



Digital  
Heritage  
Center

# know how books

individual knowledge transfer

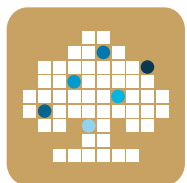
Editor: Halina Gottlieb

Halina Gottlieb

## ***Ten Innovations***

For Museums, Academia and  
Creative Industries









Halina Gottlieb

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books

# ***Ten Innovations***

For Museums, Academia and  
Creative Industries

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Digital Heritage Center



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## Know-How Books – The Individual Knowledge Transfer Series

*Ten Innovations for Museums, Academia and Creative Industries* is the first know-how book in the *Individual Knowledge Transfer* series that will focus on the sharing and exchange of knowledge, practices and skills between academia, society and industry. The series will continue with contributions from members of the **Culture KICK** network that joins together researchers from Denmark, Finland, Iceland, Norway and Sweden, that cover a broad range of expertise (including humanities and social sciences, media and information technology, as well as arts and design) and have a solid experience of collaboration with cultural heritage institutions and SMEs from creative industries.

The **Individual Knowledge Transfer** series is published within the **Nordic Knowledge Triangle Network** project with the kind support of the **Nordic Council of Ministers**. The concept of Knowledge Triangle captures the interplay between education – research – and innovation. During 2012-2014, The Nordic Council of Ministers will concentrate its efforts on establishing a network of Nordic universities and colleges that will contribute to stimulating the collaborations between academia and society, as well as to increasing knowledge exchange in relation to commercialization and innovation.

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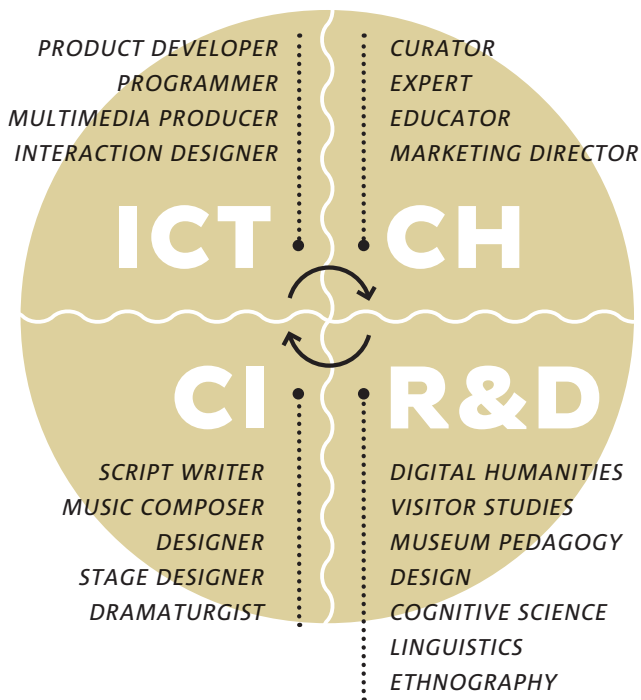


# *Digital Heritage Center*

History, Mission, Achievements and Future

## DIGITAL HERITAGE CENTER

### Interdisciplinary collaborations



The Digital Heritage Center collaborates with a large network of researchers, SMEs, governmental agencies, academia, museums, science centres, artists, designers and creators, regional and national heritage boards, libraries and other memory institutions in Europe, South-East Asia and Pacific.

#### A teamwork

- ◆ an interdisciplinary process that connects Information and Communication Technology (ICT), Cultural Heritage (CH), research and development (R&D) and Creative Industries (CI)
- ◆ flexibility and tolerance
- ◆ investigators, not experts
- ◆ long work process

#### The Digital Heritage Center

- ◆ is part of Swedish ICT research at The Interactive Institute
- ◆ relies on a wide European network of researchers, artists and creators, cultural heritage professionals, ICT industries, SMEs, researchers
- ◆ participates in several international research collaborations
- ◆ co-ordinates DIHA (Digital Intangible Heritage in Asia) in collaboration with Nanyang Technological University Singapore
- ◆ was member of EPOCH (European Network of Excellence in Open Cultural Heritage) where it was also represented in the board of this European Excellence Network

## Digital Heritage Center – Innovations for Museums, Academia and Creative Industries

### Brief History

In 1999 Halina Gottlieb has founded the **Digital Heritage Center** which is the **first European expertise centre** to offer **research, services and solutions** for supporting the implementation of **digital technologies and innovations in the field of cultural heritage**, as a mean to enhance cultural experiences.

First known under the name of Vision for Museums, the Digital Heritage Center is a spin-off from The Interactive Institute in Stockholm (Sweden). The Interactive Institute is an experimental IT research institute that combines expertise in art, design, humanities and information technology with the purpose of conducting world leading applied research.

### Areas of activity and mission

In the course of her long career in the field, that spans over almost two decades, Halina Gottlieb has led and assisted the conception, development and evaluation of numerous **digital prototypes aimed at improving the communication, experience and understanding of cultural content in museum environments**. While collaborating with world leading scientists and talented artists, she has pioneered, together with her cross-disciplinary team at the Digital Heritage Center, numerous innovative solutions directed at supporting the implementation of digital technologies in art

and science museums, as well as developed new academic curricula.

Besides the development of the actual prototypes and the modelling of advanced media tools for improving visitors' interpretation and communication in museums, these innovations include also **services, methods and practices to assist stakeholders** (culture professionals, educators, SMEs in the ICT and creative industries, policy makers) in the transfer of the newly created knowledge and know-how.

This latter area of activity resonates with one of the primary objectives that Halina Gottlieb pursued as a director of the Digital Heritage Center, namely that of bridging the gap between professionals and researchers in the fields of Cultural Heritage, the ICT industry, as well as Creative Industries and individual creators. Among the actions conducted in order to further this important objective, one may count academic and on-site courses, practical seminars, research and thematic clusters, workshops and research meetings with the participation of stakeholders, interdisciplinary and international conferences, incubator programmes, as well as the publication of research studies, support materials and know-how books.

Over the years, the Digital Heritage Center has grown into a veritable **expertise centre in digital cultural heritage** and has channelled its efforts

towards the development of regional competences in the field, assisting in the process of **transferring new knowledge and the sharing of best practices** concerning the usage of new technologies for cultural heritage purposes. As a consequence, the centre was and continues to be involved – locally, as well as internationally – in the development of research clusters at universities and R&D institutes and supports vocational training within digital heritage.

## Visitors 21-st century – Digital artefacts for cultural heritage



## Digital Heritage Center Initiatives and achievements

As a programme manager at the Interactive Institute and Vision for Museums, and then as a director of the Digital Heritage Center, Halina Gottlieb has promoted and initiated a significant number of projects, activities, and services, of which the most notable are

- The development of several **interface prototypes for interpretive use** and innovative communication with visitors
- The design of a number of **research methodologies**, aimed at the preliminary, formative and summative assessment of digital artefacts and their **cognitive and aesthetic impact on visitors in different museum environments**
- The creation of a **Visitor-Study Lab – a mobile research station** for capturing the engaging experience of visitors and interaction modes of digital interfaces
- The creation of an **experimental laboratory** for the gradual **testing of prototypes** as their development process unfolded
- The organisation of the Interactive Salon, an **international traveling exhibition** that showcased research prototypes and ICT products and occasioned collaborative and formative activities with **broad stakeholder participation**

- The foundation of the **interdisciplinary conference NODEM** (Nordic Digital Excellence in Museums) that connects stakeholders from academia, museums, ICT and SMEs in a community of about 1000 active members

- The publication of 10 **know-how books** illustrating and documenting, **step-by-step, with practical and functional information**, the development of successful projects involving the implementation of digital technologies in cultural heritage sites

- The elaboration of **new academic curricula**, such as “New Technologies and the Exhibitions” (2003-2005)

- The creation of a **model for a knowledge bank** to assist culture professionals and interested stakeholders in their envisaged projects in the field

- The organisation of **vocational training packages** (modelled 2003-2005) aimed at forming competence centre leaders

- The development of a **model for an Incubator programme** directed at assisting companies in the creative industry sector in their start-up stage

- The development, in collaboration with the Nanyang Technological University in Singapore, of the **DIHA (Digital Intangible Heritage in Asia) research cluster**

## The Digital Heritage Center in the Future

The Digital Heritage Center will continue to develop and expand the interdisciplinary and cross-sectoral approach endorsed so far. Its **methodological and theoretical framework will be augmented** by recruiting related fields such as **cognitive and affective sciences**, or **cognitive semiotics** – a younger discipline entirely dedicated to furthering a thorough understanding of meaning-making processes across modalities and communication channels.

One area of study that will receive particular attention from the research team at the Digital Heritage Center is that of **intangible cultural heritage**. Our ambition is to investigate several components of intangible cultural heritage from a variety of perspectives.

We will continue to support the process of **knowledge exchange and knowledge transfer** in the field of digital heritage, by developing, among other things, a flexible transfer system that will be customized to suit the specific needs, ambitions and requirements of the various stakeholders.

The Digital Heritage Center will deploy significant efforts for transferring the experience accumulated after a decade of laboratory experimentation and prototyping to the field. We will focus primarily on **museum design** and on providing a **framework for interpretive content** for new museums.



*Section I*

## ***How to design an engaging exhibition?***

Five research-based innovations for design  
in museum environments





▲  
The development, step-by-step, of „Touch of Kandinsky” – an interactive and synesthetic installation inspired by Kandinsky’s painting „Grouping” from 1937

In her research conducted at the Digital Heritage Center, Halina Gottlieb has focused on interpretive uses of digital media aimed at **enhancing engagement and intellectual accessibility for visitors**. She explored and developed human–computer interfaces, as well as digitally informed approaches to conceptualising content for interpretation within art and science museum contexts. Halina has further investigated which aspects of both interfaces and content of digital media are most effective, in terms of design goals as well as evaluation of results. For this purposes, her investigation has focused primarily on the digital heritage artefacts (DHAs) that were developed and evaluated within the scope of her research.

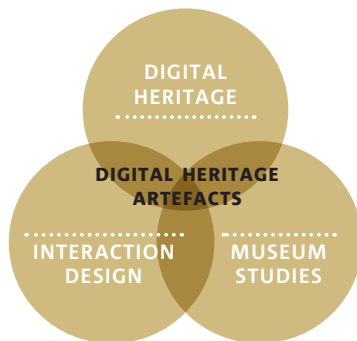
### Digital Heritage Artefacts (DHAs)

DHA is a concept meant to capture a specific type of **experimental prototype for interpreting art and culture**. The aim of DHAs is to **create engaging experiences** and to **facilitate a two-way communication** between the museum and the visitor. This type of digital artefact is primarily designed to be displayed on location in a museum exhibition space. However, it is often possible and beneficial to link these digital artefacts to secondary, external contexts, such as schools, cinemas, shopping malls and subway systems. The concept of DHAs as experimental prototypes is the result of a long process, aimed at meaningfully **integrating the interpretive aspect of digital heritage with the new and growing field of interaction design**.



## Exploratory and Interdisciplinary Approach

This innovative approach relies on concepts from the **interaction-design** field that were recruited in order to conduct exploratory and interdisciplinary research. Halina Gottlieb has also explored concepts for **interpretive content** inspired by the **constructivist theory of learning** adopted by post-modern museum pedagogy in their ability to enhance intellectual accessibility for visitors.



## Design-oriented research

The design-oriented research commonly used in the field of human-computer interaction and interaction design is characterised by the **design, implementation and evaluation of functional prototypes** in order to conceive novel applications of technology, styles of interaction/communication, and interface solutions. The knowledge that

comes from studying a prototype in use or from the process of prototype creation is usually seen as the main knowledge contribution, while the prototype itself is more of a means to an end. This methodology provides a framework that facilitates the **exploration of possibilities and solutions outside of current paradigms** for a particular problem setting, whether these are paradigms of style, technology or economic boundaries. Using museum exhibitions as a scenario for her studies, Halina has demonstrated that there is great potential in the application of familiar designed interfaces to experiential activities that augment visitor engagement in art and culture.

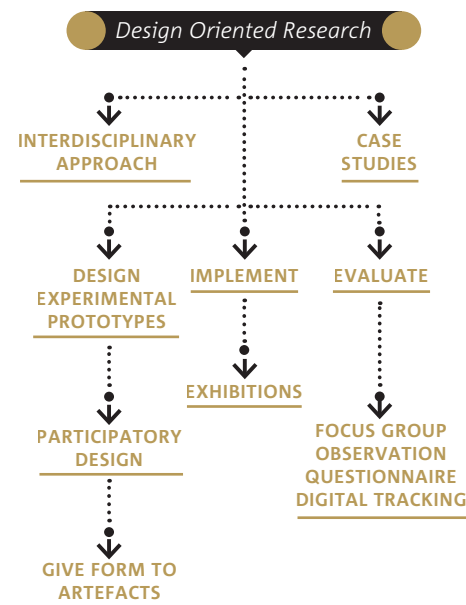
## Practice-based research

Previous studies in the field have primarily focused on learning outcomes and technological considerations. In her novel approach, Halina makes a direct and active engagement in the field through the **design, implementation and critical evaluation** of a set of bespoke prototypes in use in museums. The academic argument in this practice-based approach is thus developed through the **analysis of experimental prototypes**, and through the **study of their impact** on users. The findings derived from this practice-based approach show that digital heritage artefacts have a stronger positive impact on visitor engagement than traditional multimedia kiosks.

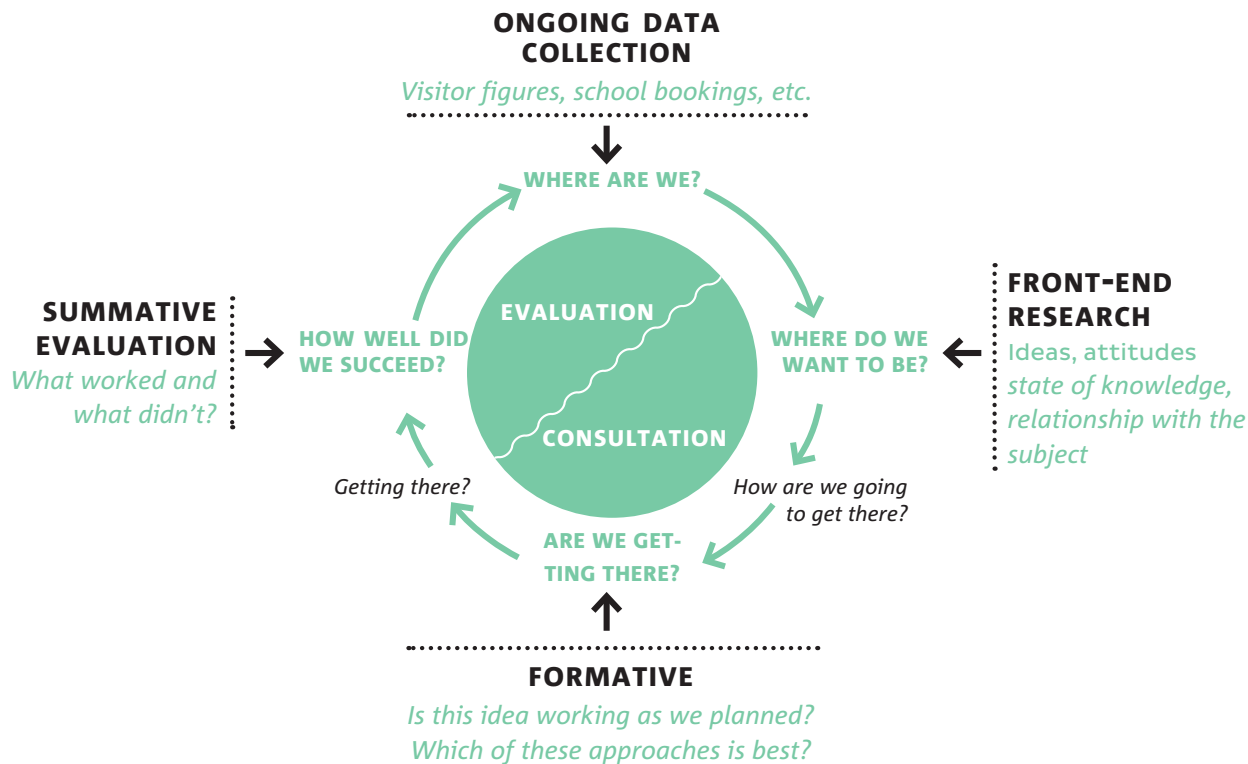
## Research Advantages

Research can benefit the design of a successful exhibition or can help improving an existing one in a variety of ways: through visitor studies, through

research conducted with cultural professionals, but also through research directed at informing the actual design, and especially the interpretive content, as well as the creation of new interaction or presentation modes by adapting and applying theories, tools and practices developed in other areas of study.



## The Visitor Studies Planning Wheel



1.

## How to shape the original vision of an exhibition together with the visitors

### Cultural probes as front-end evaluation

One relevant technique that provides inspiration and support for researchers and designers is the use of Cultural Probes (Gaver et al., 1999\*). This method was tested by Halina Gottlieb in re-designing an audio guide for children at the National Museum in Stockholm, as well as in designing the content and interface for “Touch of Kandinsky” with the Museum of Modern Art in Stockholm.

\* GAVER W., DUNNE A., PACENTI E., 1999. CULTURAL PROBES. INTERACTIONS 6(1): 21–29

### Bridging interactive design and museum studies

Cultural probing is an experimental development method that helps in **gathering information for design inspiration** when looking for **new interfaces, new interaction modes** and **research insight** arranged in real environments. Cultural probing is deployed in the **initial stage of prototype development** with the purpose of consulting the visitor about relevant aspects of an envisaged concept.

While the **cultural probe concerns the design** aspect of a digital artefact, **front-end evaluation** is about **consultation with visitors on the whole concept**, including interface, interaction mode and interpretive concept. One of the most insightful

advantages of front-end studies is that they force us to question our assumptions about visitors, about their understanding, attitudes and beliefs; about how people learn and why they come to museums in the first place; and about our accustomed approaches to exhibit and program design.

### Visitor identity

With the advent of new paradigms in cultural heritage thinking, the **visitor becomes a central component of the museum experience**. The post-modern conception of museum design places great weight on creating **customized experiences** that tap into **visitors’ identity** – their interests and knowledge, their preferences, goals and needs. Integrating research tools from the field of **interaction design and museum studies**, this novel approach yields valuable insights into visitor behaviour, attitudes and motivation in relation to visiting museums, but also into the knowledge and interests of the visitor in relation to the specific topic of an envisaged project. It may probe a variety of relevant variables, such as visitors’ understanding, preconceptions, or familiarity with the subject of the exhibition.

### Advantages of cultural probing

By systematically accessing such vital data, this method provides a valuable tool for improving the design of exhibitions and programmes. Visitor feedback can be thus incorporated into the

development process **before investing too many resources** into a project. As such, it constitutes a first step towards guaranteeing the success of a planned exhibition and opens a conversation between museum staff and advisors, between visitors and the subject matter. Beyond the very punctual benefits related to the development of the project in focus, cultural probing has also **long-term benefits**, whereby systematic knowledge is gathered about various target groups in relation to a variety of topics, contexts, interfaces and interaction modes.

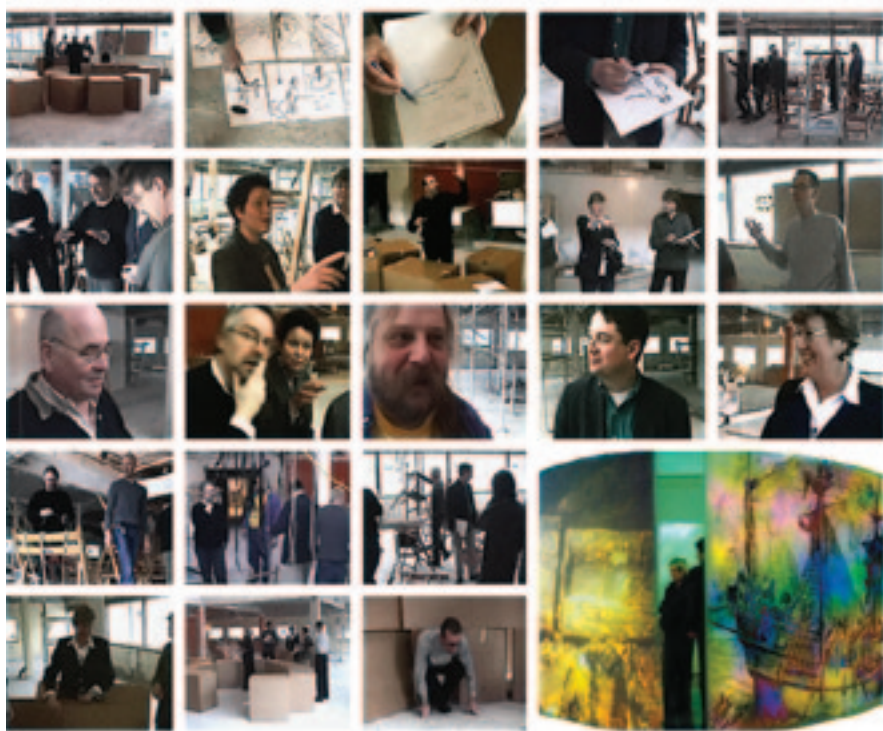
### Example and implementation

Cultural probes were, for instance, used in the project **Storytelling Animals** at the National Museum in Stockholm, where young visitors were invited to participate in an exploratory workshop. The purpose of the workshop was to find out what children thought about digital museum guides as an interpretive concept, interface and mode of interaction, and to get perhaps unexpected ideas about digital guides from this interaction. The participants were asked to test and discuss different objects as potential museum guides, and to try to contextualise this in terms of an individual visit or a group visit. This workshop helped greatly in clarifying an outline for the prototype.









▲ Through collaborative work, brainstormings and exploratory workshops with stakeholders, a vision materializes gradually in the making of the „Eyewall” – a new exhibit stage for multisensory interaction.

## Creative Stages In Prototype Development

### VISION

*Conceptual  
shaping*



### OPERATIVE IMAGE

*Vision is  
externalized*



### SPECIFI- CATION

*Vision takes  
final shape*

## 2. How to visualize the concept of an exhibition by including the perspective of museum professionals and visitors

### Multidisciplinary and interdisciplinary approach

One crucial aspect that characterizes Halina Gottlieb's research is that it is grounded on **multidisciplinary and interdisciplinary collaborations**. Halina's research comprises a collection of projects that were developed in an environment (Digital Heritage Center / The Interactive Institute) that operates within the **borderland between art, culture, technology and design**.

The development of digital technologies for museum environments touches upon several knowledge areas, such as **digital heritage, interaction design and museum studies**, and organisations such as **memory institutions, academia, creative and IT industries and research institutes**.

The primary objective driving this research was to explore how technology can be utilised to enhance engagement when experiencing art and to gain a better understanding of the interaction between technology and art. In this context, it was equally important to investigate what processes give rise to **successful communication tools for museums** – in terms of policy, interdisciplinary collaboration, knowledge transfer and incubators for SMEs – and how to implement them.

Halina Gottlieb has conducted her research in the form of **case studies**, in which **museum practitioners and researchers could collaboratively** explore design ideas related to ongoing local exhibition projects. Professionals from the cultural heritage

sector were invited to creative experimental workshops and brainstorming sessions with multidisciplinary attendees.

### Exploratory workshops

Since the **visualisation of the concept is an organic process of research and exploration** that rests on collaborative efforts, it is vital to include, throughout the development of a prototype, the point of view of museum professionals. Exploratory workshops were incorporated into each project as a natural and essential part of the work process. A workshop in this context is a **creative process** where a number of people collaborate in an informal way within a pre-planned theme towards a pre-planned task related to a given prototype. Participants in a workshop must give form to its content in some way. During this process, it is advantageous for all participants to change from experts to explorers and to look at possibilities that open up from a joint reflection of competencies. A coordinator is responsible for ensuring that each participant's input is given equal consideration.

The workshops' purpose within the particular research described here was to create **collaboration between parties** from research studios, professionals from the cultural-heritage sector (particularly museums educators), professionals from creative industries and software developers. The starting point was to bring together people with a wide range of competencies and create a meeting

place where a concept would be discussed. In this context, it is also important to confront museum exhibition concepts with competencies from other public media. One goal was to find out whether environments from the traditional entertainment industry could offer museums new approaches to public relations. The workshop format gives participants an opportunity to make contact with people from other experience-oriented industries and gain insights into projects in other public spaces.

### Advantages of the approach

This approach enables all stakeholders (museum professionals, educators, representatives of creative industries, artists, designers) to **experience the ideas and concepts by themselves**, to reflect on the research and elaboration process, to get familiarized with new ways of visualizing innovative concepts for the use of digital media, and enrich the process of creation with insights from their own perspectives. Formative evaluation is conducted also for **identifying difficulties visitors may have** with using, accessing or understanding an exhibit or a collection of exhibits. Research carried out during the development stage helps in finding and establishing a meaningful dialogue with visitors. In more concrete terms, it assists in finding adequate ways to engage the visitors by relating to their own interests, and by anchoring novel content to already existing references in their everyday lives.

## Summative Evaluation – Use Qualities Method



The field of **interaction design** specific to information technology provides useful concepts for digital heritage research. Valuable insights can be gained by discussing digital artefacts in terms of their **use qualities**. In this context, it is meaningful to address primarily those **properties that enhance visitor engagement** with the subject matter of a digital artefact and the overall theme of the exhibition. A first difficulty that arises, however, in this type of research resides in identifying the use qualities that are most relevant to the specific knowledge domain in focus and, then, measuring them objectively. In the approach modelled for the purposes of her research, Halina Gottlieb has adapted to the purposes and requirements of DHAs the taxonomy proposed by Löwgren and Stolterman\* (2004) in their study of IT artefacts.

The approach to **understanding digital heritage artefacts from an interaction design perspective** reminds us that the structure and functionality of digital artefacts also involve an aesthetic experience, and that this should be considered when designing interpretive processes connected to digital media in exhibitions and heritage sites. Being in the position of designing these aesthetic experiences and interpretations as a meeting between museum professionals and visitors, the need emerges to translate the fluid and vibrant forms of interpretation into multiple possible interactions with digital artefacts. The main question becomes how to design the aesthetics of interpretation into digital heritage artefacts. Consideration should also be given to the structure of points of entry and access,



## 3.

## How to evaluate visitors' direct experience of content and interfaces

### Use qualities method from interaction design

to revealing thematic meanings by providing different viewpoints to the issue in question, to building relations with visitors' everyday experiences and to building a dialogue of validation and exchange between diverging visitor interpretations and museum professionals and curators.

\* LOWGREN J., STOLTERMAN E. 2004. THOUGHTFUL INTERACTION DESIGN – A DESIGN PERSPECTIVE ON INFORMATION TECHNOLOGY. CAMBRIDGE, MASSACHUSETTS: THE MIT PRESS.

#### Evaluated qualities

Use qualities studies would typically measure aspects related to how **motivating** and **'seducing'** an exhibit appears to be to the visitors, how **'playable'** it is, how it relates to **visitors' own interests and everyday references**, to what extent it can provide a **social action space**, promoting **meaningful interactions** with other visitors. Other aspects may concern the **degree of flexibility, fluency or autonomy** of a given interface in the hands of the visitors, as well as **structural qualities**, such as intuitiveness and accessibility, but also **content-related features** such as the complexity of the meaning that emerges in the interaction between the visitor-the exhibition-other visitors.

#### Methodological implementation

Digital artefacts were evaluated in the relevant

museum environments in collaboration with museum educators, curators, researchers and partners from the IT industry.

The main field studies were conducted at the ambulating exhibition "Interactive Salon", which took place in 2006–2009. Four digital artefacts – "Touch of Kandinsky", "Access in Mind", "Electro Bacchanalia" and "Old Masters Paintbrushes" – were evaluated in this context.

In order to establish which use qualities are most relevant for digital heritage artefacts, a quantitative method was selected. This took the form of a **questionnaire survey**, designed to give a broad picture of the visitor experience and levels of engagement.

The data collected in these settings have revealed that the **most effective use qualities** for the purposes of engagement with interpretive content and intellectual accessibility are those that connect to a **user's sense of motivation**: e.g. elements of playability, seductivity, relevance and usefulness or transferability of use. For instance, playability – typically associated with games – provided one successful approach with which to build a prolonged interaction with the visitor, as seen in the "Touch of Kandinsky" installation. Dramaturgic concepts such as seductivity, anticipation and immersion

were also used to great effect in some of the installations (e.g. in "Access in Mind"). This group of use qualities have been previously under-utilised in the domain of cultural heritage.

#### Advantages of the use qualities method

Deploying an **integrated methodology**, that combines a focus on the visitor (as it is customary in **museum studies**), with a focus on interaction modes and interfaces (as in **human-computer interaction**) such evaluation studies, not only assist in assessing how well the exhibited collection has met its stated goals, but also helped identify shortcomings and potential remedial changes to inform future planning efforts.

„Access in Mind” is an audio-visual installation for art galleries. The prototype was developed in 2002 by the Digital Heritage Center (formerly Vision for Museums) in collaboration with The Swedish Arts Council (Kulturrådet) and exhibited in several venues: Sollentuna Konstmässa (2002), Liljevalchs konsthall (2004), Interactive Salon (2006-2007). Placed at the entrance of the gallery, the installation has the function of introducing the visitors to contemporary art. The prototype was thought as a tool that guides the visitors on how to respond to contemporary works of art, rather than explaining their cultural importance, style or historical context. A multimedial approach was employed in the design of „Access in Mind”, combining lighting, dramatization and sound. Employing a novel model for the evaluation of educational impact, that triangulates digital tracking, observation, and questionnaires, it was possible to reveal that young visitors who had tested the installation before entering the gallery were more comfortable in engaging with contemporary art and dwelled longer in front of the pieces exhibited by the actual collection. Moreover it was possible to demonstrate the long-lasting cognitive impact of the digital prototype. After being exposed to the installation, the visitors exhibited an updated vocabulary and adequate concepts for describing contemporary art. They were also able to formulate aesthetic judgments and notice specific aspects of the paintings that did not appear available to visitors who weren't previously exposed to the installation.

### THE ARTIST

When people say: “What the hell is this? this is only crap!” – Because many people say that – then one can react in two ways. Either you can despise these people because they are stupid that they don't understand that this (art) is fantastic, or you can be really curious: “Why do they say that? What do they mean?”

### THE YOUNG GUY

I don't understand. I feel like I will burst with longing: I don't understand, why love should hurt that much? I just want to be happy and in love, but it doesn't work. I can't eat, I can't sleep. All the time I spend away from A (her) is meaningless. Empty! How does one spend ones time? Can you explain that?

### THE CONSCIENCE

Who are you anyway? You are here now: you are the one who came with your life and your experiences. Right now, that is the most important thing.



## 4. How to evaluate the educational impact of the exhibition and the new knowledge acquired by the visitors?

### Educational impact – a new mission for museums

With the rise of new scientific paradigms and the advent of new cultural policies, securing long-term learning and **knowledge augmentation** effects is one of the **key roles of the museums**. The versatility of digital media is well suited for creating novel experiences in order to facilitate the **communication of cultural content** and thus a **long-term educational impact**. But how is it possible to assess this novel pedagogical function of the museum?

Studying knowledge effects is a very challenging task since we only have access to indirect indicators, such as people's own reports or their problem solving skills. What can be studied are externalized traces (or 'signs') of people's learning, such as, for instance, artefacts or speech.

In 2004, Halina Gottlieb has pioneered, in collaboration with Lena Geijer and Eva Insulander, a **novel methodology for evaluating the educational and cognitive impact** of digital media in cultural heritage environments, by assessing learning in the context of an interactive museum exhibition. This innovative approach integrates a **sociocultural perspective** with a **multimodal view** inspired by social semiotics. In this framework, emphasis is placed on the **intersubjective dimension of cultural experiences**, in other words on the dialogue that is established between the exhibited artefacts and visitors. Meaning is viewed as emerging multimodally in the situated interaction between the individual and

contextual resources that go beyond traditional linguistic communication, including a variety of communicative channels: text, photographs, images, animation, colour, light, sound, music, etc. As such, artefacts are the mediating tools of inner transformation or learning.

### Mastery and appropriation

In this approach, **mastery and appropriation** are key notions in the evaluation of the educational impact of digital prototypes. At one level of evaluation, test items may be created for assessing whether the visitor **masters** the matter, i.e. whether the visitor is able to identify the topic or object and its function.

At a higher level of assessment, it is possible to verify whether the visitors have **appropriated** the content, through a more complex processing of meaning that involves a negotiation of their formal and informal previous knowledge and the new content provided by the exhibition.

### Methodological triangulation

The experimental prototypes were evaluated using **visitor study methods** from museum studies and **methods from human-computer interaction**, where the focus lies on interaction modes and interfaces. An interaction-design perspective on human-computer interaction offers an integration of use qualities that covers both the making of the interpretive artefacts and properties in design and

interaction modes that touch upon visitor engagement. The evaluation included **observation studies**, **questionnaires** and the **collecting of comments** from visitors.

This **triangulated method of evaluation** was used in order to develop a more detailed picture of the aspects of the use qualities of digital artefacts that would enhance engagement in, and understanding of, art thus **securing a path to long-term knowledge augmentation**. When used correctly, a combination of different methods can provide a **more reliable and representative picture of visitor engagement and understanding**. In such occasions, it is a good idea to combine qualitative and quantitative data, but it is important that the objectives of the evaluation are clear at the outset so that the appropriate method, or methods, can be chosen. If the objectives are clearly identified, then analysis can be undertaken with reference to them.

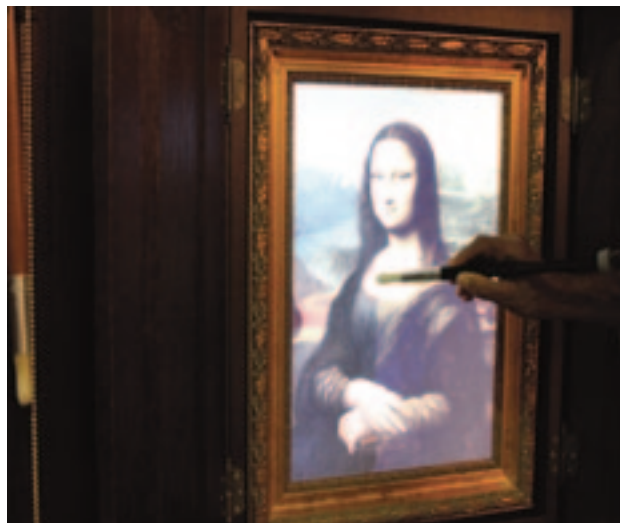
The observational study was fairly informal, collecting data such as how many people visited the exhibition and how long they spent looking at a particular painting. This method is a good starting point for further evaluation and can help, for example, when deciding what questions should be asked using further evaluation methods. It is important to have a clear checklist of what to observe and record. The data collected and analyzed by the Digital Heritage Center in this context, highlighted and confirmed the **significant potential of digital artefacts and applications in mediating learning**.



In the project „**Storytelling animals (II)**“, The Digital Heritage Center, in collaboration with Sennheiser, has developed audio guides for Universeum Science Discovery Center in Gothenburg. The guides present four different animals: wolf, beaver, adder and salmon – all of which are confronted nowadays with loss of habitat due to mankind impact. The animal-guides lead the visitors along The Water's Way exhibit, giving an overview of their own habitat. Each animal narrates about the conditions governing its life in the Swedish landscape. Every audio guide consists of a headset and a bracelet decorated in a theme associated with the specific animal. The four audio guides have distinct

scripts that are read out by different actors and the narratives pause at different stations in The Water's Way area. The wolf's audio guide is the longest and the most multimodal of the four and stops at the most stations. It encourages the child to actively interact with the exhibit's environment and has environmental sounds, sound effects and dramatised music. The beaver's audio guide has no interaction, but has environmental sounds that enhance the feeling of being out in nature. The salmon and adder are both without interaction and sound effects, consisting of only an actor's storytelling voice.

In „**Old Masters Paintbrushes**“ (exhibited at the Interactive Salon in Stockholm and at the Science Centre in Singapore), the visitors interact with a digital replica of a painting using a set of five interactive paintbrushes. Each paintbrush behaves differently when in contact with the screen and activates sensors that allow to **reveal the layered techniques** employed by the Old Masters in creating their paintings. The exhibit illustrates also an innovative approach to the **visualization of intangible heritage** in terms of artistic skills. Old Masters Paintbrushes was appreciated in terms of its **sensory richness**: the installation enabled the visitor to experience distinct visual-tactile interactions while using the brushes and acting from a novel posture – that of the creating artist.



## 5. Novel interfaces and narrative methods for enhancing aesthetic experience and unraveling layers of meaning

### Interpretive content

The post-modern museum is inspired by a **constructivist approach to visitor communication** and places the visitor at the centre of the decision-making process of any public exhibition. In this process, museums consider how to offer **challenging interpretations and representations of cultural heritage**, providing visitors with experiences that inspire, provoke and leave a lasting impression. Digital media constitute ideal means for achieving such tasks.

A number of shortcomings, however, appear to affect the customary use of digital media for communicating with visitors. The most crucial deficiencies identified in this context derive from a very low level of interpretation afforded by customary digital media and from a limited conception in the design of human-computer interfaces, as well as from a lack of scholarly and practical frameworks for interpreting aspects within the knowledge field of digital heritage. Commercially available interfaces, such as multimedia kiosks and audio players, are usually not tailored for these purposes and are therefore sub-optimal.

In the course of her research conducted at the Digital Heritage Center / The Interactive Institute, Halina Gottlieb has developed and assessed a variety of **human-computer interfaces and interpretive concepts** of digital media for external communication with visitors at art and science museums. This endeavour has taken the form of a **practical**

**exploration** of the possibilities for enhancing engagement and intellectual accessibility of, for example, Old Masters or abstract and contemporary art. Each of the prototypes developed within this framework represents an **alternative approach to the use of digital media** in art museums as compared to more traditional interfaces, and can complement existing perspectives and approaches in **user-centred design** when investigating the novel application of modes of interaction design and art interpretation. The interpretive concepts explored in this context challenge the typical one-way communication of content. The evaluation of digital heritage artefacts revealed that interpretive concepts are independent of the digital media typology and the museum environment. Moreover, it was found that such digital heritage artefacts are indeed more effective than traditional multimedia kiosks in conveying key information, inspiring engagement and stimulating user imagination.

### Interfaces

In the novel framework that Halina Gottlieb promoted at the Digital Heritage Center, the focus is explicitly placed on the **interpretive content** that emerges in the interaction between the visitor and the subject mediated by technologies. The **design of digital prototypes for cultural communication** is thus shaped by a **genuine humanistic approach** aimed at stimulating visitors' engagement with the

subject of the exhibition, but also at facilitating intellectual accessibility.

Digital exhibits bring forth **hidden qualities** and allow to exploit several **layers of meaning**. They have the potential to shape and enrich interpretive content, to reveal new angles, and propose unexpected perspectives, to add **novel affective and cognitive dimensions**, going beyond the surface layers that are immediately accessible to visitors' senses.

### Storytelling

As a natural characteristic of human communication, storytelling enables humans to organize and transfer vast amounts of knowledge. As such, storytelling represents a priceless **tool of effective knowledge transfer** in the context of cultural heritage, where artefacts included in museum collections bear stories that often remain untold or ineffectively communicated if adopting a unidirectional approach.

With the help of digital artefacts, novel narrative interfaces can be devised for exploiting such resources, and expand interpretive content innovatively, in a variety of ways.

The cultural content of an exhibit may, for instance, be enriched and strengthened by adding affective dimensions. Multi-sensory and multi-modal features may aid in **recreating the atmosphere** of past events or **immersing** the visitor into alternative worlds. Furthermore, digital media offer the liberty of devising **participatory scripts**, whereby the visitors engage in conversations with the exhibit and are invited to recreate, from a first person perspective, the story.

*Creative and Research Processes – 2000-2006*





*Creative and Research Processes – 2000-2006*







*Section II*

***How to get knowledge and  
find collaboration partners?***

Five innovative services for museums, academia  
and creative industries



*Exploratory workshops with the participation of stakeholders.  
Developing digital prototypes at the Digital Heritage Center / The Interactive Institute  
(1999-2010)*

### How to get knowledge and find collaboration partners?

The development of digital prototypes for improving the communication of cultural content is a joint venture that gathers **competencies from across disciplines and sectors**. Such projects rely on extensive and in depth collaborations between professionals in the field of research and development, cultural heritage, as well as information and communication technology.

On one hand, such collaborations imply significant **exchanges of specialized knowledge, practices and skills** across disciplines and sectors. On the other, the actual process of experimentation and prototyping generates, besides end-use artefacts, a valuable **patrimony of know-how** that needs to be continuously documented and systematized for the purpose of future application in new projects, thus securing the growth of this rather young field.

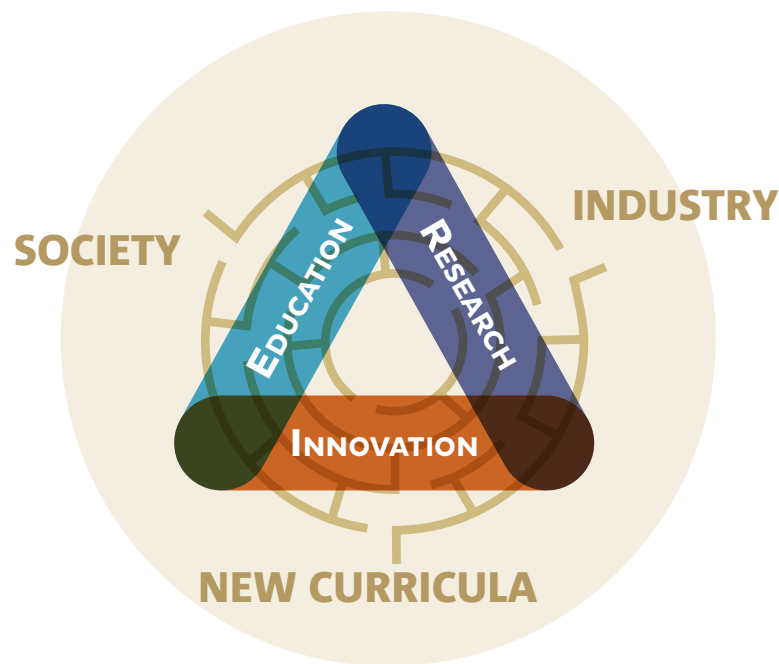
With her long experience in developing digital prototypes for museums, and after almost two decades of close collaboration with professionals in a variety of relevant fields, Halina Gottlieb has led the Digital Heritage Center towards becoming a veritable **centre of expertise** in the process of **mediating the transfer of knowledge and practices** between technological innovation and culture professionals.

The field of digital cultural heritage is relatively new and still emergent, with technologies for digitisation changing so quickly that the task of framing the work in a scholarly context is imbued with

the time-sensitive challenge of keeping up to date with new formats as well as with new ideas.

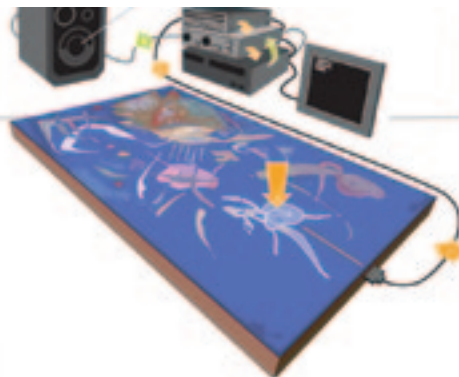
One important objective of the Digital Heritage Center is to set up a **sustainable infrastructure for supporting shared learning and the development of competencies** required for improving, on a long-term basis, the use of digital technologies in museum environments.

In order to achieve this objective, The Digital Heritage Center has developed, over the years, a number of services and solutions aimed at bridging, on the theoretical, methodological and practical level, research findings and everyday practice in museums, through concrete guidelines and specialized training into the implementation of a number of digital prototypes. These include, among others, the publication of a series of know-how books for the implementation of digital media in museums, workshops, practical seminars, academic courses, demo exhibitions, interdisciplinary conferences, as well as an incubator programme for creative industries.



Outline of competencies, resources, processes and technologies for the development of a digital heritage artefact – excerpt from the know-how book on the making of “Touch of Kandinsky”.

In-house sensors connected to a PC respond to user interaction with the carpet's motif through a midi-interface card. Sounds linked to the motif are played out on external speakers placed under the carpet.



Used in connection with permanent exhibitions, entrance halls, coffee shops, walking halls, a children's atelier with the aim to:

- Stimulate curiosity, imagination and creativity about paintings and themes.
- Narrate history/stories related to motifs of art.
- Bridge the gap between an artist's message and visitor references.

#### Required competencies

Art Historian  
Museums educator  
Carpenter  
Musician/Composer  
Sound Designer  
Interaction Designer  
Stage Designer  
Project Manager  
Technician



#### Resources

Person hours: 200

Technology: €2,500

Material: €200

Production costs for the carpet:  
€2,500, for the podium boxes  
€5,000

## 6. Sharing know-how in the digital heritage sector

A useful **technique for knowledge documentation** in the context of interdisciplinary collaborations is to provide know-how books that describe, step by step, all aspects of the project in a form that is available to all professionals participating in the project. In 2007, under the auspices of EPOCH, the Digital Heritage Center at the Interactive Institute has launched a KNOW-HOW book series aimed at bridging research findings, technological innovations and everyday practice for museum professionals. The whole collection was edited, coordinated and supervised by Halina Gottlieb. The information covered within the booklets benefits managers, exhibition producers/curators, pedagogues and professionals working with digital restoration, as well as those working with communication and audiences.

The KNOW-HOW series comprises several **instructional and inspirational booklets** that offer, step-by-step, guidelines for the design, development and realization of digital installations and applications for the cultural heritage sector. The detailed description of already implemented projects is supplemented with thoughtful suggestions for alternative solutions and applications within the cultural heritage sector.

The KNOW-HOW booklets cover projects in the following categories: MUSEUMS, HERITAGE SITES

and MONUMENTS. The reader is initiated into the new field of digital heritage by an introductory volume with general guidelines for *Cultural Heritage Professionals in the Effective and Sustainable Use of Information Technologies in Monuments, Museums, and Sites*.

In the MUSEUMS category, 5 titles are published and gathered in a collector's box. In addition to the collector's box, all booklets in the series MUSEUMS, HERITAGE SITES and MONUMENTS are freely accessible online.

The KNOW-HOW booklets are produced and distributed by the Interactive Institute. The actual prototypes described in the booklets, however, are the result of a number of **interdisciplinary and trans-sectoral collaborations** involving several European partners connected to EPOCH.

The know-how book series will be continued 2012-2014 by a **new collection** focused on the **Individual knowledge transfer** between research and academia, cultural professionals and industry. *Ten Innovations for Museums, Academia and Creative Industries* is the first know-how book in this new collection funded by the Nordic Council of Ministers within the Nordic Knowledge Triangle Network project.

### THE KNOW-HOW SERIES

#### INTRODUCTORY VOLUME

◆ **Cultural Heritage Professionals in the Effective and Sustainable Use of Information Technologies in Monuments, Museums, and Sites.**

#### MUSEUMS

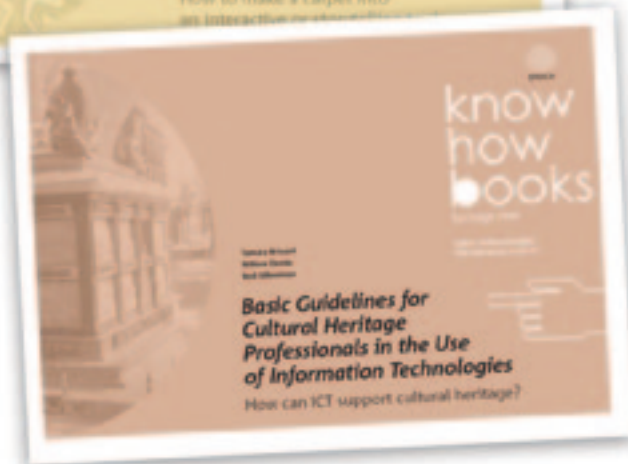
- ◆ **Electro Bacchanalia** – a peep box and an interpretive tool for Old Masters' paintings
- ◆ **Interactive Storytelling Exhibition** – How to produce a virtual interactive story to engage visitors with the real world
- ◆ **Virtex** – A multisensory approach for exhibiting valuable objects
- ◆ **The ARC 3D Webservice** – How to turn images of an object or scene into 3D models for exhibitions and archives
- ◆ **Touch of Kandinsky** – How to make a carpet into an interactive or storytelling tool

#### HERITAGE SITES

- ◆ **Interactive Landscapes** – How to read and understand historical landscapes
- ◆ **Interpretation Management** – How to make sustainable visualisations of the past
- ◆ **Presenting The Hidden Past** – Highlights and impressions from the lowlands

#### MONUMENTS

- ◆ **Monitoring Monuments** – A low-cost digital early warning system for preventive conservation of built heritage









## PROTOTYPES AT THE INTERACTIVE SALON IN STOCKHOLM

- **3D web service** – by the University of Leuven (Belgium) / EPOCH
- **Hokusai Manga** – by Museum of Far Eastern Antiquities / Touch & Turn (Sweden)
- **The magic book scroll** – by Swedish Institute of Computer Science / the Royal Institute of Technology / the Museum of Science and Technology in Stockholm (Sweden)
- **Interactive Café Table** – by Digital Heritage Center (Vision for Museums) / Interactive Institute / Stockholm City Museum (Sweden)
- **Touch of Kandinsky** – by Digital Heritage Center (Vision for Museums) / Interactive Institute (Sweden)
- **Access in Mind** – by Digital Heritage Center (Vision for Museums)/Interactive Institute / Swedish National Council for Cultural Affairs (Sweden)
- **The Arrigo VII kiosk** – by Soprintendenza ai Beni A.P.P.S.A.D / Istituto di Scienza e Tecnologie dell'Informazione (ISTI) / C.N.R. Pisa / X-Lab / Università' di Pisa / Università' di Firenze (Italy)
- **Culturama** – by Centre for Documentation of Cultural and Natural Heritage (Egypt)
- **The Works** – by The Interactive Institute / Avesta kommun (Sweden)
- **Smart Museums Sites and Landscapes** – by Pervasive Computing group / Computing Laboratory / University of Kent (England) and ARCES / Università di Bologna (Italy)



## 7. How to collaborate for creating digital exhibitions?

In 2006-2007 Halina Gottlieb has been the main initiator of the **Interactive Salon**, a showroom for **technologies that promote and preserve cultural heritage**. The Interactive Salon was a touring exhibition showcasing innovative technologies and concepts for communication with visitors in different museum environments.

The project was the result of a fruitful collaboration between the Digital Heritage Center / Interactive Institute, Stockholm City Museum and EPOCH (European Network of Excellence in Open Cultural Heritage) and received support from Framtidens Kultur, Riksbankens Jubileumsfond and EPOCH.

Projects from European research institutes, universities and museums have been invited to **demonstrate how new technology and concepts** can enhance visitors' experience, interpretation and communication in museums and similar environments.

The projects that were present at the Interactive Salon offered **examples of the five main types of digital media technology** that have been applied to museum environments, and illustrated a **broad spectrum of partnership constellations**, including government authorities, SMEs, IT companies, foundations supporting projects, museum content

providers, heritage sites, media producers and research institutes.

The initiative was a premiere in Sweden and it occasioned, for the first time, a **forum for discussions** around technologies that promote and preserve cultural heritage, involving professionals from research, cultural heritage, ICT – and creative industries.

Collaborative and formative activities (meetings, evaluations, scenario labs, seminars and workshops) were organized throughout the exhibition with the purpose of supporting cultural heritage institutions in their dialogue with other stakeholders, to promote a greater sharing of expertise, but also to disseminate case studies of successful applications of ICT to cultural heritage.

Furthermore, the exhibition functioned as a great way of letting the public take part of ongoing research projects in the ICT and cultural heritage field.

### INTERACTIVE SALON

#### THE INTERACTIVE SALON WAS PRESENT IN:

- ◆ Stockholm (Sweden), October – March 2007, Stockholm Stadsmuseum
- ◆ Budapest (Hungary), June 2007 – Hungarian Academy of Fine Arts
- ◆ Prague (Czech Republic), September 2007 – Eurographics 2007
- ◆ Paestum (Italy), November 2007 – BMTA
- ◆ Brighton (United Kingdom), November 2007 – VAST2007
- ◆ Rome (Italy), January 2008
- ◆ Kista, Stockholm (Sweden), February 2008 – November 2009, The Interactive Institute

## NODEM venues 2003-2012



## 8. Where to find relevant competencies and partners for collaboration?

The development and implementation of digital artefacts in the service of cultural heritage is a complex process that demands a number of **competencies beyond those traditionally associated with the museum**. In 2002, Halina Gottlieb has founded, in partnership with the Interactive Institute, a project called Nordic Digital Excellence in Museums (or shortly NODEM).

Under the aegis of NODEM, the Digital Heritage Center has organised a series of **conferences with international participation**. The explicitly stated aim of this series was to promote encounters between scientists and cultural professionals and stimulate an effervescence of new insights and innovative solutions by assisting and supporting the collaboration between researchers, artists and cultural professionals. Each conference was centred on a core theme allowing the participants to systematically bring contributions and discuss issues aimed at consolidating the interdisciplinary grounds of employing digital technology in the service of cultural display. The themes spanned from more abstract and theoretical topics to the more concrete issues concerning the actual implementation of digital media in sites of cultural experience.

Today, NODEM is also an **interdisciplinary portal** that brings together researchers, SMEs, artists and cultural professionals from all over the world,

providing thus an interface between cutting-edge research in the field of digital technologies on one side, and arts and education on the other. NODEM's mission is to mediate this knowledge transfer and aid the implementation of digital tools in museums, galleries, exhibitions, natural and cultural heritage sites.

At the same time, the ambition of the portal is to create a **patrimony of knowledge, know-how and best practices** departing from the experiences, innovations and insights that emerge in the context of such collaborations. This valuable repository is freely made available on the **www.nodem.org portal**.

The NODEM initiative proved to be a successful one and soon attracted a host of partners, including research institutes, museums and cultural associations from Denmark, Finland, Iceland, Norway and Sweden, as well as members from beyond the Nordic countries. Currently, NODEM is a vibrant community with **over 1000 active members** that represent a great variety of fields of activity and areas of research, including interaction design, exhibition design, museum studies, media and communication studies, digital curation, and technologies.

### NODEM CONFERENCE

#### NODEM CONFERENCES

- ◆ **NODEM 2003:** *Interdisciplinarity in Digital Heritage*, Helsingborg, Sweden.
- ◆ **NODEM 2004:** *Exhibition – Exchange – Know-How*, Helsinki, Finland.
- ◆ **NODEM 2006:** *Digital Interpretation in Cultural Heritage*, Oslo, Norway.
- ◆ **NODEM 2008:** *Experiences in Natural and Cultural Heritage*, Reykjavik, Iceland.
- ◆ **NODEM 2010:** *From Place to Presence*, Copenhagen, Denmark.
- ◆ **NODEM 2012:** *Future Culture: [In]tangible Heritage – Design – Cross Media*, Hong Kong, China.

Academic textbooks (2003-2006) and DIHA projects (2009-2012)



## 9.

## Innovations for academia

## Where to study and research about digital media and their uses in cultural heritage sites?

## Research Clusters...

It is equally important to increase and encourage interdisciplinary collaborations, not only cross-sectorally – between R&D, ICT, cultural organizations and creative industries – but also within academia and research itself. Even within this area, the Digital Heritage Center remains faithful to the belief that several approaches attending to the same matter, yet with distinct theoretical frameworks and specific methodological tools and practices, can only benefit each other. For this purpose, Halina Gottlieb has promoted the model of **thematic or research clusters, as a way of addressing knowledge exchange and transfer**, this time triangulating and strengthening the connections between **cutting-edge research – new curricula within academia – and society**.

One such research cluster initiated by Halina Gottlieb (on behalf of the Digital Heritage Center) in collaboration with Ng Bee Chin and Francesco Cavallaro (on behalf of Nanyang Technological University in Singapore) is **DIHA (Digital Intangible Heritage in Asia)** that joins together researchers, but also undergraduate and postgraduate students with a variety of academic backgrounds, spanning from linguistics, to history, design, interactive media, computer engineering, and museum studies. Besides promoting **models for content development and interdisciplinary**

**collaborations**, the group focuses on the documentation, archiving and preservation of **intangible cultural heritage** and promotes innovative cross-disciplinary collaborations, such as language ecology or interdisciplinary studies of **cultural identity**.

## ...New Academic Curricula...

Starting with 2003, and with the active support of the Digital Heritage Center, Halina Gottlieb has begun teaching a **new academic module** on the use of digital media in museum environments at the University College of Film, Radio, Television and Theatre (Dramatiska Institutet), in Stockholm.

Entitled **Exhibition Visitors and Digital Media (Utställningsbesökare och digitala medier)**, the course was directed at exhibition designers, museum employees, IT and multimedia producers interested in acquiring knowledge and specializing in the field. Endorsing an interdisciplinary framework, the course touched upon relevant topics, including an overview of current and future digital technologies to be deployed in museum environments, as well as the ways in which such new media can enhance cultural experience, while accomplishing a pedagogical role, by mediating knowledge related to the subject of the exhibition.

Besides lectures, the course included practical assignments and study visits. A **textbook** with the title **Digital media for museum visitors (Digitala**

**medier för besökare på museer)** has been published by Halina Gottlieb in collaboration with Paul Henningsson, in 2004. The textbook served as course material and, currently, this pioneering volume continues to be recommended as compulsory literature for courses in ICT, arts, ethnography or museum studies offered by various universities and departments.

## ...and Practical Seminars

During the Museum week, 2002-2003, in collaboration with the Swedish Arts Council (Kulturrådet), Halina Gottlieb has initiated a series of practical seminars for museums and other cultural or educational sites. The seminars focused on introducing to culture professionals and educators the new **interdisciplinary field of visitor studies** as a theoretical and practical tool for **developing the communication of cultural content** to their audiences. A number of international guests, key names in developing the field, were invited to give lectures and practical training.

Topics discussed during the seminars focused on methods for getting access to visitors' understanding and needs in the context of cultural experiences, spanning a range of approaches to be deployed in the preliminary, conceptual stage of planning an exhibition, to approaches employed during the development of a prototype or programme, to approaches aimed at the final assessment of a cultural product. Methods for approaching and incorporating the specific needs of certain categories of audiences (e.g. children, visitors with certain disabilities) were also addressed.



Incubator for SMEs (2007-2010) at the Interactive Institute, Stockholm-Kista, the Electrum building



10.

## Where to find competencies that will help your SME grow and will assist you in the product development process?

The Incubator programme – the first of its kind in Sweden – was primarily directed at **companies within the creative industry** (artists, designers, architects, media producers, etc.) that are in their **startup phase** and envisage to engage in projects or activities that focus on promoting the use of digital media for cultural heritage purposes.

The **Incubator model that Halina Gottlieb initiated** at the Digital Heritage Center included, among other types of services and assistance, infrastructure resources, network support, individual coaching, as well as a host of training activities.

In more concrete terms, the startup company was offered, 2 days a week, a **workspace** at the Digital Heritage Center / The Interactive Institute in Stockholm. In this prolific and effervescent environment, surrounded by experts in cultural heritage, design, information technology, research and development, the SME could grow and develop its business, by **directly participating in projects** initiated by the Digital Heritage Center within its Incubator programme, as well as in projects commissioned by third parties.

Through the Incubator, the startup had access to a **network of knowledge and competencies**, comprising entrepreneurs, decision makers in the field of culture, IT companies and venture capitalists.

The **individual coaching** was tailored to target relevant aspects based on the specific needs of the SME, offering expertise in IT, business, advertising, analysis, etc.

Finally, the startups within the Incubator participated regularly in **formative activities** such as lectures, workshops and study visits.

**Project management** and coordination, devising **business plans**, extensive knowledge about the **cultural heritage market**, as well as proficiency in **communicating** with customers and cooperating partners are some of the skills that the Incubator model aimed to develop in the SMEs enrolled in the programme. The Incubator model was thought also as an instrument to facilitate the process of **making an experimental prototype into a commercial product**.

The first company to emerge from the Incubator was, in 2006, Evoking Spaces. The company is specialized in designing audiovisual experiences for visitors at museums and other cultural heritage sites. Evoking Spaces was involved, as its first commissioned project, in the development of the Interactive Salon exhibition in Stockholm.

“Touch of Kandinsky”, “Breathing Life into a Painting” and “Old Masters Paintbrushes” became

commercial products at the Swedish SME Evoking spaces, and were ordered for the Universal Forum of Cultures, B.A.N.G exhibition at Planetarium ALFA in Monterrey, Mexico, 2008; for the permanent exhibit at Papalote Children’s Museum, Mexico City, Mexico in 2008; for the permanent exhibit at Papalote@Cuernavaca Children’s Art Museum, Cuernavaca, Mexico in 2008; for Stockholm City Museum in 2008; and for the Science Centre in Singapore in 2009.

*In the spring of 2006 I got the chance to start my own business with support from the Digital Heritage Center. The Incubator programme didn’t just give me a work space, it also provided me with the opportunity to work in projects initiated by the Digital Heritage Center and the Incubator. This was very good since the most important and most difficult task for a new business is to get assignments. I received funding for six months, which was a welcome start and helped me to focus on important things without worrying too much about surviving the first period.*

(DAVID NILSSON, EVOKING SPACES).



*Album with examples of prototypes, processes and competencies (1999-2011)*



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Digital  
Heritage  
Center

 INTERACTIVE INSTITUTE



norden

Digital Heritage Center is the first European centre of expertise to offer services and solutions for supporting the implementation of digital technologies and innovations in the field of cultural heritage, as a mean to enhancing cultural experiences.

The Interactive Institute is an experimental IT-research institute that combines expertise in art, design, humanities, and information technology with the purpose of conducting world leading applied research.

The Nordic Knowledge Triangle Network is a network project funded by the Nordic Council of Ministers that focuses on establishing a network of Nordic universities and colleges that will contribute to stimulating collaborations between academia and society, as well as to increasing knowledge exchanges in relation to commercialization of research findings and innovations.

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Halina Gottlieb is the director of Digital Heritage Center, a spin-off from the Interactive Institute/Vision for Museums, as well as the coordinator of the Nordic Knowledge Triangle Network at Nordic Council of Ministers (2011-2014) and founding director of NODEM (Nordic Digital Excellence in Museums). She is affiliated with Nanyang Technological University in Singapore as co-funder of the DIHA (Digital Intangible Heritage in Asia) interdisciplinary research cluster.

As an art historian, digital curator and knowledge transfer facilitator, dr. Gottlieb has concentrated her efforts on promoting a fruitful and effervescent exchange of knowledge, practices and skills across fields of research related to digital heritage issues, as well as across relevant sectors, including academia, ICT and creative industries.

Conducting research on Digital Heritage, an emerging interdisciplinary area of study that connects digital technologies, museums studies, interaction

design and participatory design, she has earned the first Scandinavian PhD title in this innovative field with a dissertation entitled "DESIGNING ENGAGEMENT FOR ART - Exploring Interfaces and Interpretive Content of Digital Heritage Artifacts in Museum Environments."

Halina Gottlieb has been a member in the Executive Committee of EPOCH (European Network of Excellence in Open Cultural Heritage), as well as the Swedish re-presentative for the EPOCH Network of Expertise Centres (2004-2008). She is also the curator of the Interactive Salon (2006-2009), a travelling exhibition showcasing new technologies for promoting and preserving cultural heritage that was present in 6 European countries. Dr. Gottlieb has organized and taught an academic course on "Exhibitions and New Media" at the University College of Film, Radio, Television, and Theatre in Stockholm and in 2007 she has developed the model for an Incubator that focused on transferring research results to SMEs from creative industries.