COMMON FACETS OF MUSEUM VIRTUAL SELF-PRESENTATION: EXPERIMENTING WITH INTERACTIVE IMAGE AND TEXT

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Abstract. *In the modern world, all the museums, especially science and technology centers, seek transforming from storages of valuable historical objects to the knowledge exchange and construction places. This study aims to research official sites and social media channels of twenty European science and technology museums in order to understand how the virtual museum self-presentation is done. Using thematic analysis five common facets of the science and technology museum official site were coded: i) site interoperability; ii) home page; iii) first ten news; iv) science and education activities; v) information "about us". All the data were anonymized. The study showed two contradicted science and technology museum virtual self-presentation behavior styles: orientation "Museum as a storage" and orientation "Visitor as a creator". Researching how science and technology museums experimented with interactive image and text in their official web pages, museum social media site follower responses and museum ratings in social media, we expanded The Museum Visitor Experience Model with insights how the virtual self-presentation could help attracting museum visitors.*
Keywords: *museum website, science and technology museum, thematic analysis, virtual museum self-presentation, visitors experience.*

Introduction

Any museum can be described as a repository of history, art or science collections, some of which are publicly available. The science museum presents historical and contemporary scholar facts and phenomena in its collections. Although it was not always true, most museums exist in order to attract and serve visitors (Falk, 2016). Because of this, most of the museums advertise themselves and their collections online. The most common museum advertisement is self-presentation through the main internet page. Contemporary museums also present themselves through the social media: *Facebook*, *Youtube*, *Instagram* and other channels.

Museum visual challenges for the online provision of modern and contemporary art collections in US, Germany and Great Britain were studied by Neumann (2016). In her qualitative research of museum visitors and selected

webpages of the online collections, Neumann (2016) found the primary new visual challenges of art presentation. New visual challenges were in particular influenced by the internet and social media technological capabilities. Functions of the physical museum with slight adjustments could be applicable to the online museum space. Text and image is still important in virtual representation of the museum, but online presentment of information could be done using multi and hyper medium WWW and internet. Rather not all museum collections can be displayed on a virtual basis. Some specific works, especially art pieces or music production, need specific installation, room environment or layout. The multi-layered structure of multimedia allows continuous change, improvement and interlinking structures of online collections, information and resources. It requires constant renewal of the museum's virtual exhibits and the provision of information support to museum visitors. Virtual museum visitors need to feel that they are welcomed to see collections (Neumann, 2016).

A contemporary museum can be studied from three perspectives: i) the exploded museum's environments; ii) visitors' interaction and learning with mobile technologies; iii) design of mobile digital experiences (Atkins, 2009). Researching the exploded museum environments Samis (2008) found that in a contemporary world, museum activities start then person begins to think about it before the visit and continues in its visitors' imagination even after the end of physical museum walls.

Falk & Dierking (2008) in their study of different museum visitor groups experiences found that the museum is attractive to the person when it presents materials differently to different age groups; allows visitors to be able to personally connect and interact with the objects, ideas and experiences provided by museum; these experiences need to be shared with peers; new media and technology used. The museum presents itself as process and product in overlapping personal, sociocultural and physical contexts. Personal context include museum visitor motivations, expectations, prior knowledge and experience; choices and control mechanisms. Sociocultural context cover cultural background; within and outside group social mediation. Physical context embody physical space, place, design, as well as technology, events and experiences inside and outside the museum (Falk & Dierking, 2008). These three overlapping contexts represent the museum learning and personal knowledge construction complexity.

In their further research Falk & Dierking (2016) expanded the contextual model of learning in a museum with the visitor's profile and the individual's identity-related museum visit motivations. Mobile digital experiences help support knowledge creation in encounters with museum artefacts and stories (Charitonos et al., 2012). Museums could use internet, social media and mobile

technologies to virtually present its activities end expositions. These virtual expositions could be seen before the live museum visit.

This study aims at: i) finding common facets of museum self-presentation in internet and social media channels; ii) investigating how science and technology museum attracts its visitors through virtual presentations of its collections, exhibitions, events and learning activities; iii) researching how museum self-presentation influence future visits.

Methods. We used the *Museum Visitor Experience model* (Falk, 2016) as theoretical background and thematic analysis (Boyatzis, 1998) for empirical research. Scientists agree that facilitating the visitor's knowledge construction is key to introducing new technologies in museums (Charitonos et al., 2012; Kaptelinin, 2011). In this study, researching the museum virtual self-presentation, we examined one of the components of contextual model of learning in a museum (Falk & Dierking, 2016) – the component called "before the visit". We looked to the museum from the outside perspective and explored it from the point of a potential visitor (adult learner and family member).

Data collection. We studied webpages and *Facebook* pages of 20 science and technology museums. Territorially, museums have been scattered across Europe. We researched one huge (more than 1 million *Facebook* page followers) museum, national country museums (from 10.000 to 200.000 followers) and regional museums (approximately 3.000-4.000 followers). We dropped out the museums that did not created the museum *Facebook* page.

Data analysis. We used thematic analysis as data analysis method. Firstly, we qualitatively coded the information from five parts of science and technology museum official website: i) site interoperability; ii) home page; iii) first ten news; iv) science and education activities; v) information "about us".

Secondly, we developed codes and themes from museum social media (*Facebook*): i) we collected *Facebook* social network data about the museum social media page followers, reviews, likes, and social media site ratings; ii) we collected 1 year review texts. All these data were freely available online without the password protection.

The research data were anonymized and the abbreviations created.

We applied the constructivism paradigm which stated what knowledge is socially constructed and may change in different situations and depending on different circumstances. To support the rigor of data analysis we used secondary analysis of social media and qualitative data performed by another researcher and wrote thematic analysis memos (Morse et al., 2002). For the research credibility we discussed the question how congruent the findings are (Shenton, 2004).

Findings: museum self-presentation in internet and social media

Findings showed how the European science and technology museum presents itself online. Firstly we examined the museum home page and found that most museums uploaded information to social media sites. The most popular social media site where museum operated was *Facebook*. Therefore, we analyzed not only websites but also the provision of information on social networks.

Interoperability of any internet page is typically defined as the ability of systems or components to exchange and use information. Explaining the ideas of interoperability, Miller (2000) defined that to be interoperable,

> … *One should actively be engaged in the ongoing process of ensuring that the systems, procedures and culture of an organization are managed in such a way as to maximize opportunities for exchange and re-use of information, whether internally or externally.*

We found that almost all the science and technology museum websites (except one) meet the interoperability requirements. It showed that museum websites are up-to-date and technically adapted to various devices (including smart phones). It can be assumed that the interoperability solutions of museum websites contributed to the attraction of the museum visitors, since it was possible to easily view website information. For information viewing, a stationary workplace (computer) becomes unnecessary.

The science and technology museum home page provided information in national language (few sentences or paragraphs to catch the visitor) with short summary in English. Only a few museums based in non-English speaking countries provided sufficient details in English on the home page and on deeper pages. This let us guess that science and technology museums were oriented towards a national visitor. The information and texts of the first page of the museum were adapted for an adult visitors (for parents, family, and teachers). This suggested that museums expected information from their site to be most often read by adults who make decisions about visiting museums. Not all museums used multimedia solutions for self- presentation. We found museums' websites with lack of interactive information. In some websites only texts and photos were provided, there were no additional references, video materials, interactivity elements. Such disadvantages have been noted in several museums. Inclusion of these elements to the portal would indicate that the science and technology museum is modern. Most of the museums on their first pages featured hot museum video news, 360 panoramic exhibitions, and promoted interactive workshops.

Our findings showed that museum in many cases did not payed attention to news in their portal. The "*first ten news*" section of the portal is not often updated. Here the information on exhibitions, short and long-term events was provided. Hot museum information moved to social media.

In contrast to the news section, the information "*about us*" on all of the museums' websites was detailed. Here we found addresses, maps, links and texts how to find museums, and the museum's working times. We found, that each museum considered "*about us*" part of the portal to be an essential part of museum's self-presentation.

Table 1 **Comparison of science and technology museum social media followers and ratings (n=20)**

No	mu-seum	fol-lowers	*Ratio (stars)*					Re-views	% of all fol-lowers	% of 5 star reviews	ratio
			5	4	3	2	1				
1	SCA	24850	2000	336	141	32	22	2500	10,06	13,44	4,7
2	MMN	2351	89	17	5	1	0	112	4,76	15,18	4,7
3	BML	**1387649**	42000	6300	1300	519	2700	53000	3,82	11,89	4,6
4	TSC	5799	201	47	24	15	4	291	5,02	16,15	4,5
5	CAC	73357	6100	1500	639	185	237	8700	11,86	17,24	4,5
6	SML	**189575**	12000	3700	1700	674	579	19000	10,02	19,47	4,4
7	DES	13864	805	219	131	35	38	1200	8,66	18,25	4,4
8	NEM	20280	1800	839	321	71	54	3100	15,29	27,06	4,4
9	CSC	**149507**	2700	699	298	88	162	3900	2,61	17,92	4,4
10	NMS	32631	730	352	168	43	32	1300	3,98	27,08	4,3
11	ABE	34423	4500	1700	1100	242	178	7800	22,66	21,79	4,3
12	TTS	12143	750	311	161	61	40	1300	10,71	23,92	4,3
13	EXD	21968	797	487	229	76	54	1600	7,28	**30,44**	4,2
14	HMS	6554	141	67	43	11	8	270	4,12	24,81	4,2
15	CSI	73797	1900	944	494	171	165	3600	4,88	26,22	4,2
16	MST	13444	603	403	165	35	37	1200	8,93	**33,58**	4,2
17	ECM	4725	137	70	28	13	14	262	5,54	26,72	4,2
18	TBE	24648	430	289	133	40	30	922	3,74	**31,34**	4,1
19	HFI	21321	870	618	404	82	58	2000	9,38	**30,90**	4,1
20	OKA	12867	469	226	151	39	46	931	7,24	24,27	4,1

While the use of *WhatsApp* is already ahead of *Facebook* in nowadays (Newman et al, 2017), the survey, conducted August 2017, found that 67 percent of U.S. adults get news from social media (Shearer & Gottfried, 2017). Our findings showed that all the researched museums had their social media sites in *Facebook* and *Youtube*. Additionally, some museums had links to *Snapchat* or *Linkedin* and even *TripAdvisor*. Researching 20 the most visited museum *Facebook* pages we found, that locally operating museums have more than 2000 and nationally – more than 1300 social network followers, mostly of them – adult persons. One huge national museum had more than 1.3 million followers. From the posts it is possible to guess that museums were rated after the live visit. 20 to

30 percent of persons who rated the museum exhibitions and events gave the highest ratings (5 stars). All the researched museums were rated higher than 4 stars. Museum virtual page reviews was done by approximately 5 to 22 percent of museum followers. These numbers could predict the interest in virtual museum activities (Table 1).

Our research has shown that many museums (but not all) were engaged in education activities. Museums had exhibitions that are adapted to different age groups (young and pre-school children, school-age children, teenagers, young people, adults) and organized various learning and experimenting actions. Gaming and gamification techniques were used. It was possible to play online games and download mobile gaming applications from the museum portal. Teachers and school-children can find curriculum-based resources for use in the classroom or learning at home. Some museums had mobile exhibitions that can be delivered to the desired location. One of the museums (which had high rates in *Facebook*) had the special initiative for teachers to become Museum Learning Advisers. This museum invited visitors to actively engage themselves in the development of contemporary *STEAM* educational content. Museum reviewers responded in *Facebook* page of the museum:

> *Absolutely brilliant place to take children. We took our 5, 10 and 13 year olds and they all loved it - which is a feat in itself. There was something for all of them - and us. It is just so well done, entertaining and interactive. <...> we really cannot recommend it more highly. A super day out for the family especially if the weather isn't that great. (SM)*
>
> *Fabulous place for kids and for grown-ups too. My 4 year old son enjoyed all the simulators and several interactive science displays. This is a good place to start the STEM idea and the value of imagination through building things on their own. (CJ)*

The strength of the museum was that museum linked live exhibitions and educational activities with events important and attractive for the young adults. For example, then we researched the museum home page, many people had been waiting for the very popular *"Star Wars Saga"* to continue. The museum adapted the science and technology exposition, providing scientific information related to the film. Such activities are high rated by the museum visitors. Similar case was with *Pink Floyds* music. After the visit museum visitors shared experiences in museum *Facebook* page:

> *(I) went for "The dark side of the moon" showing... Just amazing! With the hectic pace of life. It's hard to remember how long it's been since I last took the time to listen to an album start to finish uninterrupted and as my only focus. Thanks for reminding me how glorious that experience can be. <...> incredible! (LW)*

The museums had their *Youtube* channels, and even organized *TedxMuseum* educational events. Some museums opened their world-class collections and special archives for scientists and researchers. In these scholar museum pages scientists can learn out about current and past research, find out about researching in partnership with the Museum and discover resources to help with their own studies:

I like this place because I'm in to science and like finding out about Earth and related (SS)

All these and many other examples showed that many museums let its visitors to become creators of the stories. From these *Facebook* social network data and followers and reviewers responses, we developed the museum virtual self-presentation behavior style orientation *"Visitor as a creator".*

The comparison of science and technology museum ratings (Table 1) showed, that not all the museums were rated only in high marks. Museum visitors wanted to see, touch and feel the latest innovations in the science and technology museum. In addition, visitors strived to be not only silent observers, but active participants in the development of new innovations. Visitors want the museum emerge them to the learning activities:

Sorry, Science museum, but I have to admit I was very disappointed. I have visited many times over the years and I am afraid you don't seem to have moved on. The aero planes and the space ships are what we came to see, but you need to involve us. I feel there needs to be more to interest children and young people. There is very little to encourage and stimulate children which is very disappointing. <…> please, wake up Science museum and breathe some fresh life into your galleries. (PB)

<…> A video of the steam trains running through the countryside, showing how coal was added to the fire or water tanks were refilled with a commentary alongside would have brought the old trains to life. How many 9 year olds or younger will read the texts about the history of the railways in place? <...> Although some of the exhibits about computers were interesting, they were also quite outdated. We enjoyed the robots provided by Jaguar but it dated from 1980s, the canal boat going though a lock, was fun and kept my godson busy for a bit, but why not a video showing the real thing and upgrade the very simplistic "button pressing"? <…> We thought the TT (the museum) was impressive, however, youngsters 7 years upwards are switched on to technology, hungry to learn and smart to follow computer instructions. The resources were limited, I thought the future was a bit stuck in the past. (CT)

Another respondent added that it is important to visit the science museum, but from other side - museum visitors lack active educational activities in some museums.

When you come to A (the city), you have to visit ABE (the science museum)! We didn't want to miss the experience of going inside and the price for the tickets is

reasonable. But the exhibition was kind of careless and a little boring. It would be much more interesting, if the XXX (the topic) was taken further inside the B (the science museum). I imagine the employees in costumes or the restaurant as a diner, for example. There is nothing to "do" in the whole exhibition. They have a lot of nice exhibits, but nothing to touch, watch or listen to. Maybe we just overlooked something... <...> We were very disappointed by the audioguide! Save your money and read the signs yourself, because that's what the guide basically does! (KP)

As the mission of the science and technology museum is to stimulate people's interest in science and technology and to increase their awareness of methods and results within science and technology, the museum itself need to be modern. As it is seen from the examples provided, that modernity was not observed in all the museums. The second virtual self-presentation behavior style orientation that we developed from *Facebook* social network followers and reviewers responses was *"Museum as a storage"* (Figure 1).
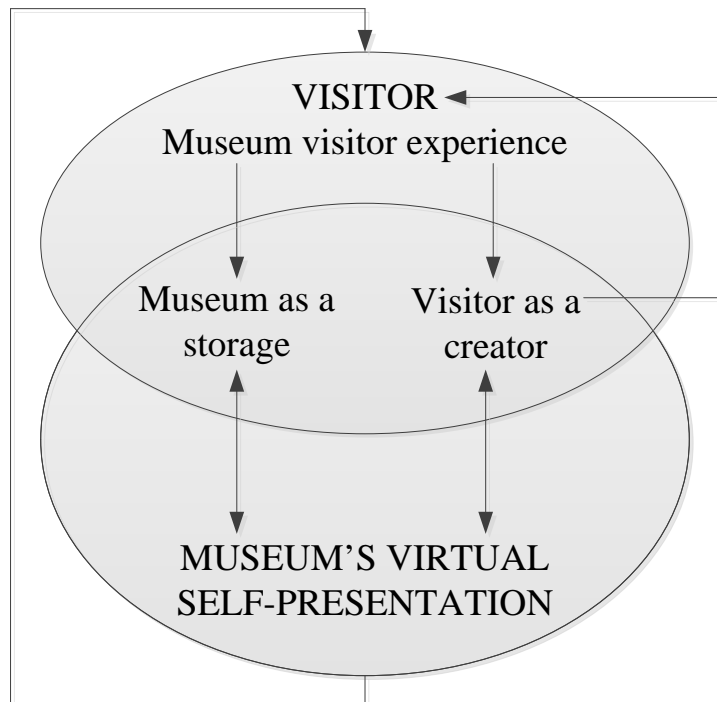

Figure 1. **The museum virtual self-presentation and the visitor experience: the reasons to return to the contemporary science museum**

Two themes: *"Museum as a storage"* and *"Visitor as a creator"* explained how the museum treated its visitors. The arrows in the museum virtual self-presentation and the visitor experience model (Figure 1) explained the visitor reasons why they go to the museum for the first time. Before the visit, the visitor got acquainted with the museum on the internet and social media sites: surfs the *museum's virtual self-presentation* and acquires the first ideas of what he or she will find when visits the museum - gets first *museum visitors experiences* from

museum's virtual self-presentation and from other visitors responses. During the live visit *museum visitor experiences* strengthens. Some visitors value *museum as a storage*. They saw many valuable artifacts, expositions and other information, but had less possibility to interactively "communicate" with these expositions. Another group of the visitors felt like creators (*visitor as a creator*). Visitors returned to the science and technology museum for the second time only then museum was interactive and they (visitors) were treated as creators.

Discussion

We researched official sites and social media channels of twenty big nationally and internationally operating European science and technology museums in order to understand how the virtual museum self-presentation is done and how it influenced visitors. In our research we adapted Falk (2016) *Museum Visitor Experience Model*, theoretically explaining and empirically clarifying how visitors value the museums and what kind of museum behavior attracted visitors return. Falk (2016) categorized identity-related museum visitor motivations to five groups: explorer, facilitator, experience seeker, professional/hobbyist and recharger. Oppositely to Falk (2016) we researched museum self- presentation to its visitors and found two different museum motivations: guardian of values ("museum as a storage") and visitor creativity promoter ("visitor as a creator"). We did not studied all the visit motivation contexts and payed attention only to personal context.

In our webpage analysis we were inspired by Neumann (2016) analysis of museum online collections. Neumann (2016) analyzed museum's online collection structures with regard to its content structure, but we payed attention to the museum webpage interoperability, home page structure, first ten news (how they appeared and how fresh the information is), science and education activities and their online representation, museum addresses and other direct information in section "about us". Neumann (2016) researched mind maps of museum online collections and artwork's pages as the extended data. We decided to research museums *Facebook* site to receive more information about the museum.

Our findings were fully in line with Samis (2008) theoretical ideas about the exploded museum. Our research confirmed that the museum's visit begins before the person arrives at the museum. Visiting the museum begins when a person reads reviews and comments from other museum visitors and checks the museum's evaluation and ratings in social media. Media ratings affect visitors' choices. In this research we did not studied how museums facilitate its visitor content creation and publishing. We only stressed that for a visitor becoming a creator is very important and museums need not to forget this.

This research is just a starting point. We researched only one of three contexts - personal context. We found that social media data is very important to adults: teachers, parents, family. The physical and socio-cultural context of science and technology museum self-presentation and its representation in the museum's social media accounts must be further explored taking into account different visitor age groups.

One of the limitations of our research is small number of European science and technology museums researched. We did no comparison and did not researched similarities and differences of science and technology and any other type museum self-presentation. Science and technology museum as educational center's self-presentation is another challenge that need further research.

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