

On the way to the total Amusement Park. What Science Museums could learn from Art Museums (and vice versa)

Harald Peter Kraemer

School of Creative Media, City University of Hong Kong

Summary

As the title suggests, this text articulates a few observations I made in science museums and art museums, their differences and similarities. As a result, the focus of this text shifted from the analytical to the transfer, towards the different visitor behavior, the peculiarities of the respective museum type and the areas of application of the various media. It's also about what both types of museums can learn from each other.

Key Word: Art Museums vs. Science Museums, role of media, visitor participation

1. Introduction

The central question behind this contribution is the future of communication with the visitors in science museums and art museums and the role of media in this relationship. This is about the extent to which these types of museums with their offered mix of fact-rich knowledge and exploration spectacle meet the changed demands of the increasingly participatory visitor groups. I critically investigate whether the offered forms of occupational therapy through guided tours, videos and audio guides in art museums and hands-on models, puzzles and games in the science museums are still up-to-date.

Provocantly I question the traditional educational role model of art museums, with their unreflective blind belief in the power of the art elite and art history, and at the same time the science museum's strategy of playful and entertaining 'learning by doing, no matter what'. Or, to put it another way, the fairy tale 'The Emperor's New Clothes' meets 'The Land of Milk and Honey', an utopian place full of gaming, puzzling and exploring (at least among the younger visitors).

The following text is to be understood as a beginning investigation, not as a comprehensive analysis. It is based on observations made by the author in numerous museums. This rudimentary text does not present any ready-made solutions. My presentation follows some observations and should encourage discussion. (1)

2. Media in Museums

What exactly is being conveyed and how are the visitors behaving? Unfortunately, there are no studies on how typical visitors of an art museum behave in science museums and vice versa, so we have to look at the two types of museum separately. Put simply, at the art museum, strategies of narrative mediation with aspects of contemplation are met, in the case of the science museum with a predominantly strongly explorative and ludic offer. Both museums use media such as video or interactive applications. However, there are big differences in the use of dioramas, hands-on models, augmented reality, virtual 3D environments or gesture-based computing. The latter appear in art museums only sporadically or as part of special exhibitions. Reversely, the widely used and obligatory audio guide in art museums is used only occasionally in science museums, then to tell the history of science, as happens, for example, in Oxford.

In art museums there is still a kind of "aesthetic apartheid" against the use of technology, as Peter Samis describes the reluctance to use multimedia in art museums, which is often limited to audio guides. (2) The audio guide can "provide an alibi to museum leaders or institutions who want limited change" in the communication with the visitors, as if to say: "Yes, we're supplying all that information if you just take the audio tour or look at our website." (3) Samis points to Mannion,

Sabiescu, and Robinson—one of the rare studies in this field—and states: "The sobering fact is the vast majority of museum visitors don't take the audio tour—or consult the museum's website." (4; 5) The "disadvantage of audioguides", so David Finn in 1985, "is that they take you through a museum at the speaker's pace, and, because you are being told what to look for in each work of art, you may not have the same sense of personal discovery that you can get when you are on your own." (6)

Art museums with collections of modern or contemporary art are often grateful that the mobile devices brought by the visitors themselves release the museums from the unpleasant situation of having to set up a kiosk system in the exhibition area. Meanwhile innovations in the fast-growing communication technology industry have led museums into a dependency. One of the big challenges in the last decade has been the changing role of visitors from passive consumers of given knowledge to active participating customers of a living museum community. This supposed "co-authorship" has fundamentally changed the way museums communicate, and will also have an increasing impact on the content to be provided. In social media trained visitors consume the museum and they are becoming more and more customers, requesting the museum's insights if readily available—but if they're not, "simply Google's knowledge" (as P. Samis said) on their personal electronic gadgets.

What can art museums actually learn from science museums?

In the art museum seniority dominates. These follow and apply the well-known educational role model, developed by Alfred H. Barr (7) since the 1930s, Hungry for education, they follow the behavioral rules (8; 9) and determine the behavior of the other visitors through a deliberately demonstrated seriousness. Considering art is ultimately a deadly serious matter and laughing a sacrilege. In the Science Museum, however, a very different behavior can be observed.

Art museums can learn from science museums, the art of how to arouse the curiosity and the participatory skills of the visitors. The hands-on models are inviting and the handling is often self-explanatory. Inconceivable texts are missing. Complex issues are conveyed with a variety of different media. In addition to hands-on models, videos, animations, interactive infographics, products of scientific visualization are used. Participation in an art museum is different and must first be conceived, designed and learned by the visitors. The contents of the media focus too much on factual information or narration. Far too little possibilities are offered through exploration and games—especially serious games. In the exhibition 'Aggregation & Blooming. Artists Groups and the Development of Fine Arts in Taiwan' presented by the National Taiwan Museum of Fine Arts, we find a way of exploration which becomes impressive and exemplary. There, in next to selected paintings such as the work 'Uprising the Civilization' (1983) painted by Chang Yung-Tsuen is a small monitor installed that

demonstrates a video film, which shows in sign language information about the artwork. A few meters away from the artwork there is a table with several texts about the artwork in English and Chinese, a text in Braille and a 3D relief of the painting for blind visitors, and a wooden modular system for playing with some forms of the painting. The multiplicity of given possibilities not only allows an informative and narrative access, but also an explorative and ludic approach and excludes no visitor.

Following the history of multimedia applications since the early 1990s, there is indeed a growing trend towards a development that could be cautiously described as infantile occupational therapy with an emphasis on amusement. Thanks to gesture-based computing, science museum hands-on models finally found their way into museums with cultural-historical and art collections, so that visitors can access the often thin contents with a light gymnastics experience. Or the visitors are so overwhelmed by the rapid flood of images of thousands of artworks and objects that are offered to them on a 40-foot interactive multi-touch wall, that the original artworks come across as somehow colorless, lifeless and uninteresting. With their 'ArtLens' spectacle the Cleveland Museum of Art is an excellent object for the study of the changing behavior of visitors in an art museum and shows the things to come.

What can science museums actually learn from art museums?

At the heart of mediation in art museums are the works of art. Based on these, mediation concepts are developed, mostly presented as stories and narration. Sometimes these can depict the history of creation, or details of the life of the artist, or about the significance of the work of art in connection with other, comparable works or different interpretations. The challenge and sometimes the dilemma of the art museum is to convey both experience and interpretation. (10)

Educational programs in art museums often follow this assumption that there is an idea of the artist behind the artwork that is often not directly expressed by the artwork. In order to make this idea visible, i.e., the meaning of the work of art, a translation is required. The question "What did the artist want to tell us?" is often at the beginning of the interpretation. Accordingly, this question is not to be understood as a simple translation which explains the meaning of the work of art that the artist intended, but rather more aptly understood as a form of "interpolation" as M. Bockemühl called the function of art education. (11) To convey to the visitors what the work of art expresses, because only through the prior knowledge can the work be understood. The offer provided by the education in the form of information and conceptual knowledge is therefore directed to the hunger for information of the visitors. These offers are helpful in closing information gaps, but they do not support the need for a primary experience in the face of the artwork.

On the basis of these observations, the question arises:

What are the potentials of the museum and how can they be opened up for a new understanding of through the creative use of media? A museum is rich in collected experiences of life. The visitor's preferences, his/her associations, and last but not least his/her own history lead him/her through the museum's contents. If the most successful way to transfer information is the "creation of a confidential relation" (12), then the primary objective has become to define strategies by using the visitor's own experiences, preferences, and curiosity. (13; 14; 15; 16) To capture the visitor's "feeling of solidarity" (17) by empathy will be the key for successful media applications.

At the Museums and the Web conference 1999 in New Orleans Larry Friedlander demonstrated that these problems encountered when we try to communicate information about art are not art-specific but essential for the common transfer of all knowledge. Friedlander asked: "How do we integrate media-rich environments with people-rich ones and make them human, warm and conducive to learning? How do we organize these experiences for the user so they can make sense of them without robbing them of their inherently rich and spontaneous qualities?" (18) These questions are also of relevance for the science museums, because here the problem arises, what exactly the visitors really take away from their actions of the hour-long interaction. So questions like "What do people remember from their museum visits? And more importantly, what factors seemed to most contribute to visitors forming these long-term memories?" will lead to sustainable success. (19)

With such an abundance of entertainment through games and hands-on models, offered in the Science Museums, the essential content can get lost. Even serious topics and sustainable issues are sometimes treated like interactive games. But differently important contents require differently inserted media. If the history of the discovery of gravity, the functioning of a Wankel engine, and the question of what should actually happen to all nuclear waste are treated with the same medium of a 90 second video, then the relevance of a topic becomes obsolete. The central themes or important objects require a special media staging. It appears that Science in the Science Museum seems to be entertaining first and then instructive.

Some art museums like Tate Britain create thematic landscapes in their exhibition area and stage their masterpieces in them as impressive moments of a special perception from which the story of this outstanding object is told on behalf of others. Science museums frequently neglect this, as key questions often lack succinct objects. For science museums, this poses the challenge of how complex themes can be visualized and branded using suitable objects.

3. Instead of a conclusion: the dependency of museums on media technology

To remain competitive art museums and science

museums become more and more dependent on the latest technological innovations. (20; 21) We run the risk that technological pomp and frippery will become more important than pure content. The half-life of the attractiveness of the media used is staggering and this is punished by the visitors emerging ignorance. The expectations of the customers will always follow the latest technology and if art and science museums do not want to lose their influence as one of the key players in the education and leisure arena, they will have to follow the technological hype too. Herein lies one of the cruxes of the problem.

Another problem is media stations that are not in operation. Even if the content is conveyed by accompanying media, a dead screen is always a sad sight. Such a non-operational screen showcases the dependence of technology and the lack of care of the museum to take care of his technique. The biggest opportunities for museums are the permanent presence of mobile media and the attractiveness of the constant noise of social channels. With the development of machine learning and artificial intelligence, the problems of the museums are likely to intensify. (22) If museums want to retain their visitors—especially the young visitor groups—they must take into account the changed expectations of the visitors. Often only what is expected is offered: entertaining occupational therapy through fun and games on the one hand and a instant gratification of the hunger for special experiences and artistic provocations on the other hand.

Where are the museums that shake us up and lead us to a critical reflection?

Where are the museums that call us to shape the future on the basis of the burning themes of the present?

Where are the museums that become places in which questions and constellations can be discussed that are not considered elsewhere and that poses the crucial "cultural, democratic, social and ecologic questions" [...] "that goes through all the ways of society." (23)

Acknowledgments

This essay is dedicated to Kim Henry Veltman in honor of his 70th birthday.

I would like to thank Tobias Klein for his feedback.

4. References

(1) Kraemer H. (2018a) "Media Are, First of All, for Fun": The Future of Media Determines the Future of Museums. In: Bast G., Carayannis E., Campbell D. (eds) *The Future of Museums. Arts, Research, Innovation and Society*. Springer, Cham. Published 2 Oct 2018. <https://link.springer.com/chapter/10.1007/978-3-319-93955-1_9> Accessed 18 Oct 2018.

(2) Samis, P. (2018). *Museum Media & Communication*. New York: Routledge (in print).

- (3) Samis, P. & M. Michaelson (2017). *Creating the Visitor-centered Museum*. New York: Routledge, p. 17.
- (4) Mannion, S., A. Sabiescu & W. Robinson (2015). "An audio state of mind: Understanding behaviour around audio guides and visitor media." In *MW2015: Museums and the Web 2015*. Published 1 Feb 2015. <<http://mw2015.museumsandtheweb.com/paper/an-audio-state-of-mind-understanding-behaviour-around-audio-guides-and-visitor-media/>> Accessed 18 Oct 2018.
- (5) Samis, P. & M. Michaelson (2017), p. 17.
- (6) Finn, D. (1985). *How to visit a museum*. New York: Harry N. Abrams, p. 55.
- (7) Klonk, C. (2009). *Spaces of Experience: Art Gallery Interiors from 1800 to 2000*. New Haven & London: Yale University Press.
- (8) Finn, D. (1985), p. 55.
- (9) Idema, J. (2014). *How to visit an Art Museum*. Amsterdam: BIS Publishers.
- (10) Serota, N. (2000). *Experience or Interpretation: The Dilemma of Museums of Modern Art*. London: Thames and Hudson.
- (11) Bockemühl M. (1998). "Zu Grundfragen der Betrachtung, der Kunstvermittlung und zur Zukunft der Museen." In H. Kraemer & H. John (eds.). *Zum Bedeutungswandel der Kunstmuseen. Positionen und Visionen zu Inszenierung, Dokumentation, Vermittlung*. Nuremberg: Verlag für moderne Kunst, pp. 102–117, p. 108.
- (12) Treinen, H. (1996). "Das Museum als kultureller Vermittlungsort in der Erlebnisgesellschaft." In Landschaftsverband Rheinland (ed.). *Vom Elfenbeinturm zur Fußgängerzone*. Opladen: Leske and Budrich, pp. 111–121, p. 120.
- (13) Marable, B. (2004). "Experience, Learning And Research: Coordinating The Multiple Roles Of On-Line Exhibitions." In D. Bearman & J. Trant (eds.) *Museums and the Web 2004: Proceedings*. Toronto: Archives & Museum Informatics, 2004. <<http://www.museumsandtheweb.com/mw2004/papers/marable/marable.html>> Accessed 18 Oct 2018.
- (14) Giessen H.W. & W. Schweibenz (2007). "Kommunikation und Vermittlung im Museum: Ueberlegungen zur Museumskommunikation, kognitiven Lerntheorie und zum digitalen Storytelling." In M. Mangold, P. Weibel & J. Woletz (eds.). *Vom Betrachter zum Gestalter: Neue Medien in Museen—Strategien, Beispiele und Perspektiven für die Bildung*. Baden-Baden: Nomos Verlagsgesellschaft, pp. 51–63.
- (15) Schweibenz, W. (2008). "Know thy visitors: Personas for visitor-centered museums." In *The International Journal for the Inclusive Museum*. No. 1(2), pp. 103–109.
- (16) Falk, J. H. (2009). *Identity and the museum visitor experience*. Chicago: Left Coast Press.
- (17) Mothes, U. (2001). *Dramaturgie für Spielfilm, Hörspiel und Feature*. Konstanz: UVK, p. 78.
- (18) Friedlander, L. (1999). "Keeping the Virtual Social." In D. Bearman & J. Trant (eds.) *Museums and the Web 99 Proceedings*. CD ROM. Archives & Museum Informatics, 1999. <http://www.museumsandtheweb.com/mw99/abstracts/prg_1094.html> Accessed 18 Oct 2018.
- (19) Falk, J. H. (2013). "Understanding Museum Visitors' Motivations and Learning." In I. B. Lundgaard & J. T. Jensen (eds.). *Museums – Social Learning Spaces and Knowledge Producing Processes*. Copenhagen: Danish Agency for Culture, 106–127, p. 108. <https://silks.dk/fileadmin/user_upload/dokumenter/KS/institutioner/museer/indsatsomraader/Brugerundersoegelse/Artikler/John_Falk_Understanding_museum_visitors__motivations_and_learning.pdf> Accessed 18 Oct 2018.
- (20) Kraemer, H. (2017). "The Phantoms of Multimedia. About the Increasing Loss of Digital Cultural Heritage and some Challenges for Museums and Archives." In O. Grau, W. J. Coones & V. Ruehse (eds.). *Museum and Archive on the Move*. Berlin: DeGruyter, pp. 248–358.
- (21) Kraemer, H. (2018b). "The Future of Media determines the Future of Museums. Some remarks on the current situation of the Post-NMC era" In *MW2018: Museums and the Web 2018*. Vancouver. Published 21 Apr 2018. <<https://mw18.mwconf.org/submit-paper/?pid=1363>> Accessed 18 Oct 2018.
- (22) Veltman, K.H. (2006). *Understanding New Media: Augmented Knowledge and Culture*. Calgary: University of Calgary Press.
- (23) Beuys, J. & F. Haks (1993). *Das Museum. Ein Gespräch über seine Aufgaben, Möglichkeiten, Dimensionen...* Wangen/Allgäu: FIU Verlag, p. 38; 49.

Operation of Open Storage in National Science and Technology Museum, Taiwan

Jong I Lin

National Science and Technology Museum, Collections and Research Division

Summary

For the sake of increasing accessibility and providing visitors different approach to learn about museum collections, the National Science and Technology Museum, Taiwan, set up an Open Storage in the exhibition hall. It is the first Open Storage in Taiwan and aims to promote object-based learning and public understanding of collection management tasks in the museum.

Key Word: NSTM, Open Storage, visible collection, Exhibition

1. Introduction

The museum storage has always been regarded as a scared and mysteriously forbidden palace for the public without allowance for any access. However, if we interpret it as a place for preserving artifacts, it could only be a warehouse to stuff all curiosities. With the recent concept of looking after visitors' demands, more and more museums have planned and publicized new strategies to allow their visitors to gain the access to their storages, for example, the National Museum of Ethnology in Osaka, the Darwin Centre Phase I and II at the Natural History Museum in London, Musée de quai Branly in Paris, and the Open Storage of National Science and Technology Museum (hereafter abbreviated as NSTM) in Taiwan. NSTM Open Storage uses the exhibition concept of "visible collection" which combines the museum's ideas of collection, research, exhibition and education. This work introduces the operation of Open Storage in NSTM including the function and the aim of NSTM, the interaction between collections and visitors in NSTM Open Storage, and the conclusions of this work.

2. Operation of Open Storage in NSTM

The National Science and Technology Museum (NSTM), inaugurated in November 1997, is the first national museum in applied science in Taiwan, occupying a space of around 19 hectares and with 114,000 square meters of floor area. The museums' missions are the development, design, and exhibition of different technology related themes with an emphasis on key developments and their effect on human life. NSTM's educational activities aim to enhance visitor's understanding of science and technology. In addition, the

exhibitions cover all kinds of technology, from modern to ancient technology and from the traditional to state-of-art technology.

Usually, the museum collections are stored in restricted areas for museum staff and researcher access only. Under the philosophy of the collection belongs to the people, the Open Storage of the NSTM allows the general public access to museum collection in hopes of raising interest in research and preservation of Taiwan's scientific and industrial history. The construction began in June 2008 and was completed at the end of 2009. Several months before its grand opening to the public, limited viewing sessions were held to gather feedback from visitors to make final adjustments. In July 2010, NSTM's Open Storage was officially opened. Figure 1 shows the entrance of the Open Storage in NSTM. Since then on-site guided tours are given and visitors can view NSTM conservators' work in inspecting and conserving collections at a close distance. These activities are also demonstrated to enrich the visiting experiences. It is the responsibility of NSTM to preserve the proof of technological developments. Open Storage is divided into three parts: artifact storage process, artifact collection and large artifact, and inspection/maintenance as shown in Fig. 2.



Figure 1 Entrance of Open Storage in NSTM

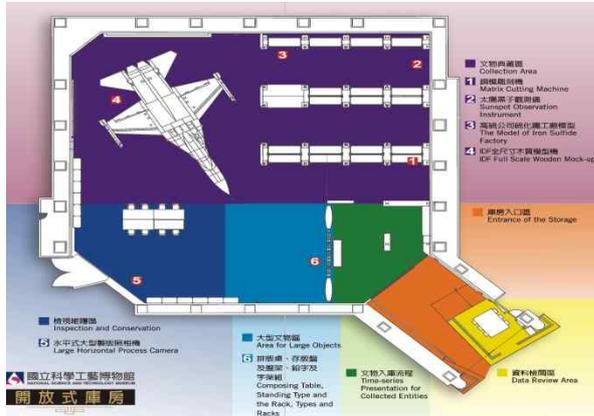


Figure 2 Floor plan of Open Storage

In NSTM Open Storage, visitors can see parts of treasures of the museum collections. There are 9 unique ones: the Meridian Instrument which was used to execute the astronomical geodesy, the Meter Prototype which was received by the Taiwan Provincial Institute of Weights and Measures from Japan, the Sunspot Observation Instrument, Taiwan-made Tompkins Knitting Machine, the Model of Iron Sulfide Factory of Kaohsiung Ammonium Sulphate Company, full scale wooden mock-up of the Indigenous Defensive Fighter, Hand Powered Type Casting Machine, Electrotype Casting Machine and Regular Script Matrix New Type 1 of which strokes were simulated from scholars in Ching Dynasty. In addition, visitors can see a series of early printing machines which allow them to have an overlook of technical developments of letterpress and intaglio printings in Taiwan. Sometimes, they can even personally operate these machines. For instance, by using letterpress proofer, visitors can participate in hands-on activities to make their own printed pictures as souvenir as shown in Fig. 3.



Figure 3 Use a letterpress proofer to make personal print

Besides, basic information about museum collections is provided by on-site explanatory panels and labels. Through guided tours, visitors can know more about history and stories of the collections as shown in Fig. 4. For the complex and/or interested collections, the computer animations are manufactured to describe the operation processes and the design principles. For

example, Ancient Chinese locks are one kind of the most important collections in NSTM. There are some reconstruction ancient locks that are provided for visitors to play in NSTM Open Storage. However, the structures of locks are too complex to understand them. Using the computer animation, the inner structure of the lock is visible. It is a useful way to help visitors to realize the design principle and the open process of the lock. Figure 5 shows a part of an animation of an ancient Chinese lock. Demonstration on conservation is also available, visitors can have brief conversation with museum conservators while they are working in the storage to know what materials and skills they've use to preserve the artifacts.



Figure 4 Guided tours in Open Storage

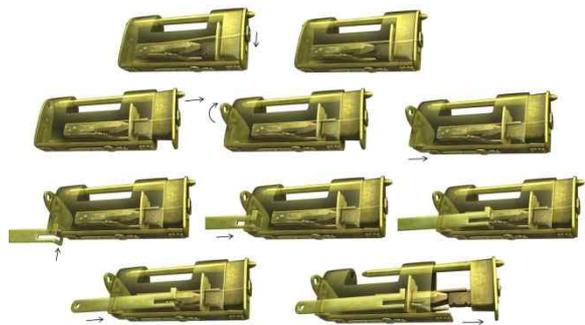


Figure 5 Animation of ancient Chinese lock

In order to recruit potential volunteers for conservation and preservation works and to improve museum conservators' knowledge and skills, NSTM also designed and conducted a series of workshops and seminars in the Open Storage to convey the importance of the ethics of conservation and to introduce the new technologies and practical skills of the field. Experienced conservators from various fields were invited to give lectures of such as shown in Fig. 6. Through on-site and long-terms of conservation and preservation lectures, practices and demonstrations, NSTM hopes to make the visitors and participants become more literate in the concepts and technologies of conservation and preservation.



Figure 6 Workshops in NSTM Open Storage

After more than 60 years of economic development in Taiwan, there are many people who have the abilities and capabilities to have their own collections according to their different interests. However, most of these amateur collectors still lack the management and conservation resources and skills to conserve their own collections. NSTM Open Storage also works as a platform for amateur collectors to share their collections and for the museum to share its knowledge of managing and preserving collections to the general public as shown in Fig. 7. Hence, a series of exhibition activities and conservation workshops were also held for these amateur collectors to help them to gain the basic skills and knowledge to display, manage and conserve their own collections. While the museum gives this support to amateur collectors, NSTM also hopes to make them become strong supporters for museum.



Figure 7 Exhibition of amateur collector in Open Storage

The aim of Open Storage is to attract more visitors, enhance the content of collection exhibitions, and revitalize the content of collection exhibitions. In order to reach the aim, the researchers at NSTM are devoted to study the artifact research and try to convert the results of artifact research into promotional activities. There are 12 collection promotion events that are launched in the Open Storage per year and several collection replicas have been designed and manufactured for the public to experience since 2013.

3. Conclusion

NSTM Open Storage uses the exhibition concept of “visible collection” which combines the museum's ideas of collection, research, exhibition and education. Through guided tours, explanatory labels, computer animations, and practical conservation works, Open Storage allows visitors to have an overall understanding of how artifacts are collected, preserved, managed, displayed and researched in a museum. The space conveys not only the importance of preservation of cultural artifacts, but also adds to people's interests in scientific and industrial research history and finally highlights the importance of the existence of museums.

4. References

1. Silverman, L. H.. “Visitor meaning-making in museums for a new age”, *Curator* (1995), 38(3), P.161-170.
2. Thistle, P. C.. “Visible storage for the small museum”, *Curator* (1990), 33(1), P.49-62.
3. Yeh, K. Y.. “Visible storage”, *Museology Quarterly* (2004), 18(2), P.71-78. (in Chinese)

Energie.Wenden (Energy.Transitions)

Thomas Hofberger, Dipl.-Ing. (FH)

Deutsches Museum, Exhibition Designer, Touring Exhibition Manager

Summary

Today, we stand on the cusp of a 4th industrial revolution. The global challenges of energy transitions, with its clean technologies, smart solutions and decentralized, flexible energy production should and can tag along with the 4th Industrial Revolution. In a similar way to the first, our next industrial revolution will enable and be enabled by new energy systems — in this case, renewable energies will replace fossil fuels i.e. coal — thus completing a full energy transition. But in order to get there, acceptance and participation of energy literate citizens is necessary.

To deal with this complex and sometimes overwhelming topic and its multi-layered dependencies, the Deutsches Museum has designed an exhibition providing visitors with background knowledge about the necessities and challenges of energy transition, unpicking the links between the different technical, economic and social challenges.

This case study presents the overall design of that exhibition: The recent travelling exhibition “energie.wenden” (literal translation: turning energy around). The award-winning exhibition design is best described with - A clear structure for a complex content. To get a rather easy and spontaneous access to the exhibition without neglecting the complexity of the issue we choose a highly interactive design. A role-play enables visitors to design their own energy transition in the role of a politician. In addition, the ten surrounding themed rooms convey basic knowledge about energy generation, storage, distribution and consumption through the provision of fascinating objects and interactive stations. In this session, I will examine that highly interactive and emotive approach, chosen to engage museum audience with the pressing topic of energy transition.

Key Word: Deutsches Museum; energy transition; exhibition design; role playing game; travelling exhibition
