

Engaging with books you cannot touch: interactive multimedia to expose library treasures

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Interactivity has proved a successful way to engage visitors of science museums. However, it is not a common practice when the objects to exhibit are artefacts or, as in the case of this paper, books. A study was set up to investigate the driving criteria for the ‘The Life and Work of William Butler Yeats’ exhibition at the National Library of Ireland and compare those with the visitors’ opinions. Books, notebooks and personal belongings of the poet have been digitized and used to create a rich and varied exhibition that used both interactivity and multimedia. The result of a visitors’ survey showed that the variety was a key factor for the success of the exhibition: different people engaged with different contents and different medium to different degrees. The design of the ambience is critical: dim lights and the use of audio as a medium have to be carefully planned to avoid annoying instead of engaging.

Keywords: Digital imaging; Library exhibition; Interactive multimedia

1. Introduction

Many different kinds of technology have been used or experimented with in museum settings: from traditional stationary multimedia kiosks, to mobile and adaptive guides (Petrelli and Not 2005, Zancanaro *et al.* 2003), wearable devices (Sparacino *et al.* 1999) and virtual reality (Rousseau 2001, Sparacino 2004). Each of them has advantages and disadvantages: multimedia kiosks are rich in information but limited by their location that can be away from the artefacts being described (Ciolfi and Bannon 2003); PDAs (personal digital assistants) are less physically constrictive than kiosks and have similar functionality, however as they are designed for individual use they can disrupt the social nature of museum visits (Vom Lehn *et al.* 2005); wearable devices and virtual reality have a novelty factor, but to be effective for learning they have to hold visitors’ attention beyond the initial surprise (Rousseau 2001).

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Whatever the differences in the technology used, each of the above offers a single interaction point. This contrasts with the evidence coming from evaluating visitors' experience that a multi-sensory mixed medium strategy is the most successful (but for the very quiet and solitary visitor (Davison *et al.* 1994)). Indeed evidence shows that a mixture of traditional presentations (cases with artefacts, dioramas, graphic panels, labels) supported by hands-on sensory components (touch, listen, smell) and interactive problem solving is the most successful solution for audience engagement in science museums (Davison *et al.* 1994). An open, non-didactic information structure that includes multiple views and activities can be successfully applied to interactive technology (Leslie and Gleeson 2005). The challenge is to plan the whole exhibition (not just one interaction point) and assure that each part is self-contained but at the same time integrates and complements the others (an excellent example of such an approach is in Ferris *et al.* 2004). The role of a modern museum is not any more to exhibit significant artefacts, but to create experiences for visitors (Caulton 1998). Pushing the boundary further, constructivist museum theory emphasizes the learning process over the actual body of knowledge: a visitor does not merely absorb information, but constructs new knowledge by interacting with content and assimilating it into what is already known (Leslie and Gleeson 2005). To be effective an exhibition has to allow individuals to explore multiple narratives and construct knowledge through exhibits which present multiple scenarios and outcomes (Leslie and Gleeson 2005).

In line with the transformation that museums are experiencing, the library is less important as a physical place that provides access to books (as collections and catalogues can be used online) and more as a space to facilitate accessing and acquiring knowledge. The possibility of digitizing precious books and make them available to the public through interactive technology (like Turning the Page*) is core to this transformation. However, while museums have been the focus of much research (for an overview of recent trends see Ciolfi *et al.* 2005), little has been done in libraries as it is much harder to engage visitors with what are primarily text-based artefacts. The National Library of Ireland has recently experimented with interactive and multimedia technology in two exhibitions based on the lives of the prominent Irish literary figures Joyce and Yeats. While the Joyce exhibition, the first of its kind, was limited in scope and technology used, in Yeats' one the principle of a multi-sensory open-ended interaction guided the design. Technology has been used not only to present rarely seen artefacts (e.g. manuscripts), but to interpret them in different contexts, supporting the visitors in a wider exploration of the writer and his work.

This paper reports a study done during the initial opening of 'The Life and Work of William Butler Yeats' in early Summer 2006 and carried out to investigate if the intentions and aims of the curators and the designers had been received by the visitors and how. One of the curators and two exhibition designers have been interviewed to specifically identify the driving criteria for the exhibition; questionnaires were used to collect visitors' opinions and a tour guide was interviewed to better understand the questionnaire result.

2. 'The Life and Work of William Butler Yeats' at the National Library of Ireland

'The Life and Works of William Butler Yeats' exhibition opened at the National Library of Ireland in May 2006. Put together over a period of two years, it was intended to

*<http://www.bl.uk/onlinegallery/ttpbooks.html>

promote and illuminate the Library's burgeoning collection of Yeats' manuscripts, notebooks and correspondences, as well as Yeats' own personal library. The exhibition benefited from the work of five dedicated exhibition staff in the Library, a team of designers from Martello Media, input from several scholars, artworks by various artists, and the guidance of a film producer.

Given that the material is mainly paper-based, the exhibition makes great use of digitized images and interactive computer technology to provide depth and detailed content. More traditional communication methods like graphic boards and cases, audiovisual installations and replicas of places and artefacts are used to complete the visit experience. This results in a variety of different but inter-related zones designed to engage the audience at intellectual, interactive and visceral level.

2.1 *Structure and layout*

Best known to the Irish public as a poet and playwright, Yeats is one of Ireland's most important literary and cultural figures. The structure of the exhibition is biographical, beginning with Yeats' origins and family tree and ending with his death and funeral in 1936. Visitors are not explicitly directed (no arrows or maps); the layout invites natural moves from one phase to the next in a circular way. The general setting is dark with lightened elements (cases, interactive points, audiovisual settings) to attract visitors' attention.

Aspects and periods of Yeats' life and work are presented in separated 'islands', each represented by a 'Signature Image' and a different colour theme. Signature images are reproduced on large wall boards and are displayed as screensavers on interactive touch screens (figure 1). Four evocations (reproductions of rooms) with associated four films focus on particular aspects of Yeats' life, while replicas (reproductions of artefacts), display cases and turning the pages installations focus on particular objects. The two interactive installations in the centre of the circle, *The Tower* and *Poetry in Print*, provide in depth understanding of Yeats' work and complement each other. The technology used in each of these islands is described in more detail below.

2.2 *Audiovisual experience*

The welcome to the exhibition is the 'Verse and Vision' space, a circular reflective area where people can sit and listen to Yeats' poetry and watch the words and related images appear on four large high screens (figure 2).

Four significant locations in Yeats' life are recreated in the 'Evocations', small curved enclosures located at different points of the exhibition and related to specific periods in his life. Each Evocation has an associated documentary film describing: important women in the poet's life (*Affair of the heart*), the relation with theatre (*Players and Painted Stage*), the interest in the esoteric (*The other world*) and his public and political role (*The Mask*).

2.3 *Information points*

Touch-screens and interactive points are distributed all around the exhibition with different functions depending on the context. Touch-screens placed under Signature Images (figure 1) provide an overview of the period. A selection of manuscripts from the library's collection is on show in display cases together with photographs and artefacts

lent by the family. The touch-screen nearby (figure 3) provides a means to examine the contents of the display cases more closely. Each display case and its contents are exactly represented on the touch-screen: by touching an object, visitors can view it in more detail (zoom in) as well as get information on it.

2.4 Digital reading points

Following the public success recorded during Joyce's exhibition, two Turning the Pages* installations are available to enable the audience to view Pail (figure 4) and Rapallo notebooks at such a high level of detail that even the grain of the paper is apparent on the screen. The installation uses a book metaphor for interaction: users turn the page by dragging its corner across the screen. A side description introduces the page and visitors can zoom in a page to read Yeats' personal notes.



Figure 1. Signature image and touch screen.



Figure 2. Verse and Vision installation.

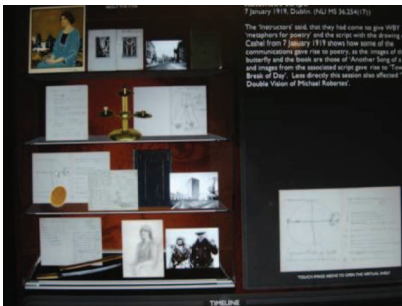


Figure 3. A display case and the related touch screen.

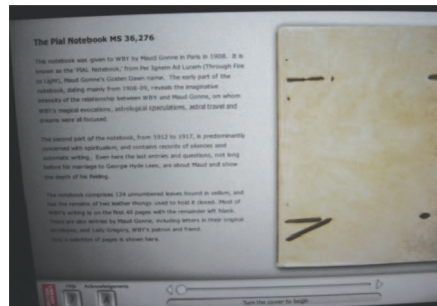


Figure 4. Turning the pages installations.

*Designed and developed by the British Library and Armadillo Systems <http://www.turningthepages.com/>

2.5 Interactive points

Two further installations aim at supporting a deeper exploration of Yeats' work: the evolution of the collection of poems *The Tower* and the poet's direct involvement with the production and publication of his books.

The *Tower* is a semicircular structure (figure 5) displaying a map of the process leading up to the creation of the *Tower*, from the writing of the first poem, to the intermediary stages and the book's final publication. The same process map is displayed on two touch screens (figure 6) where users can view the book in detail and access further information. A master class tutorial can be accessed by touching various locations on the same map.

The *Poetry in Print* installation allows visitors to explore Yeats' desire to be involved with the work related to the publishing of his books, including the illustrations, binding, type, and even the paper on which they were printed. The installation includes a display of Yeats' book art alongside two touch-screens which illustrate the process behind the design and provides insight into the work of the designers involved.

2.6 Replicas

Digital images have been exploited to create simple and effective interaction objects. A few everyday objects have been recreated to render Yeats a more real person. His passport and the scrapbook of photographs of his family (figure 7) have been physically reproduced and left for the visitors to explore.



Figure 5. The Tower installation.



Figure 6. The touch screen of the Tower.



Figure 7. Yeats' photo album replicas.

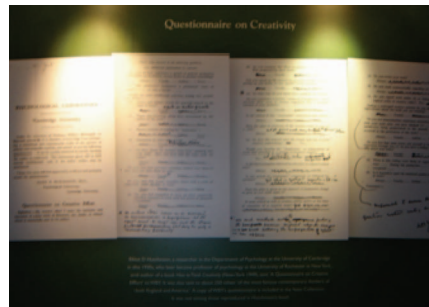


Figure 8. The questionnaire on Creativity.

A questionnaire filled in by Yeats on creativity has been reproduced on a wallboard (figure 8), enlarged enough to make his quite intricate writing as legible as possible. Although this is a more traditional way to communicate content in museum settings, it shows how digital images can be used to increase the impact of artefacts on visitors.

3. The Study

As described in the previous section, ‘The Life and Work of William Butler Yeats’ is an ambitious exhibition that uses a range of traditional (boards), interactive (replicas) and technological (touch screens) installations to affectively engage visitors with a collection of (mainly printed) material. A study was set up to investigate if the aims of the exhibition design team were perceived and appreciated by visitors.

A multi-methods approach was used: a curator from the National Library of Ireland and two of the designers from Martello Media were interviewed to determine their individual perspective; a survey questionnaire, filled in by visitors while exiting the exhibition, was used to understand the audience experience; finally a tour guide was interviewed to better understand the result of the survey. Interviews were transcribed and coded; surveys were analysed statistically. Main results are summarized below, details can be found in Reilly (2006).

3.1 *Curator and exhibition designers intents*

Two semi-structured interview schemas were used with the curator and the designers. While the interview with the curator took place individually, the interview with the designers was done in pair. Interviewing the two together produced a richer set of data as they not only responded to the direct questions, but also raised questions of their own for the other to answer. A dialogue emerged between the two as they corroborated each other’s recollections and added to each other’s responses.

A clear role division emerged between curator and designers: the curators of the exhibition decided the content, including the objects to be displayed, the signature images to be used, and the information content of the interactive installations. Much of the layout and all of the technical aspects were left up to Martello Media to design.

3.1.1 Aims and layout. Curator’s and designers’ aims were obviously different but complementary. The curator wanted to expose the library treasures to the widest possible audience in a complete and coherent way in order to unveil and explain Yeats’ person and work. Of particular interest was the presentation of less known aspects of the poet’s life, e.g. his interest in occultism and his political involvement. Designers were more concerned with exploring new ways of exploiting digital interaction while presenting the manuscripts in the Library at their best. Both curators and designers wanted to address a wider public than the scholar.

The curator and the designers focused on different aspects of the exhibition layout: the curator on the organization of the content, the designers on the appearance. The curator discussed the autobiographical or chronological order that develops along a full circle around the room, “starting off with his early life and going right through to his epitaph”.

The designers mainly discussed the sensorial and aesthetic aspects of the layout: a dark space with text displayed on screens in reverse (while on black background) to avoid

white bright squares that would clash with the signature image nearby; the touch-screens suspended on poles that become an element of the design space; the use of warm and cold colours to underline Yeats' lunar cycles.

3.1.2 Content selection. Discussions seemed to have occurred while the content was selected, although the curators were the ones who decided, as they were both experts and knew the content of the collection. Novelty seems to have been the driving force in the content selection for the curator: 'material that the family would have donated', 'things that people haven't seen before that are considered important', 'manuscripts never seen before because they have never been put on display'.

Designers pointed out that initially curators planned to exhibit only manuscripts (as previously done in the Joyce exhibition), but were open to suggestions of including 'life cases' and 'stuff about the people', implemented in the exhibition by showing Yeats' passport and the filled questionnaire. Designers requested images that 'could be treated thematically similarly' but the actual selection was done by the curators as 'they know which image is important and how they link to each other'.

3.1.3 Digitization. As digital surrogates were the basis of the exhibition, a section of the interview investigated the work done to digitize original material and the perceived value. Martello Media was mainly responsible for the digitization: different devices (scanner, camera, photographic table) were used depending on the material in hand and the expected use of the digitized image (e.g. the 2m high signature images). The digitization process was done iteratively as new material was selected for display.

The digitization was perceived by the curator as an outreach more than a preservation tool: '[of] a book you can only display the front or the back of a page whereas with a touch-screen you can show... you can see the cover and flick through inside' 'turning the page technology [...] really does give people an idea of the book'. Making a DVD from the exhibition was mentioned as an important result of the digitization.

Digitization for preservation was mentioned instead by the designers. They also highlighted the possibility to show every detail of every single page of the most delicate manuscript to everyone: 'It's like a democratic access to objects that you couldn't show otherwise'. Interestingly they pointed out how the digitized images can be overlapped with other material: 'you've got the manuscript there in front of you, untouched, but then you can layer information over it, highlight the various areas, because the manuscript can be hard to interpret, the handwriting isn't always easy to understand, so you can highlight things, do the transcripts and all that and then you can wipe it all away again.'

3.1.4 Interactive installations. Both the curator and the designers highlighted the fact that the interactive installations allowed many more objects to be offered up than was physically possible: 'There are 400 objects on display and a further 2500 represented through the touch screens'. Displayed objects become starting points for navigation in a wider information space.

Another common comment was the possibility offered by the interactive installation to explore complex in-depth concepts, the process of writing, its changes and its stages. The curator mentioned the gaining of a deeper understanding, a more enjoyable experience and the stimulation of a more exploratory attitude as advantages of the

interactive installations. The designers mentioned the possibility of providing multi-lingual captioning and the advantage of not overloading the wallboards with text (aesthetic) while ‘having a real expert over the shoulder telling you into you ear exactly how it is’.

3.2 *Visitors’ views and tour guide opinion*

A questionnaire aiming at investigating visitors’ experience was distributed over a period of a week and had 148 respondents. The questionnaire consisted of 14 closed and open-ended questions about: personal and group profile; their visiting experience (expectations, use of interactive installations, favourite exhibit); and their learning experience (general as well as particular).

The lack of control over the sampling process might have had an impact on the data collected: since it was entirely up to the visitor whether to respond or not, those who either had a very positive experience or a very negative experience may have been more motivated to fill out the questionnaires. In order to balance the questionnaire result, the tour guide was interviewed about her observations of visitors’ interaction with exhibits.

3.2.1 Visitor survey results. The age of respondents was quite varied: 9% were children under 12; 7% teenagers; 16% between 18 and 30 years old; 37% between 31 and 55 and 30% above. Considering the topic of the exhibition (a poet) and the time (out of school time) these percentages with a majority of adult people should be expected. Visitors came with: a group 5%; the family 42%; friends 21% and alone 32%. The percentage of respondents who visited alone is very high compared to other studies in museums (Petrelli and Not 2005); this could be due to the fact that the exhibition was in the Library, a place where it is common to go alone.*

The global feedback was extremely positive with the majority of respondents (59%) stating that the exhibition exceeded their expectation; 30% who liked it and only 6% who said it did not meet expectation or 3% who did not like it.

Two questions asked which was the most and least favourite exhibit. Tables 1 and 2 show the answers (in numbers of respondents and percentage). As the question was open for respondents to write their opinion, not all respondents filled in this field and the answers are quite varied. Of respondents, 93% decided to write what was their favourite exhibit, while only 34% wrote their least liked one.

Verse and Vision and the Evocations were the most favoured (if the instances related to evocation listed by visitors are summed—Abbey, Study, Occult, Women, Georgie, Esoteric—the percentage rises to 24%). Next-favoured was the touch screen, preferred by 10%. Then there is a spread of other preferred items. Interestingly, The Tower, surely the most complex and challenging of the installations, was the favourite of only one visitor.

Physical aspects of the exhibition feature prominently as a least favourite aspect: sound (9%), darkness (4%), too much (4%), etc. The wide range of media used in the small space of the exhibition caused a conflict in audio presentations while darkness was necessary for the conservation of the artefacts on display. The audio was perceived as a problem wherever it was used, i.e. Verse and Vision, Evocations, and the tutorials on the

*No question investigated if the visit was planned or happened because the person was already in the Library.

Table 1. Answers to the question ‘What’s your favourite part of the exhibition?’

Most preferred part	Replies	%	Most preferred part	Replies	%
Verse & Vision	43	29	Women	2	1
Evocations	20	14	Study	2	1
Touch screen	15	10	Objects	2	1
All	12	8	Tour	2	1
Replicas	7	5	Tower	1	1
Artefacts	7	5	Information	1	1
Abbey	6	4	Esoteric	1	1
Manuscripts	6	4	Georgie	1	1
Occult	5	3	Influences	1	1
Wall displays	2	1	Family tree	1	1

Table 2. Answers to the question ‘What’s your least favourite part of the exhibition?’

Least preferred part	Replies	%	Least preferred part	Replies	%
Sound	13	9	Manuscripts	3	2
Evocations	7	5	Wall displays	3	2
Verse & Vision	7	5	Too many people	1	1
Darkness	6	4	Too much in small space	1	1
Too much in exhibit	5	3	Not enough seating	1	1
Exhibition cases	3	2	Not enough poetry	1	1

touch screens. To avoid this inconvenience and keep the social dimension of a shared experience, directional audio devices should be used.

Verse and Vision and Evocations seem to be controversial items as they are among the most disliked exhibits mentioned as well as the most liked. The majority of respondents who disliked Verse and Vision were children that instead listed the replicas as their favourite. Both results are not surprising, as listening to poetry is a passive and reflective experience, while children are likely to prefer a hands-on approach.

Respondents who disliked the evocations primarily disliked their content, in particular the evocation relating to the occult. This may be because of the new and controversial nature of this aspect of Yeats’ life.

A set of questions specifically investigated the experience with the touch screens. Of all those who responded, 85% interacted with the touch screens while 10% did not. The reason for not using them were: not enough time (2%), no interest (2%), do not know how to use it (2%), do not like it (1%), too loud (1%), too crowded (1%).

Of those who did use a touch screen, 93% said it was easy; the 7% who had difficulties stated that it did not work, the content was not interesting or too cluttered, or that it was too loud. The fact that six people said the touch screens did not work does not mean necessarily that the technology is not robust: the short time of the survey and the fact that it was early in the opening* may have produced data unrepresentative in the long run.

When questioned, 86% of respondents agreed that interacting with the touch screens added something to the experience and 63% stated they had learnt something by

*Problems are likely to emerge soon after the opening later installations are fixed and the problems solved.

Table 3. Answers to the question 'Describe one new thing you have learnt?'

What has been learnt	Replies	%	What has been learnt	Replies	%
Occult	16	16	Political life	5	5
Yeats's personal life	14	14	Everything	5	5
His work	11	11	Influences	4	4
Affairs	9	9	Abbey theatre	4	4
Family	8	8	Work process	4	4
Women	7	7	Georgie	3	3
Relationships	6	6	Political situation	1	1

interacting that they would have not found elsewhere in the exhibition (7% disagreed and 30% did not answer).

The last two questions aimed at understanding if the exhibition had been successful in terms of new knowledge acquired: 70% said they had learnt something new, while 5% did not (25% did not answer). Table 3 reports the topics that respondents listed as new to them. The topic that was new to the most respondents was Yeats' interest in the occult (14%); this was expected as it is an aspect of Yeats' life that only recently came to the attention of scholars.

Facts about his private life were a novelty for 14% of visitors, that could be extended to include answers like: affairs (9%), women (7%), relationships (6%), political life (5%). Considering Yeats is known as a poet, it is somehow surprising that 11% stated that they had learnt something new about his work: this indicates that the exhibition has been successful in making Yeats' poetry better known and appreciated. Another interesting answer is the 4% of people who listed the work process as new learning; this is likely to refer to The Tower installation showing that even very complex content can be appreciated, even if by just a minority.

3.2.2 Visitors as observed by the tour guide. The role of the guide during the half-hour-long tour of the exhibition involved leading groups through the biographical path of the exhibition, providing an overview of each thematic area, drawing visitors' attention to particular exhibits and displays, and providing a demonstration on how to use the interactive touch screens.

Visitors' feedback as perceived by the guide was generally very positive and many said it was necessary to come back to take in all the information. Complaints were limited to the poor lighting, but the situation was easily accepted when conservation reasons were explained and the function of the touch screens to see the objects in more detail proposed.

The guide suggested that older people did not interact with the technology very much while children loved it. A Chi-square test of the correlation between age and use of the touch screens showed that age does not have any bearing on the dislike of technology. This may be because of a preconception, similar to that disproved in the Petrelli and Not (2005) study, or it may be that the tour guide was asked by older visitors to show them how to use the screens, giving the guide the impression that older people were unsure of how to interact while at the same time giving these visitors the encouragement and know-how to use it.

4. A hybrid approach is the key to affective communication

The aim of the exhibition as derived from the interviews was not only to showcase the collection, but to reach out to as many people as possible and illuminate previously

overlooked areas of Yeats' life. The range of content, the broad spectrum of respondents to the questionnaires, and the answers on what was learnt show that all of objectives were achieved.

The wide range of favourite aspects show the array of preferences that exhibition designers have to cater for and emphasizes the importance of using several methods for a successful engagement with the audience. The combination of items and concepts exposed should be as varied as possible. Although the initial plan was to use only manuscripts, the inclusion of everyday objects and personal items (e.g. the questionnaire) made the Yeats exhibition more lively, approachable and enjoyable than only the exhibit of his work. The first challenge for exhibition designers is to identify a variety of content that can appeal to different people.

The variety of content was matched in the Yeats exhibition by the variety of media used: more passive presentations (listening to poetry or watching videos) were interleaved with electronic interactive points (touch screens and turn-the-pages installations) and more traditional touch-and-feel objects (replica of the passport and the family album). As not all visitors are excited by, or interested in, technology, this variety allowed each individual to engage with the modality he or she felt more comfortable with. Moreover, the position of the interactive cases and the use of audio instead of text to convey content allowed passive visitors to acquire information by watching while someone else interacted. The second challenge is then to plan for different attitudes and abilities and design the digital interaction to support a 'social access' to the information.

To ensure that different media are seamlessly integrated effectively in the ambience is a further challenge: the content, the media and the environment have to be designed together to create a holistic experience. Particular attention should be paid to invasive media like audio: quiet visitors may feel inhibited in the interaction if they perceive the narrative may annoy other visitors.

The presence of artefacts as a means in the learning experience was brought into question by the lack of respondents who mentioned the artefacts as their favourite part of the exhibition. This could be due to the excellent use of the digital images that recreated the sensation of interacting with the original. Digital images were the bases for both physical replicas and their electronic reproductions. Indeed digital surrogates were used all across the exhibition in both high-tech (interactive displays) and more traditional (the wallboard questionnaire (figure 8)) forms. By means of digital images the Library was successful in driving attention to Yeats' literary work and, ultimately, to fulfil its role.

The exhibition demonstrates the value of digital multimedia in creating engaging and stimulating environments. Through digital interaction it was possible to expose more artefacts and more information than the space allowed (the exhibition had 400 items exposed and 2500 available electronically). The use of the digital medium provides visitors with a choice, through layers of information, and supports personal attitudes, as each individual can investigate more or less of each issue. The role of an exhibition designer is then that of proposing to the public multiple paths of visits and to leave each visitor free to select the mode and the level of engagement.

In summary, as for science museums (Davison *et al.* 1994), a mixture of more traditional presentations (cases with artefacts, reconstructions, graphic panels) supported by multimedia (audio, video, touch screens) and hands-on sensory components (touch replicas) demonstrated to be the key for success even when the focus of the exhibition is composed of difficult objects like manuscripts.

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