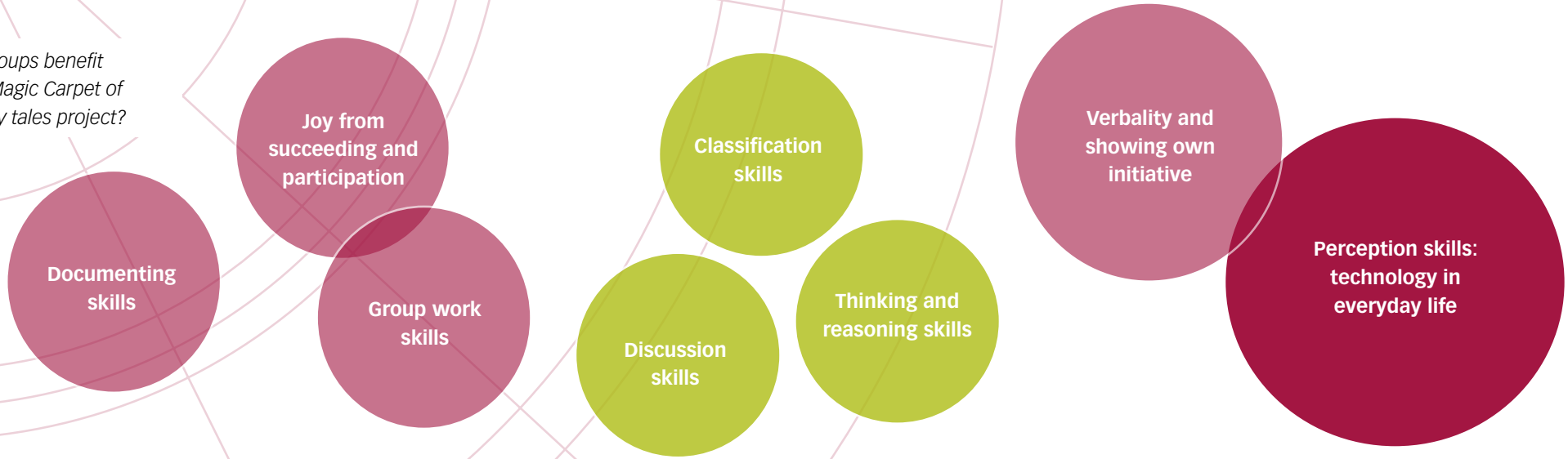
2) Other follow-up assignments

- I as an inventor: What sort of an invention would you design? Draw or build.
- What kind of a museum would be created around your own object and what other exhibits could be showcased at the museum? Draw or tell a story.
- Making observations of technology in different environments: how many technical applications can you find in your own surroundings? Select three different kinds of surroundings and compare them to each other. How do they differ from each other?

Preschool children from the Metsäpolku Day-care Centre with a completed museum.

Conclusion

How do groups benefit from the Magic Carpet of Technology tales project?



WHAT KIND OF IMPACTS DO THE MAGIC CARPET ACTIVITIES HAVE?

The production process of the Magic Carpet of Technology tales as a whole, and later the operational model, has been a winding path, but also very rewarding. the Magic Carpet has visited day-care centres, and schools, as well as libraries and many kinds of events. A wide array of audience experiences has been collected on the Magic Carpet. What is particularly rewarding is that t the Magic Carpet activities have had, even at this point, tangible effects on the everyday life of visitor groups.

Early childhood educator Kirsi Rehunen from the Metsäpolku Day-care Centre in the village of Taipalsaari participated in the steering group of the Pienten Paja Project. She explains how the Magic Carpet project has affected the everyday life of her preschool group: inspired by the Magic Carpet sessions, Fridays are now Technology Days or Treasure Days at the day-care centre. Children bring along treasures and technical objects which are used to set up museums. The children catalogue the objects into associated classes and showcase the museum to each other as experts.

Kirsi thinks that the Technology Days develop the thinking and categorisation skills of children (dividing objects into groups based on the method of operation, for example) and teach them to make observations about technology in their surroundings and discuss and express their opinions on the subject. According to Kirsi's experiences, Technology Days are particularly successful as recurring events, and, through them, children become engaged in planning the operations of the day-care centre. A child might not grasp the idea of a theme at the first time, but thinking gradually develops and the child plans, gets new ideas and, for the next event already, he/she might bring a technical object and demonstrate it eagerly. When offered a chance to think about and study technology independently, it is possible to inspire even those children who are usually less eager to participate.

Families have also noticed The Technology Days at home. Kirsi says that she has noticed how the kids have active conversations at home with their families about technology and technical objects before the "Treasure Days". The children plan what kind of technological manifestation of technology they will take to the next "Technology Day" and they are excited to drop hints in advance and make guesses about the items.

The Magic Carpet and Technology Day events have ever since been used at the Metsäpolku Day-care Centre for introducing new preschoolers and integrating them into the group: the pupils moving on to first grade have brought objects to the carpet on orientation day and also showcased preschool activities and Technology Days to future preschoolers.

DIFFERENT TARGET GROUPS – NEW OPERATIONAL LEVELS

Even though the Magic Carpet of Technology tales operational model has been primarily designed for children in the early childhood education phase, the Magic Carpet method has been tested with many other target groups as well during the project. The results have been positive and they indicate that, with certain changes, the operational model can be adjusted to the technological education activities of a number of different target groups.

Within the project, the Magic Carpet sessions have been tested out with 4-5-year-olds in a slightly shorter and more

Adult groups find tools for interaction and sense of community on the Magic Carpet.

Members of the Pienten Paja Project's steering group on the the Magic Carpet.

concise format. It has been discovered that this version, taking technological education to a very young target group, works well: the younger children were genuinely enthusiastic on the carpet and the teachers submitted positive feedback especially of the activity elements of the carpet: identifying the hidden objects by feeling them by feet, the phone activity in the 'how technology works' part and how happy the children were to succeed and participate when bringing their own exhibit from home and showcasing it to their friends.

The feedback also largely praised the theme, as it has helped to raise the topic of technology in the larger scale as a part of the groups' activities. It was considered amazing how much more actively children, especially those for whom Finnish is a second language, have taken part, expressed themselves verbally and shown initiative in the everyday activities at the day-care centre after the Magic Carpet session.

In addition to child groups, a number of adult groups have come to learn about the Magic Carpet activities: mostly museum professionals, (future) educators and museum pedagogues.

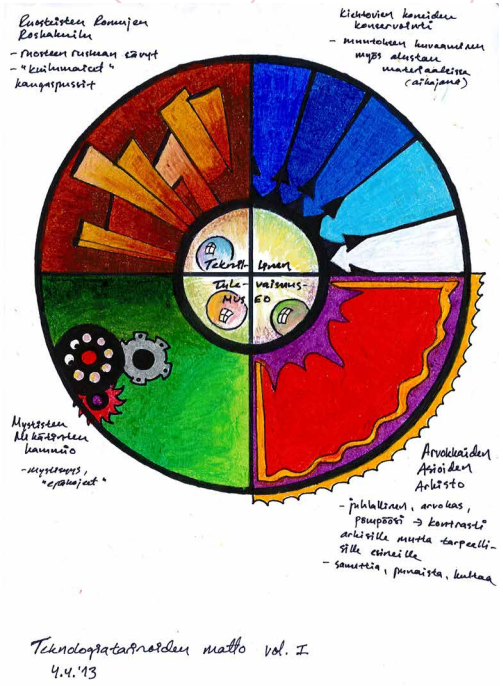
The adult groups possess better abilities to tell about the objects and make creative connections of the knowledge they have than the child groups, so with adult groups the storytelling aspect of the Magic Carpet sessions reaches a whole new level. If, with the child groups, the focus is on observations and activities, with adults the objects they have brought in and the connected experiences come into focus when the objects are studied and the exhibition set up; through discussion and interaction, these are processed into a single, larger story for the Magic Carpet exhibition.

The different kinds of adult groups bring along their own backgrounds and experiences onto the Magic Carpet: the topics brought up on the carpet include, for example, the similarities between the human eye and a camera lens, reminiscing about first phones of their own, thinking of the amount of media infrastructure, audio landscape and activity functions required for an exhibition.

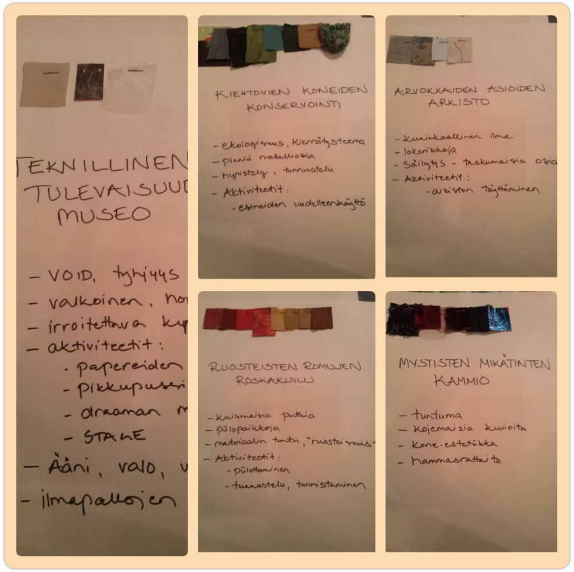
It is also interesting to learn what the different groups take with them from the carpet. For the adult groups, it seems important to be able to share your own knowledge, experiences, memories, stories and even emotions: through the exhibit they bring, everyone has the chance to tell something about themselves and their history without the story getting too up, close and personal. The object frees you to tell the story from an adequate distance. This also seems to promote becoming a group: people who do not know each other and possibly come from different cultures and backgrounds find common memories and stories to share with the help of the objects.

For students of education, the carpet sessions have been beneficial in picturing what a target group of children would do and think. By explaining the hustle and bustle that takes place on the carpet with a child group, the thoughts and ponderings of children concerning technology and the museum, the pedagogic goals of the Magic Carpet project are explained and so are the ideas behind the many kinds of methods.

Planning of a Magic Carpet method that will visit sheltered housing facilities at the activity clubs of the elderly. The emphasis of this version is on discussion, sense of community and telling stories. The stories of the participants' own objects are the basis for discussion and the exhibition that is produced together. The intention is to digitise and record



The first draft of the the Magic Carpet of Technology tales and plan for materials



the exhibitions and stories connected to the objects in the collections of the Museum of Technology.

IN CONCLUSION

The role of the Magic Carpet of Technology tales as a testing platform of the pedagogic contents and methods of the Museum of Technology in the Pienten Paja Project has actually exceeded what was estimated in advance. Through the day-care centre groups, adult groups and observed research groups, interesting insight has been collected on the development of operational practices and methods, for the model of child-oriented museum activities and adjusting the services to different target groups. With the processing of the Magic Carpet method, a new kind of opportunity has been opened up for evaluating the development process of a pedagogic product throughout its entire life cycle.
It has been discovered that the Magic Carpet works very well in its basic use, as a technological education platform for children in the early childhood education phase (pre-primary and grades 1 and 2), but with the adaptations required for the case in question, it is also suitable for pedagogic activities in other contexts and with very diverse target groups.

Hopefully, this operational model will inspire the readers to try out the the Magic Carpet of Technology tales method in yet again new operational environments and with new kinds of groups!

LINKS

Pienten Paja blog:
pientenpaja.wordpress.com

Article: Towards children's creative museum engagement and collaborative sense-making.
http://www.tandfonline.com/doi/abs/10.1080/14626268.2014.904370

Introductory video of the Magic Carpet of Technology tales
https://www.youtube.com/watch?v=N1tvMadVrzM

The Magic Carpet of Technology tales instructions
https://prezi.com/wbsqyslbkzcx/tekniikan-tarinamatolla-toimintaohje/

Phases of the the Magic Carpet of Technology tales
https://prezi.com/2rgmx1g4pjrr/tarinamaton-vaiheet/

Museum in supporting early childhood education presentation:
https://prezi.com/9_4qpov4e5n2/pienten-paja/

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