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Renewal of the Museum in the Digital Epoch

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Abstract and Key Words

Abstract

At the beginning of the 21st century, digital technologies are radically changing the way young people communicate, learn and spend their free time. Museums, in order not to lose the next generations as visitors, must conform to the new expectations and needs. On a large scale, the museum must address young people, provide a forum for self expression and participation, and advertise itself by new means. On a smaller scale, the style and means of individual exhibitions must change, providing space for activity, emotions, and multiple modalities besides text, personalized visits, interactive explorations and self-expression, evoking emotions but meanwhile also fulfilling educational objectives. Digital technologies – by the yet smaller, cheaper and more and more pervasive devices and services – provide ample means to reach these goals. In our article first we provide a conceptual framework, focussing on the internet generation as new audience, and traditional and new functions of museums. We show how digital technologies may be used to reach six major and general goals. For each issue, we discuss concrete recent examples, from international and own projects. Finally, we address the roles in the complex process of design, development and daily operation of digital applications, in the context of a digital strategy for the museum.

Key Words

Design, digital museum, , digital technologies, evaluation, learning, New Media culture.

1. Introduction

We have been witnessing a tsunami of development of computing technologies and digital devices – as it was forecasted by the Moore law. Devices – such as mobile and tablets – get not only smaller, cheaper and as powerful as former PCs, but are equipped with cameras to create high-quality and 3d images, as well as a range of sensors to indicate location, orientation, but also, radio waves or humidity. One can find – or rather, cannot even notice – tiny sensors which may not only be used in shops, but hidden in toys, furniture, everyday clothes or jewellery. Via these sensors and devices, thanks to 7/24 internet connectivity, not only people, but „things" can communicate and exchange all kinds of information.

The availability of devices and information – both technically and financially – opened new terrains for socially relevant applications, addressing broad audiences. One of these terrains is the museum. For the traditional „temples of cultural heritage" it is a challenge

to redefine themselves from their rooted in Gutenberg Galaxy[1] into the Neumann Galaxy. Their new, potential audiences – the digital natives[2] – have very different habits of learning, and communication of their parents', and a magnitude of (digital) media competes for their attention and time. On the other hand, the emergence of new digital technologies opens entirely new, almost „magic" means for interpretation and outreach for cultural heritage institutions: galleries, libraries, archives, and museums, shortly referred to as GLAM[3]. However, it is not self-evident to find the right place for the digital technologies in museums. The discussion has been going on at newly-established professional forums[4] as well as in the general media[5].

In this paper we will examine the ways of exploiting this new arsenal for the good for GLAM institutions. We will be using, however, the museum as a more familiar term, and also because of the majority of our examples will be related to exhibitions in museums. But most of our statements may be applied for GLAM institutions too. The other important aspects are the societal-cultural context. We will be talking from the point of view of societies which are part of the Neumann Galaxy, without going into details of differences in layers of society and the cultural background surely present in different countries and continents, but a comparative discussion is beyond the focus the present paper.

We shall identify - old and novel – communicational principles the museum may – or even, must – use to reach its (potential) audiences, and we will discuss how digital technologies particularly can serve as means to achieve major and indirect goals, like knowledge transfer and involvement. In the next session, we outline the communicational needs and habits of the potential audience of the museums, and identify – yet independent of the digital or analogue realisation – goals and means of museums. Then, in the major body of the chapter, we discuss one by one how technology may be used to achieve these goals. For each issue, we will introduce examples from our own practice as well as from others. We close the paper with dwelling on design and strategy forming. Based on our own experiences, make an attempt to identify the

[1] *McLuhan, Marshall (1962). The Gutenberg Galaxy : the making of typographic man. Toronto, Canada: University of Toronto Press. p. 293. ISBN 978-0-8020-6041-9.*

[2] Bennett, Karl Maton and Lisa Kervin (2008). The 'digital natives' debate: A critical review of the evidence, British Journal of Educational Technology, Volume 39, Issue 5 p 773–964

[3] https://en.wikipedia.org/wiki/GLAM_(industry_sector)

[4] A sample of the annual conferences and forums: MuseumNext, Museumandthe Web, MuseumID,…

[5] The *Daily Telegraph* puts forward the progressive attitude of museums in Scandinavia to be followed by institutions in the UK http://www.telegraph.co.uk/technology/news/11411580/Swedens-cultural-heritage-gets-a-digital-identity-makeover.htm

characteristics of „good" application of technologies in museums, the possibility of creating new genres and qualities, and outline the context of exhibition installations.

2. The museum and its audiences

2.1. The New Media culture

One of the most important aspects of information technology on society is that it enables *participatory culture* in the virtual world. The media researchers of the McArthur Foundation[6] sum up its characteristics in the following:

- increase in *civil participation*,
- tools in ease of reach for everybody *creative self-expression*,
- support *to create and share content*,
- *self-organized support and mentorship* for novices to catch up with skills and knowledge, and organize the body of emerging treasuries',
- *emergence of informal and formal social networks and protocols* in course of the above activities, where the reactions by the community are of principal importance.[7]

The citizens of the participatory culture are bound to formal and informal groups, they are motivated to express themselves and contribute by sharing their (correct or incorrect) knowledge, and they are open for discussion and for cooperation to create new forms (e.g. blog, Wikipedia) and bodies of knowledge.[8] Joint, social activities are gaining dominance over individual achievements.[9] As the major enabling technologies, the mobile phone is becoming an all-day companion for the new generations, the above phenomena become prevalent at work and school, as well as in personal and private life. Thus the usage of online, virtual world gets interwoven with the every-day real life. The internet generation is not only skilled in practicing this interwoven life (both in a technical and in an intellectual sense), but find it natural and even necessary to be constantly present in both the real and the virtual world. The real and the virtual do not exist in parallel,[10] On the other hand, the new media and enabling technologies do not invoke automatically a democratic, participatory culture.[11]

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[6] The study sums up the results of the „Digital Culture and Education" study by 2009, supported by the McArthur Foundation.

[7] Henry JENKINS (ed.), *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*, MacArthur Foundation, The MIT Press Cambridge, Massachusetts London, England, 2006, 5–6.

[8] *Same*, p. 13.

[9] *Same*, p. 22.

[10] PINTÉR, Róbert, *Információs társadalom: utópia vagy valóság?* = www.artefaktum.hu/irasok/pinter_inftars.rtf

[11] BUCKINGHAM, D. Afther the Death of Childhood, 2000, Polity Press, Cambridge.

2.2. Learning in new ways

According to Henry Jenkins, in order to solve the gap between what the „enabling tools" make possible, and what of these is utilised, the methods and means of formal and informal learning must be brought to level of the digital age. They identify the following ingredients of new *media literacy*:

- learning by playing
- ability to create and interpret computer simulations of real-life processes
- privatization and creative reuse and remixing of (parts of) selected content
- content creation in a community, by sharing knowledge
- easy switch between modalities and media surfaces to trace information
- multitasking, parallel attention to multiple sources, filtering important content
- assessment of validity and reliability of information sources
- communication and maintenance of contact, recognition and trust of communities with different cultural backgrounds.[12]

The man of our age at the beginning of the 21st century is overwhelmed by new information and technologies. Competence-based education and life-learn learning have become key concepts. The museum, just as well as the institutions of formal learning, the schools, are challenged by these developments.[13] [14]

2.3. Old and new roles of the museum

Before discussing the potentials of digital technologies in detail, we must address a common and frequently articulated fear about the *nature and scope of the change* as a result of opening the doors of the museum for the digital arsenal,

Will the application of technologies and the induced activity of the visitor not turn the museum into a Disney-Land? This question is posed even today (we have heard it several times in our practice), in connection with museum installations turning the visit to an interactive experience. Experts, having spent decades with their museum, fear that as digital technologies gain terrain, the very essence of the museum gets endangered:

[12] JENKINS (ed.), *(footnote 8)*), xiv., 35–104.
[13] Nina SIMON, *Why Participate? = The Participatory Museum*, Santa Cruz, California: Museum 2.0, 2010, i–vi.
[14] ÉBLI Gábor, *Évforduló után – merre tovább hazai múzeum kutatás* = UŐ, *Az antropologizált múzeum*, Typotex, Budapest, 2009, 154–171, 169.

visitors get attracted by games, gadgets and light and sound spectacles, not by the exhibits and the message they convey. The opinion of the audience competes with the scientifically sound information, and visitors even may alter masterpieces – albeit digitally only. The real learning and the emanation of the original objects gets endanger by the loud groups. Some question if the digital gadgets convey at all any message, have any positive effect other than the joy of playing.

The above, somewhat exaggerated view loses its grounds if we examine what are the general goal of a museum, as of the experiences and feelings of the visitors departing. The following is a summary of brainstorms we moderated with representatives of different museums at workshops, but also as a kick-off to discuss the application of some digital technologies for an exhibition. They should leave with good memories, pleasant and inspiring experiences, with new knowledge, may be with new skills exercised, with the feeling of success and curiosity raised. The hours spent in the museum should resonate, inspire for further learning, raise curiosity and awareness, or even, cause a change in daily routines or view on life. Moreover, the visitor should share the positive experience with others, propagate the museum, and feel responsible for its future, and support its institutional existence. These goals are not related to our very time – only the audiences are now different, in number, in variety and in cultural and communicational habits, as described above.

Nevertheless, museums must accommodate new roles besides being the "source of knowledge": they must engage in discussion with their audiences, give well-defined means and space for self-expression, and consider the additional role of being a place of leisure both with the exhibition and the auxiliary services like shops and restaurants.

3. Digital technologies for museums

3.1. Potentials in serving goals

The arsenal of digital technologies offers novel and complementary means to achieve the earlier discussed very goals of the museums in our age.

They may transform the visitor from a passive "consumer of culture" to an active participant, open to experiment, to make discoveries, to form own opinions. He/she may get information in content and format most suitable for his/her age, intellectual and physical capacities and cultural and social background, instead of obliged to earlier protocols, such as to read a „general text". The particular objects and pieces of

information may be woven into a story or filtered according to a set of points of view, or may be „discovered" via dialogues. Especially for young visitors it is effective to engage them by making them move and act on emotions in a playful way.

A guide, equipped with a huge body of knowledge and empathy, surely exploits the above-mentioned arsenal to engage a more or less homogeneous group of visitors. By the application of digital technologies, the exhibition itself can be responsive to many of the characteristics and needs of the individual visitors, in an indirect way or by dialogue. But they make possible what is beyond the capacities of the best human guides. While in museums usually objects may not be touched, and even less, operated, with the application of digital technologies it is possible to examine them in function or taken apart (or a fragment extended to assumed complete form), view them in their original setting, or brows related artefacts not even in the exhibit. These are novel forms of learning, relying on visitors' curiosity, activity and emotional experience. Moreover, a visit may trigger a wider-range social influence, both by providing means to (digitally) „take home" memorables and share them on the social media, express opinions or encourage discussion and coordinated action during the visit on spot or after the visit in the virtual world.

Thus we can conclude that technology, if carefully applied to serve the message of an exhibition and goals of the museum, do not destroy but strengthen its very essence as an institution of transferring cultural heritage.

3.2. The enabling technologies

The scope and power of digital technologies have been increasing year by year: the processing and sensing devices become smaller, cheaper and more powerful, and new ones enter the market, enabling new types of interaction and information exchange. The equipment (the hardware), the basic software to get it running and communicate, and the clever dedicated algorithms and applications exploiting the capabilities are the 3 components behind every application. Without going into details (which would get outdated by the months anyway), we outline the potentials of the basic digital technologies around.

3.3. Functions and roles

After having described the major and general goals of museum, the communication habits of the internet generations and the aspects of media literacy, we dwell on 6 possible „usage" of digital technologies:

- motivation, raise of interest in a playful way,
- education in different ways: affective, cognitive and motoric, and gamification,
- triggering visitors' activity – learning by doing, by search, by discovery,
- visitors participation on different levels,
- personalization,
- extending the visit in space and time.

Note that the above terms are not the least technical. Some like education express one of the major goals of the museum. Others refer to visitor's protocol, some of which are novel and related to the characteristics of the potential new audiences. And there are some – such as learning by doing – which were not practiced before not only because of the different contemporary theories of learning, but because there were no means to implement them before the arrival of digital technologies. We also emphasize that several of the above aspects may be used to compare and evaluate also non-digital „solutions" in the museums, such as museum pedagogy activities, guided tours or even exhibitions relying only on „analogue" solutions for presentation. Such a basically functional view helps to bridge the gap between the „traditional" and „digital" museum practices, and use them in a combined way.

3.3.1. Motivate and engage

Digital technologies may be used to „sell" some serious content, which would normally be out of the interest or beyond the normal temporal and intellectual capacity of the visitor. Raising interest is essential at the very beginning of an exhibition: the first impression sets the mood, and the motivation of the visitor. A surprising, unusual „beat up" may give some summary of the topic from an unusual point of view, may address the visitor right at the entrance by a personalized piece of information, and last but not least, reassure him that a novel experience is to come.

> **Example 3.3.1.1** Our favourite example for such a „beat up" as the very first encounter with an exhibition is the „Be the Bird" installation (see Figure 1). The topic of the exhibition – the endangerment of migrant birds, due to climate change and pollution caused by the people – is of limited interest, partly because lack of experience with „natural life", and partly because of the too often articulated phenomena of pollution. The very first experience at the exhibition puts the visitor in a different perspective, as of the birds. By a clever (and invisible) application of

kinect technology, the visitor gets the illusion of driving the flight of different birds: they become the bird. Moreover, by stepping in the footprint of different birds, the – unconsciously or not- identify with one of them the most. Further, they are motivated to see if „their bird" can make it to the remote migration destinations.

Example 3.3.1.2 Another example motivates visitors to read poems, by an engaging, almost magical experience. The Patch the Poem installation is one of several to make visitors experience poetry. Visitors must assign the right missing words of a poem to the „wholes" in the text. This may be a paper and pencil exercise known from school. But what makes application work is exactly the magical aspect: one has to catch the right word, and once in the palm, carefully transfer it into the intended location. The careful, slow treatment is basically necessary because of the limitation of the used technology (kinect camera) – but in this case, it is in line with the experience of carrying precious items, in the form of light. The slow pace of the application allows time to read, to contemplate about choices. Moreover, the setting is a horizontally laid large open „book" with the (projected) text of the poem and the vagabonded words dancing around. where several visitors can stand-by, advice and support the „active" player.

In both cases, the visitors hardly pay attention to the (invisible) technology, they are primarily immersed in the unusual experiences. Also in both cases, the experience is not a lonely interaction with a digital application, but a public act, triggering also communication between the visitors.

3.3.2. Educate in different ways

The simplest choice of modalities for learning is present at many museums: often, exactly the same text may be read next to the exhibit or in a small booklet given to visitors, or listened to by using an audio guide. The textual and auditory modalities may be extended with visual, tangible and motoric ones. The usage of *multiple modalities* in a redundant or complementary way has the following advantages:

- as opposed the omnipotence of textual information, visitors with preference for visual or motoric modalities are addressed too,
- the application of multiple modalities supports leaning by different experiences
- it opens ways for novel and intriguing ways of interaction.

Example 3.3.2.1 In another installation of the above quoted exhibition, the rhythm and melody of poems may be felt under the fingertips: based on the low-

high and short-long syllable in the poems, for each poem a tangible 3d print is created and may be consulted. (Figure 2). Hence, the „rhythmic reading" of poems (another not so easy and appreciated task known from school years) may be experienced in a different way, with the aid of touch. Moreover, there is a game element in the installation, as one has to match the written and the 3d printed versions of poems. So this installation incorporates gamification, usage of supportive modalities and a surprising experience of manipulation 3d prints of poems. All these serve, in an indirect way, learning of individual lines of poems as well as principles of rhythmic patterns.

Emotions may be driving for learning as „entry points" to collections and stories, as well as the joy and other positive emotional experiences like surprise or satisfaction. By formulating a query by making a face or pose[15] uses the motoric and affective channels for learning, the latter in double way: it is fun and surprising to see objects with emotional facial expressions similar to the one posed by the visitor.

Gamification, with the essential character of competing with time, with an opponent or motivated to score high on an objective scale, motives people per se. The common - cognitive and single-modality – realization of games are quizzes, which gained their places in exhibitions too. However, in their traditional multiple-choice form, they are reminiscent of test

Games may be geared towards primarily to observe a given (or several) exhibits better and do some own discoveries needed to proceed, or to take the role of some personage and perform complex decisions to archive certain goals related to the - intangible – topic of the exhibition.

Example 3.3.2.2 For the first case, in the genre of „collecting items" we refer to our own project of „Musical paintings"[16]. The tablet app is basically a multi-media guide, but the path is set by the goal of finding special musical instruments in the few rooms filled with Dutch paintings. The goal is to find all instruments. Meanwhile, additional information – even music – becomes available as reward. Also, the app encourages cooperation over fear competition, as visitors may

[15] https://vimeo.com/60866008

[16] The app was designed by students of our „Digital Museum" course in 2012, in cooperation with the Museum of Fine Arts in Budapest.

exchange instruments from their own collection on spot with other visitors, but also may propagate their favourites via Facebook.

3.3.3. Learning by doing

Relying on active participation of the visitors has the following advantages:

- Visitors may choose what they are interested in, and occupy themselves differently.
- It support „Learning by doing", which is more effective than passive observation.
- Some phenomena may be best explained by simulations.

There are a multitude of installations where the working of a machine, some natural phenomenon or (may be by the eye even invisible) object gets explained by operation, simulation allowing changing of conditions or 3d manipulation.

Another usage of explorative learning is interactive data visualization. The visitor initiates „queries", and the answers get presented in not only telling, but visually pleasing format. An outstanding application of this technology is the online exploratory facilities of Object Photo[17]

3.3.4 Participation

By taking an active role in the exhibition, the visitor already finds himself in a participatory role. However, participation covers much more: all the activities and possibilities by which the visitors takes part in the interpretation (and even, making) of the exhibition, its major messages, gets attached to the museum, finds its future important and contributes to its future by different means.

As a way of participation, a response to the (usually. art) exhibits, the creativity of the visitors is triggered, providing space for self-expression. Not a smaller museum than the Rijksmuseum in Amsterdam created a special online editing tool to trigger visitors to re-mix pieces of art in their collection. This was also to trigger wide-spread access to their on-line available part of their collection.

If the topic is history, or some local or global social issue, visitors may be asked to contribute with their own stories, memories, objects. In the near past, in the exhibition

[17] https://www.moma.org/interactives/objectphoto

„Back in the photo atelier" an end of 19th century famous Budapest photograph's atelier was filled with exclusively photos borrowed by private people. The campaign was conducted via Facebook and other online media, and got an overwhelming response. People appreciated that the story, the possession of the ordinary man may be of general interest.

Another form of participation when people give feedback, by expressing opinions or votes, during or at the end of the exhibition or online. By digital voting it is possible to „give space" for the visitors preferences, like it is happening on the Collection wall where the most liked pieces can be traced. But also, it is an effective way to confront people with the diversity of opinions or wide-spread misbelieves.

The steps of such concrete activities may lead to active and long-lasting participation in supporting a museum e.g. financially, and representing the importance of their survival.

3.3.5. Adaptation to different visitors

Digital technologies make it possible that a single exhibition serves a wide range of visitors, concerning their characteristics and presence. The choice of language and the availability of *different modalities* are the most common options. Another, subtle yet rewarding gesture is if things start (or are to be started) when a visitors arrives, as opposed to e.g. looped videos.

However, the adaptation may take place at other aspects too:

- A *special visitor route* may be suggested, depending on special interest, level of knowledge, time to spend. The visitors may specify his/her needs, or may be guessed by certain characteristics (age, nationality, gender). These options may be complemented by „surprise tours" or „curators choice" tours.
- The *amount and depth of information* available at each exhibit is designed in a multi-layered way.
- The interaction and the user interface acknowledge the technical skills of the user, offering help on usage only if some problems are perceived. On the other hand, with an eye on elderly, not technology-geek visitors, it is important to make the interactions transparent and familiar to them.

3.3.6. Extension in time and space

When talking about digital technologies in museums, we should bear in mind the potential benefits of the technologies beyond the walls and duration of a single exhibitions. As of space expansion, one can think of three options:

- The topic of the exhibition may be reflected upon at other locations, typically, in the built environment, or in nature. The mobile devices may be used to create specific, playful guides in a city e.g to trace an artist. We created a walk tour in Budapest to trace the appearances of Frans Liszt,. Another application uses a novel of a commemorated author as the main guide in Budapest, The visitor reads (or listens to) the novel at the actual locations of the scenes. In both cases, photos, videos, contemporary articles extend the experience of the physical visit. Such a walk, on the one hand, is available even when the exhibition in the museum is over. On the other hand, it bridges the gap between past and present, physical every-day environment and the virtually recalled past.
- Another dimension of extension is the availability of an exhibition, or collection, on-line. Browsing may result in urge to see the original works int he museum, or to recall a visit, or to use the assets and fully reliable information for educational purposes.
- For specific school-groups, many museums create an educational corner on their website, filled with ready to use learning materials similar to „paper and pencil" activity sheets, as well as games and special apps to be used independent of the visit.

4. Design issues

Nowadays – as it is normal with new emerging technological applications – there are good (and bad) examples of solutions, and the prior danger of complete rejection is replaced by the danger of uncritical expectations from and over-the usage of digital technologies. Once the (often huge amount of) investment is done, there seem to remain little interest and capacity to analyse the result. What makes the application of digital technologies a success? When are digital technologies proper in quantity and quality, and strengthen the overall effect of an exhibition? How and when to decide about the application of interactive digital installations, in the process of the design of an exhibition? In order to come up with the „right" type and amount of digital applications in an exhibition, the decision must emerge from a close dialogue between the museum experts and the person – or team – responsible for the digital assets, starting at the very beginning of designing the exhibition. Further, with the emergence of „internet of things" the „hardware" may be invisible, or operated by natural physical means or hidden in eye-catching furniture – and do not stick out from the environment as ugly

computer or displays. Or there is no need for hardware at all, if visitors arrive with theor own computers: tablets or smart phones.

This „hiding" of the technology is in line with the fact that it is not the technological novelty per se which guarantees the success of a digital application and qualifies the exhibition as contemporary. The application of QR code, kinect or the latest technology should enhance the message of the exhibition, and engage visitors with the exhibits, not the technology. The Disney-land effect may emerge if there is no concept behind the introduction of the digital tools, they overwhelme in quantity, visually or acoustically. Unfortunately, one can come across such cases too – but in these cases one should not blame the digital assets, rather the curator or designer of the exhibition.

4.1 Digital strategy and design process

We have touched upon that there is role for digital applications beyond a single exhibition. On the other hand, the possible applications for distinctive exhibitions highly depend on the overall digital environment, in terms of availability of digital resources, finances, supporting personnel. Finally, the success of digital technologies at single exhibition may suggest that the museum has made a step towards the 21st century needs. Such a perception may be correct, in line with further developments at the museum. If not, visitors may be disappointed at the next „step back", and get confused about the statement of the museum with respect of innovative technologies. Hence, in addition to designing the technological support for individual exhibitions, the museum must make a digital strategy, covering the following issues:

1. Long-term vision and commitment (if any) for the usage of digital technologies, related to specific goals (e.g. reaching new audiences, taking up new roles for social debate).
2. The realisation of digital technologies within the museum:
    a. in digitalization and with rich meta-data description of assets of the collection – a strategy on focus, timing and quality,
    b. in exhibitions (permanent/temporary)
    c. in propagating the museum (online, social media)
    d. in providing access beyond the visit (e.g. educational materials, virtual tours)
    e. in offering digital assets to be taken home and re-used,
    f. in participatory activities (feedback on different forums, co-creation, community created content)
3. The planning of infrastructure (wifi, equipment, personnel)

4. Assessment and renewal process: the mechanism for assessing the „merit" of individual solutions, and the incorporation of the lessons learnt to adjustments on installation level as well as refinement of the strategy.

It should be self-evident that the above tasks are not of those of the personnel in traditional roles, as curator, researcher or educator. A new role is to be filled, where a person is aware of the objectives and practices of the museum, and is well informed about the (ever growing) arsenal of the digital technologies, as well as the aspects of their utilisation. On international forums, we hear from such people (or the need for them) as digital curator, digital assets director, new media curator. The education of these people would also require a specific course, of which a few examples are emerging.

It is similarly important, that the digital installations get designed by an interdisciplinary team, and in a process interwoven with the entire design of the exhibition. On the one hand, the arsenal of digital technologies may help the curator to design the concept of the exhibition, to address multiple audiences and to exploit new methods of interpretation, to plan the exhibition of a limited number of top pieces and offer additional content optionally. On the other hand, for a digital installation not only its role must be defined, but content may be gathered in digital format. The physical space and visual appearance of the exhibition should be designed such that the digital installations fit well. Finally, the operation of the installations – both on spot, and providing the infrastructure – must be assured after the opening.

4.2 Quantity and quality

In our days, just because of the novelty of the technology and the lack of „design rules", one of the puzzling issues is the „right" amount and quality of the digital installations. In line with the previously emphasized functional approach, when planning digital installations for an exhibition, they should pass the scores of functionality. There should be at least one, but preferably, more aspects where the digital technology contributes to the goals: makes some intangible or difficult content easier to grasp, serves special visitor needs, triggers physical and mental activity, discussion within and/or beyond the museum. The digital technologies may be applied in a uniform way, replacing written text with layered and multimodal information attached to each exhibit. For such a solution the pioneering – and still today functioning – organization of the annotation of the Chopin Museum permanent exhibition is a good example. Moreover, here too several additional goals are met, such as automatic usage of language based on visitors profile encoded in the ticket which is used to activate each exhibit's description, choice

of modality, quantity and depth of additional information. The organization of the information displays is clear and uniform, and there are no technical burdens with the interface (e.g. touch not recognised). Hence, here we have a genre (information on/related to exhibits) which was designed and implemented well, The latter also covers the placement of the displays, clearly in second role to the objects in the corresponding displays..The amount is not disturbing, as the visitor understands the structure and cast of role of the objects on display and the information on the displays.

Another kind of installations are the unique, very much content-dependent ones, also with special unique role in the exhibition. The above quoted „Be the Bird!" serves as a very well articulated first upbeat for the rest of the exhibition. The installations for sensing poetry are also in this category. 11 installations open different ways to poetry, individual topics. These installations can hardly be re-filled with other content. Even for our poetry installations, we resisted to use them with other poetic content, as the very playful nature of the poets and philosophy of the poet himself (they should use rather than admire my work) were essential in justifying the installation.

The special organization and visual presentation of the digital applications is of a major design issue. One should bear in mind that any other item than the exhibits themselves are intruders – and this applies especially for the grey displays, black plastic bodies of equipments or loud and light devices.

In order to quote a recent case dividing opinions, we refer to the permanent exhibition on the history of the Jews in Poland, shown in the brand new POLIN museum.[18] In a building evoking emotions in its puritanism, the permanent exhibition is a meander of small spaces in the underground level without any natural light, but packed with more than 70 interactive installations which dominate the irregularly connected spaces. One can overhear the audio of nearby installations (in different languages), full wall projections with animated anecdotic stories in similar visual style lose their attractiveness after the 2nd or 3rd case. Many games and puzzles invite for play, but most of them are quizzes testing knowledge which could be acquired by reading textual explanations abundant in the exhibition. The interactive installations neither lead the discovery, nor enchanted the visitor. The quotations form historic documents, their explanations and the „added-on" digital installations compete for the attention and time of the visitors. The lack of reference in space (how much is still to come), and the huge

[18] http://www.polin.pl/en/wystawy-wystawa-glowna-galerie/first-encounters

amount of content to be covered „in one go" also contribute to the overall unease in the exhibition.

In the Science Museum in London,[19] a similar number of installations evoke a different experience. Entering the mostly huge exhibition spaces one can recognise the role and connection of the physical and digital elements. Their cast, genre and the physical and visual appearance show a pleasing variety and harmonize the with the topic in question. The visitors does not get tired of repetitions, rather the digital installations help to keep the level of interest and activity. The games and installations invite, mostly the younger, visitors to tackle „real" problems, and challenge their creativity and physical skills in serving the „messages" of the exhibition.

4.4 Evaluation

Once an exhibition is opened, and the developers and designers got paid, there are hardly any means for evaluating if the installations serve the envisioned purposes. This is a real loss, as neither the museum can get feedback on the decisions taken, nor is the community informed about lessons learnt. Instead, it is assumed (and propagated) that any digital installation is a positive contribution, the more expensive and technology-showing, the better. However, a range of questions rise about actual usage and short and longer-term effects:

1. How sustainable is the installation, with respect to (mass) usage, updates of operating systems and devices, eventual fixes in content?
2. Do people engage with the interactive installations? What parts are used, what not? The reason for not frequenting certain installations or parts of it may be due to content, language, UI issues, spatial location in the visitors journey, or mismatch with the persona characteristics of the intended audience.
3. What is the short-term effect of the installation? Do people like it, do they get motivated to see (again) the exhibition? Do they learn what was intended?
4. On a longer term, what are the effects, such as: people remember more and have learnt more, find the topic relevant, get motivated for further investigation, consider the museum as an interesting place to return to.

5. Conclusions

[19] http://www.sciencemuseum.org.uk/

In our article we have show the complexity of the issue of using digital technologies for the benefit of museums. We have pointed out the societal changes, resulting in new expectations from (potential) visitors, concerning the principles and tools of communication of the museum. On the other hand, local as well as global problems urge the museums to make their voices heard, provide forum for discussions and become a relevant player in public opinion forming. Once the museum acknowledges these new challenges, it comes natural to rely on contemporary digital technologies for a range of goals: to inform, reach and motivate visitors, to make them emotionally involved, turn them physically and mentally active participants, engage them in co-creation, even in co-curation, and enhance the museum visit in space and time. We introduced examples from own and international practices.

Due to the novelty of the field, the differences in themes, scope and tradition of museums, and the essentially interdisciplinary nature of the design of digital applications for exhibitions and museums makes it difficult to formulate general design guidelines. Based on our own experience, one of the major factors of the success is in working in a team where everybody is outstanding in his/her field, the roles are well established, the different players trust each other and can communicate. This last is particularly difficult, as there are gaps in views and language between scholars in humanities and the technologist, scientists and artists, not to mention the financial/marketing and professional representatives of the museum. One should consider a current task (e.g. the design of an exhibition) in a strategic context.

Finally, it would be very much needed to pursue empirical research on the working and effect of the digital installations in museums, on a routine way whenever an installation or service is put in place in a museum, and in the framework of an interdisciplinary and international research agenda.

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