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Colour Mirror – Connecting Visitors with Exhibits by an Interactive Installation

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Abstract. Museums are in transformation, along with today's rapidly changing society. Digital technologies not only attract the young generations as potential visitors, but they also create entirely new ways of interpretation, engagement and outreach. As a case study, we introduce our ColourMirror, a multi-functional digital installation accompanying a museum exhibition in which objects are arranged by colour. In a "magical" mirror visitors get to see the exhibit that resembles their own colours the most. They may forward and distribute the image in the mirror. The collected data is the basis of animated visualizations. An empirical study of usage and visitor experience reveals that visitors enjoy the interaction, remember well and identify with the object they have been assigned, and feel motivated by digital installations to visit an exhibition. We sum up major lessons and potential further applications.

Keywords: Digital museum, interactive installation, evaluation, Hungarian method.

1 Introduction

In the age of the Information Technology revolution we witness not only the proliferation of digital assets and online services in daily life, but also profound challenges to the traditional forms of cultural heritage preservation and the institutions dedicated to it [5]. In particular, museums are in transition, from being the "temple" of knowledge and cultural assets to a forum where the tangible and intangible heritage triggers conversations between the past and present, between the museum and its visitors, and also among the individual visitors [3, 6, 7]. The visitor is no longer considered a consumer, but a participant, on a number of different levels [11, 16, 19].

Digital technologies offer an arsenal of possibilities to liven up exhibitions, to trigger visitors' curiosity and get them involved, and to reach out beyond the walls to increase

impact and to attract new audiences. Museums are starting to harvest the opportunities. For earliest examples, see [8, 12], for recent developments, check out the annual conferences[1]. Still do not exist enough studies of the benefits of digital installations, apart from their entertainment value for (young) visitors. Do they also learn, do they become more interested in cultural heritage, do they come to value museums more? We firmly believe that well-designed digital installations can serve all these purposes. One must be aware that the introduction of technology merely for its own sake may even work against the basic objectives of museums, e.g. if people come to play with new technologies, without focusing on the exhibits and confronting their key messages, or if an installation appears too "childish" to certain types of visitors who, thus, feel excluded. However, the essence of good design is hard to figure out and formulate because of the diversity of content and messages in different museums, the lack of settled methodology of measuring success in the aforementioned dimensions, and because several factors play a role in the evaluation of an installation, such as the design of the UI and UX, the quality and quantity of the content, and the spatial and logical integration of the installation into the structures of the exhibition. Thus a detailed account of the design and usage of an installation helps to establish a new, interdisciplinary field, and nuance the picture about the potentials of digital technologies in museums. The lessons are relevant for all major players: the creative and the computer scientists involved, and the staff of the museum. The Clevland Museum of Art's detailed follow-up report and conscious strategy for re-design is an example in this respect [2].

In our TechLab, we have been designing, implementing and – occasionally – evaluating installations for leading museums in Hungary[2]. We have been working with a dozen partner museums both in the framework of our interdisciplinary *Digital Museum* courses[3] and through commissioned works prepared for exhibitions. In both settings, we are motivated to support the message of an exhibition, the – explicit or implicit – needs of the visitors of all kinds, and last but not least, to comply with the aesthetics of the physical space and the topic of the exhibition, by hiding, as much as possible, the electronic components.

In this paper, after exploring the above-mentioned challenges in more detail, we discuss one of our most recent and most complex museum installations as a case study. The ColourMirror is a multi-functional digital installation with three components, accompanying an exhibition where objects are arranged by their dominant colour. We discuss the experience and the working of the "magical" mirror, where visitors get to see an exhibit next to their own image. They may send and distribute this special "selfie". The collected data is visualized in several ways, giving insight into the objects and colours recalled by prior visitors.

We report on an exploratory empirical study of usage and visitor experience and discuss its results. We also reflect on the museum staff's reaction to this unusual item. We finish the article by outlining further work and application potentials that have a broader relevance.

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[1] Museum and the Web: https://www.museumsandtheweb.com/ Museum Next international conferences: https://www.museumnext.com/

[2] For information and videos on a list of our museum projects, see http://techlab.mome.hu

[3] See http://techlab.mome.hu/dimu

1.1 Museums and their new audiences

The communication, learning and leisure habits of the generations growing up with internet and mobile devices have changed drastically [10, 17]. These potential future visitors of museums may be characterized by the following features:

- a preference for (audio)visual materials over text,
- fast and parallel processing of (small) chunks of information,
- a need for activity,
- a preference for discussion and self-expression instead of authoritative (academic) statements,
- living online, connected, all the time,
- a masterly handling of digital devices and services.

For these generations, the traditional 19th-century setting and protocols of museums are not appealing. This is strikingly visible from the result of an inquiry in which university students in art and design were asked to write down the first three words that came to their mind about a museum (see Figure 1).

But behind many of the issues raised here there are – and in fact, there have been for quite some time – inherent problems that may become more articulated with the increase in visitor numbers and diversity. The following phenomena will be familiar both to visitors and to museum staff:

- The so-called "museum fatigue", caused not only by the difficulty of *orienting oneself* and by the distances and stairs to be walked (typical in traditional museums), but by the overwhelming *amount of exhibits*.
- People spend little time *examining individual exhibits*: they take a quick photo, a selfie (if allowed), they are in a hurry "to see everything", or wonder around as they do not receive enough clues to explore the exhibition and make sense of it for themselves [18].
- Visitors are reluctant *to read the textual information* offered, both the "object descriptions" which are professional and of identical nature for each object, and the lengthier introduction at the beginning.
- There is a limited availability of affordable *souvenirs to take home and give away*, to recall the visit, typically constituting magnets, note-books and small office utensils.
- Once visitors have seen an exhibition, they receive no means of remaining in touch, they are not motivated to do so, nor to return and to consider the (future of) the museum as a matter of personal concern.

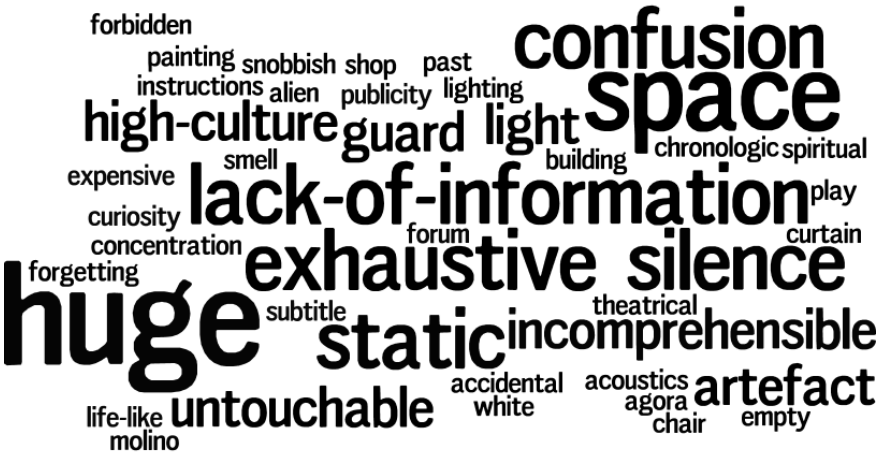

Fig. 1. Words associated with the museum by university students.

1.2 Potential uses of digital technologies in museums

Digital technologies can be exploited both to serve the needs of the new generation of visitors and to remedy – one or more - anomalies of the museum visit. We emphasize that even without any digital device it is possible to reach several goals. For instance, an experienced museum guide can orient, inform, keep interest alive, adjust the depth, length and wording of his/her explanation to suit individual visitors, and challenge them to give their own opinion. But there are far more visitors than guides, so digital devices and solutions can take over several of these functions. Different types of applications such as multimedia guides, quizzes and touch-screen based explanations are finding a place in museums.

It is more exciting to invent entirely new, poetic or "magical" experiences that would not be possible without a digital arsenal. These novel experiences – often involving emotions, the joy of bodily movement or cooperation between visitors – should not distract attention from the artefacts, but just the opposite; and they should underline the main message of the exhibition. We are especially motivated to invent such unique applications.

Before discussing one example in detail, we sum up the possible functions and forms of digital applications in an exhibition:

1. Helping to *find one's way in an exhibition*, localising objects or topics and offering paths tailored for individual interest – by audio or multimedia guides, where the path may be tailored to the individual visitors (e.g. offering a list of top attractions, suggesting topics to suit age, gender or cultural characteristics – not to mention the choice of languages).
2. Helping to *investigate and understand individual exhibits* – by showing hidden parts or layers, (visually) explaining the mechanism behind, the creation or the usage, by putting the visitor in charge through "learning by doing".

3. Helping to *explore the context* of a single exhibit, for example by providing layered information about its provenance and/or its historic or artistic context, or by presenting a (virtual) collection of similar artefacts, even from other collections and countries.
4. Facilitating *active learning* – by quizzes or single or multi-player games.
5. Enabling a *playful physical activity*, also in order to break the monotony of the visit.
6. Facilitating *remembering and creative re-use* – by enabling visitors to take (special) photos and share them instantly, by offering access to high-resolution photos of the exhibits online, possibly accompanied by further background information.
7. Making the visitor *identify emotionally* with the topic, protagonists and stories in an exhibition – the means for which may vary from controlling motion, bringing to life the "heroes" of an exhibition or taking decisions on their behalf, or following a story from the point of view of any particular character. The general atmosphere, realistic or abstract sound and light installations may also induce emotions.
8. Urging the visitors to *form and voice their own opinion* – by taking decisions and voting as part of the exhibition visit, with witty physical or virtual instruments fulfilling the role of a query or a guest book.
9. Inducing *discussion between visitors* – multi-user and spacious installations with a role for onlookers can also fulfil this function.
10. *Reaching out* to potential visitors – by placing a catchy installation at the entrance of the exhibition, or outside of the museum building.
11. *Getting visitors involved* – by asking them for contribution to an exhibition or a collection with own objects, stories, creative ideas or pieces.

Space does not allow for a detailed discussion of the above functionalities (nor some others); but see further [4]. We will reflect on these functions in connection with our application in the final discussion.

2 The ColourMirror

The ColourMirror is an interactive digital installation that was created for the exhibition 'In the Mood for Colours' at the Museum of Applied Arts in Budapest[4]. This exhibition, which was the last one before the museum closed for several years of renovations in Fall 2017, was based on an unusual curatorial concept, presenting almost 400 artefacts (glass, ceramics, textiles, furniture) arranged according to their most dominant colour, in three rooms — Red, Green, and Blue.

The museum asked the interdisciplinary team of MOME TechLab to create an engaging and playful installation which would prepare visitors for the colour-centred exhibition, before they entered the exhibition rooms. They gave complete freedom to

[4] http://szintukor.imm.hu/en/

the design team; the only constraining factor was the physical space available. After exploring different ideas that would allow visitors to experiment with R-G-B colours or to explore the linguistic expression and the emotional and symbolic connotations of colours, the museum staff chose for a transmedial interactive application to bring the exhibits into focus in a playful way.

The very basic idea of our installation is similar to the one of the Make a Face! application, where the visitors recalls a portrait from the collection which is similar to his/her facial expression [1]. In [15] the authors present a "digital souvenir", a photo compiled of the image of the visitor and the exhibit he/she spent the most time with. We also exploited a similar idea of a digital souvenir.

2.1 The three functions

The ColourMirror is placed in a separate room with two doors opening to a corridor, which visitors pass through before they enter the exhibition. In the corridor a short text in Hungarian and in English explains the installation and invites visitors to give it a try. (Initially, we provided no other written instructions in the room, neither printed nor displayed.)

Besides creating an engaging interactive installation, we also wanted to reflect on the visitors data and to offer them a digital souvenir as a reminder of their experience, and of the exhibition. We created an installation consisting of three units, on three sides of the room, serving the following functions:

1. When entering the room, the visitor is faced with a *mirror-like interactive installation* that responds to the visitor by displaying one of the exhibits.
2. On the side wall, as visitors move forward in the room, *animated data visualizations* may be observed on large displays.
3. Next to the exit there is a touch-screen from which visitors can *send off an e-mail with their own "mirror image"* that also shows the object that was assigned to them.

2.2 Mirroring the visitor with the object that matches him/her the best

In the darkened room, there is an installation resembling a full-length dress mirror. Behind this semi-transparent mirror there stands a display of the same size, and at the bottom of the mirror there is a hidden Kinect camera. At first, the mirror shows a dazzling mixture of moving colours in order to catch the eye of the visitor. When the visitor stands still in front of the mirror, (s)he is scanned by the camera. The few seconds of this scanning process are indicated visually in the mirror, after which there appears an exhibit in the upper right-hand corner of the mirror next to the silhouette of the visitor, which is filled with stripes representing proportionally the six dominant colours that result from an analysis of his/her captured silhouette image. A one-sentence explanation (also in two languages) states that the object is the exhibit that is the most similar in colour to those of the visitors (see Figure 2).

Fig. 2. A visitor in front of the ColourMirror.

When a visitor enters, stands still or leaves, this is perceived by processing the amount of movement (the number of changing pixels) in a dedicated capture area in front of the mirror. The silhouette of the person is extracted through depth analysis of the 3D image taken by the Kinect camera. The colour photo of the visitor is processed in a similar way as the object photos (see below).

The visitor is offered the artefact from the collection of exhibits that matches his/her colours the best. The implicit DB query of the artefacts is based on pre-processed information about the colours of each artefact in the DB. For each object, there is also a good-quality photo available, in 3x8 bit colour representation and with the background removed. In order to reduce the number of colours for fast query purposes, we reduced the number of colours for each object to six by standard colour quantization [9]. In all computations we used CIELab representation, which is more suited to model the human perception of colour similarity. For computing the similarity of individual colours, we used the CIE94 measure [14]. For each object, next to the full-colour photo, we also stored the six reduced colours and the percentage of the presence of each of these in the entire image. Hence a *colour palette*, consisting of six colours and six percentages, was obtained for each artefact and stored in the DB. From the scanned image of the visitor, a colour palette was obtained each time in a similar way.

The best match for the visitor's palette was obtained by the following steps:

1. The correspondence of the colour palette of the visitor with that of the k-th object was characterised by a number h_k for each of the objects in the database:
    a. Using the CIE94 measure, the colour distance c_{ij} of each of the 36 pairs (6 in the colour palette of the visitor paired with 6 in that of the object) was quantified.
    b. Indicating by p_i and p_j the percentages in the colour palette of the visitor and in the that of the object, respectively, a representative distance r_{ij} of the colour pairs was computed by taking into account the occurrence of the two colours:
    $r_{ij} = c_{ij} * \min (p_i/p_j, p_j/p_i)$.
    c. Then, by taking into account the r_{ij} numbers for the 36 pairs of colours between the two palettes, we picked the "best match" – that is, the best pairing of the 6 colours in the object and the visitor – by using the Hungarian Method algorithm [13], which provided the number h_k.
2. From all the objects, the one with the lowest h_k value was selected as the best match and shown in full colour on the display of the mirror.

2.3 Sharing the mirror image

Before leaving the room, visitors passed by an interactive display showing the images that had been taken most recently by the mirror. Here they could select their own mirror image and send it to themselves by email. (For this purpose, we installed wifi in the room.) We wanted to offer a simple and fast means to "take home" the mirror image, also as an alternative to the fashionable selfies that are often shot in museums. Moreover, the email contained more information than had been shown in the mirror, including a more detailed description of the selected object and the codes of the six colours in the visitor's palette.

The visitor obtained the content of the email by activating a URL and could also share the content with others via Facebook, Twitter or email by clicking on a button. About half of the visitors used this option. We found, however, that many of the images were spread further on Facebook.

2.4 Data visualizations

On a large display, slightly animated data visualizations are shown in a loop, allowing visitors to reflect on past scans in four different views, one after the other:

1. In the *Catwalk*, the past ten scan results are shown, appearing in a 2.5D catwalk presentation, where the visitors' colour palette silhouettes walk alongside their corresponding object (see Figure 3).
2. In the *Calendar*, the palettes of all visitors of the past 30 days can be seen in a matrix-like arrangement. This view gives an impression of the dominant colours of the clothes of visitors (see Figure 4).

3. In the *Statistics*, a visual impression of the statistics of different colours in past periods is given.
4. In the *Extremes* view, the "most colourful" and the "most red/green/blue" visitor's colour palette is shown in their silhouette, differentiating between adults and children by a guess based on the height of the scanned person (see Figure 5).

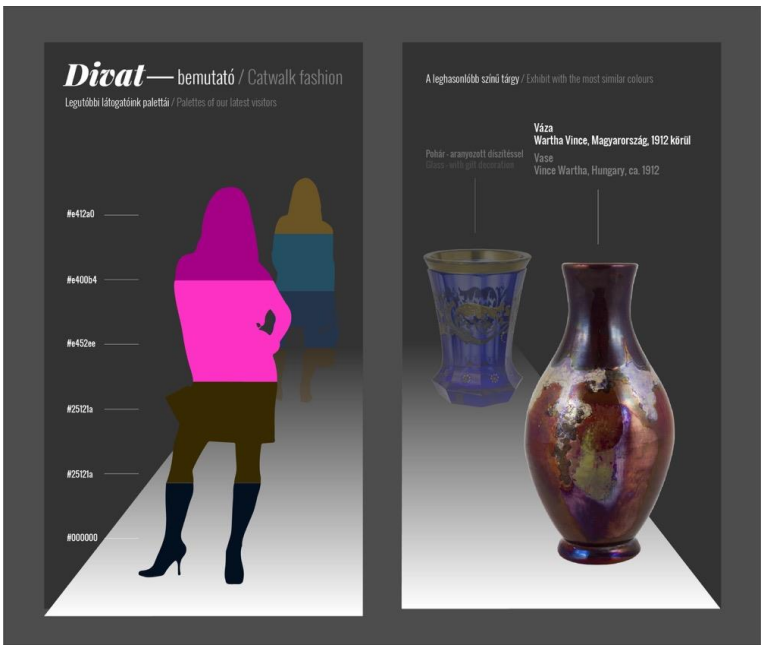

Fig. 3. The result of past scans in the Catwalk view.

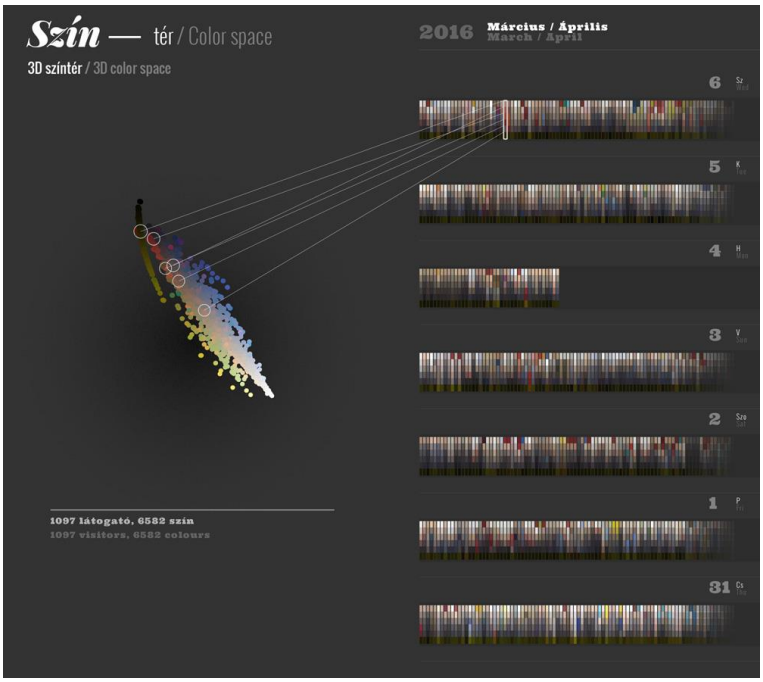

Fig. 4. The Calendar view.

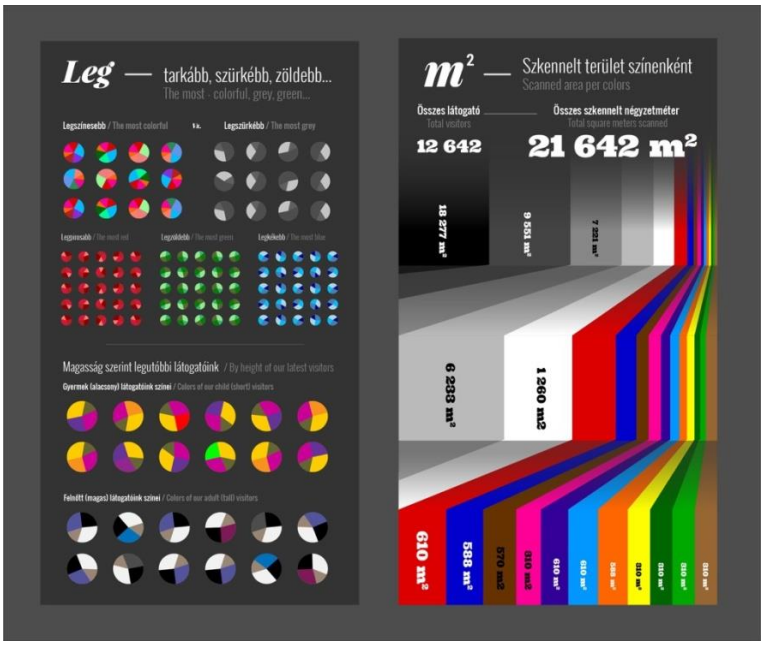

Fig. 5: The Statistics and the Extremes views.

3 Visitors' emotions, behaviour and opinion

In the case of novel – and usually rather expensive – digital installations it is very justified to ask whether the investment was worth the trouble. Usually, a digital installation is regarded as modern, and it is praised by the media for this reason. But how to grasp the real benefits for the museum: based on feedback in the visitors' book (which is still in use)? In terms of the number of visitors? Or of the time spent with the installation? Or how they behave, what emotions they reveal? Or what they think of it? Through some measure of what visitors really learnt, thanks to the installation? How should these aspects be aggregated?

From the perspective of the designers, the efficiently and the ease of the interaction and the appropriateness of the user interface are of also interest – and they may turn out to work differently than expected. Moreover, one should remember that feedback from different people may differ based on static as well as time-based dynamic personal characteristics. With all this in mind, we conducted a small-scale study, trying to explore several of the above aspects.

3.1 The empirical study

We collected data from 135 visitors. Their age group, nationality, gender and type of visit (individual or in a couple, family or group) was also recorded. We also interviewed six museum guards who had been observing and helping visitors for months and four guides offering special activities for young visitors, by asking open-ended self-completed questions.

The major body of the research was carried out by means of recording observed behaviour in the room of the ColourMirror, and by a short interview just after visitors had left the room. The data was collected during the winter months, in two-hour recording sessions both during the week and on weekends, by four coders who had received some initial training. The observer, sitting in a corner inconspicuous as a museum guard, registered data on a tablet in a Google form, considering:

a) *the type and number of scans* (some people modified their dress, pose, formed groups);
b) *the emotions observed* (expressed by the face of the visitors, sometimes by their body language, and very often also verbally);
c) the amount of attention paid to the *data visualizations*;
d) whether the visitors *emailed their mirror image*.

In the interview, the visitor was asked a few questions. The answers were registered by the interviewer in the same online form, ticking on choices characteristic of the answers. Spontaneous additional remarks from visitors were typed in. The interview addressed, among others:

a) *recall* of the (first) received object;
b) *liking* for the received object;
c) whether the visitor would *track down* the object in the exhibition;
a) how they thought the ColourMirror *worked*;
b) in what way they *experienced* the ColourMirror installation;
c) what they thought of *digital installations in museums* in general.

3.2 Major findings

Based on the collected empirical data (shown in Table 1 and 2), we sum up the major conclusions around four general questions.

Table1. Summary of visitors' data concerning the ColourMirror and the object shown.

ASPECT	DISTINCT CATEGORIES with occurrences (%)		
emotion displayed	happy	neutral	other
	72.6	17	10.4
recall of the received object	very good	satisfactory	false or none
	71.5	24.4	4.1
satisfaction with the object	pleased	neutral	unsatisfied
	72.6	20.2	7.2
would track down the object	for sure	perhaps	not
	81	10.7	8.3

Table 2. Summary of visitors' opinion about the ColourMirror and digital installations in museums.

QUESTION	ANSWERS with occurrences (%)		
How does the ColourMirror work, in principle?	correct answer	approximate	incorrect/no idea
	33.3	36.7	30
How do you characterise the ColourMirror?	great, funny	modern	for youngsters
	80.6	27.3	6.5
What do you think of digital installations in museums?	motivates to visit	do not care	dislike the idea
	77.6	18.4	4

How did people use the ColourMirror? About half of the visitors observed *did not know what to do* in the room, so they asked for assistance from a guard (one was always present in the room). From accounts by the guards, even more people needed some amount of help. *Children and young people*, on the other hand, had hardly any difficulty and they were the ones to invent ways to receive different objects (e.g. by changing their dress or forming groups). Also foreign tourists, who were less hurried and had usually read the description outside, were more at ease in general, than Hungarian visitors. As we discovered, it was here that many of the subjects met an interactive museum installation for the first time in their life, and some regarded the Mirror as an exhibit to be watched but not to be used. People over 60 complained several times about the lack of detailed written instructions on what to do, and about a fear of becoming awkward in public with such an installation. They asked for assistance from the guard. As a reaction to this somewhat unexpected outcome, we added more instructions to the display, telling visitors what to do.

As for the engagement with the installation, *children and teenagers* spent more time in the room, were at ease and kept experimenting (e.g. by changing their dress or forming groups), while people above 60 often needed assistance to get started, and hardly went for more than a single scan.

The *data visualization could not compete for attention* with the mirror itself: people in general did not look at all the four visualizations and found some of them (Extremes, Statistics) difficult to interpret. However, foreigners (e.g. tourists) spent a larger amount of time observing and discussing the visualizations.

From the point of view of the *design and the technical solutions*, we (the designers and programmers) spotted some anomalies that visitors usually did not notice. It turned out that certain types of textiles (corduroy, shiny leather) fooled the detection of a motionless visitor, as their reflection was constantly changing. Due to the lack of light in the windowless room and the low quality of the built-in camera of the Kinect, the scanned colours were not always true to life. The complex selection criteria made sure that the many visitors who wore dark colours also received an object. On the other hand, the colour of the skin was always taken into account, which made it difficult at times to interpret the match even if somebody was wearing at least some bright colours.

How did people experience the ColourMirror? Visitors enjoyed the experience: they were smiling or laughing (72.6%) or pleasantly surprised (7.4%) when their object showed up. If they were with someone else, they also made emotionally charged comments about the objects.

Children and young adults became especially engaged, made further scans, and experimented by changing their dress or altering their pose. Some children spent more than ten minutes in the room, and several visitors returned later for a second try.

We also expected that the ColourMirror would confront visitors with their clothing habits, and with the tendency of Hungarians to wear dark colours. We have some clear but anecdotal evidence for this: some people did return in different outfits and commented on the dominance of grey and dark colours of the visitors shown in the data visualizations.

How did people perceive the object they were assigned? More than 95% of the visitors *could recall the object*, over 71% of them very well (describing its details, quoting its textual description).

A majority of the people (72%) *were happy* with the object they received. When they were not, the negative linguistic connotations of certain objects as well as gender mismatches (a man receiving a woman's dress) were mentioned as reasons for disliking it. In the case of indifference, aesthetic aspects were sometimes mentioned.

81% of the people *planned to track down "their" object* – even in cases when they did not like it. Hence the "mirrored object" served as an entry anchor to the nearly four hundred exhibits.

People *identified with the object* – they mostly used terms such as "I am a jar" in spontaneous outbreaks, and in the feedback in the visitors' book. This identification was beyond expectations: people were eager to seek (and find) psychological and life-style references in the object they received. People talked spontaneously and passionately about their feelings and assumptions, even to strangers.

What did people think of the ColourMirror, and of digital installations in museums? Only about one third of the subjects had the right idea about the working of

the mirror, one third had no idea or gave very strange answers (assuming for example that it was based on an X-ray scan, or an analysis of their shape). This result really surprised us, as it was explained in a text outside the entrance of the room how the installation functioned, and also on the mirror whenever an object got displayed. It seems that many of the people did not read these texts at all (though we did not explicitly check this).

A vast majority (above 80%) of the subjects did like the ColourMirror and found it a joyful, funny, enjoyable experience. They liked to find such a cheerful installation in a place as "serious" as a museum. More than a quarter (also) described it as "modern".

For a vast majority of the subjects (more than 77%), digital installations offer an additional motivation to visit a museum.

Did people share digitally the object they received? Only about half of the visitors sent their mirror image to themselves. Those who did not were mostly above 50, and they explained that they do not use social media. On the other hand, we traced the sent images and found that they spread quickly over Facebook. Thus the visitors themselves spread the news about the exhibition.

Some visitors wanted to know more about the object they received. For this purpose, after the study we expanded the e-mail in which the mirror image was forwarded with a textual description of the object.

3.3 Feedback from the museum staff

During the 16 months of the exhibition we received much positive feedback in the media (even in television), and also from museum professionals. We conducted a small survey with the six guards who were on duty in the room, and four people who were organizing activities for children in the museum. The qualitative answers from the guards were in line with the major findings suggested by the empirical data. They all liked the installation very much, and enjoyed that – finally – it put them in a more interesting role than just disciplining visitors: their help was needed and appreciated, and they strayed into conversation with visitors. They were also pleased that – in the huge staff of the museum– they were addressed as competent people in the research.

The animators reinforced the impression that children loved the installation. The only problem they had was the inevitable queuing effect, when complete classes visited the exhibition. They found that similar digital installations should become a regular item with all exhibitions. The management and direction of the museum was very pleased by the free PR due to the mirror images of artefacts that were shared by visitors on Facebook. They were planning to use the ColourMirror in dedicated campaigns and to provide more publicity for e.g. data visualizations on the website of the museum, but after all this has not happened so far.

4 Discussion

The ColourMirror is a novel and unique installation. However, several of the lessons learnt are of a general scope.

1. People can engage and even identify with objects if they encounter them in a playful context. Besides "having fun", we managed to focus their attention on a singular exhibit, and by this, get them interested in the exhibition.
2. The installation turned visitors (and guards) into participants. It evoked discussion even among visitors who did not know each other. It helped to increase the impact of the exhibition.
3. It connected artefacts with an every-day aspect of the life of the visitors (that is, how colourfully they dress). In this way, it also underlined the major message of the exhibition – the rich use of colours in past centuries.
4. The ongoing development of the enabling technologies (e.g. small and cheap sensors, powerful processors in mobile devices, the scaling of image processing, internet and wireless communication) open up entirely new domains of applications. A novel, surprising and engaging installation can serve several of the objectives listed in the introduction, and possibly even better than more direct types of application that have already been in use in museums

The empirical study revealed that with a single installation, we could accomplish 5 of the 11 potential functions listed in section 1.2, namely:

1. facilitating *active learning,*
2. enabling a *playful physical activity*,
3. making visitors *emotionally involved,*
4. inducing *discussion between visitors*,
5. *reaching out* to potential visitors.

The ColourMirror itself can be used in other public spaces than the museum – this would also provide a way to "keep in touch" with the collection of the museum, which will be closed to the public for several years. On the other hand, the same idea could be adopted for other collections, especially for paintings. Also, the colour-based query could serve the basis for different campaigns and competitions, e.g. who is able to receive from the mirror objects that rarely appear as a query result, or appointing the most colourful visitor of a certain period.

In such a new field of application, the possible genres, the criteria of good design and success and the methods of evaluation all have to be established. This is especially difficult compared to the traditional fields of application of computer science (such as banking or manufacturing) for the following reasons:

a) The collection, the mission and the audience of museums are significantly different.
b) In the process of creating applications, there has to be a close collaboration and a mutual understanding of each other's disciplines, working methods and values between museologists/curators and computer scientists/programmers, and this must be extended to other players (visual designers, museum educators, marketing experts), each of whom have their own objectives.
c) Data collection and evaluation of digital installations is (still) rarely done,

connected to a lack of resources and the short time-span of temporary exhibitions.

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