Affordances, Appropriation and Experience in Museum Exhibitions: Visitors' (Eye) Movement Patterns and the Influence of Digital Guides

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List of Acronyms

CRR   Cued retrospective reporting

LiMo   Literaturmuseum der Moderne (Museum of Modern Literature)

M3   Multimedia museum guide

MET   Mobile eye-tracker/mobile eye-tracking

Prologue

Visitor and audience research in museums is a rapidly growing area (Falk & Dierking 2013) that began with the "turn to the visitor" (Hooper-Greenhill 2006: 362). Presently visitor research is becoming increasingly important in academia although it is often not yet sufficiently considered by exhibition makers when designing exhibitions (Reussner 2010). Visitor research is conducted by various disciplines, mainly sociology, socio-cultural anthropology, psychology and educational science.

The visitor research presented in this thesis *Affordances, Appropriation and Experience in Museum Exhibitions: Visitors' (Eye) Movement Patterns and the Influence of Digital Guides* was part of the German interdisciplinary cooperation project *Wissen & Museum: Archiv – Exponat – Evidenz* (*Knowledge & Museum: Archive – Exhibit – Evidence*, 2009-2012) between the Ludwig-Uhland-Institute for Empirical Studies (LUI) and the Institute for Art History at the University of Tuebingen, the German Literature Archive (Deutsches Literaturarchiv, DLA) in Marbach a. N. with its affiliated museums and the Knowledge Media Research Centre (KMRC) Tuebingen, an extra-faculty research institute that is part of the Leibniz Association. The project was funded by the German Federal Ministry of Education and Research. It consisted of four sub-projects respectively: "Spaces of Literature" conducted by Thomas Thiemeyer and advised by Bernhard Tschofen (LUI); "Materials of Literature" conducted by Felicitas Hartmann and advised by Anke te Heesen (LUI); "Iconicity of Literature" conducted by Yvonne Schweizer and advised by Barbara Lange (art history); and finally "Presentation Practice and Evidence Attribution" conducted by myself and advised by Stephan Schwan (KMRC). My subproject integrated socio-cultural anthropology and psychology.

The goal of this interdisciplinary cooperation project was two-fold. On the one hand the aim was to gain knowledge about museum transformations, from the archival material to the exhibit at the German Literature Archive with its affiliated museums. We sought to create an exhibition and generate knowledge about exhibitions that was newer than each discipline could provide and that was generalizable to all exhibitions. A second aim was to train scientific and museum staff at the same time. Each scientific staff member was also a trainee at the literature museums in Marbach. Hence each one of us was working between different disciplines and between academia and museums as well.

Thus it was a challenging interdisciplinary project. This project was characterized by the exchange between the disciplines and by (re)drawing boundaries between all the disciplines

that are part of so-called museum studies. Each of the staff members as well as the supervising professors were open to and interested in the knowledge and practice of the other disciplines.

This project ultimately resulted in the exhibition "1912 – Ein Jahr im Archiv" ("1912 – One Year in the Archive") and the final conference "Präsenz – ausstellen, erfahren, erforschen" ("Presence – Exhibiting, Experiencing, Researching") in 2012. For further information about the project see http://www.wissen-und-museum.uni-tuebingen.de/.

My tasks included conducting visitor studies in the temporary special "South Sea Oases: Life and Survival in the Western Pacific" exhibition (original title: "Südsee-Oasen: Leben und Überleben im Westpazifik") at the Linden-Museum in Stuttgart and in the permanent "nexus" exhibition at the Museum of Modern Literature (LiMo) in Marbach a. n. This visitor research sought distinct, recurrent and systematic eye movement patterns in museum exhibitions and described them on the micro level in order to provide design suggestions for exhibition makers. Therefore it applied, among other methods, a recent approach in visitor studies: mobile eye tracking. Additionally it examined the influence of digital guides. Furthermore, as part of a minor aim, it investigated the differences between experts and novices.

This thesis was developed within the interdisciplinary project *Knowledge & Museum* with its openness, interests, aims and challenges. Hence, it will challenge its readers and ask them to be open and interested in something different from traditional anthropology. It aims to contribute to the application of new methods both in visitor studies and socio-cultural anthropology, and to initiate a new cognitive science approach in visitor studies by combining psychological and anthropological theories and methods.

Abstract and Thesis Outline

This thesis *Affordances, Appropriation and Experience in Museum Exhibitions: Visitors' (Eye) Movement Patterns and the Influence of Digital Guides* emerged of the BMBF-project *Knowledge & Museum*. My task within this interdisciplinary project was to conduct visitor research in the permanent exhibition "nexus" at the Museum of Modern Literature in Marbach a. N. This task was complemented and extended by visitor research in the temporary special exhibition "South Sea Oases: Life and Survival in the Western Pacific" at the Linden-Museum in Stuttgart.

Visitors are usually not allowed to physically touch the exhibits in an exhibition but they are encouraged to 'touch' the exhibits with their gaze instead. They are invited to view exhibits. They are invited to read labels and other information panels.

Based on such fundamental principles, the main aims of this project were to gain new knowledge about visitor eye movement behaviour[1] and accompanying cognitive processes surrounding the particular affordances of exhibition design and hence particular appropriation strategies. To accomplish this, I applied a new method in visitor studies and socio-cultural anthropology: mobile eye tracking (MET). Previous visitor movement behaviour research has mainly been conducted by observation. By using MET, new insights can be gained into the micro level of visitor movement behaviour. Furthermore using MET allows us to seek the emic point of view in its very literal sense, which is *the* anthropological agenda as established by its founder Malinowski in 1922. The new MET method was combined with cued retrospective reporting to gain knowledge about the goals of visitors' that underlie their attentional behaviour and thus the meaning of their movements. Thus MET works as a complementary method. The digital guides that were provided in these two exhibitions – an audio guide and a tablet like medium – were investigated in regard to their influence on visitor movement behaviour. Thus I will provide new insights into the museum experience with and without digital guides. Furthermore, it was a minor aim to investigate the differences between experts and novices.

The overarching aim of my research was not a simple evaluation of curatorial messages being transferred by the exhibits and exhibitions and received by the visitor, although this was the initial idea in exploring the field. Contrarily I chose to rely on complex basic research about

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[1] In the following text I will refer to (eye) movement patterns or (eye) movement behaviour always as movement patterns or movement behaviour, whereas I imply that the eye is always included in these movements.

visitors' eye, head and body movement behaviour and their accompanying cognitive processes.

Eighteen distinct, recurrent and systematic movement patterns could be identified by applying MET in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart, which could be classified according to their appearances and possible utilities. These are unique and innovative results, which make evident the fact that visitors' movement behaviours are more complex than just stopping and attending to particular exhibits. Rather movement behaviours comprise several unconscious movement patterns that serve the exploration of exhibitions and exhibits in a detailed manner from the visitors' own perspective. The distinctness of these movement patterns was successfully confirmed firstly, with a completely different method, systematic observation, applied in the same exhibition and secondly, in a completely different exhibition, the "nexus" exhibition at the Museum of Modern Literature in Marbach a. N., again with MET. In sum, after applying these confirmation methods, 26 movement patterns and sub-patterns were found altogether in both exhibitions.

Note that the two exhibitions are quite different as the descriptions of them in *Chapter 3* will show. They are different because of their subject matter but also in many other aspects. Due to these differences these exhibitions provided a great range of typical exhibition situations, which led to the identification of this relatively large number of movement patterns (i.e., 26). Nevertheless the comparability between both MET studies is given because both exhibitions avoid directing visitors down a single or main pathway. Instead both exhibitions allow explorative free viewing, which was the requested task of the visitors included in this study in order to elicit their eye movement patterns.

My research focuses on the influence of exhibitions' affordances on visitors' eye, head and body movement behaviours. These affordances are created by the selection of exhibits and digital guides and their presentation and design. For example, exhibits can be presented freestanding or in display cabinets. The design of the display cabinets may vary from being only viewable from the front side to being display cabinets made completely of glass that even have glass shelves. The presentations and designs of exhibits can be homogenous or heterogeneous. They can be presented hanging or lying on a shelf or a platform.

The influence of digital guides like the audio guide at the Linden-Museum in Stuttgart and the tablet-like guide at the Museum of Modern Literature were examined. The main finding was that digital guides direct movement patterns and focus attention in a straightforward manner.

Hence the usage of digital guides leads to more and to broader ranges of different movement patterns; thus visitors using digital media tend to be more actively engaged visually and cognitively when visiting museums than visitors who were not using digital guides. The main difference between audio guides and tablet-like guides is that audio guides allow a dual or parallel way of appropriation by viewing exhibits and listening to the audio guide at the same time, whereas tablet-like guides without the audio guide function only allow a successive but extended way of appropriation shifting between exhibit/exhibition and guide.

Besides the exhibitions' affordances and their influence on visitors' eye movement behaviours, investigating the difference between general content experts (socio-cultural anthropologists and literary scholars/Germanists) and novices was a minor aim; hence visitor characteristics were not collected and investigated. The comparison between experts and novices showed that individuals of both groups behave and process similarly when viewing exhibitions, although experts are more active visitors than novices. These results may reflect the selection of experts in this study, because they were not experts on the particular exhibition theme or the material culture that was exhibited. After a final review of the findings, it can be concluded that differences between visitors are primarily determined by digital guides rather than by expert status.

The results of this basic research, firstly, demonstrate that visitor movement behaviours are much more complex than previous visitor research studies have concluded. It provides evidence that 26 movement patterns including variations are used to view exhibits and exhibitions in detail from the visitors' own perspective, and highly welcomes further research on these identified movement patterns, especially cross-cultural research. Secondly, this research will inform the influence of digital guides on visitor movement behaviour. Thirdly, findings from this research can help inform exhibition makers about exhibition design on a micro level and suggestions from these findings can be drawn to support use of visitor-centred exhibition designs. In order to present the benefits of visitor-centred exhibition designs, anthropological and psychological theories and methods are combined in a way that creates a new cognitive science approach to visitor studies. Finally yet importantly this thesis shall enable visitor researchers and socio-cultural anthropologists to decide whether MET could be advantageous and applicable for their field research.

The research and relevant background, theoretical terms, and concepts were outlined as follows:

Chapter 1 introduces visitor research in general and in socio-cultural anthropology, its methods and previous findings about visitor circulation behaviour and use of digital guides, as well as (my) reasons for conducting visitor research as a socio-cultural anthropologist. This chapter describes MET as a new method and introduces the research questions and aims in detail.

Chapter 2 introduces three main important terms and concepts that are helpful to investigate visitors' movement patterns and the influence of digital guides: "affordance" (Gibson 1979), appropriation, and museum experience. This chapter looks briefly at museums as a research area in general, and in particular, ethnographic and literature museums.

Chapter 3 provides a detailed description of the research settings. The "South Sea Oases: Life and Survival in the Western Pacific" exhibition and its audio guide at the Linden-Museum in Stuttgart. The "nexus" exhibition and its multimedia museums guide called the 'M3' at the Museum of Modern Literature (LiMo) in Marbach a. N., including floor plans, photographs and original texts of the exhibitions.

Chapter 4 describes the results of the first MET study conducted in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart. Eighteen distinct, recurrent and systematic movement patterns are identified and described in detail. Additionally, this chapter provides the frequencies of the movement patterns at four selected sections demonstrating the level of frequencies and hence level of affordances' perception (primary, secondary, tertiary and no frequencies). Furthermore it focuses exemplarily on movement behaviour and accompanying cognitive processes of experts and novices.

Chapter 5 describes the results of the systematic observation study conducted in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart at four selected sections. It describes the confirmation of the movement patterns and the investigation of the audio guide's influence on these patterns. Furthermore this chapter provides examples of cognitive processes reported by a subset of visitors that were additionally interviewed directly after they were observed.

Chapter 6 describes the results of the second MET study conducted in the "nexus" exhibition at the LiMo. It proves most of the movement patterns identified in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in a completely different exhibition and thus provides first evidence for possible generalizability of the research findings. Additionally further movement patterns were identified in the "nexus"

exhibition. Furthermore it compares exemplary descriptions of movement behaviour and accompanying cognitive processes of one expert and one novice who did not use the digital guide M3 with one expert and one novice who did use it.

Chapter 7 critically reflects on the methods applied in this research by emphasizing their limitations, potentials, and prospects as well as by describing exemplarily the reactions they triggered in the social environment of the research, such as in participants, project partners, colleagues, museum staff and the press.

Finally, in *Chapter 8* the research results will be summarized (*Chapter 4-6*) and linked to research results from previous studies (*Chapter 1*) and the theoretical terms and concepts (*Chapter 2*). Based on the specific exhibitions ("South Sea Oases: Life and Survival in the Western Pacific" and "nexus" presented in *Chapter 3*), I answer the research questions, provide a list of all 26 identified movement patterns, and discuss which conclusions or design suggestions can be given. Furthermore, I will anticipate the future of digital guides in exhibitions, MET in visitor studies, the new cognitive science approach in visitor studies and future visitor research.

Please note that small parts of some aspects of this thesis were already published due to the expectations of the *Knowledge & Museum* project. Single aspects of Chapter 1 were already published by Eghbal-Azar, Merkt, Bahnmueller and Schwan (2016) and Eghbal-Azar & Widlok (2013). Eghbal-Azar & Widlok (2013) dealt with parts of the methodological reflection also covered in Chapter 7 in my expanded discussion concerning the pros and cons of MET in visitor studies and social sciences generally. Furthermore this publication contained single movement patterns discussed at length in Chapter 4 and 6. In addition, parts of the research procedure, especially the instruction for the participating visitors in both MET studies, and a simple version of both MET study sample tables were already included in Eghbal-Azar & Widlok (2013). Similarly, parts of the "nexus" exhibition description were already published in Eghbal-Azar (2013). These publications also include the publication of a few figures mentioned in the respective chapters.

1. Introduction: Behaviour of Museum Visitors and Methods in Visitor Studies and Socio-Cultural Anthropology

This first chapter will introduce the research aims and relevant visitor research in anthropology and other disciplines. It will firstly introduce the wider scope of this research and provide reasons why socio-cultural anthropologists should conduct visitor studies. Secondly, it will describe the main methods in visitor studies and socio-cultural anthropology and it will introduce the recent method MET. Thirdly, it will describe how museum visitors move through exhibitions and how they use digital media. Finally, the first chapter will describe gaps in knowledge about museum visitors – hence what we still need to know about their movement patterns and their use of digital guides in museum exhibitions – by introducing the research questions, aims and applied methods.

1.1. Visitor Studies in Socio-Cultural Anthropology?!

Museums are becoming increasingly important due to their increasing number (Falk & Dierking 2013, Te Heesen 2012) as well as their function as informal learning settings (Schwan 2015). Thus museum visitor studies are becoming increasingly important as well, especially since the "turn to the visitor" (Hooper-Greenhill 2006: 362). Due to this turn museums focus more on their visitors. Before this turn museums focused more on their objects, which raises several questions: Why should socio-cultural anthropologists conduct visitor research? Why should visitor research be conducted in a literature museum? Why should visitor research even be conducted at home in Germany?

The anthropologists Mary Bouquet (2001) and Eric Gable (2010) provide some answers to these questions. In 2001 Mary Bouquet describes how academic anthropology is recently interested again in museums. This is demonstrated in the book *Academic Anthropology and the Museum: Back to the Future*, which she edited. Bouquet believes the "(re-) invention of museum anthropology" (Bouquet 2001: 1) started with the academic involvement in post-colonial museums and the reshaping of ethnographic museums 'at home'. Another reason for the revival of academic interest in museums is provided by Gable's (2010) argumentation in his article *Ethnografie: Das Museum als Feld* (*Ethnography: The Museum as Field*). He quotes Laura Naders (1972) that anthropologists need "to study up". Usually and formerly socio-cultural anthropologists rather studied the underprivileged. This is part of the political agenda of socio-cultural anthropologists who themselves feel on the edge of their homeland society. Hence, according to Gable, "to study up" also includes socio-cultural research in

museums. According to Gable (2010) and Bouquet (2001) this also means studying other museums besides ethnographic ones, like art and science museums for example.

As I will show in *Chapter 2,* literature museums like the LiMo work similarly to art museums. Hence I follow Gable's recommendation "to study up" by conducting research not only in an ethnographic museum but also in a German literature museum. However, since I focus on visitors who are commonly not seen as high-ranking within the museum hierarchy (Gable 2010) and I do not focus on museum work "behind the scenes" like the anthropologist Sharon Macdonald (2002) did, my work is still intermingled with that old political agenda of speaking for the underprivileged.

Of course, at this point we have to differentiate between Germany and Anglo-Saxon countries like Britain, USA and Australia, for example. Whereas in Anglo-Saxon countries visitor research has a longer tradition and hence a greater amount of visitor studies were conducted that have a greater impact, visitor research in Germany is still marginalized. Furthermore, Gable (2010) describes how socio-cultural anthropologists increasingly study museums at home, which is in my case Germany. Thus I want to briefly illuminate the German context of my visitor research.

In Germany in 2012, the project *Knowledge & Museum* presented its results at the conference "Präsenz – ausstellen, erfahren, erforschen" ("Presence – Exhibiting, Experiencing, Researching") and with the exhibition "1912 – Ein Jahr im Archiv" ("1912 – One Year in the Archive"). At the same time the "Zeitschrift für Ethnologie" (German "Journal of Cultural Anthropology") presented reviews of ethnographic exhibitions or exhibitions with anthropological issues by socio-cultural anthropologists for the very first time. The editor of the "Zeitschrift für Ethnologie", Markus Schindlbeck, introduced this new section with a reference to the relevance of such reviews made by experts and marked this with the recent changes from regional-oriented to issue-oriented exhibitions and from exhibits as main actors to exhibits as requisites (Schindlbeck 2012: 239-240).

If it is time for exhibition reviews by anthropologists, it should also be time for anthropological (museum visitor) research in such exhibitions. If it is time to introduce reviews of anthropological or ethnographic exhibitions, it should also be time for introducing new methods in anthropological (museum visitor) research like MET, too. If there are new times of presentation in such exhibitions, there are new times of presenting anthropological research in academy as well as in museums like additional MET video examples on a DVD.

Anthropological or ethnographic exhibitions are important to the field of anthropological public relations, especially for novices. It should be the main aim to create such exhibitions carefully for visitor needs, characteristics, interests and behaviour (of movement and use of digital guides). Hence it should be the main aim to transform anthropological knowledge of the world into incorporated knowledge at home in Germany. Like the Linden-Museum (2009) once mentioned on its website: World tours start at home.

If world tours start at home, then what about anthropologists conducting (museum visitor) research also at home in Germany? What about those conducting research at home in German literature museums, or at home in German ethnographic museums? What about the world beyond Europe?

In 2012 at home in Germany, a new ethnographic museum was planned to open in Berlin: the Humboldt Forum. The ethnographic museum shall move from Dahlem into the middle of the city next to the Museumsinsel. The Humboldt-Forum does not want to be a classical ethnographic museum. It comprises space for and exchange between the academy, the library and the museum (Humboldtforum 2015). This shows an altered awareness of the potential impact of ethnographic museums and their messages in Germany.

In 2012 at home in Germany, the municipal ethnographic museum of Cologne, called the Rautenstrauch-Joest-Museum – Cultures of the World, was awarded with the museum award of the European Council for "their innovative concept and their cross-cultural approach" (personal communication with Klaus Schneider, director of the Rautenstrauch-Joest Museum on 19th October 2015).

If new ethnographic museums can have an important impact in our society, then new anthropological (museum visitor) research may certainly have an impact, too. And from the new anthropological reviews of ethnographic exhibitions to the new ethnographic museums and innovative research: if the academy is focusing on museums again, then we should also focus on the museum visitors. Even in cross-cultural studies worldwide we should be doing this.

This research is situated in this broader context of changes in German museums and German museum studies as well as my personal interest in making (ethnographic) exhibitions in Germany more suitable for their visitors.

1.2. Main Methods in Visitor Studies and Socio-Cultural Anthropology

Currently what are the traditional, mainly applied methods of visitor research and socio-cultural anthropology? In a German introductory book on methods in anthropological fieldwork Bettina Beer (2003) characterizes anthropological research as being conducted in a field and does not perform studies in a laboratory that are conducted by applying purposefully a variety of quantitative and qualitative methods. Several authors present methods such as participant and systematic observation, linguistic analyses, different kinds of interviews and questionnaires, the extended-case method, cognitive field tests, ethno-demographic methods, photography, video and documentation. These are probably the most often applied methods in anthropological research with participant observation established by Malinowski (1922) being the most famous one among them.

To properly conduct visitor studies we firstly have to distinguish evaluation from research. Evaluation is conducted for a single institution or project and can be differentiated as front-end (before producing an exhibition), formative (while in production) and summative (after the production of an exhibition) evaluation. Whereas research on visitor studies means rather basic research that provides new transferable insights and generalizable results that are publicly available (Bitgood & Shettel 1996).

Nevertheless although one might want to distinguish between research and evaluation, both approaches apply the same methods (Bitgood & Shettel 1996). These methods comprise mainly three forms: interviews, questionnaires and observation. These methods can be applied quantitatively or qualitatively. In their summary of visitor study's methodology, Yalowitz and Bronnenkant (2009) express the dominant view when they stress that the main method regarding visitor studies is still observation, no matter how observation data are collected (e.g., by the paper-and-pencil technique or through videotaping or other tracking technologies). This principle probably applies to social research more generally since many social scientists, especially anthropologists, who are conducting field research all over the world continue to apply the paper-and-pencil technique for observation in the field.

Typically, visitors' behaviour is investigated by "timing and tracking" studies (Yalowitz and Bronnenkant 2009). In these studies, trained observers unobtrusively watch visitors make their way through an exhibition and record which elements they stop at and for how long. More advanced methods have introduced automatic user tracking, partly combined with continuous recording of physiological measures such as skin conductance and heart rate in order to determine the intensity of emotional and cognitive reactions across an exhibition

(Tröndle, Greenwood, Kirchberg & Tschacher 2014). My research as well as research by Tröndle et al. (2014) demonstrate the current trend of an integrative methodology or multi-angulation of methods in visitor studies.

The application of these methods in visitor studies shifted from formerly behaviouristic studies into current constructivist studies acknowledging that visitors are actively engaged in constructing meaning, hence learning. This approach requires more elaborate research strategies as well as spending more time and money on research and it gives preference to social scientists like socio-cultural anthropologists to study museum visitors (Hooper-Greenhill 2006). Hooper-Greenhill (2006: 374) highlights the work of the social anthropologists Macdonald and Katriel as examples of research that is aiming at "deep understanding rather than the improvement of practice". This characterization also describes my research agenda, which is detailed below.

In sum, museums can act as a novel field of study for anthropological research that seeks the field instead of the laboratory, pursues deep understanding and engages in long-term research. Visitor studies can benefit from anthropological approaches, methods and theories just as anthropology might benefit from having new methods like MET applied to visitor studies.

1.3. (Mobile Eye) Tracking Studies

Yalowitz and Bronnenkant (2009) provide an excellent overview about tracking studies in museums but they do not mention MET technology. A famous study by Tröndle et al. (2014) applied body tracking to investigation the locomotion or circulation of people through a gallery. However their study does not document the exact eye movements. Milekic (2010) was one of the first authors who claimed that "eye- and gaze-tracking technologies have matured enough to be considered for use in a physical museum/gallery setting" and that "eye-tracking technologies can play a vital role in museum studies". Nevertheless few papers have been published on this new method as it can be applied in visitor studies (Mayr, Knipfer & Wessel 2009; Filippini-Fantoni, Jaebker, Bauer & Stofer 2013; Krukar & Conroy Dalton 2013; Krukar 2014).

What can we learn from new methods like MET? Mayr et al. (2009) conducted the first exploratory MET study in "a small exhibition about nanotechnology" (191-192) that had been created solely for this study at the Knowledge Media Research Centre (KMRC).

Before summarizing the results of Mayr et al. (2009) and my own experience, I will provide some background information about MET because this method might be unknown to most readers:

As a first step towards understanding MET technology and the kind of data that it provides, some background knowledge about visual perception in action is essential. The way we perceive everything visually differs depending on the context, for instance the physical world appears differently when seated in an armchair reading a book or when sitting in front of a screen watching videos or looking at images. Seeing the world while being engaged in bodily action involves more parts of the brain than seeing them while at rest does. These processes are connected especially to the executive areas of our working memory (Baddeley 2007) and to our procedural long-term memory (Land & Tatler 2009).

According to Land and Tatler (2009: 221-223 & 4-5), four different neurocognitive systems are involved:

- The visual system processes bottom-up information about the environment;

- The motor system executes actions within this environment;

- The gaze system decides which information is important or needed for the task;

- The scheme control system applies top-down agendas of where to look, what to look for and what to do.

The perception of museum visitors is therefore a clear case of what is now called embodied knowledge in anthropology (Scheper-Hughes 1994, see *Chapter 2*).

The implicit or procedural knowledge involved in visual perception in action is stored in schemata and scripts and it is largely unconscious in nature so that agents themselves find it hard to verbalize and manipulate their behaviour (Land & Tatler 2009; Schank & Abelson 1977 for "scripts").

The discussion of visual perception relies on three important technical terms which are also important for our assessment of MET, namely "fixations", "saccades" and "scan patterns". Our vision consists of so-called eye movement patterns (or scan patterns/gaze patterns) that are made up of combined "saccade and fixate" strategies. Fixations are very short "stops" of eye-movements. The duration ranges from 150 ms to 600 ms (Duchowski 2003: 49) indicating what someone is probably (but not certainly) paying attention to. Saccades are very rapid eye-movements that occur between fixations spontaneously and can vary in duration

from 10 ms to 100ms (Duchowski 2003: 44). When performing saccadic movements we can hardly perceive anything; we are basically "blind". Hence, eye-movements are not performed smoothly but in an apparently zigzag fashion that seems to be very unsystematic at first (Land & Tatler 2009). Eye-tracking technology records these movements; it is the first task of MET data analysis to distinguish fixations from saccades and then to investigate correlations between the observed patterns, meanings and goals of attention (Holmqvist, Nyström, Andersson, Dewhurst, Jarodzka & Weijer 2011).

Whereas stationary eye-trackers require participants to be seated in front of a screen, METs can be mounted on the participant's head while they move around, freely engaging in various tasks. There are a number of head mounted eye-tracking devices available. We have used the ASL MobileEye (2006 model) at the Linden-Museum (see below, Figure 1 and 2) and the Locarna PT Mini (2010 model) at the Museum of Modern Literature in Marbach a. N. (see *Chapter 6*, Tables 67 and 68). Many of the following points refer to MET technology in general, although many new technical developments have occurred in the meantime.

Figure 1: Calibration of the ASL MobileEye (copyright by Kira Eghbal-Azar)

Figure 2: The ASL MobileEye designed in 2004 and applied 2010 at the Linden-Museum in Stuttgart (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

All of these devices generally work with two cameras (see Figure 1): a scene camera records the scene and the environment from the participant's perspective, and an eye-camera records his or her eye movements usually by using a harmless infrared light, a technique called "dark pupil tracking". The two cameras are mounted on frames of a pair of eyeglasses, but most devices only record one eye of the participant. These glasses sometimes are mounted on a cap or even on a helmet. As Figure 1 and Figure 2[2] show, some devices needed to be fixed in a very stable manner on the participant's head. However, the current trend is to produce MET devices that are worn like regular glasses by the participant and that can track both eyes (so-called binocular eye-tracking). These devices reduce the parallax error caused by our binocular vision, which is more pronounced when relying on MET technology that tracks only one eye, as advertised by SensorMotoric Instruments and Tobii on their websites in 2015 (SensoMotoric Instruments 2015, Tobii 2015, Holmqvist et al. 2011: 60 for parallax error).

Both separately recorded videos have to be brought together and processed into a single video by a computer, whereas the calibration of the cameras is essential. Accordingly, self-calibrating or

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[2] These two figures were already published in Eghbal-Azar & Widlok (2013).

calibration free eye trackers have become another trend in MET technology (Duchowski 2003: 227). Processing[3] synchronizes the two recordings so that we receive a single video with a marker (a fixation cross or circle) that is permanently shown while we watch the recorded scene from the participant's perspective. This video indicates eye-movements in action by using the eye camera together with the picture of the three-dimensional space through which the participant is moving (Mayr et al. 2009 and the manuals of MET devices: ASL MobileEye 2006 and Locarna 2010). This process makes MET rather complex to use in field research, and some preparatory training with this technology is necessary (Holmqvist et al. 2011: v-vi, 1). Holmqvist et al. (2011) provide the first guide available for eye-tracking beginners. It provides comprehensive information collected over many years and across many eye-tracking studies but with the clear focus on remote (stationary) eye tracking for experimental lab conditions.

One of the reasons eye tracking has not yet played a role in the social sciences is that in its stationary version it requires a typical experiment-like setting, cutting out the social context and the context of agency. With MET becoming more readily available this limitation is less severe today.

Although MET devices have been commercially available since the 1980s, they did not become realistic to study people "outside the laboratory" until a decade later. While remote eye tracking in labs is still favoured (Land & Tatler 2009: vii & 9) "the role of vision during action can usefully be studied only during the performance of action itself, preferably in conditions that are as unconstrained as possible" (Land & Tatler 2009: vii-viii). As mentioned above, visual perception in action works differently than sedentary studies performed in front of computer screens. So far, MET has been commonly applied in research conducted by biologists, psycholinguists, psychologists and cognitive scientists (Land & Tatler 2009) and is only rarely used for examining visitors' eye movement behaviour. With MET we can "grasp the (visitor's or) native's point of view, his relation to life, to realize *his* vision of *his* world" (Malinowski 1922: 25, emphasis in original, brackets by the author) in its very literal sense. To grasp the meaning of this emic view we have to combine other methods like cued retrospective reporting. Thus MET can work as a complementary method to other approaches

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[3] Earlier on data analysis only could be done after synchronizing the videos; currently data analysis is even possible online while recording takes places (for example Pfleger Vision MET model in 2015).

and, when used in this way, it can be appropriate for socio-cultural anthropologists who are conducting field research to use.

1.4. Museum Visitors' Movement Behaviour

Immediately following the "turn to the visitor" in museums (Hooper-Greenhill 2006: 362), visitor behaviour became defined as a process of actively engaged in meaning-making, hence learning (Falk & Dierking 2013). The initial prerequisite step to make meaning out of exhibitions is to move through them. How do visitors move around in exhibitions? A considerable amount of empirical research about visitors' movement patterns in and circulation through exhibitions has been carried out since the beginning of tracking studies; however without applying MET.

To date, visitor research has introduced a distinction between the attracting power of an exhibit – defined as the number of visitors who notice it, approach it and stop in front of it – and the holding power of the exhibit – defined as the mean time spent in front of the respective exhibit. Accordingly, researchers generally assume that a longer holding power indicates a more elaborate processing of the exhibit (Robinson 1928; Boisvert & Slez 1995; Serrell 1998).

Further research results about visitor circulation in exhibitions are partially contradictory: Some studies suggest that the disparities between research studies of different exhibitions may be attributed either to the design factors of the exhibitions, or to visitor characteristics. However, they may be attributed to the interaction of design factors and visitor characteristics. Hence the visitors' own agenda plays a crucial role (see Falk, Moussouri & Coulson 1998). Visitor behaviour has been characterized as "free-choice" (Falk & Dierking 2002; Kirchberg & Tröndle 2012), and accordingly, most visitors do not "work through" an exhibition in a comprehensive manner but instead focus on a small subset of exhibits.

By observing visitors in a British Science and Industry Museum, Morris Hargreaves McIntyre (2004) identified four different types of visitor behaviours, which differ both in completeness and elaborateness of the visit: browsers, followers, searchers and researchers. In short, browsers browse through the gallery with "little or no agenda" and want information about selected objects; followers want the museum to provide a narration that they can follow; searchers already have knowledge about the exhibition theme and want to view all of it; and researchers are the experts. In this line from browsers to researchers each type of visitor can

change into the next type (e.g., browsers can become followers and so on) and the proportion of these types concerning the whole population is diminishing.

According to Morris Hargreaves McIntyre (2004) going through an exhibition in a systematic approach means paying attention to nearly all of the exhibits presented. This attentiveness was observed for less than 10% of the visitors, whereas the vast majority showed a much more selective behaviour. Similar results have also been reported by Serrell (1997): In several observation studies in museums and galleries, she found that only a minority of visitors are "diligent visitors" who stop at more than half of the available exhibits. Instead, museum visitors showed a highly selective pattern of attention, stopping at only a fraction of all exhibits, and closely inspecting an even smaller number of them. Thus most visitors only spend about 20 minutes in one exhibition.

Additionally, it has been shown that during the course of an exhibition, visitors tend to be increasingly selective and, at the same time, less involved with the exhibition's content. This phenomenon has been described as museum fatigue and is experienced by museum visitors after only 20-30 min. (Bitgood 2009, Davey 2005).

Regarding these findings visitor researchers asked which strategies lead to such behaviour. Falk & Dierking (2000: 117) conclude that visitors or at least most of them are applying "poorly developed" strategies of appropriating exhibitions properly. In contrast, the interaction approach represented mainly by the American psychologist Bitgood and the American cultural anthropologist Rounds conclude that visitors use appropriate strategies regarding an exhibition visit. Bitgood and Rounds apply principles or rules derived from the Rational Choice Theory (RCT) on visitor movements/circulation.

Bitgood (2006; 2013) applies the General Value Principle derived from RCT in visitor circulation through exhibitions. Thereby the value of an exhibition visit is the result of an unconscious choice between its benefits and its costs (the General Value formula: benefits/costs = value). Therefore, visitor circulation is characterized by the "economy of movement" which means minimizing or 'saving' steps in order to save time and physical energy hence minimizing the costs. Accordingly, visitors tend to pay attention to only one side of a gallery and also tend to walk along the main track, avoiding aisles and backtrack. Exceptions are attributed to other motivations like following a group, landmark objects that trigger more attention, high-interest versus low-interest topics and crowding (i.e., too many people at one place that visitors want to avoid).

Similarly the American anthropologist Jay Rounds (2004) deduces behavioural rules from a special case of RCT namely Optimal Foraging Theory (OFT) as well as from Decision Theory (DT) and Information Foraging Theory (IFT). Derived from these three theories the following formula is applied to exhibition visits: the lower the costs of the exhibit search, the greater the benefits of the exhibition visit wherein exhibits of interest are like food for the hunter- and gatherer-visitors. From DT, Rounds deduces the landscape analogy and defines the exhibition landscape as the "interest landscape" of the hunter-and gatherer-exhibition- visitor. This "interest landscape" has two axes: the horizontal and the vertical axis. The horizontal axis arisen from the arrangement of exhibits whereas the vertical axis arises from the individual interest of the visitor in a single exhibit. Hence the exhibition visit is characterized by the interaction between those two. That is why it is so difficult to arrange exhibits in an equally interesting way for all visitors.

Rounds (2004) defines his rules as being non-explicit, unconscious and hardly communicable by the visitor but rather as being rules in the sense of scripts and schemas. He stresses that they are not specific to the exhibition context but rather are learned in other landscapes that are similar to exhibitions. He declares that these rules are applied as an interaction between the changing environment and changing individual needs.

Rounds classifies his behavioural rules as three types: search rules, attention rules and quitting rules. Search rules are defined as an "initial scanning mechanism" (2004: 401), attention rules are defined as a "stop searching (for the moment) and start attending" (2004: 403) and quitting rules are defined as a "stop attending to a given exhibit element and resume the search" (2004: 405). Unfortunately these rules are not yet empirically proven. Note that I also do not test Rounds rules in detail, just as I did not analyse complete tours through exhibitions. However Rounds states that, in order to prove these rules, the complete visit/the complete circulation within an exhibition must be examined. These rules are difficult to operationalize; for example, the search rule "Follow your nose" means "If it smells good, check it out. If it doesn't, keep moving" (Rounds 2004: 404). How could this rule be operationalized? Furthermore, proving these rules are accurate would additionally require methods that elicit unconscious behaviour.

Rounds (2004: 394) thinks that applying these rules is the appropriate strategy for "wide but shallow" learning that is experienced in museums rather than "narrow but deep" learning experienced in school (more about the museum as a learning environment in *Chapter 2*).

In sum, the interaction approach by Bitgood (2006) and Rounds (2004) states that, since visitors do not have control over the benefits offered in exhibitions (i.e., the design of the exhibition and the level of information provided), they concentrate on their "costs" in order to arrive at an optimal visit.

I want to shed light on some critical aspects of this approach. In particular, 'saving steps' as a principle does not explain every phenomenon encountered in exhibitions. Moreover, it does not account for the most important and distinguishing feature that characterizes a museum exhibition visit in contrast with other forms of information gathering, like watching a movie or reading a book: "strolling and viewing" is the classical way of appropriating exhibitions ("gehen und sehen" Korff & Thiemeyer 2008: 137, cf. Korff 2003). "Strolling and viewing" is the ability to go off and to explore in multiple possible ways and from a number of perspectives. This approach is what makes museum exhibition visits such unique experiences and it is arguably the feature that attracts visitors to museums over other forms of mass media. The agendas that we have set for ourselves during a visit influence our attention (Falk, Moussouri & Coulson 1998) and may override the time that we devote to a particular object as well as the "cost" factor more generally. Alternative explanations of visitor behaviour will have a better basis for discussion after good data is collected on the time spent on particular objects, the fixations associated with an exhibition visit and data from other sources, which together allow for a triangulation of methods as George E. Hein (1998) proposed long ago. That is why, in my study, I triangulate MET with cued retrospective reporting and systematic observation.

Furthermore, the definition of value as serving interests and curiosity necessarily leads to differences between different visitor groups; for example experts and novices probably have different interests and motivations when they view an exhibition. Thus experts and novices probably have different agendas when visiting these museum exhibitions. Moreover, defining value in this way precludes other values, such as the social acts of exhibition visits for example when visitors discuss objects and issues amongst each other.

The attribution of exceptions on landmark objects or high-interest versus low-interest topics also neglects differences between different visitor groups as well as between exhibition makers and visitors. The curatorial agency is insufficiently considered at all, and probably is also hardly verbalizable by the curators themselves sometimes.

Last but not least, the "General Value Principle" in particular and hence RCT in general is not falsifiable because everything can be subsumed under costs and benefits. The   critical

rationalisms by Popper declared that verification does not exist at all and only falsifiability counts (Popper 2007). Thus what is the rationale or insight value of a theory that is not falsifiable?

Furthermore, as a socio-cultural anthropologist, I must criticize Bitgood and the research he is summarizing as being focused on Anglo-Saxon exhibition and visitor cultures. I mistrust these research results and Bitgood's explanations as well as Rounds' deduced behavioural rules; I doubt that they are universally applicable to all museum visitors on this planet. What about people having a geo-centric perception of their environment instead of our ego-centric one? This critique applies to my own research too, and my results (see below) have to be re-tested in other cultural settings as well.

Nevertheless what we can learn from the interaction approach is that orientation plays a crucial role in visitor movement through exhibitions. For example, orientation plays a major role for Rounds' search rule and for the saving steps principle stated by Bitgood. No wonder orientation is a basic need prior to and serving the physiological needs of human beings (Maslow 1954). It will be interesting to discover how and how often visitors apply movement patterns for orientation in exhibitions.

In sum, since decisions for movement patterns are unconscious and hardly communicable an empirical test is difficult. Hence research on movement patterns using MET combined with cued retrospective reporting is probably the best available method for recording unconscious reasons for movement behaviour with the cue of one's own viewing behaviour.

1.5. Digital Guides in Museum Exhibitions

So far, we have concentrated on general visitor behaviour without considering the use of digital media/guides. Without using digital guides, the movement behaviours in exhibitions usually require less eye-hand-coordination, whereas digital guides require more eye-hand coordination. Thus using digital guides presumably must influence the movement behaviour of visitors. Building on this fundamental concept, I will describe the state of art surrounding digital guides in museums exhibitions in this section and analyse the movement behaviour influenced by using digital guides in *Chapters 5* and *6*.

Since Bourdieu, Darbel & Schnapper's comparative studies presented in *The Love of Art (*1969/1997), museums are defined as mass media themselves. However this thesis does not focus on museums *as* mass media. It rather focuses on digital media applied *in* museums.

Media *in* museums can comprise labels, text panels, dioramas, hands-on exhibits, and new digital guides etc. In the last two decades, various types of digital guides have gradually supplemented museum tours, and been offered by museum staff and human interpreters. Such digital guides come in many forms, ranging from traditional audio guides that provide explanations in purely oral form (and are widely handed over by museums and already expected by the visitors) to multimedia presentations on smartphones or tablets that include both oral and written text, pictures and videos (Proctor 2011, Tallon & Walker 2008, Tallon 2006).

According to Tallon & Walker (2008: xviii) these new digital guides are defined by three characteristics: they are "mobile" (accessible at any place and any time), "digital" (electrical-based) and "personal" (controlled by the visitor in her/his unique connection with the guide). Nevertheless, there is no consistent conception of whether these digital guides applied in museums are exhibits themselves or not (Kirchberg 2006). Sometimes digital guides solely provide information, sometimes they are part of the exhibition design and sometimes they become exhibits themselves (Noschka-Roos 2006).

Given the variety of digital guides and despite the huge application of audio guides, hardly any available research about digital guides exists so far. Tallon (2006) attributes this fact to the economic reasons of the companies producing the guides and to many prejudices about digital guides in museums. These prejudices range from audio guides leading to zombie-like behaviour to preventing the aesthetical experiences that traditional ideology imagines museums to provide (Tallon & Walker 2008 quotes Alfred Hickling "Block Beuys", Guardian, November 29, 2004). That is why basic research about visitor experiences with digital guides has begun only recently. For example, one study by Eghbal-Azar, Merkt, Bahnmueller & Schwan (2016) used statistical methods to examine the anonymous user data recorded by the content management system of the multimedia guide 'M3' in the "nexus" exhibition at the LiMo. They assessed which characteristics are influential in exhibit selection within the 'M3' (for more information read *Chapter 6*). Until research like this, research solely focused on percentage of usage of provided digital guides and time spent in exhibition (Tallon & Walker 2008, Falk & Dierking 2008).

Despite the prejudices articulated by art critics and the press, mobile museum guides offer several desirable features from the perspective of the visitor. Most importantly, they allow customization of information and explanation according to the individual needs of the visitor. Customizable options include selection of language, mode of presentation for people with

seeing or hearing disabilities, provision of orienting maps and navigation help, display of relevant additional material for scrutinizing and in-depth exploration as well as provision of games and simulations to increase interest and motivation (Proctor 2011, Tallon & Walker 2008).

However, these desirable features of mobile museum guides can also challenge visitors. In addition to "museum fatigue", "technology fatigue" is a great issue due to several usability difficulties like multimedia guides being too heavy, interfaces being too difficult to handle or audio guides feeling uncomfortable around the visitor's neck. In the end both types of fatigue can merge into a special kind of cognitive overload due to too much information provided by the mobile museum guide (Filippini-Fantoni & Bowen 2008).

Relevant preliminary findings about tablets are currently scarce and more is known about the well-established audio guides. Smith & Tinio (2008) found that visitors seek a balance between guidance and freedom in audio tours regarding art exhibitions; howsoever these audio tours are provided technically. They stated that visitors usually listen to the complete audio guide spot. Therefore, I assume that the length of an audio guide spot probably correlates with the dwell time at an audio guide spot. Furthermore they state that audio guide usage is characterized by the possibility to view the exhibits and listen to the audio guide at the same time whereas otherwise the attention is separated between exhibits and label. Bitgood (2010) also stresses this parallel way of appropriating by looking at an exhibit and listening to the audio guide at the same time as the main advantage of audio guides that do not shift attention by coupling the gaze.

How is this coupled gaze guided? Franklin, Becklen & Doyle (1993) report on the impact of different information provided for exhibits. They conclude that it leads to different cognitive processing but not to different guidance of viewing behaviour.

What about other digital guides like multimedia guides in the form of PDAs, tablets, IPhone, etc? Do they separate again between viewing exhibits and the multimedia guide? As Tallon (2006) adds for consideration label reading also interrupts viewing the exhibit. Filippini-Fantoni & Bowen (2008) summarize research about these new digital technologies, which finds evidence for both focusing on the screen instead of the exhibit and processing the exhibits more elaborately. Furthermore Schwan, Zahn, Wessel, Huff, Herrmann, & Reussner (2008) found that the design of displays influences the learning outcomes in exhibitions and digital guides like tablets can lead to more intense involvement with the exhibition's content.

In sum, so far several studies and evaluations have demonstrated that the use of mobile guides substantially prolonged visitors' stay in the exhibition by increasing exhibits' attraction power (i.e., more visitors paying attention to the exhibits covered by the mobile guide) and holding power (i.e., visitors spending more time in front of exhibits covered by the mobile guide) (Kuflik, Stock, Zancanaro, Gorfinkel, Jbara, Kats, Sheidin & Kashtan 2011; Lanir, Kuflik, Dim, Wecker & Stock 2013). In addition, visitors using mobile guides not only frequently reported higher satisfaction with the exhibition, but also indicated they noticed details that are more relevant and developed a better understanding of the exhibits (Belotti, Berta, De Gloria & Margarone 2002, Helal, Maxson & Ancelet 2013, Kuflik et al. 2011, Mann & Tung 2015, Webb & Mann 2014, Viehöver 2006).

While 'holding power' allows for a crude estimate of elaboration, some observation schemas make finer differentiations with regard to visitors' behaviour in the face of a particular exhibit (Boisvert & Slez 1995, van Schijndel, Franse & Raijmakers, 2010). For example, in the context of science museums, Boisvert and Slez (1995) distinguish between (i) involved time when the visitor stands in front of an exhibit but does not read directions or interact with it,
(ii) positive interaction when the user reads labels or uses an exhibit in a way it is intended to be used, and (iii) instructional time when a visitor has an exhibit explained or discusses the meaning of an exhibit. Thus, according to Boisvert and Slez (1995), looking at an exhibit involves several steps that increase cognitive elaboration, with prior steps being necessary conditions for the following ones, and with the possibility of stopping at every point during the process. Hence, it is only on the third level of Boisvert and Slez's taxonomy that a visitor may decide to access additional information via digital guide.

What exactly happens on this third level? Regarding the variety of technologies, their prototypical existence and the few studies so far, it is hardly possible to find or conclude generalizable research findings overall or regarding ethnographic or literature exhibitions in particular. Unsurprisingly, to the knowledge of this author, no visitor study so far has investigated the influence of digital guides on eye movement behaviours and accompanying cognitive processes. Hence this thesis is presenting the latest state of art.

1.6.   Research Questions, Aims, Applied Methods and Outline

This chapter described (my) reasons for studying visitors as a socio-cultural anthropologist, the main methods in visitor studies and socio-cultural anthropology and the results   of visitor studies, namely the visitors' movement behaviour and their usage of digital   media.

Throughout this chapter, it should be clear that we already know a lot about visitor movement circulation through a gallery on the macro-level, but less about smaller eye movements on the micro level. How do eyes move around in exhibitions? What movements of the head, the trunk and the whole body do they entail? The answers to these questions will be provided in *Chapters 4* to *6*, whereas a complete list of all movement patterns identified by this research will be provided in *Chapter 8* in Table 17 paragraph 8.2.1. Visitors' Movement Patterns: The Complete Master List.

Furthermore, we know very little about the use of digital guides in exhibitions, and even less about how they influence visitors' movements and cognitive processing. How does the usage of digital guides influence movement behaviours and cognitive processing? Do different digital guides like audio guides and tablets influence the visitors' behaviours and cognitive processing differently? The answers to these questions will be provided in *Chapter 5* (audio guide) and *Chapter 6* (tablet-like guide).

As Hooper-Greenhill (1994: 69) already correctly stated "Research and evaluation are often confused". Accordingly, I must clarify that the visitor studies presented in this thesis belong to basic research providing new insights into visitor movement patterns and use of digital guides that are transferable between different kinds of exhibitions rather than to the evaluation or assessment of the presented exhibitions. Hence the objective of this thesis is *not* to evaluate whether the visitors 'got the message' of the exhibitions, although I will provide some incidental hints about this later. Additionally the objective of this thesis is *not* to evaluate the digital guides provided in these exhibitions, although I will provide some incidental hints about this as well. The objective *is* to provide a detailed description of movement patterns and the associated cognitive processes as well as the use of digital guides. Through these descriptions, this thesis will provide new innovative results about museum visitor behaviours on the micro-level of eye movements thus filling the gaps in the current literature. In the end, building on this empirical basis, design suggestions are presented for creating visitor-centred exhibitions in hopes that exhibition makers can gain useful information about which design option they want to choose.

Therefore this thesis has several aims led by a new cognitive science approach in visitor studies that combines anthropological and psychological theories and methods:

1. *Chapter 2* aims to introduce three main concepts and terms: firstly, the "concept of affordance" by Gibson (1979); secondly, the latest notion of appropriation of museums by visitors; and thirdly, the widely applied term of museum experience.

These three concepts and terms shall help to understand the results of this research and contextualize them within the latest theoretical concepts. Furthermore the field of the respective museums and their exhibitions, namely ethnographic and literature museums, will be introduced in general.

2. *Chapter 3* aims to describe the research fields. It provides a detailed description of the two exhibitions "South Sea Oases: Life and Survival in the Western Pacific" at the Linden-Museum in Stuttgart and the "nexus" exhibition at the LiMo in Marbach a. N. through floor plans, laying lists, photographs of each exhibit and original texts of the exhibition and their guides. These descriptions provide bases for the reader to contextualize the results within their research setting and transfer the results to other exhibitions.

3. *Chapter 4* investigates distinct, recurrent and systematic movement patterns due to particular "affordances" (Gibson 1979) in the exhibition design or the exhibit characteristics that are identified in the first study in the "South Sea Oasis: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart. Therefore the recent method of MET will be applied and combined with cued retrospective reporting to determine the goal of visitors' attention and the meaning of the movement patterns without focusing on learning outcomes but instead focusing on learning processes. A minor aim was to investigate the differences between experts and novices.

4. *Chapter 5* validates the identified movement patterns found in the first MET study by applying a completely different method, namely systematic observation, to study the same exhibition. This validation is performed to triangulate the study. Another substantial aim is to analyse the influence of digital media on these movement patterns. In this case the digital medium is an audio guide in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. According to Tallon (2006: 5) future research about audio guide should investigate whether "audio tours allow the viewer to be active". Hence, I will analyse carefully whether audio guide usage leads to more active behaviours in the sense of more quantitatively performed eye movements that can be identified.

5. *Chapter 6* uses MET to validate the movement patterns found at the Linden-Museum in Stuttgart exhibition in a second, different exhibition – the literature exhibition "nexus" at the LiMo in Marbach a. N. It investigates whether these patterns are transferable in a different exhibition setting. In comparison to the influence of audio

guides on the distinct, recurrent and systematic movement patterns, I will also investigate the influence of the tablet-like multimedia museum guide 'M3' in the "nexus" exhibition at the LiMo with regard to the differences between these two digital guides. Furthermore, I will look for further distinct, recurrent and systematic movement patterns that are linked to this different exhibition with its different guide. Investigating the differences between experts and novices is a minor aim also discussed in this chapter.

6. *Chapter 7* critically reflects on the applied methods concerning their potentials, limitations and prospects in visitor studies and in socio-cultural anthropology as well as in regard to the reactions they trigger. Besides MET, cued retrospective reporting and systematic observation, I wrote field diary notes during the whole research process; I conducted interviews with the curators and documented the exhibitions. All methods were connected into a multi-angulation approach. The combination of these methods is truly a new cognitive science approach in visitor studies and socio-cultural anthropology requiring more effort of time and money. Thereby I also hope to this thesis will help anthropologists and other social scientists engaged in field research make an informed decisions about whether and how to apply MET-technology in their future research studies.

7. *Chapter 8* summarizes the research results; concludes with a discussion about the application of the theoretical terms "affordance", appropriation and museum experience; and presents a master list of all 26 movement patterns that were identified in both exhibitions. Furthermore it presents conclusions about the influence of digital guides in exhibitions. This chapter also summarizes design suggestions based on this visitor research and anticipates the future of digital guides in exhibitions. It anticipates the future of MET in visitor studies and socio-cultural anthropology, this new cognitive science approach in visitor studies and future visitor studies.

2. Affordances, Appropriation and Experience in Museum Exhibitions

What theories, concepts and terms could help to investigate these research questions? What is the field of museum exhibitions? This chapter will introduce the "theory of affordances" by Gibson (1979) as the main theory that forms the basis of my research questions and aims as well as the widely applied key terms like 'museum experience' and 'appropriation' (although the term appropriation is used here from a visitor perspective rather than from the traditional museum perspective regarding the objects). Finally, the field sites, museums and museums exhibitions in general as well as ethnographic and literature museums in particular, will be introduced in preparation for the detailed description of the two respective exhibitions: the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart and the "nexus" exhibition at the LiMo in Marbach a. N. presented in *Chapter 3*. However, as one chapter is not much for all these issues, this chapter can only give a flavour of them.

2.1. Affordances in Museum Exhibitions

The term "affordance" is a derivation of the verb "to afford" which means "able to have or do" and was coined by the ecological psychologist Gibson (1979: 127). Hence, for example a chair is perceived as to be "sit-on-able" (Gibson 1979: 128). Gibson's "theory of affordances" (1979) established a new ecological approach to visual perception at his time. Gibson (1966: 285) defined affordances as "properties of the environment relative to an animal" and thus affordances lead the behaviour of the animal (Sheehy 2004).

Gibson's theory of affordances is based on "the foundational Gestalt perceptual principles of figure/grounds" and "direct perception" (Jenkins 2008: 36) as well as "direct knowing" (Jenkins 2008: 37). It is derived from the particular concepts of the Gestalt psychologists Koffka (1935: "demand character") and Lewin (1969: "invitation character"). Koffka (1935: 7) defines his concept of "demand character" as follows: "Each thing says what it is….a fruit says 'Eat me'; water says 'Drink me'; thunder says 'Fear me'; and woman says 'Love me'". Furthermore Gibson (1979: 138) summarizes the sentiment as follows: "The postbox 'invites' the mailing of a letter". The concepts of Koffka and Lewin implicate a strong interdependency or interaction (Jenkins 2008: 36, 38) or "complementarity" (Gibson 1979: 127), "reciprocity" (Jenkins 2008: 34) or "relationship" (Norman 2013: 11) between the environment and the

perceiver. This interdependency was originally defined to be so strong that the character of environmental objects can change if the needs of the perceiver change. Although Gibson also takes the interdependency between environment and the perceiver into account, he states that the character of objects always exists, whether it is perceived or not and even if the temporary needs of the perceiver change:

> "The affordance of something does *not change* as the need of the observer changes. The observer may or may not perceive or attend to the affordance, according to his need, but the affordance, being invariant, is always there to be perceived. An affordance is not bestowed upon an object by a need of an observer and his act of perceiving it. The object offers what it does because it is what it is" (Gibson 1979: 138-139).

Furthermore Gibson's theory of affordance does not rely on phenomenology like previous Gestalt principles:

> "For Koffka it was the *phenomenal* postbox that invited letter-mailing, not the *physical* postbox. But this duality is pernicious. I prefer to say that the real postbox (the *only* one) affords letter-mailing to a letter-writing human in a community with a postal system" (Gibson 1979: 139).

Thus, Gibson integrates the cultural system as one part of the all-embracing environmental system and does not separate between nature and culture as he does not separate between object and subject. Like the Gestalt psychologists he wants to overcome false dichotomies and perceives them as being polarised (Jenkins 2008: 39), hence according to Gibson (1979: 129):

> "An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer".

Hence exhibition visits that are part of our cultural system (at least for some parts of our society) are also part of the environment. Moreover Gibson (1979: 129) himself compares architecture with ecology:

"In architecture a niche is a place that is suitable for a piece of statuary, a place into which the object fits. In ecology a niche is a setting of environmental features that are suitable for an animal, into which it fits metaphorically".

Consequently the theory of affordance can be applied to architecture and design. Norman made "affordances" known for the very first time in the history of design in the first edition of his book formerly named "The Psychology of Everyday Things" (1988) now renamed "The Design of Everyday Things" (2013). Norman (2013) wanted to overcome bad or poorly developed design by understanding human perception and behaviour because he believes that the users are not to blame. That is why he seeks a human-centred design. Hence the theory of affordance can be applied in exhibition design and thus visitor studies as well. Gibson (1979: 137) himself even provides examples for design factors:

"Note also that a glass wall affords seeing through but not walking through, whereas a cloth curtain affords going through but not seeing through. Architects and designers know such facts, but they lack a theory of affordances to encompass them in a system".

By conducting interviews with the curators of the respective exhibitions, I learned that both curators more or less know about the influence of design factors on visitors' behaviours but they lack a comprehensive system of design factors and their affordances. This thesis aims to provide such an often-lacking conscious system based on the theory of affordances for exhibition designers and curators. It aims to overcome bad or poorly developed exhibition design because, as I demonstrated in *Chapter 1*, the visitors are not to blame. That is why I seek visitor-centred exhibition design.

Therefore I want to transfer Gibson's definition of affordances as being "properties taken with reference to the observer" (1979: 143) into "exhibition design properties with reference to the visitor" as Chemero (2003: 187) would have put it and introduce some examples of possible affordances, thus "perceived action possibilities" (Jenkins 2008: 34), in exhibitions.

Starting with Gibson's examples of a chair and a glass wall, I must note that within an exhibition chairs have to be differentiated into "exhibited chairs" and "provided (most often folding) chairs" for visitors. Both types of chairs can be perceived as "sit-on-able" and therefore "exhibited chairs" are often exhibited behind a string or covered by a sign: "Don't touch". The string/the sign changes the affordances of the exhibited chair. In contrast, provided chairs are actually meant to be "sit-on-able". If we combine Gibson's theory   of

affordance with Barker's (1968) "behaviour setting theory", it becomes clear that behaviour onto affordances is context-dependent. Note that Barker's concept also was based on Gestalt psychology, as he was a student of Kurt Lewin (Jenkins 2008: 35).

Gibson's second example, the glass wall, is most common in exhibitions in the form of glassy display cabinets. As Gibson correctly concludes, visitors do not perceive them as "walk-through-able". They are "see-through-able", although from a defined distance. Do visitors treat these glass walls as a limitation of perceiving? To what extent do glass walls restrict movements and for whom? I will show in *Chapter 4* that glass walls are not limiting perceptions but rather lead to more and a broader range of movement patterns especially for experts.

Norman (2013: 11), who also refers to the glass example, defines the limitation of walking through glass as an "anti-affordance – the prevention of interaction". According to Norman, the glass limitation of movement may not be perceived; hence birds and human beings sometimes crash into windows and glassy doors. Thus Norman elaborates on the theory of affordances for designers by introducing a further term: "signifiers". Signifiers are needed when affordances are not perceivable. Then signifiers tell us what we can do and where. Thus the string around or the sign attached to the exhibited chair mentioned above is rather a signifier.

Furthermore, in regard to exhibitions, we have to differentiate between front-glass display cabinets that are see-through-able only from one side and display cabinets entirely made of glass that are see-through-able from all four sides or at least more than one side. Do these different display cabinets afford different movements? What about glass shelves within such display cabinets? Which further affordances do they evoke? I will demonstrate in *Chapters 4* and *6* and I will summarize in *Chapter 8* that there is a difference between front-glass display cabinets and display cabinets made completely of glass. The action possibilities multiply with multiple glass walls and shelves.

In contrast to glass walls of display cabinets, some exhibits are presented freestanding without glass walls around them. Most often these freestanding exhibits are presented behind strings or on a platform. Presented on a platform exhibits can be approached closer than behind a glass wall or a string. Which further movements do they afford? What are the differences in visitor's movement patterns between display cabinets with glass walls and freestanding exhibits on platforms? I will demonstrate in *Chapter 4* that some movement patterns are only occurring at freestanding exhibits. In contrast other movement patterns that firstly seem to be

characteristic for freestanding are even more often performed at display cabinets due to the limitation of the glass wall that seems to provide security in movement.

Whether exhibits are presented in display cabinets or freestanding, they can be presented in a homogenous way with similar kinds of exhibits or in a heterogeneous way with different kinds of exhibits. How does a homogenous or heterogeneous presentation afford movements? Are there differences in movement behaviour between these two forms of presentation? I will demonstrate in *Chapter 4* that museum fatigue is a matter of homogenous presentation and that heterogeneous presentation leads to more active movement behaviour and a deeper level of cognitive processing.

Whether exhibits are presented in display cabinets or freestanding, they can be presented hanging or lying. How do lying or hanging exhibits afford movement behaviour or rather which movement behaviour possibilities do they entail? These questions will be answered in *Chapters 4* to *6*. At this point, I want to mention that hanging exhibits lead to one particular movement pattern that is performed to view the exhibit from different perspectives no matter if it is put in a display cabinet or freestanding.

Thus, Gibson's theory of affordances is still up to date in research about visual attention, although it is from the late 1970s. Duchowski (2003: 6) summarizes Gibson's work as still relevant to the design of eye tracking research as Gibson's work is relevant for the aspect of "how" to perceive the world. This "how to perceive" the environment is also stressed by Gibson (1979: 128) himself instead of "where" one lives in the environment.

Although Gibson's theory of affordances is still considered current, two major critiques have been offered against it: Firstly, it lacks a clarification of how "direct perception" works (Jenkins 2008: 37). Secondly, learning is not sufficiently considered (Gibson 1966: 285, Jenkins 2008: 39). Nevertheless, Gibson's theory of affordances is striking and innovative because previous and current psychological theories of information processing lack a particular psychological explanation of their own that is not borrowed elsewhere like the computer analogy (Jenkins 2008: 38-40).

Taking Gibson's theory of affordances into account is not new in visitor studies: Wineman & Peponis (2010) and Tröndle (2014) applied it. Tröndle (2014: 14) finds evidence "that the affordance of the museum environment strongly affects visitor movement" through an art gallery. Thereby "Positioning seems to have more impact than the artist's reputation or the image itself" (Tröndle 2014: 13).

Nevertheless, these two examples apply affordances differently than I do. Wineman and Peponis (2010) mentioned the term explicitly in the headline of their article (*Constructing Spatial Meaning: Spatial Affordances in Museum Design*) but they neglected to explain the theory of affordance more deeply and hence missed the chance to appreciate the whole value of the theory of affordance for visitor movement behaviour. Anyway, their research of movement behaviour is concerned with the macro-level of circulation or locomotion through an exhibition rather than on the micro level of eye movements at particular exhibition sections.

Tröndle (2014) not only mentions the term explicitly in the headline of his article *Space, Movement and Attention: Affordances of the Museum Environment* but also explains the concepts of Lewin (1936), Barker (1968) and Gibson (1979). Like Wineman & Peponis (2010), he applies these concepts to the macro-level of circulation or locomotion through an art gallery rather than on the micro level of eye movements at particular exhibition sections. Furthermore he uses body tracking instead of MET, hence the exact eye movements are missing. His results rely upon only one single study, which makes it difficult to draw any generalizations. Finally, yet importantly, my research is based on further theoretical terms beyond affordances like the terms "appropriation" and "museum experience".

2.2. Appropriation in Museum Exhibitions

Usually, if one speaks about appropriation concerning museums and especially about archaeological or ethnographic museums, one speaks of the cultural appropriation of objects by the museum. Hence, ethical concerns have to be considered carefully (Young & Brunk 2012).

For example, if you conduct a Google search for "appropriation in museums", you can find 434,000 results and about 42,600 papers and books linked via Google Scholar (received on 07 October 2015). Ordered by impact the very first Google Scholar result is the book *Museums and the Appropriation of Culture* edited by Susan Pearce, the Professor Emeritus of Museum Studies at the University of Leicester, in 1994. Several authors contributed papers to this book commenting on various aspects of appropriation of culture by museums. In particular, Mary Beard and John Henderson (1994) comment on the multiple forms of appropriation by the museum concerning the objects and their histories. Their comments are based on   the

exhibition *The Exhibition?* curated by these two authors themselves. This exhibition calls into question the appropriation of culture by museums. I chose this article as an example because the authors work through the term appropriation in their exhibition and thus in their article. In the end Beard and Henderson (1994: 40) ask "Are visitors passive consumers who put themselves at the disposal of regimes of display? Do museums occasion particular sets of cultural behaviour?" However like many others, they do not shed light on the multiple forms of appropriation of the museum by visitors.

In this thesis, I want to shift our attention to the active appropriation of museums or rather exhibitions and their exhibits by the visitors. This aspect has been widely neglected so far and rather seldom considered and defined as a performative act of further appropriation. What do I mean by appropriation of exhibitions and their objects by visitors? I want to label the "rolling and strolling" (Korff & Thiemeyer 2008) of visitors through exhibitions and the accompanying cognitive processes as a kind of further appropriation that is based on the previous appropriation by the museum. It entails the collecting of objects, the selection for display in exhibitions and the presentation practice or design of exhibits in exhibitions as Beard and Henderson (1994) described it. By "rolling and strolling" through exhibitions visitors are appropriating exhibitions with their entire body (trunk, head and eyes) and person including their physical, psychological and cognitive knowledge. Anthropology calls this "embodied knowledge" (Scheper-Hughes 1994) or "embodiment" (Csordas 1990).

In regards to embodiment, we have to refer also to the concept of "habitus" by the French sociologist and anthropologist Pierre Bourdieu (1977). Originally the term habitus was the Latin translation by Thomas Aquinas of Aristoteles' term 'hexis' which can be described as a disposition to a certain activity or character. The term was also applied by Durkheim and is nephew Mauss (Wacquant 2011).

Bourdieu's concept of habitus is based on Mauss' (1973) concept of habitus as illustrated in his essay *Techniques of the Body*. According to Mauss, the habitus is learned and differs "between societies, educations, properties and fashions, prestiges" (1973: 73); hence, habitus also differs between sex and age (1973: 76-77). Mauss and Bourdieu differentiate between habit and habitus in similar ways (Crossley 2013). Bourdieu (1977: 218, note 47) thinks of the "habit as a mechanical assembly or performed programme". Hence, a habit is "mechanical behaviour" (Crossley 2013: 139) or rather a "mechanical concept" (Crossley 2013: 140), whereas the habitus is rather a learned body technique like swimming (Mauss 1973).

Furthermore, according to Mauss habit refers to differences between singular persons whereas the habitus refers to differences between social groups (Crossley 2013).

Hence Bourdieu describes the habitus as a class-specific practice connected to the social sense ("le sense pratique") which encompasses all other senses of the body and beyond of the social agent. Thus, habitus is embodied by the social agent and is complementarily practiced by its body in the way someone walks or talks (Bourdieu 1977 and 1990; Schwingel 1995/2003). The habitus is formed by the incorporated or embodied dispositions of perception schemata, cognition schemata (everyday knowledge, ethos and taste) and behaviour schemata. The agent is socialized or enculturated in this schemata and the social agent is constantly reproducing by applying his/her socially learned and determined habitus in his/her social practice (Schwingel 1995/2003). Thus, the habitus is experienced by the social agent as something naturally given (Bourdieu 1977 and Bourdieu, Darbel & Schnapper 1969/1997). Hence, the habitus and the social "field" are not taken as dichotomies but as being complementary to each other (Schwingel 1995/2003) similar to how Gibson and the Gestalt theorists (mentioned above) consider polarised parts instead of dichotomies concerning the subject and its environment.

However, habitus does not determine the social practice itself but rather the limits of optional ways of practice. To put it differently, the habitus determines how the social practice is individually performed. The access to the different forms of "capital", which are economic, social, and cultural capital, defines the lived way of social practice. Hence, habitus can validate itself and the class specific field or transform itself into other kinds of habitus and hence transform the field as well (Schwingel 1995/2003).

Bourdieu et al. (1969/1997) in *The Love of Art* present a famous example of the habitus or more precisely "cultural practice" determined by the access to cultural capital. Bourdieu et al. (1969/1997) conducted comparative visitor studies in France, Greece, Holland, Poland and Spain. They conclude that across all these nations higher social classes who already possess more cultural capital through schooling visit museums more often, despite the fact that they are public institutions. Like museums, schooling also reproduces the social class inequality in education, and through the habitus of their social class. Hence, *The Love of Art*, thus taste, is learned "by habit and exercise" (Bourdieu et al. 1969/1997: 109) that leads to a second "cultivated nature" (Bourdieu et al. 1969/1997: 110), hence nurture. Thus museum visitors usually learn how to move and appropriate through exhibitions "by habit and exercise" of their higher educated social class.

The habitus is automatically performed; normally the habitus is not put into question and is rather unconscious because it is experienced as something naturally given (Schwingel 1995/2003). As has been mentioned movement patterns are also automatically performed and are unconscious to the performer. Thus movement patterns can be considered part of a museum visitor's habitus and thus as a particular kind of embodied appropriation of exhibitions. Therefore, future research has to prove whether the movement patterns of visitors identified in this research are culturally different.

Embodiment is not only considered by social scientists but also by cognitive scientists (Gallagher 2005, Varela, Thompson & Rosch 1991, Gibbs 2006). According to Gibbs (2006: 1) "Embodiment in the field of cognitive science refers to understanding the role of an agent's own body in its everyday, situated cognition". This current thinking of interdependent mind-body relationship wants to overcome the distinction between body and mind rooted in the ancient Greek philosophy that is still common in "Western" sciences. The embodiment approach wants to overcome the stimulus-response theories and stresses the interaction of the body, the mind and their environment. Hence, perception relates to the actual behaviour while something is being perceived. This idea is not new. Former leading thinkers include the philosopher John Dewey in the 19th century and the psychologist James J. Gibson in the 20th century mentioned above (Gibbs 2006). John Dewey (1896: 137-138) claimed that:

> "In a certain sense, it is the movement which is primary, and the sensation which is secondary, this movement of the body, head, and eye movements, determining the quality of what is experienced. In other words, the real beginning is with the act of seeing; it is looking, and not a sensation of light".

This qualifies previous statements about eye movements and perception described in *Chapter 1*. Hence eye movements and cognitive processes about the perceived objects are more intertwined than previously assumed. Gibbs (2006: 64) puts this more directly: "Object perception is not an event that happens to us; rather it is something that we do by looking at the object". Hence, perception is rather actively conducted by means of eye, head and body movements. Thus, eye, head and body movements are part of an active appropriation of exhibitions and exhibits.

In sum, when I say "appropriation of exhibitions by visitors", I mean the active embodied appropriation of exhibitions by the visitor who performs particular movement patterns. Thus, this appropriation mediates between the affordances of exhibitions and the exhibition

experience. This appropriation is connected with the exhibition's affordances or rather is based on them and leads to a particular exhibition experience. Hence, my term of appropriation is complementing the interconnected triad of affordance, experience and appropriation.

How exactly do museum visitors actively appropriate exhibitions? What kind of movement patterns do they apply for this active appropriation? Before I present my research results in *Chapter 4*, *5* and *6*, here some previous classifications of movement patterns by other scientists shall be introduced as a useful point of departure.

The cultural scientist Aleida Assmann (1995) and the sociologist Heiner Treinen (1988) already identified two major movement patterns: the "long gaze" (der "lange Blick") by Assmann and "cultural window shopping" ("kulturelles window shopping") by Treinen. Whereas Aleida Assmann's term belongs to the general reception of objects in the world, Heiner Treinen's term actually refers to museum visitor behaviour. Nevertheless, both terms belong to the same state of consciousness that characterizes museum visits: aesthetic contemplation.

Aleida Assmann (1995: 240-242) differentiates between the "quick look" and the "long gaze". Assmann bases these two different ways to look at the world upon the idea that the world can be read as a text. The "quick look" at the world means "reading" the signs of the world and hence transforming the world into knowledge about the world. The "long gaze" is defined as staring ("gazing") contemplatively at the materiality of the world without reading it and hence without transforming it (into knowledge). It is characterized by "suddenness" ("Plötzlichkeit"), subjective un-knowing and "ecstasy" ("Ekstase") (Assmann 1995: 248). Hence, the "long gaze" can be described as a "fascinated gaze" ("faszinierte(r) Blick") (Assmann 1995: 249).

Treinen's (1988: 33) term of "cultural window shopping" is an exemplary movement pattern of what he calls "active snoozing" ("aktive(s) Dösen"). According to Treinen (1988: 33), most museum visitors are looking for amusement ("Zerstreuung") in museums compared to watching television. Hence, "active snoozing" lets visitors stroll around exhibitions like they stroll around towns where they are "Window Shopping" in the malls. It seems the only difference is the cultural aspect of museums. Visitors consequently do not learn much new knowledge just by "cultural window shopping" museum; instead they search for the confirmation of their previous knowledge. Thus, Treinen is critical with the notion of museums as learning settings.

Further movement patterns were already identified by the pioneering exploratory MET study of Mayr et al. (2009). Firstly, they (2009: 116) already reported behaviour that "serves as initial selection of information and visual search" and that "During early processing stages, pictorial information or text is quickly skimmed and scanned, so that a viewer gets the gist of a scene very quickly". These eye movements serve to orientate oneself and get an overview of the display. Secondly, they report on fixations that "alternate" between exhibits (Mayr et al. 2009: 193-194), a phenomenon that I will call "alternating gaze" later.

Thus, these examples of movement patterns "long gaze", "cultural window shopping", "alternating gaze" and gazes for orientation and overview are the starting point of my MET quest for movement patterns of museum visitors. I will demonstrate in *Chapters 4* and *6* that my MET studies also validate these movement patterns. In sum, the research presented in this thesis identified 26 movement patterns including these. A complete list of all these movement patterns is presented in *Chapter 8* in Table 17 paragraph 8.2.1. Visitors' Movement Patterns: The Complete Master List.

Mayr et al. (2009) conducted their exploratory MET study in "a small exhibition about nanotechnology" (2009: 191-192), providing "first insights into informal learning in museums" (Mayr et al. 2009: 195) at the Knowledge Media Research Centre in Tuebingen, Germany. However, Mayr et al. neglect that visitors are not simply "integrating information that is spatially distributed" (p. 190) but are engaged in what could be called "appropriating" the exhibition. Appropriating exhibitions means that visitors are not only gathering information but also actively looking for an emotional and aesthetic experience (Hein 2000) in a particular social setting (Falk & Dierking 2013). Now let us have a closer look at visitors' experiences in museum exhibitions.

2.3. Experience in Museum Exhibitions

First, to speak of "experience" in the context of museum exhibitions should not be taken for granted. We only recently speak of "museum experience" due to the shift to a constructivist approach to museums that defines knowledge and truths as always something constructed and hence revises the museum tasks. One of these revised museum tasks is to provide experiences for visitors via authentic objects (Hein 2000). Hence, contemporary museums "feature objects as means to experience rather than as ends in themselves" (Hein 2000: 71) and hence

contemporary exhibitions shift "from (exhibiting) objects used as evidence to objects that evoke experience" (Hein 2000: 79; addition in brackets by the author of this thesis).

Secondly, the museum experience is defined has something all comprising; hence, it is defined as a "gestalt" (Falk & Dierking 2013: 173-194) and is therefore considered as a holistic experience. Thus according to Falk & Dierking (2013: 192):

> "Many aspects beyond the museum's exhibitions, programs, and media influence the visitor's experience, including parking, restrooms, shops, and food service. Unlike most museum professionals, visitors do not view these aspects of the museum as separate functions; the visitor sees the museum as a seamless whole".

Furthermore, it is not only reduced to the actual museum visit but it also comprises the time before and after the visit; hence, the reasons (be)for(e) visiting and the processing of the experience of the actual visit afterwards belong together (Falk & Dierking 2013). According to Falk & Dierking (2013: 33), "The Museum Experience can be understood using the Contextual Model of Learning" that they established in 1992 then called the "Interactive Experience Model". The "Contextual Model of Learning" comprises three contexts that are interconnected with each other over time: (i) the personal context, (ii) the sociocultural context and the (iii) physical context.

(i)   The personal context entails "prior experiences, interests, knowledge, beliefs and values" (Falk & Dierking 2013: 33) of the single visitor.

(ii)   The sociocultural context refers to the museum as a "societal institution" (Falk & Dierking 2013: 33) and the socio-cultural character of a museum visit.

(iii)   The physical context comprises the building, the exhibitions with their exhibits and the provided information in the form of labels and media, etc.

In sum, "Whatever the visitor does focus on is filtered through the personal context, mediated by the sociocultural context, and embedded within the physical context" (Falk & Dierking 2013: 30).

Thirdly, one can also define the visitor's experience in museums as incorporating the following aspects of experience: (i) learning, (ii) aesthetic, (iii) (more or less) multisensory, (iv) bodily, (v) emotional, (vi) social and (vii) entertaining. These aspects are not separated but rather intertwined with each other. For presentation purposes, these aspects are described

separately. The descriptions shall only provide a flavour of the several museum experience aspects; otherwise, the descriptions of these aspects would go beyond the scope of this chapter.

(i)   Learning experience:

Museums and exhibitions are defined as informal learning settings in contrast to formal learning settings in schools and universities (Schwan 2015). Thus, Falk & Dierking (2002) define learning in museums as "free choice" learning that depends on the free will of the learner in contrast to the will of the teacher; hence, free choice is connected to intrinsic motivation in contrast to extrinsic motivation. Therefore, Rounds defines learning in museums as driven by a curiosity that aims at "wide but shallow" learning in contrast to "narrow but deep" learning in formal learning settings. According to Schwan (2015) the actual learning situation within an exhibition can be modelled as more or less formal or informal depending on formalisation factors like visits as part of school groups or as part of guided tours. Hence, the concrete learning situation in museum exhibition is a rather mixed form depending on the concrete learning process, setting, aims and content.

How can learning in museums be investigated? Visitor research changed in a similar way to the change of the psychological definition of learning from result and effects to process (Schwan 2015). This change is also connected to the shift from behaviouristic visitor research to constructivist visitor research (Kirchberg 2010). Within this shift, new research methods are applied like MET combined with verbal reports (Mayr et al. 2009, Eghbal-Azar & Widlok 2013, Filippini-Fantoni et al. 2013).

My research also focuses not on the concrete learning outcomes of the museum visits but instead on the learning processes that go along with the appropriation of exhibitions and exhibits by distinct, recurrent and systematic eye, head, trunk and body movements.

(ii)   Aesthetic experience:

Visitor researchers who focus on the learning aspect of the museum experience often tend to neglect the aesthetic experience of exhibitions that cannot be evaluated in terms of

information processing as in Mayr et al. (2009). This has often been criticised by my colleagues from the *Knowledge & Museum* project. However, what exactly is an aesthetic museum experience? The philosopher Hilde Hein (2000: 131) provides a concrete answer:

> "The merit of aesthetic experience is that its value is taken to be intrinsic. It is an end in itself, enjoyable without reference to further consequences, complete within itself".

It involves a contemplative state of mind. Art museums are the prototype for such aesthetic experience but the wave splashed over to other museums and thus not only literature but also ethnographic museums recently focus on aesthetic experiences although these other museums provide a different kind of aesthetic experience (Hein 2000). My research does not focus on aesthetic experiences, although I will present one example in the last chapter.

(iii)   Multisensory experience:

Museum experiences can be multisensory experiences depending on the exhibition design (Levent & Pascual-Leone 2014). Of course, primarily because we mainly view exhibitions, the most applied sense is the visual sense. However we also hear and listen to other museum visitors, audio guides, spots for music examples, etc., which influence the museum experience. Due to the shift to more hands-on exhibits, the haptic sense also becomes more applied and the sense of smell belongs to this multisensory experience of exhibitions. Exemplary evidence for this multisensory experience and the influence of other senses on the visual sense will follow in *Chapter 8.* This section will demonstrate that MET combined with cued retrospective reporting also interweave the senses by providing hints for the use of senses beyond vision.

In sum, we stroll through exhibitions with our complete body including all our senses. Although vision is the dominant sense and the one I mainly focus on in this research.

(iv)   Bodily experience:

As the museum experience is a multisensory experience, the museum experience is also a bodily experience, because visitors stroll through exhibitions (Korff & Thiemeyer 2008) with

their complete body including all senses and the mind. That is why embodiment plays such a crucial role in a museum (learning) experience like I described above in the section about "appropriation".

This bodily aspect of the museum experience is taken seriously in my research as I am not only focusing on eye movements but also on the head and body movements that visitors make when strolling through the three dimensional exhibition space.

(v)   Emotional experience:

Watson (2015) summarizes the current state of art that emotions and cognition are intertwined in human beings. She points out that museums are creating emotional experiences through design, the use of media, objects and narrative stories. She states that research has only recently investigated the emotional aspects of the visitors' museum experience. Until then "Emotions have been strangely neglected in the theory and practice of museums and galleries" (Watson 2015: 286).

Much of the visitor research focusing on emotions is concerned with the role of emotions in learning (Falk & Dierking 2002 and Falk & Gillespie 2009 quoted by Watson 2015: 286). Only very recently has the emotional aspect of aesthetic experience of artworks been researched. This investigation was performed by the project "Emotion: Mapping the Museum Experience" (http://www.mapping-museum-experience.com/) in an integrated methodology by *Merging Movement Tracking, Physiology, and Psychological Data* of specific artworks (Tröndle et al. 2014).

As the reader will see later on that the instruction for visitors' reporting in my visitor research also clearly solicited reports about the feelings visitors' felt while they were viewing the exhibition.

(vi)   Social experience:

Emotions can be shared with others. We stroll through exhibitions not only with our own body but also with the companionship of others, like friends and family members or foreigners like other museum visitors or museum staff members. Hence, the   museum

experience is defined as a social experience (Falk & Dierking 2013). This social experience entails the possibility to talk about the exhibition with each other which leads to better information processing and hence to better learning effects (Falk & Dierking 2000).

As will be shown, the social aspect is also valid in the movement patterns of visitors but apart from that, the social aspect was neglected in my visitor research due to reasons of practicability.

(vii)   Entertaining experience:

This social museum experience cannot only be educational it can be also entertaining in exhibitions themselves, in guided tours, in workshops and other events. As we just learned according to the "Contextual Model of Learning", learning in museums is not only reduced to the exhibition visit (Falk & Dierking 2013). Thus, the educational role of museums also enhances guided tours and events as well as the creation of these (Hooper-Greenhill 1999). Hence, the museum experience can be defined as an experience that is characterized by a mixture of education and entertainment. Museums are places of *edu*tainment, which is why education and entertainment in museums should not be a question of either/or but rather should be one incorporating agenda of the exhibition makers (Falk et al. 1998). According to Falk et al. (1998: 117-118), "education and entertainment should not be viewed as mutually exclusive motivations for coming to a museum but rather as complementary aspects of a complex leisure experience".

My research focuses on the edutainment aspect of the museum experience provided by digital guides. In sum, my research contributes mainly to the learning aspect of the museum experience focusing on the visual sense that is incorporated in the whole visitor body that strolls through exhibitions, thereby concentrating on single visitors and not on groups. It focuses only on the emotional experience. Furthermore, this research contributes to the edutainment of visitors through digital media.

Where exactly is this holistic multifaceted museum experience gained? What is the field of museum exhibitions and of my audience research exactly? A general introduction into the field is provided in the next paragraph.

2.4. Museum Exhibitions

After describing the affordances, appropriations and experiences in museums exhibitions, I want to briefly define museums and museum exhibitions. Furthermore, I introduce the two types of museums that are relevant for my research: ethnographic museums displaying Oceania in Germany and historico-cultural literature museums in Germany. This knowledge shall prepare the reader for the detailed description of the two research settings "The South Sea Oases – Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart and the "nexus" exhibition at the LiMo in Marbach a. N. presented in *Chapter 3*.

2.4.1. Museums and Museum Exhibitions

According to Anke te Heesen (2012), the origin of the museum can be placed in different periods depending on the aspect you want to stress. Stressing the long history of this institution, the term "museum" is derived from the Greek term "Mouseion" which means a temple for the Muses, the goddesses of arts in Greek mythology. Hence, a museum is a building for the study of arts. Stressing the scientific aspect, the history of the museums starts with the cabinets of arts and wonder in the Renaissance (cf. also Macdonald 1998). Stressing the opening to the public, the history of museums starts in the second half of the 18th century. In the 19th Century, when the museum landscape was formed as we know it today, the academic disciplines at universities and the respective museums had a strong connection (Hartung 2010). Currently our project *Knowledge & Museum* or the Humboldt-Forum in Berlin try to reconnect them again.

Let me briefly indicate that this thesis is about museum exhibitions in the sense of exhibitions that are integrated in a museum rather than exhibitions hosted elsewhere. According to Anke te Heesen (2012), museums and exhibitions are not the same although currently these terms are often mixed. Historically the term "exhibition" is derived from the Latin "exponere" and initially emerged in the 18th century. The two terms "museum" and "exhibition" were brought together at the end of the 19th century. Hence, the current museum incorporates not only collections but also exhibitions.

In my experience, visitors are usually not aware of this difference and the multifaceted tasks and rooms a museum entails behind the scenes. Nevertheless I focus on museum exhibitions since they are physically integrated into the museum, which is a building with its history, a

place of collection, conservation, research, display and knowledge transfer. This physical integration stands in contrast to exhibitions that were historically created elsewhere and for rather economic reasons.

Apart from that, museums have gone through many changes. The most recent and important ones are: (i) the opening to the public, (ii) the learning aspect, (iii) the idea of the participatory museum and (iv) the implementation of digital guides. These changes are as follows:

(i)   The history of museums is characterised by democratisation and opening to the public. At the end of the 19th century, the emerging educated middle-class got the chance to gain more cultural capital (Bourdieu 1982, Laukötter 2013) and thus strengthen their position in society. Bourdieu (as mentioned above) figured out that the museum visitors are still higher educated in the 20th century and no one in the 21st century would deny that. This main result of Bourdieu presented in *The Love of Art* (1969/1997) is still valid and became common sense.

(ii)   The learning aspect as described above is crucial for the current museum definition. It is clearly a task for exhibition makers to focus on the learning aspect of their exhibitions.

(iii)   Consequently, the idea of providing further possibilities for active visitor participation emerged instead of the previous passive consumption of knowledge. The idea of the participatory museum that engages the museum visitors to actively participate and contribute to museum exhibitions, most famously represented by the American designer Nina Simon. Simon (2010: 18) asks, "how participants' actions will contribute positively to the institution and to future audiences". She blames the design of participatory offerings to museum visitors for their unhelpful outcome instead of blaming the visitors themselves.

(iv)   Often museums provide digital guides for engaging visitors actively in exhibitions as described in *Chapter 1*. This implementation and rise of digital guides in museum exhibitions changed the museums image and work as well as it changes the museum visitor behaviour. Thus, it provides also a new research area for visitor studies.

Today the term "museum" is defined by the International Council of Museums (ICOM 2015; Statutes art. 3 para. 1) as "a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and

exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment".

However, "*the* museum does not exist" as Sharon Macdonald (1996: 4; italics in original) already correctly summarized. Hence to classify museums according to their main collections into museums types like art museums, historico-cultural museums, ethnographic museums, natural history museums and scientific/technique museums, etc. is reductionist (Hartung 2010: 8) and over-simplifies the museum landscape.

2.4.2. Ethnographic and Historico-Cultural Literature Museums

Nevertheless due to the research settings in this thesis I want to shed light on two museum types: ethnographic museums, especially the history of ethnographic museums with exhibitions about Oceania in Germany, and historico-cultural museums, especially literature museums in Germany.

- *Ethnographic museums (displaying Oceania in Germany)*

The German term "Südsee" (South Sea) is derived from Spanish navigator Vasco Núñez de Balboa's titling "Mar del Sur" and the term "Pazifik" (Pacific) is derived from Portuguese navigator Fernão Magelhaes titling "Mar Pacífico" in regards to the competitive colonisation powers (Kaufmann 2008: 36) and the calm sea he experienced (Wendt 2013: 43). The term "Oceania" comprises three regions of the Pacific (Wendt 2013: 43): Micronesia ('small islands' north of New Guinea and east of the Philippines), Melanesia ('dark islands' – due to the dark colour of the indigenous skin – comprising New Guinea and the islands East to Fiji) and Polynesia ('many islands'; a triangle of many islands from Hawai'i, to the Easter Islands and New Zealand including also Tahiti, Samoa and Tonga). Sometimes Australia and these three regions are summarized as 'Oceania', too.

Although once the connection between European colonisers and the "Südsee" was strong, Christian Kaufmann (2008) describes the potential loss of the "Südsee" in Europe. He starts with the history of the collections, museums and perception of the "Südsee" in Europe and German speaking regions. Kaufmann (2008) divides this history into different periods.

Firstly, the cabinets of curiosity showed curiosities of the "savages" to the sovereigns at home in the 17th century until 1850. Secondly, from 1800-1914 ethnographic museums or so-called "Völkerkundliche Sammlungen" ("ethnographic collections") were established to show original objects of the colonised "primitives" who were conceived as still living like we lived in the Stone Age. Hence, the perception of indigenous people was framed by evolutionary thoughts. Thirdly, from 1890-1980 so-called "Völkerkundemuseen" were established that displayed objects of so-called "Naturvölker" ("primitive people") – conceived as living like "hunters-and gatherers" – as evidence for cultures that were thought of as dying out. Fourthly, from the 1960s until approximately 2010 museums of civilizations or cultures were established. These museums display objects including photographs as memories of the past and the present developing nations that experienced cultural revivals in many regards. This period is characterized by re-contextualisation of objects for the present time.

Through all these periods an ambivalent perception of the "Südsee" ranging from being Paradise to being the homeland of "noble savages" who are cannibals was manifested and is still influencing the contemporary (visitor) perception (of ethnographic exhibitions) in Germany (Kaufmann 2008; Wendt 2013). Reinhardt Wendt (2013) attributes this ambivalent perception to European desires and critiques against their own society in Europe or in Germany. He refers to Gabriele Dürbeck's term "Ozeanism" (Dürbeck 2007: 4-6), which she created referring to Edward Said's (1978) term of "Orientalism", for the German literature about Oceania between 1815 and 1914. In his book, *Orientalism* Said reveals that our perception of the Orient is rather connected to our expectations of it. Hence, our perception of the "Südsee" was and – believe – is still a Eurocentric misperception. As it will be shown in the exhibition description the exhibition makers created the special exhibition called "South Sea Oases: Life and Survival in the Western Pacific" (Linden-Museum in Stuttgart) because they wanted to play with our prejudices and misperception. They counterpoint our biases with the contemporary reality of the destruction of islands[4] due to the rise of the sea levels from global warming.

Hence, the perception of the "South Sea" and its representation in German museums is a highly political issue as Sharon Macdonald puts it generally in her edited book *The Politics of Display* (1998: 3) with reference to Michel Foucault's *Discipline and Punish: the Birth of the Prison* (1977) and *Governmentality* (1991):

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[4] Another destruction was happening to Oceania due to several nuclear weapons tests; the atomic test by the USA on the Bikini Atoll is the most famous one (Wendt 2013).

> "Politics, in other words, lies not just in policy statements and intentions (though these are important) but also in apparently non-political and even 'minor' details, such as the architecture of buildings, the classification and juxtaposition of artefacts in an exhibition, the use of glass cases or interactives, and the presence or lack of a voice-over on a film".

Hence, visitor research should be based on a detailed description of the respective museum exhibitions regarding these aspects.

There are approximately 30-38 ethnographic museums in Germany depending on the source you choose (DGV 2015). They range from big and famous ones that are financed by the government of the respective state or city or run by universities or by foundations to small ones that are sometimes even run on a voluntary basis. Many of these ethnographic museums have an Oceanic collection. An official complete list of all ethnographic collections in Germany does not currently exist (personal communication with Larissa Förster – head of the working group "museum" in the Deutsche Gesellschaft für Völkerkunde – on 3rd November 2015). Accordingly, a few big and famous examples will have to suffice here:

- Ethnologisches Museum in Berlin-Dahlem
- Museum für Völkerkunde in Hamburg
- Grassi Museum für Völkerkunde in Leipzig
- Museum Fünf Kontinente, Staatliches Museum für Völkerkunde in Munich
- Rautenstrauch Joest Museum für Völkerkunde of Cologne
- Überseemuseum in Bremen
- Weltkulturen Museum in Frankfurt
- Linden-Museum – Staatliches Museum für Völkerkunde in Stuttgart

Ethnographic museum exhibitions about Oceania in Germany are based on their huge collections of Oceanic exhibits (Kaufmann 2008). The multifarious "Ethnographika" (ethnographic objects) were brought to the natural history or ethnographic museums by private collectors, trading houses or by expeditions organized by the museums themselves. These "Ethnographika" were bought, bartered or even stolen. Especially the "Hamburger Südsee Expedition" (Hamburg's South Sea expedition) from 1908-1910 enlarged these

collections and produced a huge amount of literature about the expedition and its collection comprising 17 volumes in 29 parts (Kaufmann 2008; Wendt 2013).

Firstly, the main aim was to collect as many objects as possible; later the provenance and contextualization became more important (Laukötter 2013). Due to the evolutionary mindsets at that time, collecting objects was seen as rescuing them from being lost and destroyed, "womit sich Völkerkunde und Kolonialismus gegenseitig legitimierten" ("with what anthropology and colonialism legitimized each other"; Laukötter 2013: 242).

As the history of ethnographic museums in Germany starts with colonization, ethnographic museums in Germany are currently discussed as "(post)koloniale Erinnerungsorte" ("post-colonial places of remembrance") in the context of the establishment of the Humboldt-Forum in Berlin (Laukötter 2013: 233). Hence, issues of cultural appropriation by the ethnographic museums are often discussed and even researched currently.

At the end of the 19th century according to Laukötter (2013: 238; italics in original) "*Völkerkundemuseen* wollten und konnten also keine »Völker« zeigen, sondern stattdessen Repräsentationen ihrer kulturellen Ausdrucksformen ("ethnographic museums did not want and could not display ethnic groups but rather display representations of their cultural expressions"). Thus viewing so-called "Ethnographika" ("ethnographic objects") became a crucial moment for ethnographic exhibitions by providing the perception of the culturally close and familiar realities of one's own culture and the culturally distant and foreign realities of other cultures. These differences between 'us' and 'them' were viewed according to the evolutionary worldview of that time and were validated by ethnographic objects. However, the selection criteria of ethnographic objects for display were not transparent for museum visitors (Laukötter 2013). Laukötter's estimation of the former situation of ethnographic museums seems still valid for contemporary ethnographic museum and their visitors.

- ***Historico-cultural museums and the special case of literature museums (in Germany)***

Historico-cultural museums usually exhibit objects related to the local history of the respective region. These museums comprise a wide range of different issues like archaeology, local industries, religion, music, literature etc. to name a few.

There are more than 200 literature museums in Germany (Kussin 2001). Scheuffelen (2001: 48-49) differentiates between four types of literature museums: (i) memorials at authentic places, (ii) literature museums close to but not displayed at authentic places, (iii) literature departments at museums of local history and (iv) documental exhibitions at public places like libraries, schools, etc. To build museums for displaying literature is very seldom done and my research setting the LiMo in Marbach a. N. is one of these exceptions. The establishment of the LiMo was conceptualized at the beginning of this new millennium – a phase of rethinking literature exhibitions as was done by the conference "Dichterhäuser im Wandel" at the Museum for Literature am Oberrhein in Karlsruhe in 2000.

At this conference Susanne Lange-Greve (2001), who worked at the Schiller National Museum in Marbach a. N. in 1990, differentiates between poet houses that work as memorial places for particular authors stressing literature history and exhibitions about literature itself. She compares the latter literature exhibitions with art exhibitions as literature shares the same features as artworks, because both are forms of art: both are made of signs that transport ambiguous meanings. Hence, "Literaturausstellungen sind eine Form des Nachdenkens über Literatur anhand von Exponaten" ("Literature exhibitions are a kind of thinking about literature via exhibits"; Lange-Greve 2001: 30), Literature exhibitions should not tell the visitors what to think but enable visitors to actively interpret these meanings themselves. Besides, Lange-Greve thinks that literature exhibitions face the same de- and recontextualisation of exhibits as all other kinds of exhibitions do.

Similar to the comparison of literature exhibitions with art exhibition by Lange-Greve, Hans Joachim Klein (2001), who is the founder of the "Zentrum für Evaluation und Besucherforschung" (ZEB) (Centre for Evaluation and Visitor Research) at the Badisches Landesmuseum in Karlsruhe, Germany, compares the target group of literature museums with the target group of art museums. He states that the difference between these target groups is that exhibiting literature is far more difficult and is only interesting for an expert audience. Hence, this characterization distinguishes literature museums from ethnographic museums.

2.5. Conclusion

In sum, this chapter provided a flavour of fundamental concepts and terms like the 'theory of affordance' by Gibson (1979), the appropriation of exhibits and exhibitions by the visitors,

and the contemporary multi-faceted museum experience. It demonstrated first hints that particular affordances might lead to particular distinct movement patterns, which shall be demonstrated in *Chapters 4, 5 and 6*. It defined the appropriation of exhibits and exhibitions as a performative act that is executed through several distinct, recurrent and systematic eye, head, trunk and body movements. This embodiment of museum exhibitions shapes the museum experience. Hence, the visual sense mainly (not exclusively) guides our learning, aesthetic, bodily, emotional, social and entertaining museum experience.

This chapter also defined the broader setting of this research – "museum" and "museum exhibitions" – and provided a brief history of ethnographic and literature museums in Germany. This was done to prepare the reader for the detailed descriptions of the two investigated research settings: the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden Museum Stuttgart and the "nexus" exhibition at the LiMo in Marbach a. N. presented in the following *Chapter 3*.

3. The Two Museum Exhibitions: Research at the Linden-Museum in Stuttgart and the Museum of Modern Literature in Marbach a. N.

This chapter provides descriptions of the two concerned exhibitions and their museums: the temporary special "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart and the permanent "nexus" exhibition at the Museum of Modern Literature (LiMo) in Marbach a. N. As the focus of my research is on the ethnographic exhibition "South Sea Oases: Life and Survival in the Western Pacific" the description of it will be more extensive than about the "nexus" exhibition. Hence the floor plan will be more detailed and four selected sections of the "South Sea Oases: Life and Survival Western Pacific" exhibition will be described in detail. Nevertheless both general descriptions concentrate on these aspects: the backgrounds of the research or its context, short histories of the museums, short descriptions of the museums as the hosting institutions, detailed descriptions of the researched exhibitions, their digital guides, and last but not least short characterizations of their typical visitors. As the reader will see, these two exhibitions and their hosting museums are quite different both in regards to their subject matter but also in other ways. Hence, this chapter concludes with a comment on the comparability of these two exhibitions as the research settings to study movement patterns in.

3.1. The Temporary Special Exhibition "South Sea Oases: Life and Survival in the Western Pacific" and its Audio Guide at the Linden-Museum in Stuttgart

The description of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition is based on my own documentation, interviews, personal communication, information on the Linden-Museums website and the exhibition catalogue. It is two-fold: Firstly, I will describe it in general whereas the main description will provide a detailed floor plan. Secondly, I will provide all information about four selected sections on display: the "Men's House Model from Palau", the "Original Outrigger Fishing Canoe from Yap", one "Homogenous Display Cabinet" and one "Heterogeneous Display Cabinet".

3.1.1. General Description

The general description about the temporary special "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart will entail the following: the background of the research; the history of the Linden-Museum in Stuttgart; an overview about the museum and its Oceania department; a general introduction to this special exhibition and its audio guide; and last but not least a short characterization of the typical Linden-Museum in Stuttgart visitors.

- *The Background*

As mentioned in the introduction I conducted two visitor studies at the temporary special exhibition "South Sea Oases: Life and Survival in the Western Pacific" presented from the 5th December 2009 until 6th June 2010 at the Linden-Museum in Stuttgart, curated by Ingrid Heermann in cooperation with Ulrich Menter. These studies were designed to identify movement patterns and the influence of the audio guide on them. These visitor studies were solely conducted for my PhD thesis. I have a strong connection to the Linden-Museum in Stuttgart, as this museum was my reason for studying cultural anthropology. Through the years I worked at the Linden-Museum: first as a museum attendant; then as an intern within the public relations department; and finally as a freelancer within the museum education department for the special exhibition about Australia in 2005/2006. Hence, the Linden-Museum and I have a strong and old personal history.

- *The History*

The Linden-Museum – headed by Inés de Castro since 2010 – was established at Hegelplatz in Stuttgart in 1911. It is a neo-classical building that was built by Bihl and Woltz according to the construction plan of their architect Georg Eser (Württembergischer Kunstgewerbeverein 1908/1909: 216-217).

The history of the Linden-Museum started with the foundation of the "Association for Trade, Geography, and Promotion of German Interests Abroad" in 1882 (original name: "Württembergischer Verein für Handelsgeographie und Förderung deutscher Interessen im Ausland e. V".) which is currently called "Society for Geography and Ethnography in

Stuttgart" (original name: "Gesellschaft für Erd- und Völkerkunde zu Stuttgart e. V"; Linden-Museum in Stuttgart website 2014a). This association was founded to establish new trading opportunities beyond the European borders and to inform the people of Stuttgart about non-European cultures. The idea of building a museum was born in 1884 at the beginning colonization. Initially the idea was to build a museum that focused on new trading opportunities that opened at the "House of Economy" (original name: "Haus der Wirtschaft") in Stuttgart in 1889. Later since Count Linden was the head of the association, he changed this aim to give preference for building an ethnographic museum, although Theodor Wanner, the treasurer of the Association, still preferred the focus on trading opportunities. As the collection was growing, more space was needed. Hence, it was decided to build a museum building at Hegelplatz where it is still placed. No wonder that this museum was named after Linden. Unfortunately Count Linden died before its opening (Kußmaul 1987: 10; de Castro 2014).

Although the era of German colonies ended after the First World War in 1918, the museum still aimed to inform visitors about non-European cultures. Luckily, it was mostly protected against the Nazi-Regime. Parts of the building and parts of the collection were lost during the Second World War although many objects were saved by evacuation. Being a private museum for many years even the rebuilding was paid for by the budget of the association, which left the association was in debt. Luckily the city of Stuttgart helped the association since 1953, and since 1964 the country Baden-Württemberg also helped. Nevertheless not until 1973 did the museum become a publicly governed institution. Since then the city of Stuttgart and the country Baden-Württemberg equally fund the museum – while the "Society for Geography and Ethnography in Stuttgart" is still part of the Linden-Museum as a friends' association and still informs about non-European cultures by lectures or arranged travels. After becoming a state museum, the urgently needed renovations could be done from 1978 to 1985. Just in time for its 75th anniversary, the museum reopened with new permanent exhibitions in 1985 and 1986 (Kußmaul 1987: 11, 16, 24; de Castro 2014).

Due to the 100th anniversary in 2011, some changes have been made: a metallic globe presenting the logo of loxodromes (a spiral-shaped line circulating around the poles) in front of the building and the lettering Linden-Museum installed on the building's façade (de Castro 2014; Linden-Museum website 2014b).

- *The Museum*

Figure 3: The Linden-Museum in Stuttgart at Hegelplatz (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Today the Linden-Museum (see Figure 3) is one of the most important ethnographic museums in Europe. The collection of the Linden-Museum in Stuttgart encompasses 160 thousand exhibits of the completely non-European world but it is not all encompassing (audio guide number 001). It is based on exemplary collected objects and focuses on the cultural meanings of these objects (Kußmaul 1987: 10).

At the time of data collection (December 2009 until June 2010) five permanent exhibitions were on display: parts of the North America exhibition on the ground floor (whereas the South America exhibition was closed due to the display of the special exhibition), Africa and the Islamic Orient on the first floor, South Asia and East Asia on the second floor. Through the years, the exhibition space for the permanent exhibition about the Oceania was minimized. Since 2001 the permanent exhibition was shut down and only special exhibitions displayed parts of Oceania (see Table 1):

English Title	Original Title	Period	Curator
Shape – Colour – Fantasy. Pacific Art of New Britain	Form – Farbe – Phantasie. Südseekunst aus Neubritannien	23rd May – 28th October 2001	Ingrid Heermann
The Art of the Dreamtime	Die Kunst der Traumzeit	15th April – 24th November 2002	Ingrid Heermann
The Art of the Australian Aborigines from the collection of Peter W. Klein	Kunst der Aborigines aus der Sammlung Peter W. Klein	3rd December 2005 – 9th July 2006	Ingrid Heermann
Dance of the Masks – Interim Exhibition of the Oceania Department at the Linden Museum	Tanz der Masken – Interims Ausstellung in der Ozeanien Abteilung des Linden-Museums	1st April 2007 – 18th May 2008	Ingrid Heermann
South Sea Oases – Life and Survival in the Western Pacific	Südsee-Oasen: Leben und Überleben im Westpazifik	5th December 2009 – 6th June 2010	Ingrid Heermann in cooperation with Ulrich Menter
Maori. The First Inhabitants of New Zealand	Maori. Die ersten Bewohner Neuseelands	1st April – 14th October 2012	Fanny Wonu Veys und Ingrid Heermann

Table 1: Temporary special exhibitions presenting parts of Oceania since the closing of the permanent exhibition at the Linden-Museum in Stuttgart

Firstly, the space was needed for the special exhibition "Shape – Colour – Fantasy", secondly, the space was needed for other special exhibitions developed by other regional departments and finally yet importantly, financial reasons averted a new permanent exhibition to date.

However maybe this is also a sign of the loss of Oceania Kaufmann (2008, see *Chapter 2*) spoke of or rather the meaning shift of Oceania for Germany and their relationship: The first principal of the Linden-Museum, Augustin Krämer, was a specialist for Oceania (Kußmaul

1987: 15). Once parts of Oceania became a colony, then other collections at the Linden-Museum started growing, like the one about Asia (Kußmaul 1987, 82 ff.). Now there is hardly any connection to Oceania in our daily life and even at the universities in Germany, you will hardly find professors who still study Oceania.

Although there are seven different regional departments in one institution they all share common aims. Firstly, they wish to remain an ethnographic museum that informs visitors about non-European cultures and promotes intercultural dialogue. Secondly, the collections are still the heart of the museum and the museum provides direct encounters via exhibits. Thirdly, the museum still aims to serve its visitors (Linden-Museum in Stuttgart website 2014b). Thereby the Linden-Museum is still engaged in the four classical tasks, namely collecting, restoring, researching and exhibiting. This is complemented by the museum education program, lectures and events like theatre performances, concerts, etc.

Besides the exhibition galleries, there are several other rooms and tasks located in the museum. On the ground floor:

- On the right: the Wanner hall named after the former treasurer Theodor Wanner for lectures, events, and sometimes for very small exhibitions at the back of the hall; within the hall: the entrance to the library, before the hall: the outsourced restaurant;

- In the middle of the ground floor: the new info counter;

- On the left of the ground floor: the museum shop.

On the first floor:

- The film projection room that is used for various tasks like meetings, film shows, museum education offers, workshops etc.

Additionally there are several offices, storage rooms, repair shops and ateliers for restoration and photography on all floors (underneath, on and above the exhibition levels) that are not open to the public.

- ***The Exhibition***
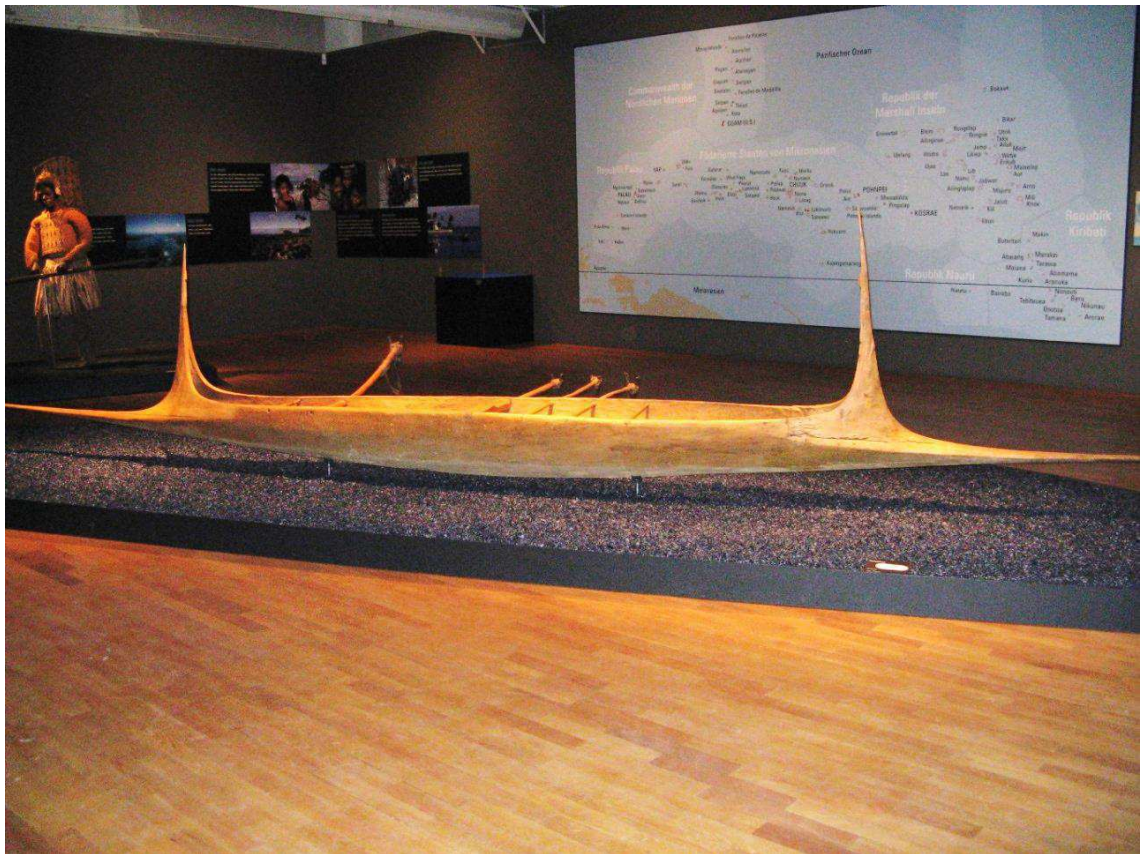
Figure 4: View from the entrance into the "South Sea Oases: Life and Survival in the Western Pacific" exhibition (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

The "South Sea Oases: Life and Survival in the Western Pacific" exhibition (see Figure 4) was a special temporary exhibition presenting an estimated 450 exhibits in 1200 m² based on the Linden-Museum collections mainly collected by Krämer and Senfft and loans from other museums (Interview with Ingrid Heermann 20th October 2010, Heermann 2009: 7). Krämer was the first director of the Linden-Museum (as mentioned above) who travelled in Micronesia as a naval doctor in 1898, and was the head of Hamburg's South Sea Expedition in 1909/1910 (Kußmaul 1987: 15, Heermann 2009: 7, 23). Senfft worked for the district office in Yap from 1904 until 1906 and provided collections in 1901 and 1905 to Count Linden for his museum (Heermann 2009: 7, 23). Unfortunately, the Micronesia collections of the Linden-Museum are sparsely documented and some islands and atolls are inadequately represented or even missing. Besides other sources, the publication of the results of the "Hamburgian South Sea Expedition" has been most helpful to contextualize the exhibits (Heermann 2009: 23 and Interview with Ingrid Heermann 20th October 2010).

The idea for exhibiting Micronesia was born in a discussion with the colleagues Antje Denner and Dietrich Schleip about Micronesia and climate change more than ten years ago before its opening. They wondered what would happen if the one hundred year old exhibits lose their countries of provenance. While working out the concept of the exhibition Ingrid Heermann figured out that the climate has always been an important factor for the life and survival on the islands and atolls (Heermann 2009: 5):

"Only step by step it has become clear that surprisingly, it is the topic "climate", in the broader sense – in terms of living under precarious climate conditions – which links the past to the present".

(Original quote: "Erst nach und nach wurde deutlich, dass es erstaunlicherweise gerade das erweiterte Thema Klima – im Sinne von Lebensgestaltung unter klimatisch unsicheren Bedingungen – ist, das gestern und heute verbindet".)

Hence navigation, boat building and rituals for controlling the weather conditions are crucial issues for this exhibition. Additionally, the curator wants to present several qualities: firstly, the region itself (see the maps presented in the exhibition in Figure 15 and 16) because it is unknown to most of the visitors; secondly, the creativity of producing a broad variation of items with only few available materials (weavings, jewellery, houses, weapons, tools etc.); thirdly, the available food (mainly taro, breadfruit, pandanus, coconuts and fish); fourthly particular characteristics (the Kiribati warriors, tattooing, *tino* sculptures from Nukuoro etc.); and last but not least the cultural change through colonization considering that most exhibits are already made for European collectors. All issues demonstrate the difficulty of life and survival that the Western Pacific is now facing – they have always been at risk of stormy weather and now climate change has brought new struggles. The connections between the islands and atolls and their ritualized commodity exchange and adoption of children are the solution and their social safety net (Heermann 2009).

For a better illustration of the exhibition, I provide a detailed floor plan consisting of 10 figures. These figures show the seven galleries of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. The floor plan provides the title of the galleries; the exhibits within display cabinets and freestanding exhibits; interactive hands-on exhibits; position of text panels, photos, films, children's play areas and audio guide spots (see the key presented in Figures 5-14). The floor plan figures of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition are joint work of my student assistant Linda Greci and the author. Emma Steinbach did the proof reading of the English version.

Floor Plan "South Sea Oases: Life and Survival in the Western Pacific"
General Overview
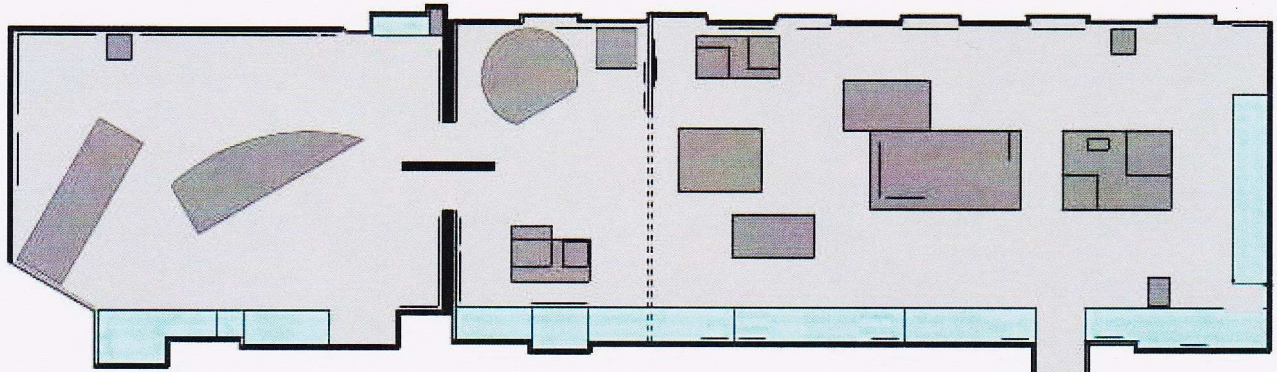
Key

Colours:

- Dark grey: Platforms with exhibits and interactive hands-on exhibits
- Turquoise: Display cabinets with exhibits
- Black lines: For text panels, photos, films, gallery titles, exhibits on walls
  or hanging from the ceiling

Numbers in brackets-:

(*Number*) = Audio guide spot
[*Number*] = Children's play area
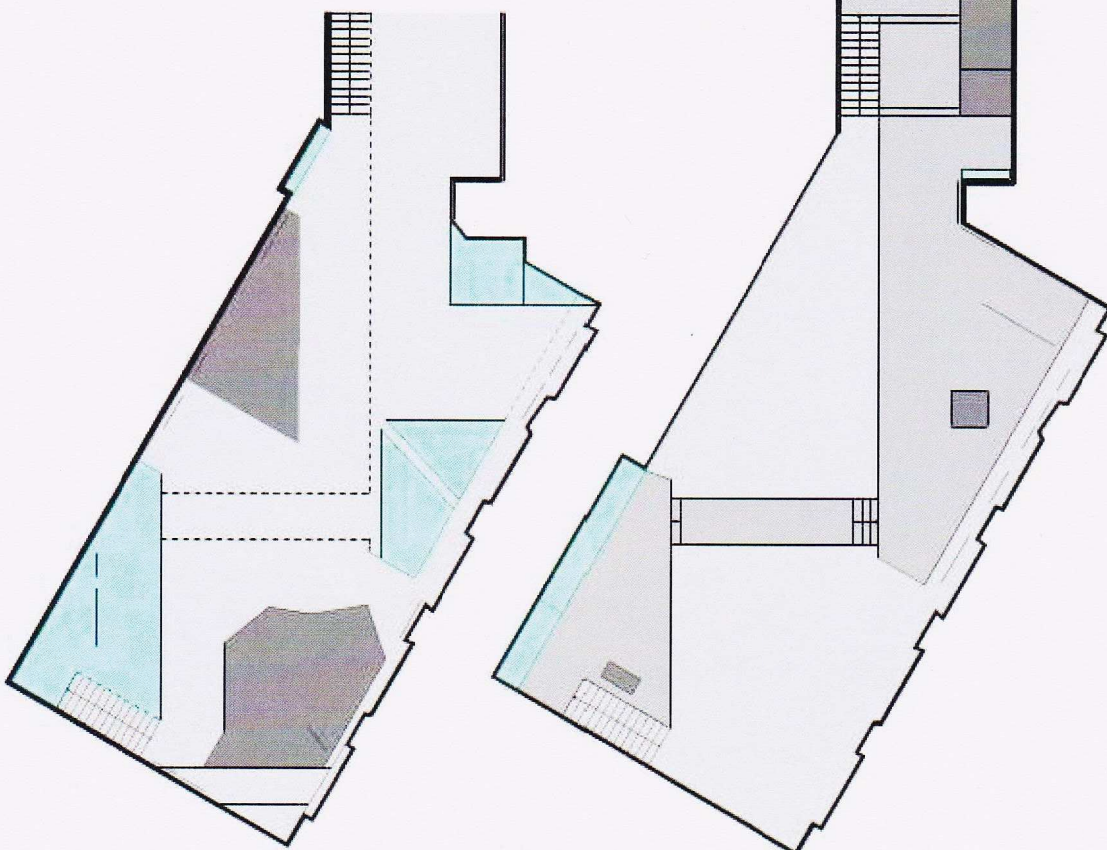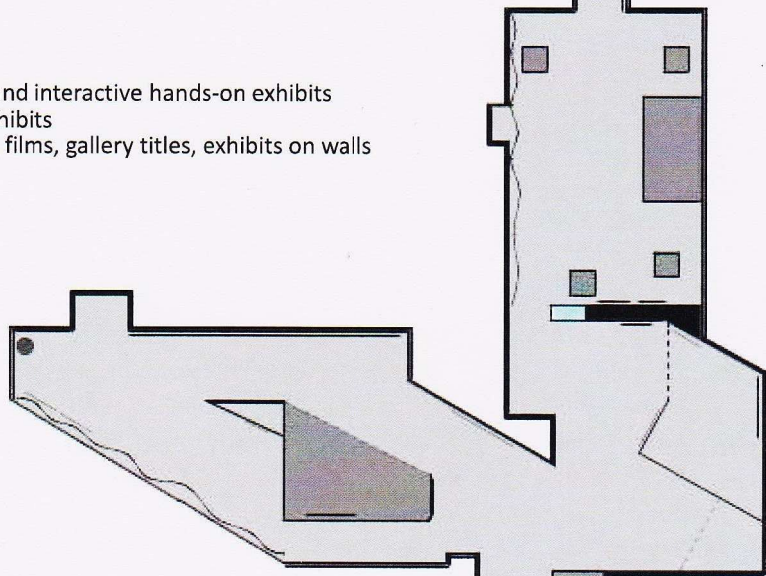
Gallery 1 (untitled)
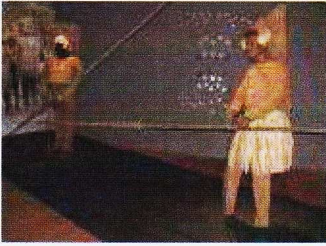
Kiribati warrior installation
(Platform 1)

Text panels and photos 1:
- "Land and Sea"
- "The Land"
- "The Sea"
- "Men and Women"
- "Knowledge"
- "Spirits"

Large map
Overview of the islands

Small map
(800) [1]

Hands-on exhibit
"Fishing Game"

Aquarium

Platform 3:
Giant sea shell
›Tridacna gigas‹

Text panels and photos 2 [2]:
- "Coral Reefs – Rain Forests of the Sea"
- "Food from the Sea"
- "Formation of the Atolls"
- **Diagram**: "Formation of an Atoll"
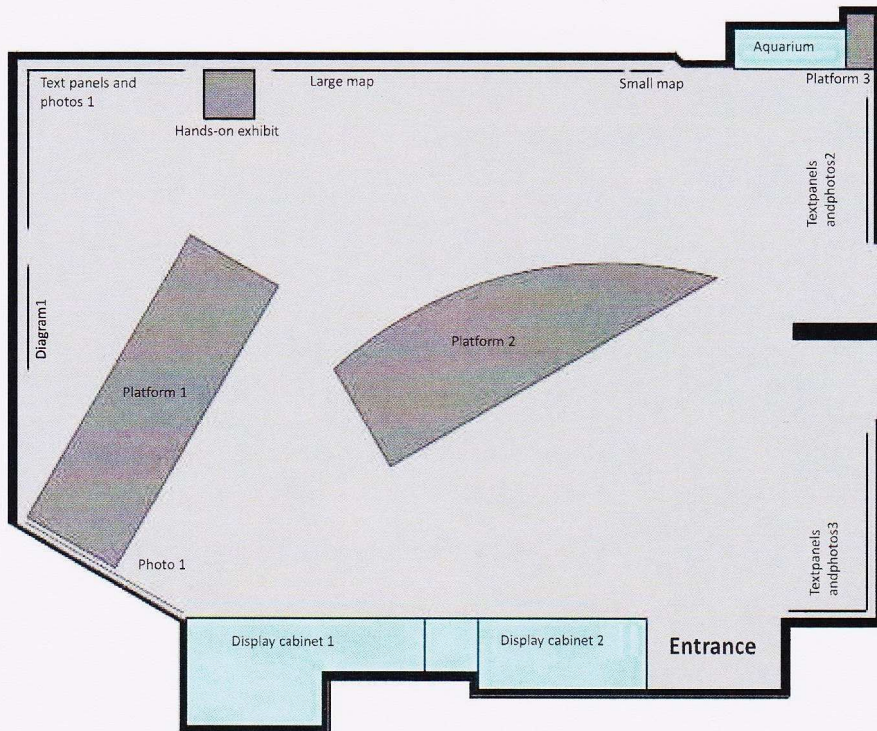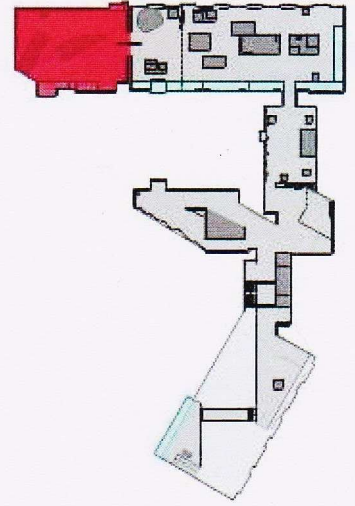
Photo 1: Warriors with "authentic" weapons

Diagram 1:
Illustration of leg positioning during a fight shown through circles and letters on the wall
A: Warriors with lances
B: Assistants with lances
C: Replacement warriors
D: Audience

Platform 1:
Kiribati warrior installation (801)
Position of warriors in combat

Display cabinet 1:
Text panel: "Kiribati – Coconut Suits of Armour and Sharp Weapons"

Exhibits: Ripping weapons, suits of armour, corselets, helmet, kidney belts

Platform 2 (802):
Outrigger canoe ›Wuvulu‹

Display cabinet 2 [3]:
Text panel: "Marine Materials"

Exhibits:
Axes, axe blades, adze, Ray skin, needles, fruit scraper, Pandanus scraper, dancing sticks

Text panels and photos 3:
- "Land Use"
- "Mangroves"
- "Coconut Palms"
- "Freshwater Lens"
- "Pandanus"
- "Taro – a Basic Staple"
- "Breadfruit"
- **Diagram**: "Threat of the Freshwater Lens by Storms and Rising Sea Levels"

Gallery 2, Part A: "High and Low-lying Islands"
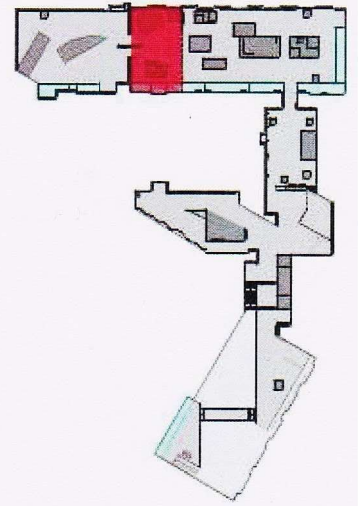
Title:
"High and Low-lying Islands"

Photo 1: Canoe

Platform 1 (805) [5]:
Model of a "King's Canoe", two models of a passenger boat; hanging above: Stick charts (Marshall Islands)

Hanging display cabinet 1 (flat and hanging from the ceiling):
Fishhooks, shark hooks, belt string with fishhooks, canoe plug (Kiribati and Marshall Islands)

Photo 2: Sea, beach

Exhibit 1 on the wall:
Stick charts

Text panel 1 [6]:
„The Marshall Islands"
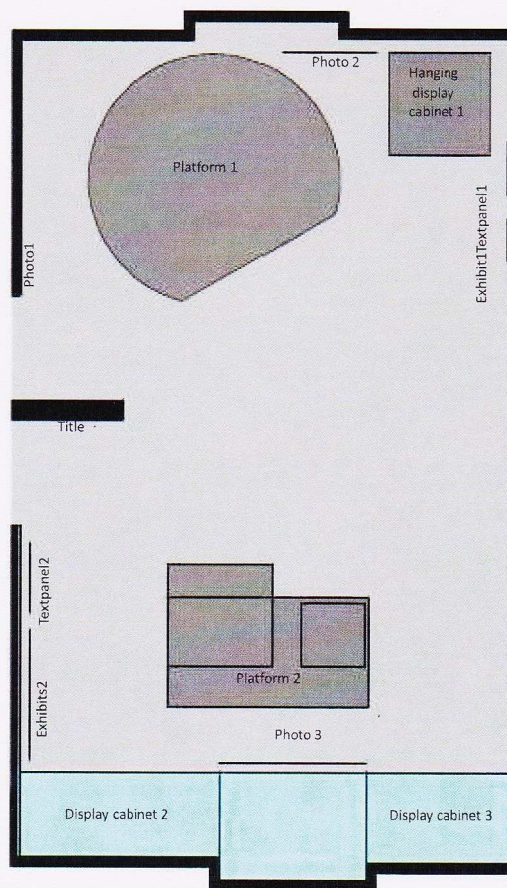
Text panel 2:
"The Art of Mat Weaving"

Exhibits 2 on the wall:
Two clothing mats

Platform 2:
- **Display cabinet, left:**
  Tattoo mats and tattoo instruments (Marshall Islands)
- **Display cabinet, right:**
  Pandanus-mallets (Marshall Islands)

Display cabinet (804) [4]:
Belts, clothing mats, fans, belt string (Marshall Islands)

Photo 3: Women

Display cabinet 3:
Drums, neck jewellery, necklaces, dancing sticks, belt string (Marshall Islands)

Figure 7: Floor plan part 3 of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum Stuttgart (copyright Kira Eghbal-Azar)
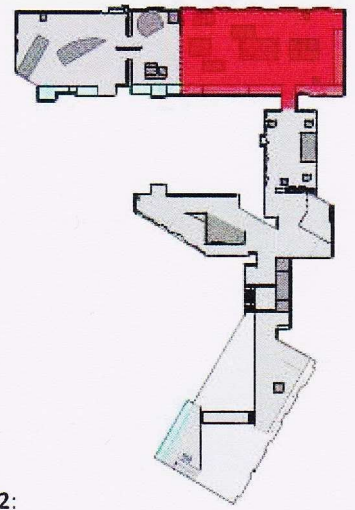
Gallery 2, Part B: "High and Low-lying Islands"
Platforms, photos, and text panels

Text panels and photos 1:
- "Palau"
- "The Men's House ›bai‹"

Two photos:
Men's houses

Exhibits 1 on the wall (807):
Painted wooden beams from a men's house (Palau), gable sculpture ›dilukai‹

Platform 1:
- **Display cabinet, left:** sculptures
- **Display cabinet, right:** Model of a syrup pot, bowl, hanging pots with lids, plates, ladle, oil lamps (Palau)

Photo 1: Landscape

Text panel and photo 2: "The Ceremony of the First Child"

Photo (life-size): Woman with "authentic" skirt

Photo 2: Dancing scenes

Text panel and photo 3: "Nan Madol – the Venice of South Sea"

Reading spot Catalogue "South Sea Oases"
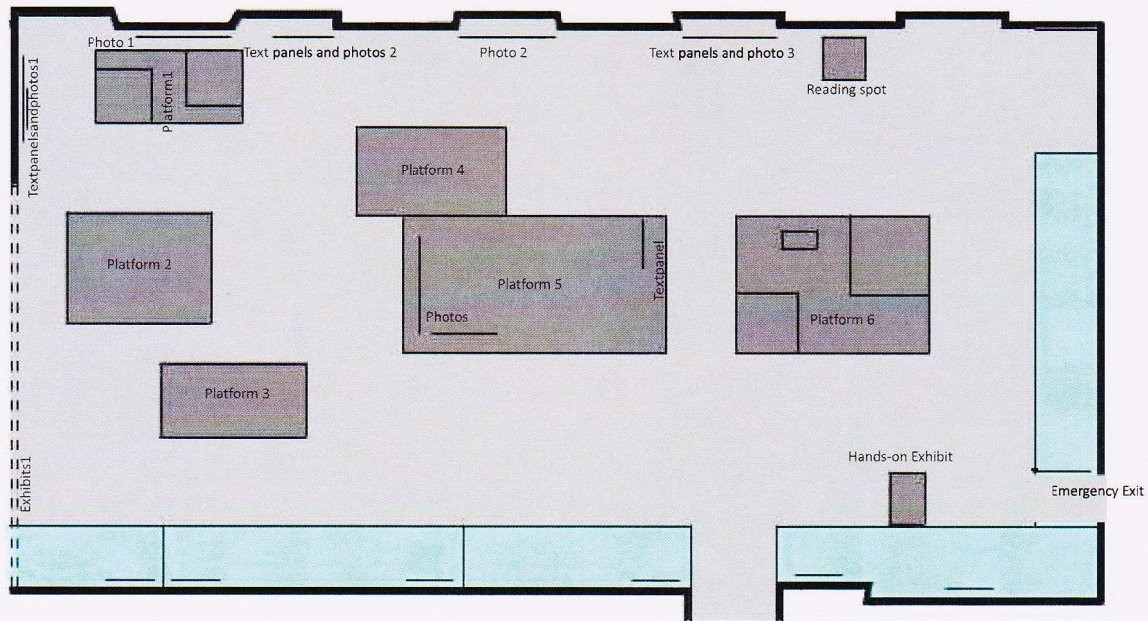
Platform 2:
›galid‹ house (Palau)

Label: ›galid‹ houses

Platform 3 (806) [7]:
Men's house model ›bai lagaláp‹ (Palau)

Platform 4 (810) [12]:
Label: "Paddle Dances on Pohnpei"

Exhibits: Model of a king's canoe, dancing paddle (Pohnpei)

Platform 5:
Text panel: "The Breadfruit Ceremony on Chuuk"

Exhibits:
- Taro benches, syrup pots, bowls, molasses pot (Palau)
- Carrying frame with breadfruit bowl, breadfruit bowls and dancing sticks (Chuuk)

Transparent photos hanging from the ceiling: People with breadfruit bowls

Platform 6:
- **Display cabinet, bottom left:** Aprons (Palau)
- **Small display cabinet, middle:** Sling stones; hanging above: slings, clubs (Chuuk)
- **Display cabinet, right:** Weaver's beams, jewellery belt ›tor‹ (Kosrae, Pohnpei)

Hands-on exhibit: Plaiting of a four-sided string

Men's house model (left) and ›galid‹ house (right)

Gallery 2, Part B: „High and Low-lying Islands"
Display cabinets
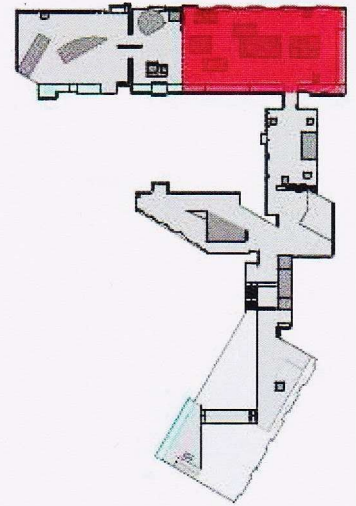
Display cabinet 4:
Text panel:
"Jewellery and Décor of Kiribati"

Exhibit (from left to right):
Chest jewellery, necklaces (Kiribati), headbands (Nauru), bag (Palau), baskets (Kiribati), mats (Nauru), necklaces (Mortlock-Islands, Chuuk) (hanging), collars (Kiribati, Nauru), ball (Tabiteuea, Kiribati), arm jewellery (Nauru), sleeping mat (Pohnpei), hats (Yap, Chuuk)

Photo: Man with jewellery

Display cabinet 5 (811):
Text panel:
"The Art of Weaving"

Exhibits (from top to bottom):
Decorative band, aprons ›tol‹ (Kosrae), ritual weaving ›machi‹ (Fais) (hanging), jewellery belts (Pohnpei), men's aprons (Western Outer Islands) (hanging), weaving accessories (Kosrae), weaving sample (Kosrae), clothing mats ›peich‹ (Woleai), weaving loom (Western Outer Islands)
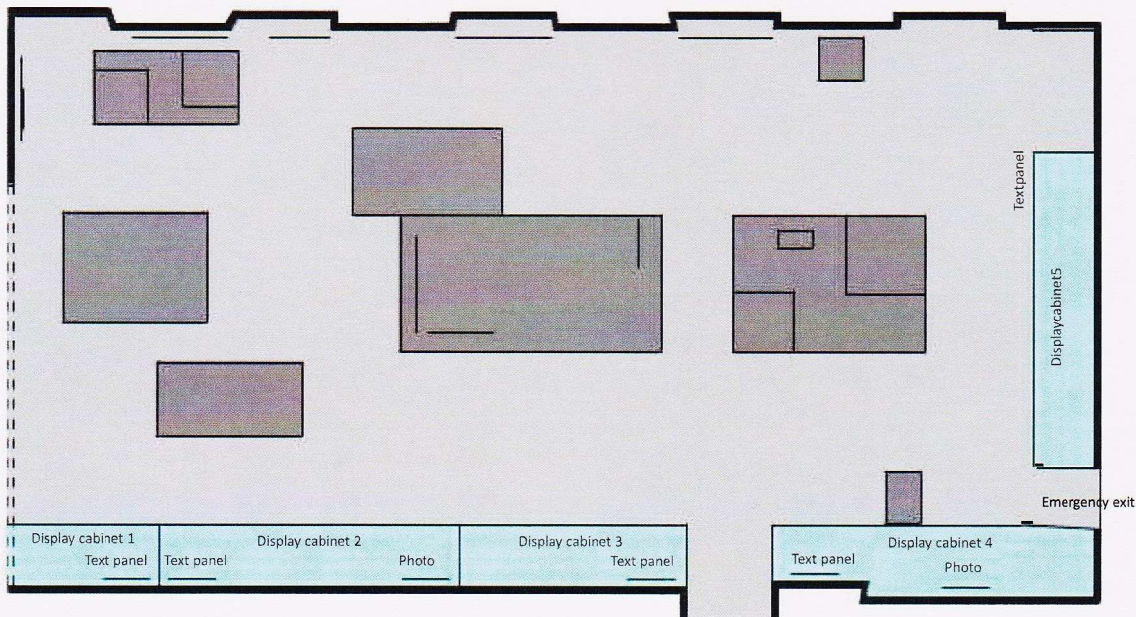
Display cabinet 1 (808):
Text panel:
"Palau – Money as Decoration"

Exhibits from Palau (from left to right):
Drinking vessel, pots, women's money, spoons, money caddy, money, decorative combs, bangle, coconut cup, pregnancy belt

Display cabinet 2:
Text panel:
"Jewellery of the Nauru Island – Floating Impressions"

Exhibits from Nauru (from left to right):
Necklace, ear rings, headbands, pregnancy jewellery (hanging), neckband, brush, ripping/scratching weapon, necklace and chest jewellery, headbands, slings for catching Fregate birds

Photo: Women with jewellery

Display cabinet 3 (809) [10]:
Text panel:
"Turmeric, Spondylus and Coconut Beads"

Exhibits from Chuuk (from left to right):
Bandeau, decorative comb, belt, poncho, head decoration, belt, decorative comb, belt, mats (hanging), necklace, ear rings (hanging), hair stick, decorative combs, aprons for dancing

Gallery 3: "Deities and Spirits"

Gallery 3: Platform 3 and 4, Exhibits 1

Photo 1:
"Scene of a Healing"

Platform 1 with display cabinet **(815)**: Sculpture of the deity ›temdokl‹ (Palau)

Title:
"Deities and Spirits"

Platform 2:
Side posts ›kalawas‹ of a men's house ›bai‹ (Palau)
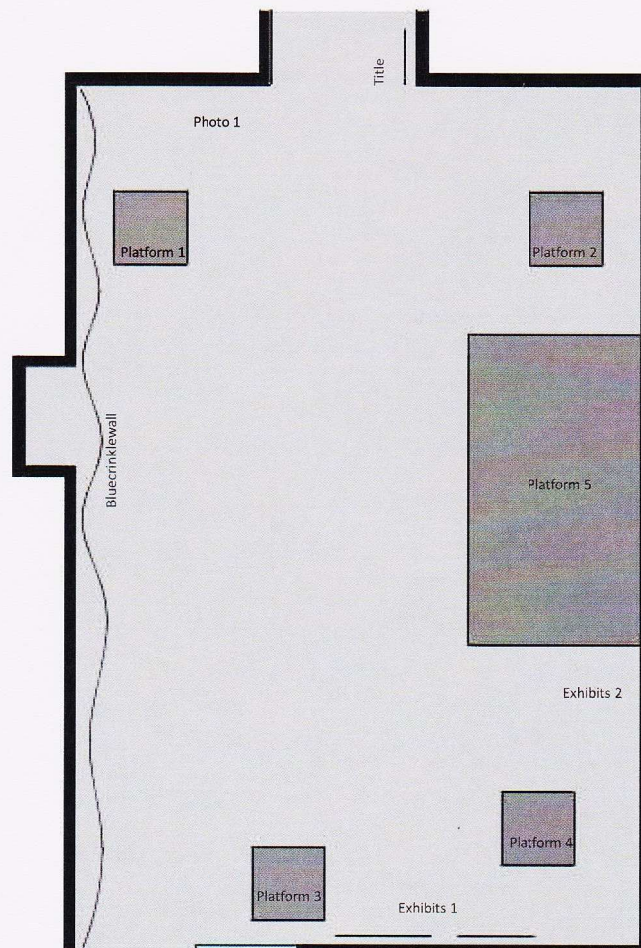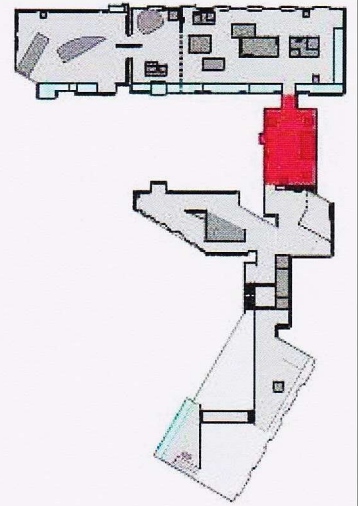
Platform 3:
Mask (Mortlock-Inseln, Chuuk)

Exhibits 1 on the wall **(813)**:
Masks (Mortlock-Inseln, Chuuk)

Platform 4 (814):
Model of a sacred house (Mogemag, Ulithi)

Blue crinkle wall made by an artist depicting the sea

Platform 5 (812, 816) [13]
›galid‹ house (Palau),
Triton shell horn ›Lau‹ (listening example by pressing a button) (Pulo Ana)

Exhibits 2 hanging from the ceiling:
Sacrificial tray (Palau), ritual stick (Chuuk), spirit boat (Palau, Outer Islands)

Gallery 4: "Life on the Outer Islands"
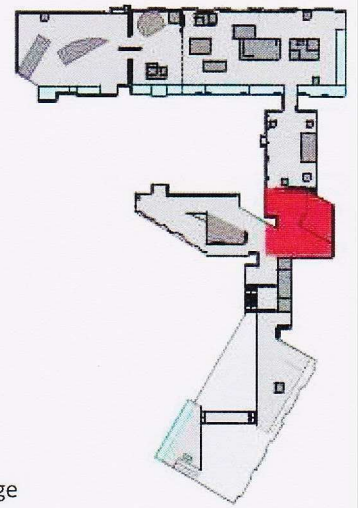
Display cabinet 1:

- hanging:
Oil container with rat proof (Yap),
bowl for toddy (palmwine) (Yap),
pot for toddy (Kiribati), pots (Palau),
vessel for transporting fish (Nauru)
- standing:
Limestone pot (Yap), drinking bowls
(Palau, Kiribati)

Title:
"Life on the Outer Islands"

Photo 1 (817) [14]:
Community

Film:
"Lamotrek: Heritage of an
Island"
(audio available on the audio
guide)

Photo 2: Village

Text panel 1:
"Everyday Life on
the Outer Islands"

Text panel 2:
"Past and Present"

Display cabinet 1

Title

Photo 1

Film

Photo2

Installation 1

Text panel 1

Text panel 2
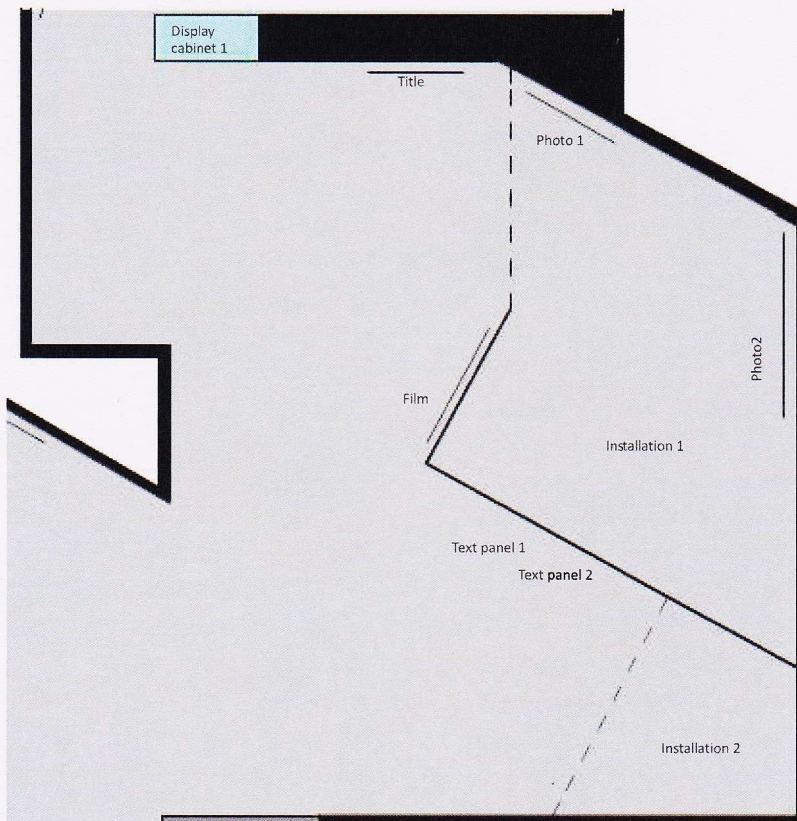
Installation 2

Installation 1

Installation 1:
Exhibits:
Fish trap (Kiribati), rake (Nauru),
bag (Palau), bowl with pestles
(Chuuk, Palau), coconut scrapers
(Chuuk, Nauru), hanging cradle
(Lamotrek), wrap-around skirts
›lavalava‹ (Chuuk, Yap)

Installation 2 (818):
Objekte:
Pestles, Pandanus mallets (Chuuk),
fish trap (Woleai), fishing nets
(Palau), hand nets (Tarawa, Kiriba-
ti), fishing net (Butaritari, Kiribati),
fish spears (Chuuk)

Gallery 5 (untitled)
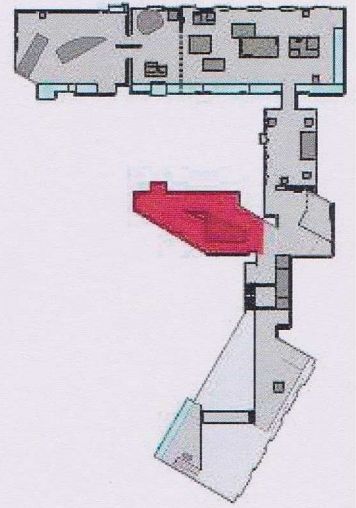
Exhibit 1: Globe   **Exit**

Quotes from the climate conference in 2009 on the wall   **Poem**

Exit

Quotes

Exhibit 1

Photo 1

Map

Film

Blue crinkle wall

Platform 1

Map

Poem

Text panel 1
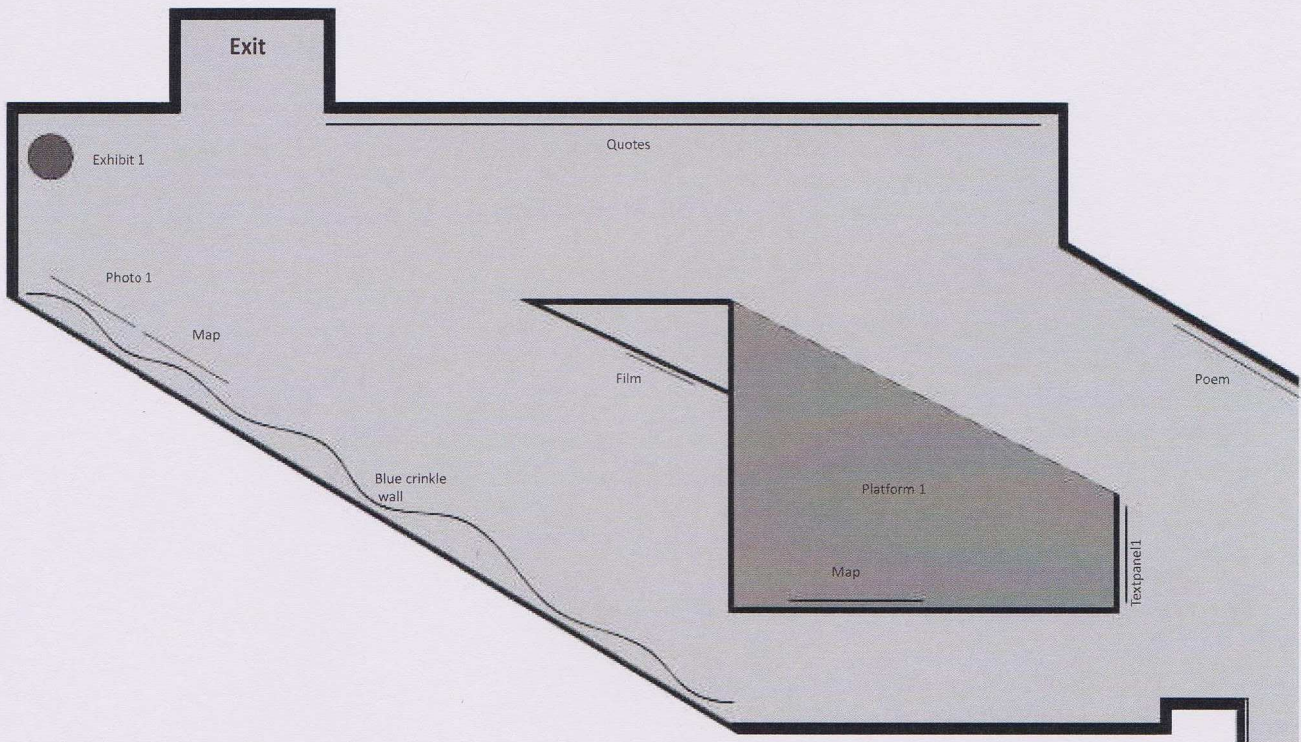
Photo 1:
Rising sea levels

Map

Film:
Climate change on Kiribati (audio output from speakers)

Blue crinkle wall

Platform 1:
Exhibits (825) [20]:
Hats (Marshall Islands), lids with monkey portrayal (Palau), cat (Palau), belt (Kosrae), bowl (Palau), syrup pots (cow-shaped (Palau)

Map: Pacific Ocean

Text panel 1:
"Changes in the 19th Century"

Gallery 6: "Nukuoro" and "Boat Building and Navigation"
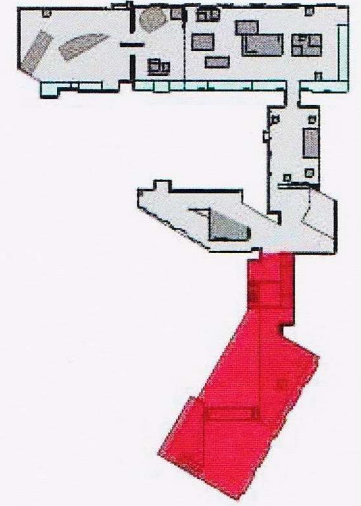
Title 1: "Nukuoro"

Platform 1 (819):
Coconut scrapers, two sculptures
›tino aitu‹ (Nukuoro)

Display cabinet 1:
Selection of bowls, boxes for fishing equipment, bowl (Lamotrek, Yap, Chuuk, Woleai, Ulithi, Palau, Kiribati, Nauru)

Display cabinet 2 [17]:
Exhibits (from top to bottom):
- Box for fishing trap (Woleai), small box for fishing equipment (Yap), fishing hooks (Marshall Islands), strings with fishing hooks (Palau), neck string with fishing hooks (Carolines), fishing hook with string (Nauru), fishing hook (Yap), box for fishing equipment (Woleai),
- Boat stem ornamentation (Chuuk), sculpture (Palau), bird sculptures (Yap)

Hands-on exhibit:
Cat's cradle:
"Outrigger Canoe",
"Fishing Spear"

Title 2:
"Boat Building and Navigation"

Exhibit 1 hanging from the ceiling: Two star charts

Film:
"The Pwo Ceremony"

Exhibit 2 hanging from the ceiling [15]:
Cards with photos and biographies

Text panel 1:
"The ›sawai‹- System"

Exhibit 3 hanging on the wall: Mat

Text panel 2: "Commerce and Communication"

Exhibits 4 hanging on the wall: Unidentifiable and without label

Text panel 3 mit photos [16]:
"Celestial Navigation" with photo
"The ›etak‹ System"
Photo: Birds

Platform 2 (820):
Belt strings (Outer Islands of Yap), turmeric paste (destined for commercial use (Chuuk), necklace (Chuuk)

Title1

Platform1

Display cabinet1

Emergence Exit

Exhibit 1

Titel2

Film

Exhibit 2

Text panel1

Platform 2 Exhibit 3

Text panel 2

Exhibit 4

Text panel 3 with photos

Display cabinet 2

Hands-on Exhibit

Gallery 7 (untitled)

Outrigger Canoe (Platform 2)
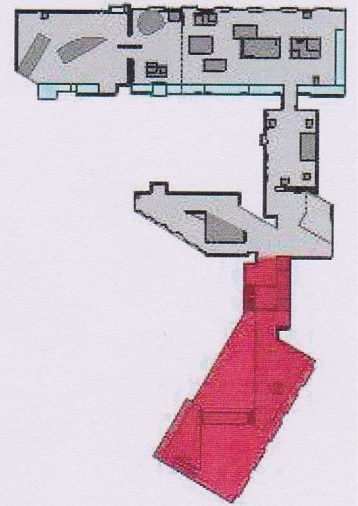
Display cabinet 1:
Exhibits:
Male sculpture, female sculpture
(Yap), tattoo hammer (Chuuk, Kiribati),
necklace, ear rings, jewellery discs,
body chain, decorative combs (Yap)

Platform 1 (823):
Exhibits:
Pump drill (Kiribati), axes (Yap), files
(Kiribati), boat models (Yap), anchor
(Kiribati)

Photos:
Men building canoes

Text panel 1: "Boat Building"

Display cabinet 2 (822):
Text panel 2: "The Initiation of
the Navigators"

Photo 2: Bowl

Exhibits: Map, bowl (without
label), spoon (Kiribati)

Text panel 3 with two photos
(821) [18]: "At Sea"

Platform 2:
Outrigger canoe
(without label)

Film

Text panel 4 with Photo:
"Sailing Charm"

Photo: "The Navigator Uroper
with Sailing Charm and Fish Trap
Blowing a Triton Shell Horn"
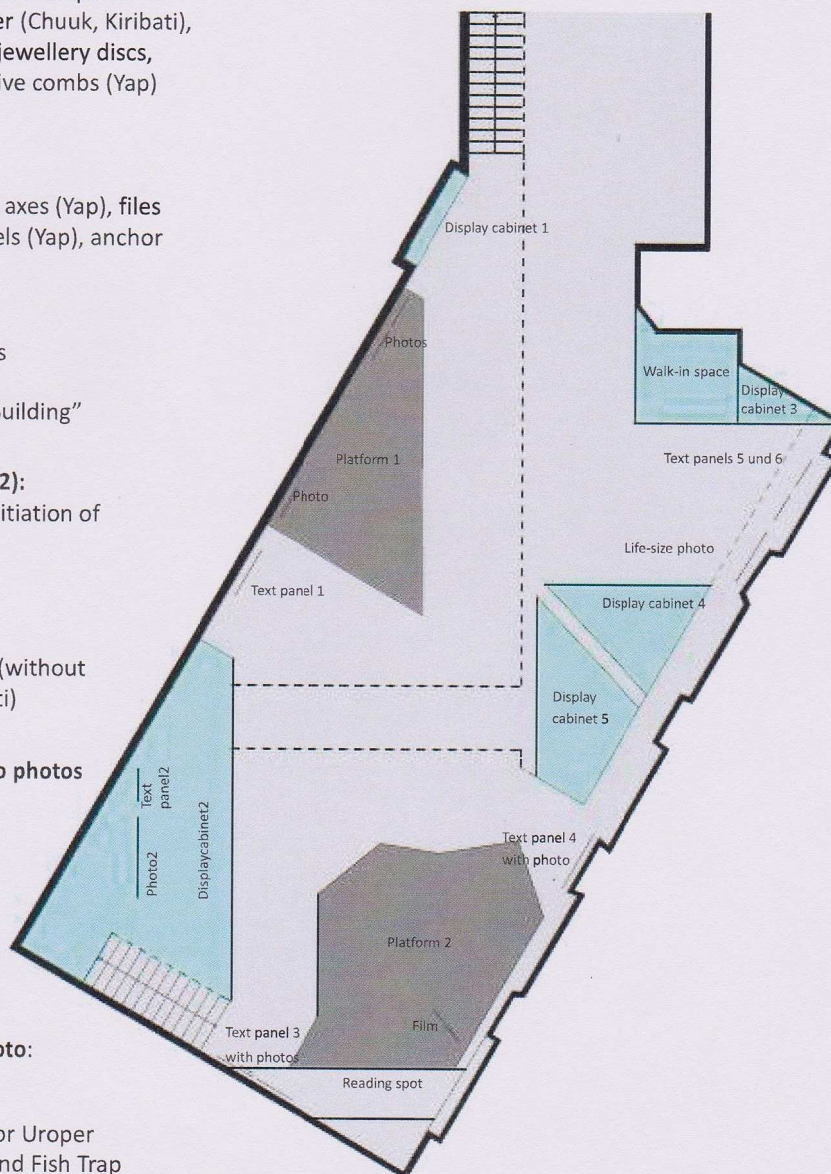
Walk-in space:
Walls made of glass; dark

Display cabinet 3 (824) [19]:
Exhibits:
Stone money (Yap), stone rings
(Pohnpei)

Two Photos: Stone money

Text panels 5 und 6:
- "Yap – the Island of Stone
  Money"
- "The Magic of the Yap
  Empire"

Life-size photo:
"The Former Chief of Gashpar,
Yap, with Traditional Tattoos
in Front of a Huge Piece of
Stone Money"

Display cabinet 4:
Exhibits:
Valuable belts, shell money
›Yar‹, valuable necklaces ›gau‹,
bunch of banana fibres (money)
(Yap)

Photo: Mat money roll in a
men's house

Display cabinet 5:
Exhibits:
Selection of sailing charms
›hos‹ (Lamotrek, Outer Islands,
Woleai)

Reading spot:
Catalogue "South Sea Oases"

Floor plan labels: Display cabinet 1 · Photos · Platform 1 · Photo · Text panel 1 · Text panel2 · Photo2 · Displaycabinet2 · Text panel 3 with photos · Reading spot · Platform 2 · Film · Text panel 4 with photo · Display cabinet 5 · Display cabinet 4 · Life-size photo · Text panels 5 und 6 · Display cabinet 3 · Walk-in space

The "South Sea Oases: Life and Survival in the Western Pacific" exhibition is characterized by its contemporary presentation style for ethnographic exhibitions: it encompasses accessible, freestanding exhibits and non-accessible exhibits in display cabinets (approximately 450 exhibits in sum), several installations, 5 hands-on exhibits, several photographs, 3 films, 43 text panels and digital guide (in this case an audio guide see Figure 18). Note that all display cabinets in this exhibition are front-glass display cabinets. Hence, visitors can view them only from the front side.

Figure 15 and Figure 16 show the Western Pacific region: Micronesia and its migration flows. It is obvious that the great ocean between the islands characterizes Micronesia. In contrast to the emic concept of the sea as the connecting element between the islands (preamble of the constitution of the Federates States of Micronesia cited by Petrosian-Husa 2009), the title of the exhibition is stressing the islands and atolls as Oases – a rather etic view on Micronesia. Herrmann Mückler originated the title "South Sea Oases". It is inartfully expressed and was chosen before working out the concept of the exhibition (Interview with Ingrid Heermann 20th May 2010).
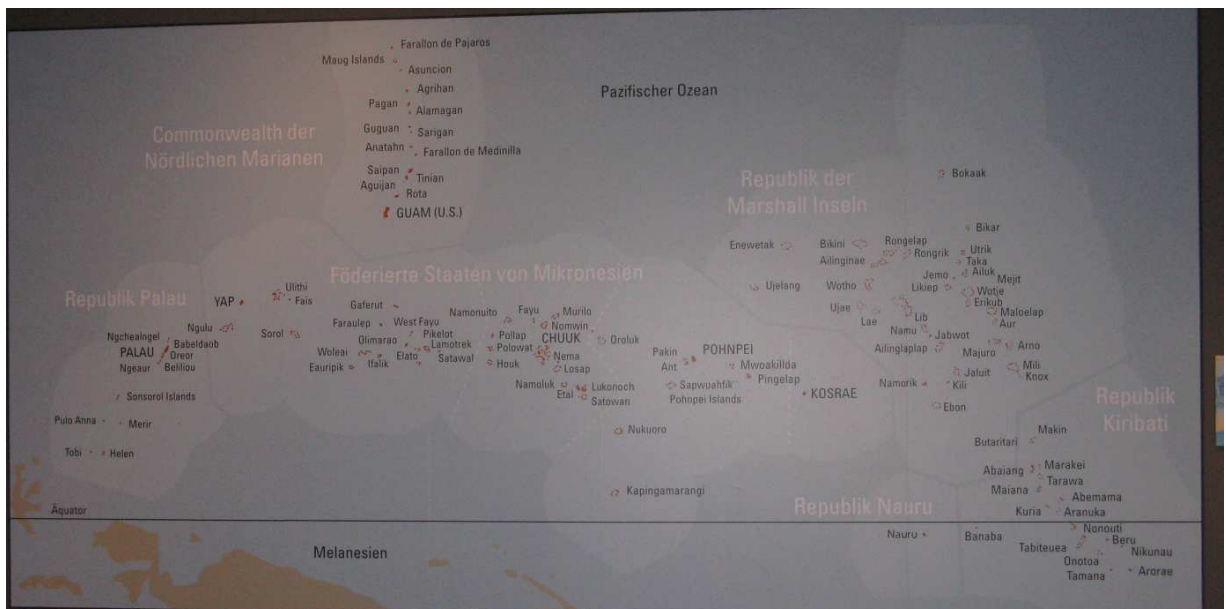
Figure 15: Huge map on the wall presenting the islands and atolls of the Western Pacific: Micronesia (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Figure 16: Smaller map on the right of the huge map presenting the completely Pacific region and the migration flows (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

The information level presented on text panels, labels and audio guide texts is mixed with exhibits. Visitors always choose which information and in which form (text, label or audio guide) they prefer. Text panels include a heading and descriptions of several issues, which you can read in the appendices 10.1.1. Labels like the example shown in Figure 17 provide the following information: the name of the exhibit that reflects what it is (e.g., Frauengeld *toluk*), where it comes from (e.g., Palau), what it is made of (e.g., tortoiseshell), to which collection abbreviated in "Slg" for the German term "Sammlung" and the year it belongs to (e.g., Augustin Krämer, 1912; Ernst Hengstenberg 1902), and finally the accession number abbreviated with "Inv. Nr." for the German term "Inventarnummer" (e.g.: 76357, 76356, 27443, 76359).

Frauengeld *toluk*

Palau

Schildpatt

Slg. Augustin Krämer, 1912; Ernst Hengstenberg, 1902
Inv. Nr. 76357, 76356, 27443, 76359

Figure 17: Example of a label in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Besides this information level, guided tours conducted by cultural anthropologists with a specialization in Oceania can provide further information. The identically named catalogue *Südsee Oasen: Leben und Überleben im Westpazifik* (2009) contextualizes the exhibits a bit more than the exhibition itself. While it is mainly written by the curator herself, sometimes guest authors also contribute; past guest authors have included Katja Göbel, Susanne Kuehling, Brian Diettrich, Lothar Käser, Carmen Petrosian-Husa, Eric Metzgar, Martin J. Schneider and Ulrich Menter. It is a useful information medium that is unfortunately not sold very often (interview with Ingrid Heermann 20th May 2010, Herrmann 2009).

The presentation practice of the "South Seas Oases: Life and Survival in the Western Pacific" exhibition follows the guideline of a general guided tour through the exhibition by the curator Ingrid Heermann (interview with Ingrid Heermann 20th May 2010). Hence, it is a narrative and interpretative exhibition telling the story of life and survival in the Western Pacific now and then with mainly one hundred year old objects. This presentation style partially is very pragmatic and it spontaneously arose while arranging the exhibits in the gallery. Thereby the curator's intention was explicitly not to create a myth of the South Sea (interview with Ingrid Heermann 20th May 2010).

The exhibits were selected for their quality, form, function, expression, meaning, story and history. The atmosphere of the exhibition is unobtrusively kept mainly in two colours, blue and green, because these are the main colours of the Micronesian landscape. The first gallery especially creates the feeling of a wide ocean due to the aquarium and the big map at the back

and the Wuvulu canoe in the middle. Apart from that, the exhibition has been adjusted to the colours of the background that were already there (interview with Ingrid Heermann 20th May 2010).

- *The Digital Guide: an Audio-Guide*

Figure 18: The audio guide at the Linden-Museum in Stuttgart (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

The audio guide at the Linden-Museum (see Figure 18) is a device named PG III 512 MB from the company Tonwelt. In sum, 96 audio guides are available at the Linden-Museum for a deposit of an identity card or a driver's license. At the time of data collection, the fee for an audio guide was included in the entrance fee for the special exhibition; hence, no additional fee had to be paid. Using the audio guide in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition is a free choice. This audio guide is easy to handle. You just have to enter the particular number and press the play button. You can take a break, stop and even press the forwarding or rewarding button. That is it. The buttons are big enough and therefore easy to handle. It is even friendly to disabled persons who cannot view the exhibition at all or properly enough. They can access the guide through a control point on button number five. Tonwelt itself holds the copyright of the texts. The texts are partially reprinted here with the

permission and courtesy of Tonwelt. According to the curator who wrote the text in cooperation with Tonwelt the audio guide, texts were written before the text panels in the exhibition.

This audio guide provides optional information about the exhibits and exhibition themes. Hence, it works as an additional didactic medium:

The first audio guide spot at the map is unfortunately not close to the entrance (original German text in Appendices 10.1.1):

English Version: 800 – Map (German Version: 2:34 min., female voice, no music)

Welcome to the exhibition South Sea Oases – Life and Survival in the Western Pacific

The many small islands in the western Pacific that you see on the map here are collectively known as Micronesia. They are very far from us – both literally and figuratively. Set in an iridescent, turquoise-blue sea they are very beautiful. Yet they have neither mineral resources nor other economic factors likely to attract international attention. The issue of climate change is what has drawn these islands into the limelight at this time – and it is a tragic fact that in 20 or 30 years many of them may no longer be habitable.

In the past, too, the islands – especially the Atolls, which lie only meters above sea level – have always been vulnerable to storms and tidal waves. The people of Micronesia developed a range of tactics to deal with these threats – and we will be presenting them in the exhibition. One strategy involved the precise observation of natural phenomena on land and sea and an exact knowledge of the stars. The religious level of spirits and tutelary gods played an important role, as well.

Let's take a closer look at the map. The region called Micronesia extends across a gigantic swath of ocean, 4,000 kilometres long. Far to the east are the islands of the Republic of Kiribati *(pronounced KIR-rih-bass).* Further to the west lie the Marshall Islands, consisting of two groups, stretching north-south. Like the islands of Kiribati, most of them are atolls. To the west of the Marshalls are the high island of Kosrae, Pohnpei, Chuuk, Yap and Palau, between which are scattered the many atolls of the Caroline Islands. The cultures of these far-flung islands are relatively similar – which speaks for the remarkable contacts between their populations over hundreds of years. Let's begin immersing ourselves in the cultures of Micronesia.

Your audio guide has commentaries for many of the exhibits here. Just enter the number of the object and press PLAY. If you need more detailed instructions for your device please press HELP.

- *The Visitors*

Approximately 14,818 visitors viewed the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart. Whereas 69,102 visitors viewed the whole museum exhibitions in 2009 and 64,214 in 2010 (note that the museum was closed for renovation for two months in 2010). The Linden-Museum is not located in the shopping mall of Stuttgart, but instead lies besides the touristic paths next to the Katharinen Hospital. Imagine how many visitors it could welcome if it were placed in the shopping mall.

The department for public relations of the Linden-Museum stated that the target audience of the Linden-Museums is: cultural active persons, families, post materialists and modern performers (called after the Sinus-Milieus – an audience-typology of the market and social research company SINUS Markt- und Sozialforschung GmbH 2014), visitors above 50 years (best agers), and LOHAS people (Lifestyle of Health and Sustainability). The visitor survey of the stARTistics company (2014; survey period from 22nd November 2013 – 16th March 2014, n = 1,162) of the special exhibition "Inca. Kings of the Andes" (original title: "Inka. Könige der Anden" presented from 12th October 2013 – 16th March 2014 curated by Dr. Doris Kurella and Prof. Dr. Inés de Castro) concluded via inductive statistics about all the Linden-Museum visitors that:

- 60% are over 60 years old
- 50% are academics
- 55% are female
- 55% live outside of Stuttgart
- 75% are from time to time visitors

More results characterizing the visitors of my visitor studies in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition will follow in *Chapter 4 and 5*.

3.1.2. The Four Selected Sections

Four sections of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition were selected to compare the MET study with the observation study. The four selected sections were selected according the following criteria:

- Inherent to the exhibition, hence seemingly being a highlight, such as the men's house model, the weavings, jewellery and the life-size outrigger canoe

- For comparison between different parts within the "South Sea Oases: Life and Survival in the Western Pacific" exhibition as well as between the "South Sea Oases: Life and Survival in the Western Pacific" exhibition and the "nexus" exhibition such as freestanding exhibits versus exhibits in display cabinets and homogenous display cabinets versus heterogeneous display cabinets.

- Due to investigation of the influence of digital guides on movement patterns, all elements had to provide at least one audio guide spot.

Thus, the four selected sections are:

- Section 1: The Men's House Model from Palau

- Section 2: The Original Outrigger Fishing Canoe from Yap

- Section 3: The Homogenous Display Cabinet

- Section 4: The Heterogeneous Display Cabinet

The description of the four selected sections contains photographs and exhibit lists. All texts of the text panels and the audio guide at each section can be read in the appendices 10.1.1.

- *Section 1: The Men's House Model from Palau*

Figure 19: Section 1: The Men's House
Model from Palau (front) (photograph by
Kira Eghbal-Azar with kind permission from
the Linden-Museum in Stuttgart)

Figure 20: Section 1: The Men's House
Model from Palau (back) (photograph by
Kira Eghbal-Azar with kind permission from
the Linden-Museum in Stuttgart)

Figure 21: Section 1: A Particular Feature of the Men's House Model: the Half Open Roof
(photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in
Stuttgart)

Section 1 (see Figure 19 and 20) encompasses the "Men's House Model from Palau" with its half open roof (see Figure 21), the gable sculpture *dilukai* above it (see Figure 20) and two audio guide spots (806: "Palau House", 807: "Second House and Splayed Figure").

Figure 22: Section1: Overview of the Men's House Model and its Text Panel (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

As can be seen in Figure 22 the text panel about the men's house model is displayed on the right next to the *galid* house. The appertaining text panel has not been observed in the systematic observation study due to the obstructed view and its large distance to the men's house model. Hence, it was also not examined in the MET study for reasons of comparability between the two studies.

- *Section 2: The Original Outrigger Fishing Canoe from Yap*

Figure 23: Section 2: The life-size outrigger canoe from Yap with photos and text panel at the back (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Figure 24: Section 2: The life-size outrigger canoe from Yap from the outrigger side (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Section 2 encompasses the life-size "Original Outrigger Fishing Canoe from Yap" (see Figure 23 and 24), one screen showing photos of the re-construction of the canoe at the Linden-Museum beneath the canoe. At the back two photos show outrigger canoes at sea, one text panel ("At Sea") and one audio guide spot (821: "The Linden-Museum's Outrigger Canoe").

- *Section 3: The Homogenous Display Cabinet*

Figure 25: Section 3: The Homogenous Display Cabinet (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Section 3 encompasses one "Homogenous Display Cabinet" (see Figure 25) showing from top to bottom: decorative band, aprons tol from Kosrae, ritual weaving machi from Fais, jewellery belts from Pohnpei, men's aprons from the Western Outer Islands, weaving accessories from Kosrae, weaving sample from Kosrae, clothing mats peich from Woleai, weaving loom from the Western Outer Islands, one text panel ("The Art of Weaving") and one audio guide spot (811: "Fiber Weaving") on the left of the display cabinet.

- *Section 4: The Heterogeneous Display Cabinet*

Figure 26: Section 4: The Heterogeneous Display Cabinet (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Section 4 encompasses a "Heterogeneous Display Cabinet" (see Figure 26) made of three parts showing a broad range of different exhibits made of the sparsely available materials on the islands and atolls.

The right part encompasses drinking vessel, pots, women's money, spoons, money caddy, money, decorative combs, bangle, coconut cup, pregnancy belt, one text panel ("Palau – Money as Decoration") and one audio guide spot (808: "Money, Barter, Valuables, Food Transport").

The middle part encompasses a necklace, earrings, headbands, pregnancy jewellery, neckband, brush, ripping/scratching weapon, necklace and chest jewellery, headbands, slings for catching frigate birds, one photo of women with jewellery and one text panel ("Jewellery of the Nauru Island – Floating Impressions").

The left part encompasses a bandeau, decorative combs, belts, poncho, head decoration, mats, necklace, earrings, hair stick, aprons for dancing, one text panel ("Turmeric, Spondylus and Coconut Beads") and one audio guide spot (809: "Chuuk, Curcuma").

We now move from this detailed description of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart to a more condensed description of the "nexus" exhibition at the LiMo.

3.2. The Permanent Exhibition "nexus" and its Multimedia Museum Guide (M3) at the Museum of Modern Literature (LiMo) in Marbach a. N.

Now, I will describe the "nexus" exhibition at the LiMo[1] and its multimedia museum guide (M3) in general. This description is based on my own observations and the huge amount of literature about its concept. Therefore, it will only contain a simplified floor plan and more textual description. Again, I will provide the background of the research, the history of the LiMo, an overview about the LiMo, a general introduction to this permanent "nexus" exhibition and its multimedia museums guide (M3), and last but not least a short characterization of the typical LiMo visitors.

- *The Background*

The visitor research at the LiMo in Marbach a. N. was part of the interdisciplinary cooperation project called *Knowledge & Museum: Archive – Exhibit – Evidence* described in the *Prologue* of this thesis. The aim of my Sub-project "Presentation Practice and Evidence Attribution" was to conduct several visitor studies in the "nexus" exhibition at LiMo curated by Heike Gfrereis. Firstly, in order to consult the museum for the revision of their portable tablet-like medium, M3, available in the permanent exhibition "nexus". Secondly, in order to achieve new insights into movement behaviour and the influence of the digital guide M3. Thus I conducted three different studies: firstly, a MET study which is comparable to the MET study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart. Secondly, a systematic observation study examined the visitors' stops across the exhibition on display cabinet level. It also evaluated the influence of the use of the M3 on the visitors' dwell time in "nexus", the number of attended display cabinets, and the linearity of the visitors' procession paths through the exhibition. This observation study served provided a framework for interpretation that was applied by the third study, in which the relevance of various heuristic cues for visitors' usage of a digital guide

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[1] Some of the figures presented in this description were already published by Eghbal-Azar 2013 and Eghbal-Azar et al. 2016.

was determined by analysing the frequency of accessing information from the M3. This PhD thesis presents the MET study in the "nexus" exhibition. The second and third studies are presented in the article *Use of digital guides in museum galleries: Determinants of information selection* by Eghbal-Azar et al. (2016).

- *The History*

The LiMo was established on the Schillerhöhe of Marbach in 2006. David Chipperfield Architects built it under the direction of architect Alexander Schwarz (Schwarz 2003: 75). The LiMo and the adjacent Schiller-Nationalmuseum (SNM) "are the only solely for the exhibition of literature used buildings worldwide" (original quote: "sind weltweit die einzigen ausschließlich für die Ausstellung von Literatur genutzten Gebäude" DLA 2013). Both museums are headed by Heike Gfrereis since 2001 and are part of the Deutsches Literaturarchiv Marbach a. N. (DLA; German Literature Archive).

The history of the DLA started with the foundation of the Swabian Schiller Society in 1895 (currently it is called the German Schiller Society – original name: Deutsche Schillergesellschaft) due to the admiration of Schiller who was born in Marbach. The Swabian Schiller Society established the Schiller Archive and Museum in 1903 that has called itself the Schiller-Nationalmuseum (SNM) since 1922. In 1955, the DLA was established. In face of the huge collection, it had become necessary to separate the archive from the museum so an archive was built that included a library solely for storing and research (Ott 2003: 13-15, 30).

Since 1980 the "Arbeitsstelle für literarische Museen, Archive und Gedenkstätten in Baden-Württemberg" also called, "alim" ("Department for literature museums, archives and memorial places in Baden-Württemberg") was founded with its office at the SNM (Scheuffelen 2001). With currently almost 100 literature museums and memorial places, Baden-Württemberg has the most literature museums in Europe. The "alim" supervises and supports these literature museums (alim 2015).

Since 1989, the Fellow House (Collegienhaus) accommodates visiting researchers (Ott 2003: 32). Hence, currently the DLA consists of four different buildings each one representing the architectural style of its own time; therefore, architect Alexander Schwarz (2003: 63) calls these buildings an "architectural zoo" ("Architekturzoo").

The SNM is constructed like a castle and appears more like a Pantheon due to its domed structure (Ott 2003: 15, 19-20). It works as a memorial for Schiller and other Swabian poets; hence, the archival materials, even the handwritings, appear like relics. Ott (2003) compares Marbach's archive with Hades in contrast to the SNM as a Pantheon for worshipping poets. The LiMo works as a building for the archival materials themselves; hence their materiality foregrounds (Gfrereis 2003).

- *The Museum*

Figure 27: The 'Literaturmuseum der Moderne' (LiMo) in Marbach a. N. (photograph by Kira Eghbal-Azar by kind permission of the LiMo)

Continuing Marbach's tradition the 'Literaturmuseum der Moderne' (LiMo) (see Figure 27) hosts the Leibinger Auditorium for lectures and film projections and several permanent and non-permanent exhibitions displaying a comprehensive collection of German literature from the 20th and 21st century (Gfrereis 2003: 42-43). At the time of data collection, there were three permanent exhibitions: "nexus", "stilus" and "fluxus" (note that the "nexus" exhibition

and the "stilus" exhibition were closed in the meantime). Each permanent exhibition or gallery has its own approach to literature:

"stilus" presents poems within a huge exhibit. By using the M3, visitors can "fish" out one poem. In "stilus", visitors are engaged to learn how to read poems hence literature. In contrast "nexus" engages visitors in how to read the exhibited materials themselves (Gfrereis 2009: 13).

External curators such as authors themselves, publishers, literature reviewers and actors, curate "fluxus" for example. Currently "fluxus" is used more often as a coproduction for special exhibitions. The floor plan (see Figure 28) at the entrance level of the LiMo provides an overview of all galleries:
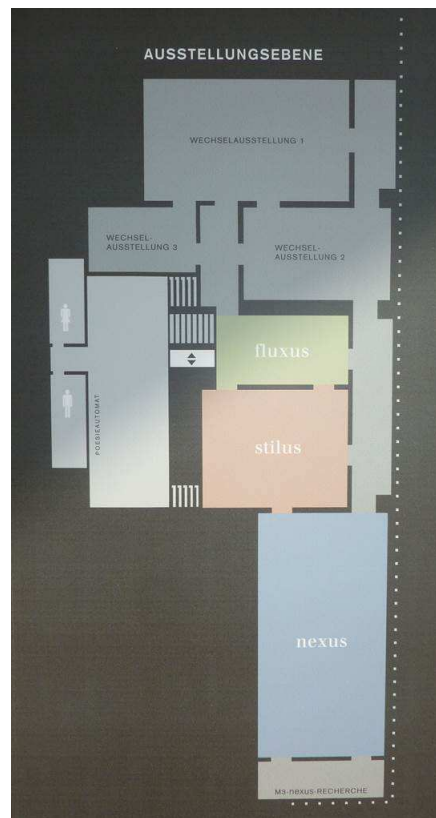
Figure 28: Floor plan of the LiMo (photograph by Kira Eghbal-Azar with kind permission from the LiMo)

The special exhibitions at the LiMo are connected with "nexus". Hence there are special exhibitions about a year ("1912 – One Year in the Archive" – original title: "1912: Ein Jahr im Archiv" – presented from 04th March 2012 to 28th August 2012) or about a single author

("Ernst Jünger: Worker at the Abyss" – original title: "Ernst Jünger: Arbeiter am Abgrund" – presented from 07th November 2010 to 27th March 2011) or on various issues ("I love you" – original title: "Ich liebe Dich" – presented from 20th September 2011 to 29th January 2012). You can find the years, authors and issues in "nexus" as well. Accordingly, it can happen that single exhibits presented in "nexus" may move from "nexus" to a special exhibition for the duration of the special exhibition. A short note at the exhibits position in "nexus" informs about this moving. In contrast to the permanent exhibition, "nexus" the special exhibitions do not divide the exhibition level from the information level. Accordingly, special exhibitions are interpretative and narrative exhibitions in contrast to "nexus" (Gfrereis 2009: 13-14).

Besides the public galleries and rooms, the LiMo is connected with the archive and has several rooms for preparing exhibitions, whereas the offices of the museum staff are located in the SNM.

- *The Exhibition*

The term "nexus" means connection and interrelations. This exhibition title does not provide a precise imagining of what can be viewed and how it may appear. Visitors shall actively connect the 1300 exhibits themselves. Accordingly, the exhibition is called "nexus". Connections can be established by comparison of two exhibits lying side by side or by comparison of exhibits from the same author or year. The M3 can be used for establishing connections and for viewing more details and making comparisons between the information provided in the M3 and the exhibits, but using the M3 is free choice (Strittmatter 2012).

The "nexus" exhibition has several characteristics that make it unique:

Firstly, it presents the archival materials of the DLA as a 400 m² portfolio exhibition exhibiting 1300 exhibits used or made in the 20th and 21st Century by authors writing in German (Gfrereis 2009: 3, 12; Gfrereis 2008: 13). According to the head of the DLA, Ulrich Raulff, this is done without focusing on literary epochs or historical events (Zimmermann together with the DLA 2013). Nevertheless, the historical change in writing and materials is demonstrated by the chronological order.

Secondly, "nexus" does not orientate itself to other literature exhibitions or houses of poets (Gfrereis 2009: 8). In contrast the architecture of the LiMo refers to art museums (Gfrereis 2012: 138). Heike Gfrereis (2009: 4) summarizes the concept of "nexus":

"In the permanent exhibition at the LiMo the archival materials are re-sorted by their date of origin or usage and are displayed in two aisles – one designated to literature the other to life. In the first long aisle there are manuscripts, in the second typescripts, mostly part of author libraries – objects that show how literature is constructed and read – in the last two aisles there are letters and relics, Kafka's fork and Thomas Mann's christening robe, but also Ernst Jünger's diary and Hesse's Nobel Prize Certificate; objects that do not so much reflect the literature but show the authors as human beings".

(Original quote: "*In der Dauerausstellung im LiMo sind die Archivalien umsortiert, nach der Zeit ihrer Entstehung oder auch Benutzung gelegt und in einen Weg der Literatur und einen des Lebens eingereiht. In der ersten langen Reihe liegen Manuskripte, in der zweiten Bücher, zumeist aus Autorenbibliotheken – Dinge, die zeigen, wie Literatur entsteht und gelesen wird – in den letzten beiden Reihen Briefe und Reste, Kafkas Gabel und Thomas Manns Taufkleid, aber auch Ernst Jüngers Tagebuch und Hesses Nobelpreisurkunde; Dinge, die nicht so sehr in die Literatur hineinführen, sondern die Autoren als Menschen zeigen*".)

"nexus" contains 39 display cabinets that are serially numbered and arranged in the four rows mentioned above. Whereas the display cabinets in the first row are accessible from all sides, the other rows are only accessible from three sides (front and both sides) see Figure 30. Each display cabinet contains five floors of glass shelves. Hence the visitors can view the exhibits within these completely glassy display cabinets from various viewpoints and not only from the front like in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. The exhibits are ordered chronologically along a period from 1894 to present. Please refer firstly, to Figure 29 for a schematic overview of the arrangement of the different rows; secondly, to Figure 30 for an insight into the exhibition itself; and thirdly, to Figure 31 for the period within the exhibition.
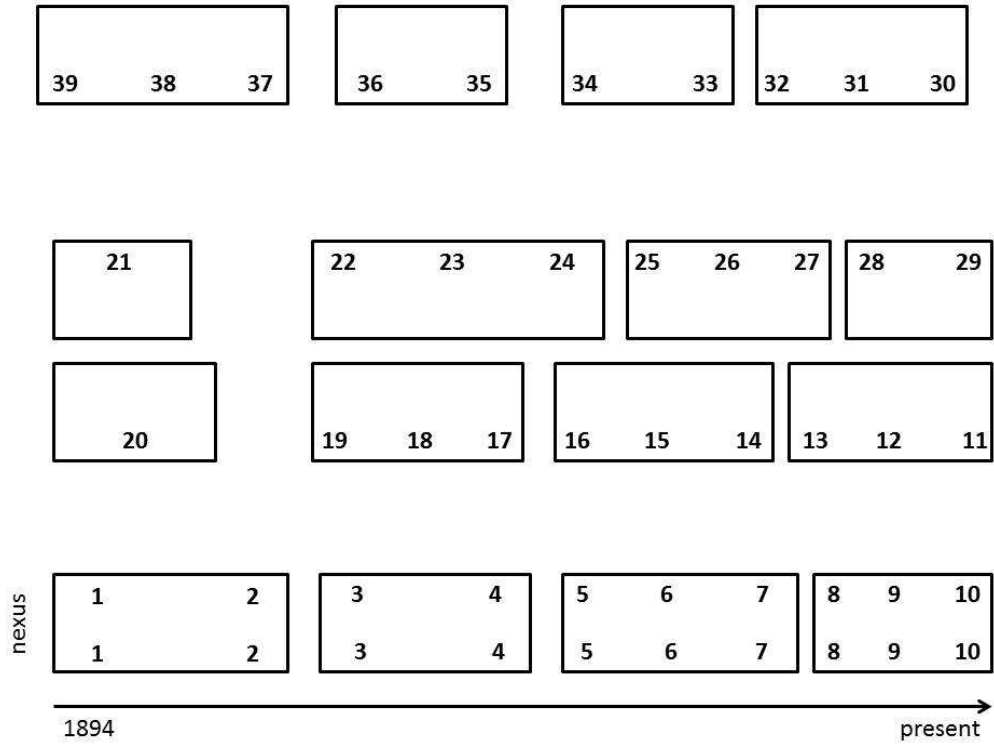
Figure 29: Floor plan of the "nexus" exhibition (not to scale; Copyright by Kira Eghbal-Azar with kind permission from the LiMo)
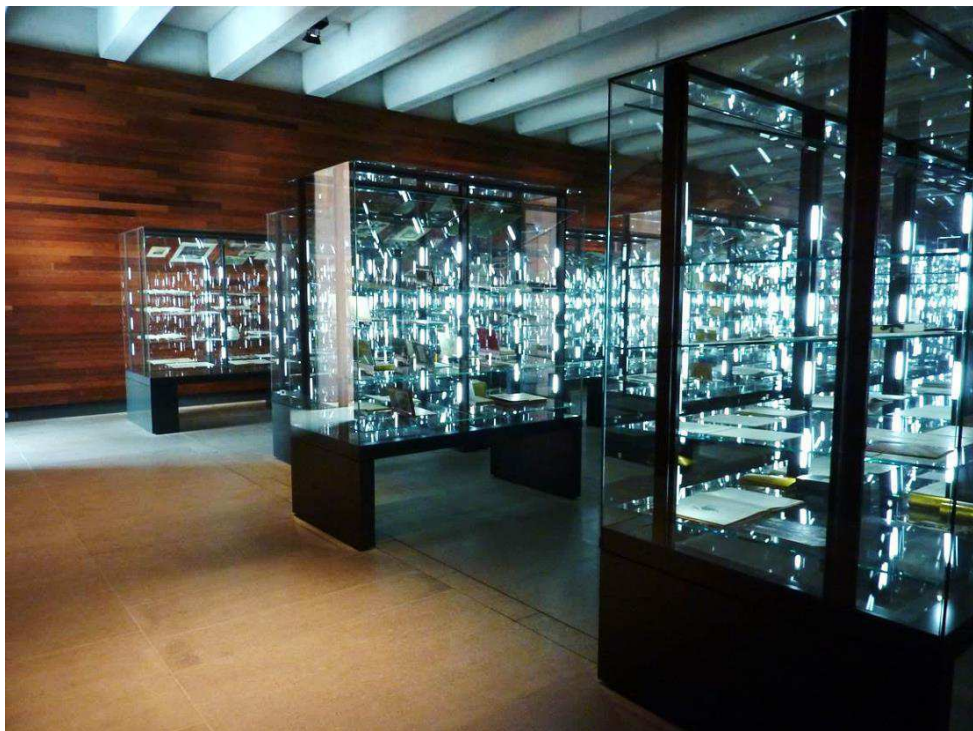
Figure 30: View from the entrance on the four rows of the "nexus" exhibition (photograph by Kira Eghbal-Azar with kind permission from the LiMo)
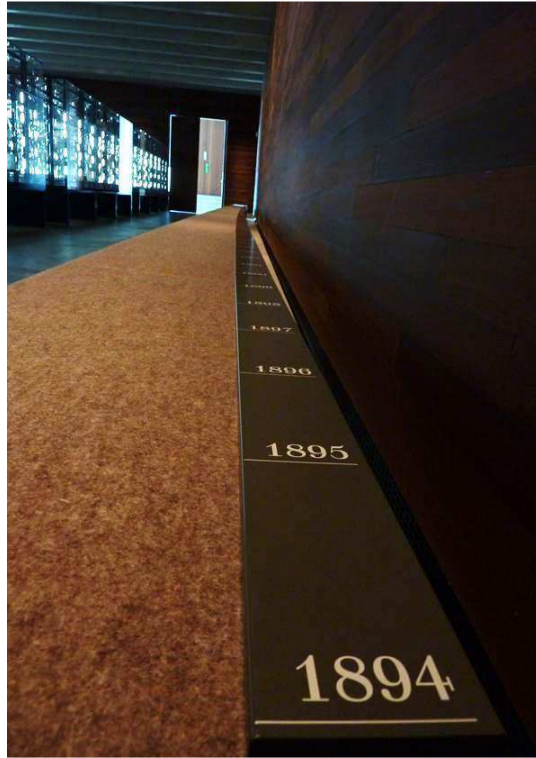
Figure 31: The period in the "nexus" exhibition (photograph by Kira Eghbal-Azar with kind permission from the LiMo)

Thirdly, another unique characteristic of "nexus" is that the single rows of display cabinets present almost completely homogenous exhibits in a uniform way. Neither large, salient exhibits outside of the cabinets nor any interactive hands-on exhibits, music or movies are included in the exhibition. Instead, visitors face long rows of similar-looking exhibits. Because of their similarities, visitors must take a closer step toward the display cabinet in order to have a better view. Accordingly viewing the exhibits is the primary and only way to explore the exhibition. What does this viewing probably look like? The answers will be provided in Chapter 6.

Fourthly, another unique characteristic of "nexus" is that the exhibits are characterized two-fold: on the one hand, they contain literary texts in their background and on the other hand the exhibits' materiality foregrounds. This two-fold character of the exhibits is constantly balancing between its background and foreground. The curator wants the visitors to view especially the exhibits' materiality because she believes that "Of course, literature cannot be exhibited. It is formed in the reader's mind only" ("Natürlich kann man Literatur nicht ausstellen. Sie realisiert sich erst im Kopf des Lesers", Gfrereis 2007: 1) and furthermore "At best, the curator consoles herself with the fact that the withholding of literature in the

exhibitions encourages the reading of it after the visit to the exhibition" ("Im besten Fall, so tröstet man sich als Museumsleiter, verführt das Vorenthalten der Literatur in Ausstellungen dazu, sie nach dem Ausstellungsbesuch zu lesen"; Gfrereis 2007: 3-4). Hence, visitors should not read just the literary texts but rather shall learn to read literary exhibits where they can explore how literature is constructed and which marks the life and the authors left on it (Gfrereis 2009: 6, 9-11). Usually visitors have to be strongly interested to take time to explore those details.

Marbach's most favourite example for learning how to read literary exhibits is the manuscript of "The Trial" by Franz Kafka. Kafka firstly wrote that K. has been "caught" ("gefangen"). Later he cancelled this term and replaced it by the term "arrested" ("verhaftet"). With the term "arrested" Kafka leads directly into the subject matter of his book right in the first sentence: only one who has been arrested can be sentenced. Such knowledge about literature can only be gained by reading original literary exhibits and not by reading printed books (Zimmermann together with the DLA; Gfrereis 2009: 6, 8).

Fifthly, the position order does not provide an interpretation of the exhibits. The visitor has to interpret the exhibits actively himself. Accordingly, the laying order is called "anti-semantic" in Marbach (Thiemeyer 2013: 366; Gfrereis 2009: 20). That means firstly, that famous exhibits are not presented as such, thus they are not necessarily put on eye-level; and secondly, this exhibition is concentrating on its exhibits and does not provide a single narration. However, there are possibilities for creating narrations due to the chronological order (Habsburg-Lothringen 2012: 11). The "nexus" exhibition works like a matrix or an index about a region (German written literature from the DLA) and a time frame (see above: from 1894 to present) that can be explored individually (Strittmatter 2012: 338). Single exhibits are presented as examples.

Sixthly, "nexus" presents mainly paper-made exhibits. Therefore, exhibits are exchanged or pages are turned over or new exhibits are presented every six months (Gfrereis 2009: 4; Strittmatter 2012: 339). Especially for "nexus" the device "Breathing with the Archive" is valid (original title: "Atmen mit dem Archiv", Gfrereis 2008). Because "nexus" provides an archival experience and the archive is constantly growing and coming to new conclusions, "nexus" adapts to this growth. Hence, exchanging and adding new exhibits is not only performed due to the sensitive material but also because it is an inherent part of its concept. Therefore, "nexus" is a vivid permanent exhibition that can be explored many times.

At last, another characteristic of "nexus" is its special atmosphere. It is part of Marbach's concept. Atmospheres of exhibitions are created by light, sound and colours and emerge in the interaction between visitors and the exhibitions (cf. Böhme 1995: 34-39). "nexus" is characterized by darkness, coolness and silence like a temple:

If you want to visit "nexus" you have to go "down to the Hades" ("hinunter in den Hades") as the staff is expressing the fact that "nexus" is not only thematically but also spatially on the same level as the archive: under the 'Schillerhöhe' like the hill is called. The museum building leads the visitors step by step into the darkness. Hence, visitors slowly adjust from the bright light at the entrance level to the only 50 Lux in "nexus". The darkness protects the paper made exhibits (Schwarz 2003: 65, 70; Gfrereis 2009: 3; Gfrereis 2007: 1). The numerous small LED lights illuminate the exhibits but they can disturb the view at the same time. The wooden walls do not make this darkness lighter. Not all visitors experienced the light in "nexus" as "a sea of lights" like one of my student assistants described. In contrast visitors criticize the illumination very often and it is frequently the reason for ending the gallery visit.

In addition to the darkness, the temperature in "nexus" is low (18 °C). Due to the darkness the 18°C feel even colder. Some visitors feel refreshed in summer. Some are not prepared for such a climate and either freeze or appreciate the green blankets they can get at the museum entrance. The distribution of the blankets probably originated in answer to the visitors' critiques when faced with such weather.

- ***The Digital Guide: the <u>Multimedia</u> <u>Museum</u> Guide (M3)***

Furthermore, the main unique characteristic of "nexus" is the separation between exhibit level and knowledge transfer or information level. The exhibit level only presents the exhibits with coded labels that contain the year date of usage or origin and the author name. Their codes can be used to get additional information about the exhibit in the <u>multim</u>edia <u>m</u>useum guide (M3; see Figure 32), which summarizes up more than 5000 pages of information. No further labels or texts are presented within "nexus". Text should not compete with text (Gfrereis 2009: 4, 12-13). Therefore, the M3 is the only medium of knowledge transfer in "nexus". Hence, the M3 is not an optional add-on but constitutes an integral part of the exhibition because, without using M3, it could be difficult for the visitors to follow the exhibition's content. The M3 is regularly offered to every museum visitor, with the exception of groups, for a deposit of 10€ at the entrance table. Fifty M3 are available in sum. The M3 is an

industrial device called Kaleo provided by the company Texxmo Mobile Solutions GmbH. Support and Texxmo has provided accumulators as well. The content management system is based on open source software and has been adjusted by the company Tegoro Solutions Ag for the LiMo. The flash-GUI (graphical user interface) has been developed by the company iart interactive (at that time iart Interactive and Element Design belonged together. Note that iart Interactive and Tegoro fused together in January 2013).
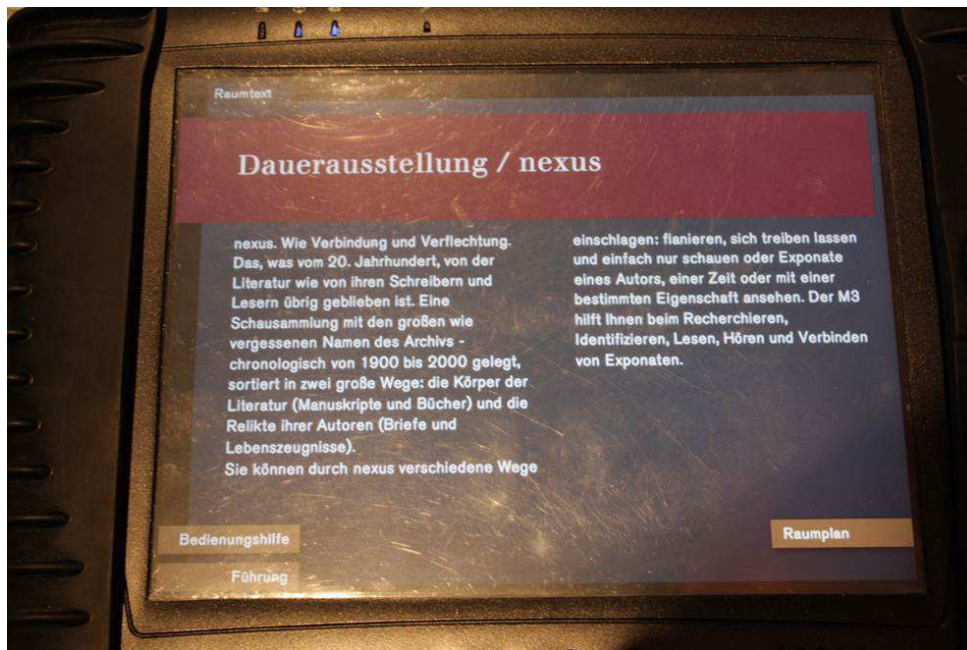
Figure 32: The M̲ultim̲edia M̲useum Guide (M3) (photograph by Kira Eghbal-Azar with kind permission from the LiMo)

The introduction about "nexus" in the M3 reads as follows (original German text in appendices 10.1.2.):

nexus. Connection and linkage. That what has been left from the 20th century, from literature as well as from its writers and readers. A public collection of the great and forgotten names of this archive – chronologically displayed from 1900 to 2000, sorted into two great long aisles: the corpuses of literature (manuscripts and books) and the relicts of their authors (letters and life testimonies).

You can take different paths through nexus: strolling around, drifting and just viewing or viewing exhibits of one author, one particular period or exhibits with specific characteristics. The M3 helps you research, identify, read, listen and link the exhibits.

To understand the M3 usage possibilities, a detailed description is provided as follows:

As can be seen in Figure 32, the menu of the M3 starts with a gallery note after the visitor has actively logged in the "nexus" menu on the touch screen. This gallery note is the only written introduction for the permanent exhibition "nexus".

Afterwards the visitor must actively log into each display cabinet. Each display cabinet contains a signal. The visitor has to hold the M3 right before that signal and press a key at the same time to actively log in. Both steps of login are probably challenging for visitors. Evidence for this is provided in *Chapter 6.*

Now an overview about the year numbers of this display cabinet appears. After pressing the desired year number on the touch screen, all exhibits of this year number in this display cabinet appear. Now by pressing the touch screen again you can select the desired exhibit.

There you get a short note about the selected exhibit. This note could be a description, a comment or an anecdote. Below the heading, "Reading" ("Lesen") visitors can view an image of the exhibit in the M3. They can select its transcript, if they cannot read the handwriting. Below the heading, "Connected" ("Vernetzt") they can connect with other exhibits in "nexus" from the same author, year or issue. The provided M3 information is changed according to the exhibit exchange that is conducted every six months. Additional German guided tours about different issues are available as well as general ones in English and in French (Strittmatter 2012: 336-345 about the M3).

The fourth 'm' in Marbach is the "<u>M</u>ensch" (human being); hence, the museum attendants are especially helpful in handling the M3 menu. The museum attendants provide a short introduction on how to operate the M3 and how to understand the concept of "nexus". Accordingly, the museum attendants probably make a strong contribution to understanding "nexus" and to overcoming the operation barriers of the M3. Besides the M3 and the museum attendants, so-called "Cicerons", specialized staff for museum education and German literature, conduct guided tours (Gfrereis 2007: 3).

Whereas the catalogue *Denkbilder und Schaustücke: Das Literaturmuseum der Moderne* (*Mental Images and Showpieces: the Museum of Modern Literature*) is not a usual catalogue explaining and contextualizing the exhibition or the museum, it is rather a literary approach in 6 notions and 35 showpieces. The notions are essays about literary exhibits in this new museum and its relation to the archive in Marbach. The showpieces are various kinds of texts by famous authors about one personally selected exhibit from "nexus" (cf. Gfrereis & Raulff 2006: 9-10).

- *The Visitors*

Who are the visitors of "nexus"? Since its opening in 2006 until 2012 approximately 237,437 visitors viewed the exhibitions at the LiMo. The LiMo is not located in the shopping mall of a famous metropolis but rather in a rural area next to state capital of Baden-Württemberg: Stuttgart. Who is visiting "nexus" then? Although the head of the museum, Heike Gfrereis, stresses that the visitors do not have to be experts (Gfrereis 2009: 5), Marbach's visitors are mostly experts and enthusiasts who travel to Marbach in order to view the archival materials and to explore them more deeply or even to conduct research about them. The LiMo is deliberately built in Marbach because the archive is there (Gfrereis 2009: 3).

The report by Melanie Waldheim about her summative evaluation conducted at the LiMo from 9th-21st June 2007 verifies that:

- Most visitors are between 15 and 29 years old or over 59 years (whereas children under 15 years old had not been evaluated)
- 58% are academics (hence comparing to Klein's (1990) research at other museums the LiMo visitors are a highly qualified)
- 52% are female
- 56% are from the country Baden-Württemberg where Marbach is located
- 81% are reading books daily or many times a week (hence LiMo visitors are reading visitors)
- 11% are repeating visitors of the whole DLA

More results characterizing the visitors of my MET study in the "nexus" exhibition will follow in *Chapter 6*.

3.3. Comments on the Comparability of the Two Exhibitions

These two exhibitions are very different. They are different in regard to their modes (temporary versus permanent exhibition); particular presentation styles of displaying objects (freestanding and display cabinets versus only display cabinets; front-glass display cabinets versus completely glassy display cabinets; a mixture of heterogeneous and homogenous display cabinets versus only almost completely homogenous display cabinets) and modes of implementing different digital guides (audio guide versus tablet guide) in correspondence with the particular intentions of the curators. Furthermore, the two exhibitions are placed in

institutions that are very different in terms of their histories and buildings (old versus newly established) and last but not least with regard to their subject matter.

Nevertheless, precisely because these two exhibitions are different, they represent a great spectrum of typical museum exhibitions. Due to these differences, the great amount of 26 movement patterns and sub patterns presented in *Chapters 4-6* could be identified. Hence, the differences between the exhibitions did not negatively affect the research aim that seeks new insights into the micro level of eye movement patterns; instead, these differences are the most important assets for gaining a broader spectrum of eye movement patterns.

Furthermore, as the reader will see in *Chapters 4-6* the visitor samples are heterogeneous as well. Again this is not negative for the research aims instead the heterogeneous samples are representative for usual visitors in museums. Therefore, the research results are even more valid.

In the end, despite the differences between the exhibitions there is one common feature that is very crucial in the context of movement patterns, namely that both exhibitions avoid suggesting a single or main pathway for visitors. Hence, the comparability between the two MET studies is given in regard to the explorative free-viewing task that was requested of the visitors.

4. Mobile Eye Tracking and Cued Retrospective Reporting – Part One: The Results of the First Visitor Study at the Linden-Museum in Stuttgart

This chapter is the core of this thesis. It provides the results of the explorative mobile eye tracking (MET) field study combined with cued retrospective reporting (CRR) in the temporary "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart in 2010.

The main aim was to identify visitors' movement patterns from their own perspective or so to speak their emic point of view in its very literal sense. Therefore, I applied MET as a new complementary method in visitor studies and socio-cultural anthropology. With observation and tracking studies, many research results were already reported about visitor circulation through exhibitions. However, with MET we can move a step further to the micro level of eye movement behaviour at one single exhibit or one single display cabinet. Thus, the main aim was to determine whether there are distinct, recurrent and systematic movement patterns to appropriate exhibitions. Thereby the previous findings by Treinen (1988) "cultural window shopping", Aleida Assmann (1995) "long gaze" and Mayr et al. (2009) first insights in alternating and orientating gazes serve as the starting point of my investigation. Another important aim was to elicit the accompanying cognitive processes in viewing exhibitions by combining MET with CRR.

Besides the main aims, I will answer further questions in this chapter such as the following:

Firstly, what do the distinct, recurrent and systematic movement patterns look like? What movements of the head, the trunk and the body do these eye movement patterns entail? Hence, how do visitors appropriate exhibitions by their body? Is it true that orientation plays such a crucial role as it can be concluded by the interaction approach of Bitgood (2006) and Rounds (2004) and as it was declared by Mayr et al. (2009)? Do these movement patterns and the applied MET shape the museum experience? This chapter demonstrates that the movement patterns form the basis of the visitors' museum experience. Later on, *Chapter 7* reports about the influence of the MET on the visitors' experience.

Secondly, MET may allow us to make detailed reports about particular affordances (Gibson 1979; see *Chapter 2*) of single exhibits or single display cabinets. Are there difference between freestanding exhibits and display cabinets? Do display cabinets limit the action possibilities as one can conclude with Norman (2013, see *Chapter 2*)? Norman (2013: 11) defines the limitation of walking through glass as an "anti-affordance – the prevention of interaction". Do we need additional "signifiers" (Norman 2013) in exhibitions?

Thirdly, besides the affordances of exhibition and hence design factors, a minor aim was to compare content experts with novices concerning the movement patterns and cognitive processes. Do experts and novices differ in their viewing behaviours and why? Is the interaction approach represented by Bitgood (2006) and Rounds (2004) right that exhibition visits are characterized by a combination of design factors and personal visitor factors?

In sum, with MET in combination with CRR we can collect unconscious data about the museum experience and appropriation of visitors. On this basis, we can draw conclusions about how to design even these smallest parts of an exhibition more deliberately. Thus, in the end, I can provide a comprehensive system of design suggestions for exhibition makers related to particular movement patterns and based on the theory of affordances by Gibson (1979), which is lacking so far.

The influence of the digital guide in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition – an audio guide by Tonwelt (see Chapter 3) – was not investigated in this MET study. Due to the sensitive calibration of the MET device that is mounted on the visitors' head the audio guide usage was excluded in this study avoiding slip outs of the MET position.

MET in visitor studies is a fairly new method as demonstrated in *Chapter 1*. Mayr et al. (2009) conducted a single MET study that consisted of an exhibition set up solely for the purposes of exploring MET with three participants (Mayr et al. 2009). I now report on research in a setting that was natural in the sense that the case study was carried out at a museum with regular exhibitions that were set up by curators with conventional training in their field and for regular visitors who frequent these museums. Putting MET at work in these "wild" conditions is a more realistic test case of this tool for interested field researchers.

This chapter is structured in five paragraphs: firstly, an introduction into the field study; secondly, a general description of the movement patterns; thirdly, general results of the CRR; fourthly, an individual description of movement patterns and the accompanying CRR of one expert and one novice at the four selected sections within the "South Sea Oases: Life and Survival in the Western Pacific" exhibition and lastly, a summarizing conclusion containing design suggestions.

4.1. The Mobile Eye Tracking Field Study at the Linden-Museum

Now, I will describe the research process and the research results of the explorative MET field study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart in 2010. The exhibition was described in detail in *Chapter 3*. Now, I will go into details about the preparation, the participating visitors, the procedure and the data analysis.

4.1.1. Preparation

Before the study could be conducted, I had to learn how to use and calibrate the MET and I had to find visitors without corneal dysfunctions. Remember that persons with corneal dysfunctions could not be tracked by the MET. For a technical description of MET read *Chapter 1, paragraph 1.3*.

4.1.2. Participating Visitors

The sample size included eight participating visitors: four "experts" (persons with prior knowledge of the subject matter, e.g., students of cultural anthropology) and four "novices" (persons with only cursory or even no prior knowledge of the subject matter and with no knowledge about museology, museum education or exhibition design). To control for technical problems, more than eight visitors took part in the study in order to achieve the planned sample of eight visitors. In Table 2 the basic information about the sample is summarized:

Sample of the MET Study in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition: Visitors' Social Data

Visitor	Visitor Category	Gender	Age	Profession	Visits in the Linden-Museum	Interest in South Sea (scale: 1= not interested to 5 = completely interested)	Interest in Anthropological Museums (scale: 1= not interested to 5 = completely interested)
E1	Expert	Male	25	Student of cultural anthropology	1	Very interested	Completely interested
E2	Expert	Female	24	Student of cultural anthropology	0	Interested	A little interested
E3	Expert	Female	24	Student of cultural anthropology	1	Completely interested	Completely interested
E4	Expert	Female	24	Student of cultural anthropology	8	Interested	Very interested
N1	Novice	Male	36	Mechanical engineer	3	Interested	Interested
N2	Novice	Male	29	Student of English philology	2	Interested	Interested
N4	Novice	Female	19	Student of linguistics	0	Very interested	Interested
N5	Novice	Male	25	Student of technology management	0	Completely interested	A little interested

Table 2: Sample of the explorative MET field study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

All participants were German-speaking and visited the "South Sea Oases: Life and Survival in the Western Pacific" exhibition for the first time and had no prior knowledge about this exhibition or how to navigate through it. All participants declared that they generally behaved as usual.

4.1.3. Procedure

I applied the ASL MobileEye eye tracker (designed 2004; http://www.asleyetracking.com/Site/Products/MobileEye/tabid/70/Default.aspx) for the MET field study at the Linden-Museum in Stuttgart in 2010 (see Figures 1 and 2 in *Chapter 1*).

I applied MET in an exploratory fashion, to help document and analyse the movement patterns of visitors, i.e., what visitors "really" looked at as they moved freely through the exhibition. According to Land and Tatler (2009: 41), "free-viewing" allows the participant "to select their own high-level approaches to looking at scenes". Consequently, by recording free viewing in as much detail as possible, I was aiming to find their implicit scripts and strategies or what one may consider their natural, habitual way of appropriating exhibitions. Thereby I presumed that the characteristics of the displayed exhibits and the design of the exhibition sections create particular affordances to which the visitor viewing behaviours correspond (cf. *Chapter 2* for the 'theory of affordances' by Gibson 1979). All participants received the following open and standardized instructions for their exhibition visit after calibrating the MET: "Please view the exhibition naturally at your own speed, following your own wishes and needs. There are no further specifications, not even a time specification for how to carry out this visit. Your knowledge acquisition about the exhibition will not be tested afterwards".

Since I wanted to find out what the participants actually attended to during their visit, we used CRR to elicit their goals of attention, avoiding priming effects as much as possible. After the exhibition visit, all participants were asked to watch their own processed eye-tracking video and to verbalize with this cue in retrospect. At that stage, I gave the following standardized instruction: "Now I present you the video recorded by the MET during your visit of the exhibition. While watching the video, please describe spontaneously what you viewed, perceived, thought and felt at various points and what you paid attention to".

The study was approved by the local ethics committee of the Leibniz Knowledge Media Research Centre in Tuebingen, Germany.

4.1.4. Analysis

Before the data analysis could take place, the eye movement recordings were transformed into AVI files and later into smaller MP4 files for presentation on DVDs. Furthermore before the MET videos could be analysed, they had to be synchronized with the reporting that was done in retrospection according to the video cue. At last, I had one video without audio and one with audio for all participants. Due to the time limit of the special exhibition "South Sea Oases: Life and Survival in the Western Pacific" the data analysis was conducted in several phases.

Phase one:

Phase one of MET data analysis was conducted directly after data collection but before the systematic observation study was conducted (see *Chapter 5*). Firstly, I watched the whole video of the visitor E1 in natural speed without audio and with rewind option looking for recurrences, systematics and peculiarities in eye movements thereby writing a chronological protocol of movements. Secondly, I watched the whole video of the visitor E1 in natural speed but this time with audio and rewinding to look for recurrences, systematics and peculiarities in eye movements and the visitor's particular reporting thereby writing a chronological protocol of movements and issues. Thirdly, I organized and classified these two protocols into issues and movements. Fourthly, I watched randomly selected parts of all other MET videos in natural speed across all other participants with and without audio and again with rewind option looking for further recurrences, systematics and peculiarities in eye movements and their particular reporting. Note that the MET videos were not yet cut according to the sections at this time. Then I completed the list of issues and movements. In sum, I identified 15 distinct, recurrent and systematic movement patterns in this first phase of analysis.

The movement patterns identified in the first phase of analysis were defined and operationalized so that I was able to successfully confirm them with systematic observation. Due to their different affordances four sections within the "South Sea Oases: Life and Survival in the Western Pacific" exhibition were selected (see *Chapter 5*). These sections were described in *Chapter 3*:

Section 1: The Men's House Model from Palau

Section 2: The Original Outrigger Fishing Canoe from Yap

Section 3: The Homogenous Display Cabinet

Section 4: The Heterogeneous Display Cabinet

Phase two:

After the systematic observation study was conducted (see *Chapter 5*), the second phase of MET data analysis began. Now, I analysed the MET video sequences at the four selected sections. Therefore, I cut the MET videos according to the selected sections. Then I watched the videos in natural speed without audio and with rewind option looking for the frequency of the 15 movement patterns identified in phase one, additionally I was looking for further recurrences, systematics and peculiarities. Three further movement patterns were identified in this second phase of analysis. Hence, in sum I identified 18 movement patterns in the MET study in "South Sea Oases: Life and Survival in the Western Pacific" exhibition. Thereby I give no claims to completeness as I assume that further movement patterns will be identified in other exhibitions.

Phase three:

In this phase, I conducted a content analysis of the CRR based on the list of reported issues developed in phase one (see *paragraph 4.3.*).

Phase four:

Then I analysed the videos with audio for one expert and one novice to provide examples of movement patterns and the accompanying cognitive processing demonstrated in the CRR (see paragraph 4.4.). Therefore, the prototypical examples were selected due to the following criteria:

- Differences between visitor groups (single expert versus single novice)
- Typical contrasting examples
- Demonstrate several movement patterns

Hence, I selected one expert (E1) and one novice (N1) as representatives.

Phase five:

At last, I interpreted the 18 movement patterns regarding their possible functions and classified them into four different tasks, which are orientation, strolling around and involvement with exhibits and social interaction with other human beings.

This chapter reports the results of all five phases of analysis. Unfortunately, the video quality of the ASL Mobile Eye was poor. Nevertheless, the quality was good enough to detect the distinct, recurrent and systematic movement patterns. For a critical reflection about the methods and technologies read *Chapter 7*.

4.2.   General Description of Movement Patterns

This section will provide a general description of the movement patterns. Hence, it includes my general definition of the term (eye) movement patterns and a general description of the 18 movement patterns with links to examples on a DVD. Furthermore it provides the frequencies of each movement patterns across the four selected sections, the total numbers of movement patterns at each section and for experts and novices as well as a comparison between experts and novices at section 3 ("The Homogenous Display Cabinet") within the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in 2010.

4.2.1.   General Definition of Movement Patterns

First, why do I call these movement patterns '(eye) movement patterns' and not gaze patterns or scan patterns or scan paths?

Firstly, I term them "patterns" because I want to stress the anthropological approach of cultural relativism represented by Ruth Benedict. She (1934/2005: 46) asserts in her revolutionary book *Patterns of Culture*: "A culture, like an individual, is a more or less consistent pattern of thought and action". Museum visits are part of so-called particular incorporated and learned cultural patterns in parts of our society as Bourdieu appropriately

pointed out in *The Love of Art* (1969/1997). Hence, viewing patterns are probably different across cultures. The psychologist Nisbett and his colleagues demonstrated the first empirical evidence based on eye tracking for this so-called culture-cognition connection in attention processes (Chua, Boland & Nisbett 2005). In their article *Cultural Variation in Eye Movements during Scene Perception,* they apply eye tracking for figuring out differences in movement patterns between Chinese and European/American graduate students viewing pictures. These reported differences in fixations and saccades make it evident that scene perception is culturally shaped because, as discussed in *Chapter 1*, eye movements are unconscious and can hardly be manipulated. Hence as a socio-cultural anthropologist I have to assume that the movement patterns I figured out (see below) are probably cultural-dependent and have to be proven cross-culturally as well.

Secondly, I initially termed them "(eye) movements" with 'eye' in brackets because I want to stress that these patterns could be performed not only solely with the eyes but also with the head, the trunk or even the whole body in a three-dimensional space.

Thirdly, I initially termed them "(eye) movements" with 'eye' in brackets because I want to confirm them with observation, and with external observation, I have to deduce these patterns from observable movements of the head, the trunk or the whole body (for a critical reflection about the methods see *Chapter 7*).

Fourthly, I term them "(eye) movements" because this three-dimensional space, a museum gallery, is characterized by appropriation via "strolling and viewing" ("gehen und sehen" Korff & Thiemeyer 2008: 137; cf. Korff 2003) mostly due to the fact that haptic experiences are usually rare in exhibitions or even excluded in my visitor research. As mentioned above visitors can 'touch' exhibits with their gaze, because they can read labels and text panels as well as view exhibits and even entire exhibitions themselves by performing particular movement patterns. These different forms of movement patterns belong to different affordances of the different exhibits and display cabinets, which likely shapes the museum experience.

4.2.2. Description of Particular Movement Patterns

The movement patterns will be described in a list below. This list contains the definition, presumed functions without giving claims of completeness, examples of accompanying cognitive processes and links to a DVD with video examples of the 18 movement patterns without audio and with audio reporting to demonstrate the accompanying cognitive processes. This list is the result of all phases of analysis described above.

The 15 movement patterns in bold print were identified in the first phase of analysis. The three movement patterns in italic and bold print were identified in the second phase of analysis. Note that these movement patterns are not part of the descriptive statistics as these movement patterns were identified later on in the process of analysis.

The discovery of movement patterns varied: some movement patterns really popped out of the video material like the "Insight" that is described as visitors are looking inside an exhibit that has an opening. The visitors themselves described some movement patterns, such as the "Major Orientation Gaze" that is performed when entering a new gallery.

Other movement patterns were described firstly as a sequence of movements and are classified as one movement pattern later on. For example, the "Changing Perspective" movement pattern is described as viewing one exhibit from different perspectives in the three dimensional gallery. Here, I will describe how I identified the movement pattern "Changing Perspective" in order to provide an example of how I identified the movement patterns in general. The "Changing Perspective" movement pattern was identified in the first phase of analysis. I first noticed this pattern while watching a video sequence of a female visitor viewing the masks that were hung at the back wall of Gallery 3 "Deities and Spirits" (see Figure 10). As mentioned above I firstly watched the videos without audio. I watched how this female visitor firstly approached the right mask more closely, hence she moved with her completely body towards this mask. Secondly, she viewed the mask from the front. Thirdly, she moved her body to see behind the mask. In the end, she moved backwards to look at the front of the mask once again. In the next step, I watched the video with audio. The reporting in retrospection at this mask proved that this sequence of movements belong together. The visitor reported that she was interested "how the mask was hung". Further video sequences demonstrated that these movements form one particular movement pattern. Figure 50 and 51 show a "Changing Perspective" movement pattern at a hanging comb within "The Heterogeneous Display Cabinet". This proves that it does not matter, if the exhibits are

presented within a display cabinet or freestanding. The relevant factor is, if the exhibit is presented hanging or not. In the end, after several samples I was able to define the sequence of movements that are performed to view a hanging exhibit from different perspectives as the "Changing Perspective" movement pattern. This movement pattern is a parade example for the viewing possibilities in a three-dimensional exhibition space in contrast to viewing a TV or computer screen presenting pictures and movies.

Other movement patterns are based on previous research such as "Window Shopping" (Treinen 1988), or "Long Gaze" (Aleida Assmann 1995) or "Alternating Gaze" and gazes for orientation and overview that were either named as such or described already by Mayr et al. (2009). These movement patterns were already described in *Chapter 2, paragraph 2.2. Appropriation in Museum Exhibitions*.

The examples of the accompanying cognitive processes identified in the CRR are the results of the third phase; typical examples are provided below. As a last step, I interpreted these movement patterns as task-oriented patterns and I classified them into four categories indicated by asterisks (*):

Movement Patterns and Orientation*

Movement Patterns and Strolling**

Movement Patterns and Exhibits***

Movement Patterns and Human Beings****

List of Movement Patterns in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition

First, note that this list is incomplete. Further movement patterns were identified in the "nexus" exhibition at the LiMo. All movement patterns are reciprocally excluded.

1) **Movement Patterns and Orientation***

- **Major Orientation Gaze** (cf. Mayr et al. 2009; see *Chapter 2*)

  Definition and presumed possible functions:

  The visitor stands at one point or walks slowly and looks around thereby the visitor moves her eyes and her head in order to view a greater part of the gallery. Possibly, she also moves her trunk and body. This movement pattern serves to orientate oneself initially in a three-dimensional space/gallery or a greater part of a three dimensional space/gallery.

  Example of Cognitive Processes (CRR-Protocols):

  N1 at the beginning of the exhibition:

  "Firstly, I had to orientate myself"

  MET Video Example:

  DVD: MET Linden-Museum 2010_KEA > Orientation > Major Orientation Gaze

- **Minor Orientation Gaze** (cf. Mayr et al. 2009; see *Chapter 2)*

  Definition and presumed possible functions:

  The visitor stands at one point or walks slowly and looks around thereby the visitor moves her eyes and possibly her head and trunk in order to view a smaller part of the gallery. This movement pattern serves to orientate oneself in a smaller part of a three-dimensional space like one part of a gallery (one exhibit, one display cabinet, an ensemble of paintings, one installation, one diorama, one text panel) in order to get an overview.

  Example of Cognitive Processes (CRR-Protocols):

  E4 at section 3 "The Homogenous Display Cabinet":

  "Are they appreciated highly?"

  MET Video Example:

  DVD: MET Linden-Museum 2010_KEA > Orientation > Minor Orientation Gaze

- **Backward Gaze**

Definition and presumed possible functions:

The visitor stands at one point of the three dimensional gallery space and turns back her head or possibly her trunk and body in order to view a part of the gallery she already viewed before. This is a short movement backwards and forwards again. This movement pattern is probably performed to compare new information with older information.

Example of Cognitive Processes (CRR-Protocols):

E1 at section 4 "The Heterogeneous Display Cabinet":

"Ah, yes, exactly, at that moment I, exactly, till that moment I wondered what the structure (of the exhibition is like)"

MET Video Example:

DVD: MET Linden-Museum 2010_KEA > Orientation > Backward Gaze

- *Forward Gaze*

Definition and presumed possible functions:

The visitor stands at one point of the three dimensional gallery space and turns her head or possibly her trunk in order to view a part of the gallery ahead or besides her which she has not yet viewed in detail before. This is a short movement forwards and backwards again. This movement pattern is probably performed to look for new issues.

Example of Cognitive Processes (CRR-Protocols):

N5 at section 4"The Heterogeneous Display Cabinet":

"Or no, now firstly again away, apparently not yet"

MET Video Example:

DVD: MET Linden-Museum 2010_KEA > Orientation > Forward Gaze

2) **Movement Patterns and Strolling****

- **Window Shopping** (based on Treinen 1988; see *Chapter 2*)

  Definition and presumed possible functions:

  The visitor walks along one display cabinet and moves her head and possibly partially or completely her trunk at the side of the display cabinet while walking along it. This movement pattern is performed to view display cases while walking along it probably to get "only" the gist of the display.

  Example of Cognitive Processes (CRR-Protocols):

  N1 at section 3 "The Homogenous Display Cabinet":

  "Yes, textiles, quick way through"

  MET Video Example:

  DVD: MET Linden-Museum 2010_KEA > Strolling > Window Shopping

- **Wandering Along**

  Definition and presumed possible functions:

  The visitor walks along a freestanding exhibit, moves her head and may mover her trunk possibly partially or completely to one side of the exhibit while walking along it. This pattern is similar to "Window Shopping". The only difference is that "Window Shopping" is performed at a window, hence a display cabinet, and "Wandering Along" is performed at freestanding exhibits that are not placed in a display cabinet. This movement pattern is performed to view a freestanding exhibit while walking along or around it probably to get "only" the gist of a display.

  Example of Cognitive Processes (CRR-Protocols):

  E1 at section 1 "The Men's House Model from Palau":

  "Right, what was it? One – I think – one rooster, or? That was on it or even many; here along the bottom"

  MET Video Example:

  DVD: MET Linden-Museum 2010_KEA > Strolling > Wandering Along

- **Turn**

Definition and presumed possible functions:

The visitor stands or walks and turns with her whole body into a different direction then the one she walked or stood before. This movement patterns is connected to movement patterns of orientation and alternation.

Example of Cognitive Processes (CRR-Protocols):

N2 at section 2 "The Original Outrigger Fishing Canoe from Yap":

"I do that again because I am also interested in that picture or rather exhibit"

MET Video Example:

DVD: MET Linden-Museum 2010_KEA > Strolling > Turn

- *Fixation Walk*

Definition and presumed possible functions:

This gaze starts while standing or walking. Then the visitor fixates one exhibit/display cabinet/diorama/installation/text panel etc. from far away and walks straight to it moving her body without moving her head. This movement patterns is probably performed to issues and exhibits that attract visitors even from far away. This movement patterns is probably connected (not only but also) to landmark objects.

Example of Cognitive Processes (CRR-Protocols):

E2 at section 2 "The Original Outrigger Fishing Canoe from Yap":

"Right, I think now, right there are the pictures: about the people who (AFTERWARDS: built that ship. Then I had to think of a book by Nigel Barley – how was it called again? – "Hello Mr. Puttyman", where he conducted research in Indonesia, brought a group of people to England afterwards and let them build a rice house – I do not know what kind of house it was anymore – in the national museum. DEEP BREATH I don't know what my opinion is on that)"

MET Video Example:

DVD: MET Linden-Museum 2010_KEA > Strolling > Fixation Walk

3) *Movement Patterns and Exhibits****

- **Reading Text Panel**

  Definition and presumed possible functions:

  The visitor stands at one point and reads the text panel therefore; she moves her eyes and possibly her head. This movement pattern is performed to gain further information.

  Example of Cognitive Processes (CRR-Protocols):

  E1 at section 4 "The Heterogeneous Display Cabinet":

  "Still reading text and (E1 laughs and claps his hands) come on – (BREAK) – Right, somewhere it is mentioned in the text that these combs are readily decorated with feathers also. I am not sure anymore, I think, (feathers) from the frigate bird"

  MET Video Example:

  DVD: MET Linden-Museum 2010_KEA > Exhibits > Reading Text Panel

- **Reading Labels**

  Definition and presumed possible functions:

  The visitor stands at one point and reads labels therefore, she moves her eyes. This movement pattern is performed to gain further information about one particular exhibit.

  Example of Cognitive Processes (CRR-Protocols):

  E4 at section 4 "The Heterogeneous Display Cabinet":

  "Ah, right, I found that exciting also, there it was written 'women's money', these flat bowls"

  MET Video Example:

  DVD: MET Linden-Museum 2010_KEA > Exhibits > Reading Labels

- **Long Gaze** (based on Aleida Assmann 1995; see *Chapter 2*)

  Definition and presumed possible functions:

  The visitor stands or sits down and views one exhibit for a long time (at least 3 seconds or even longer) without moving her head or body and without moving her eyes too much. Assmann (1995) describes this gaze as a "fascinated gaze" that stares

contemplatively at the materiality of the world without transforming it (into knowledge).

This pattern could be classified differently in the MET study than in the observation study because generally the eye moves in a zigzag fashion and does not stop moving for such a long time (see *Chapter 1*). The external observer could miss other movement patterns that are performed solely with the eyes, because the observer can only observe head and body movements (more about the pros and cons of these two methods in *Chapter 7*).

Example of Cognitive Processes (CRR-Protocols):

N4 at section 2 "The Original Outrigger Fishing Canoe from Yap":

(BEFORE: "And there were two big pictures where the boat was presented in action so to speak. I found that left picture very beautiful – it looked really like holidays.) Yes, exactly this one"

MET Video Example:

DVD: MET Linden-Museum 2010_KEA > Exhibits > Long Gaze

- **Insight**

  Definition and presumed possible functions:

  The visitor stands and looks inside an exhibit with an opening that is displayed close to the front wall of a display cabinet or freestanding. Therefore, firstly she moves likely her trunk and her head towards an aperture of the exhibit; hence firstly, performs a "Zooming Closer" in order to have a look inside, secondly. This movement pattern is probably performed due to curiosity and interest about the inside part of an exhibit.

  During an "Insight", other movement patterns are possible at the same time. Therefore, only the insight is classified in the analysis and the parallel movement patterns have not been classified because the insight is in the foreground.

  Example of Cognitive Processes (CRR-Protocols):

  N1 at section 1 "Men's House Model from Palau":

"There one can view an indentation in the floor. Well, it is poorly visible in the film now, but there is an indentation in the house"

MET Video Example:

DVD: MET Linden-Museum 2010_KEA > Exhibits > Insight

- **Changing Perspective**

  Definition and presumed possible functions:

The visitor stands at one hanging exhibit (freestanding or in a display cabinet) and moves her head and/or trunk to view the exhibit from different perspectives. Alternatively, the visitor walks a bit around a freestanding exhibit thereby moving her body and head to view the exhibit from different perspectives. This pattern is the parade example of movement patterns in a three-dimensional space. It is probably performed due to curiosity about viewing a hanging exhibit from multiple perspectives.

Example of Cognitive Processes (CRR-Protocols):

E1 at section 4 "The Heterogeneous Display Cabinet":

"This one I viewed a tick longer. And shortly back again to the comb, right then I wondered how this, this, I think it was a bone…"

Later on while viewing the head inchworm:

"…this part where there was a decoration element, where the wing is attached, with a grasp of the comb or well it is not a grasp at all, it is some kind of shaft because actually the comb was stuck into the hair, how these are fixed together, tied up with each other"

MET Video Example:

DVD: MET Linden-Museum 2010_KEA > Exhibits > Changing Perspective

- **Object Scan**

  Definition and presumed possible functions:

  The visitor stands or walks and scans with her eyes the shape of an exhibit or part of a bigger exhibit thereby moving solely her eyes or eyes and head and possibly her trunk/whole body as well. This movement pattern is probably performed to realise the (dimension of the) whole exhibit or part of a bigger exhibit.

  Example of Cognitive Processes (CRR-Protocols):

  N2 at section 2 "The Original Outrigger Fishing Canoe from Yap":

  "How the people sat down on it?"

  MET Video Example:

  DVD: MET Linden-Museum 2010_KEA > Exhibits > Object Scan

- **Alternating Gaze**

  Definition and presumed possible functions:

  The visitor stands at one point and moves her eyes and possibly her head and her trunk quickly back and forth (i) between an exhibit and its label or (ii) between a text panel and exhibits or (iii) between two different exhibits either freestanding or placed in a display cabinet).

  Again, this is a movement pattern that could be classified differently by observation or MET analysis because eye movements that are done without head and body movements are not observable by an external observer (more about the pros and cons of these two methods in *Chapter 7*). This movement pattern is probably performed to compare exhibits or combine information about exhibits with exhibits. Mayr et al. (2009: 116) already described "alternate fixation of objects" for "semantic information or information about design".

  Example of Cognitive Processes (CRR-Protocols):

  (i)   Label_Exhibit:

  N4 at section 4 "The Heterogeneous Display Cabinet":

  "And that money, well these are gemstones"

(ii)   Text Panel_Exhibit:

E1 at section 4 "The Heterogeneous Display Cabinet":

"Yes then I know at least what it is about"

(iii)   Between Exhibits:

N4 at section 4 "The Heterogeneous Display Cabinet"; several alternating gazes in succession):

"Admittedly I don't know anymore what it was, but there were feathers from such a frigate bird and they were curled and I found that totally…I never saw that before that is why I looked at it carefully"

MET Video Examples:

DVD: MET Linden-Museum 2010_KEA > Exhibits > Alternating Gazes

- **Zooming Closer**
  Definition and presumed possible functions:
  The visitor stands at one exhibit (freestanding or in a display cabinet) and zooms closer therefore her head and trunk move forward to the exhibit. This movement pattern is probably performed to have a closer look. "Zooming Closer" and "Insights" are connected with each other.
  Example of Cognitive Processes (CRR-Protocols):
  N4 at section 3 "Homogenous Display Cabinet":
  "…long. That's why I looked up because I wanted to see how long they are".
  MET Video Example:
  DVD: MET Linden-Museum 2010_KEA > Exhibits > Zooming Closer

- *Zooming Further Afar*
  Definition and presumed possible functions:
  The visitor stands at one exhibit (freestanding or in a display cabinet) and zooms further afar therefore her head and trunk move backward from the exhibit or even her whole body. This movement pattern is performed to view the exhibit from a distance/further afar.

Example of Cognitive Processes (CRR-Protocols):

E4 at section 3 "Homogenous Display Cabinet" (no report while Zooming Further Afar but shortly before she reported):

"Here one can see very nicely how this was woven. I appreciate that this (weaving example) was presented so that it was possible to imagine how these are made. And it looks like a lot of work".

MET Video Example:

DVD: MET Linden-Museum 2010_KEA > Exhibits > Zooming Further Afar

4) *Movement Patterns and Human Beings*****

- **Social Gaze**

   Definition and presumed possible functions:

   The visitor moves either solely her eyes or additionally her head, her trunk, or even her whole body towards other human beings. Social Gazes are gazes to other human beings, be it other visitors or museum attendants etc. They are probably performed due to curiosity, interest or because the attention on exhibits is interrupted by the appearance of other human beings.

   Example of Cognitive Processes (CRR-Protocols):

   E2 at section 1 "Men's House Model from Palau":

   "Right, there are the two with their audio guides".

   MET Video Example:

   DVD: MET Linden-Museum 2010_KEA > Human Beings > Social Gaze

This list demonstrates the variability and particularities of the visitors' viewing behaviours from their own perspective, their native's point of viewing exhibitions.

4.2.3. Frequencies of Movement Patterns

Due to the explorative approach, technical problems and exhausted visitors (see *Chapter 7*), there are not full samples of participating visitors at each section. Thus, I can draw only

cautious conclusions about the affordances of each section and the suggestions for deliberate exhibition design in providing the frequencies of the 15 movement patterns figured out in the second phase of analysis. As a reminder, I only provide the frequencies of the 15 movement patterns and not all 18 movement patterns for reasons of comparability with the observation study presented in *Chapter 5*. This observation study was conducted in between the first phase of MET data analysis that identified 15 movement patterns and the second phase that analysed the frequencies of the first 15 movement patterns and identified three further ones.

- *Comparison of (Eye) Movement Patterns Frequencies across All Four Sections*

As Table 3 shows, some movement patterns were more often performed than others. There seems to be a ranking of more or less frequently performed movement patterns. Thus, some affordances are more likely perceived as other affordances. Hence, some affordances are more subtle or silent, whereas some are more stuck out. The movement patterns can be grouped in four categories. These four categories are defined by frequencies into **most frequent (≥ 20)**, *frequent (19-10)*, less frequent (9-1) and none (0).

Note that although the duration is not evaluated, these frequencies correlate with a certain amount of time for performing each movement pattern. Because certainly one cannot not view the exhibition. Thus, the performance of more frequent movement patterns also means a longer duration at the respective section. Furthermore, note that these frequencies are aggregated frequency rates across all participating visitors. Thus, I do not concentrate on single visitors but on particular movement patterns that were evoked by particular perceived affordances. The frequency rates of the movement patterns thus tell us which affordances are more likely to be perceived and reacted onto.

Category	Movement Patterns	Section 1: The Men's House Model from Palau (N=7)	Section 2: The Original Outrigger Fishing Canoe from Yap (N=6)	Section 3: The Homo-genous Display Cabinet (N=8)	Section 4: The Hetero-geneous Display Cabinet (N=7)
Movement Patterns and Orientation*	Major Orientation Gaze	1	0	0	2
	Minor Orientation Gaze	**21**	**24**	**37**	**149**
	Backward Gaze	1	3	6	3
Movement Patterns and Strolling**	Window Shopping	0	0	*13*	**46**
	Wandering Along	8	*13*	2	0
	Turn	**21**	**36**	**22**	*19*
Movement Patterns and Exhibits***	Reading Text Panel	0	*11*	*12*	40
	Reading Labels	3	0	**35**	**143**
	Long Gaze	4	*16*	*15*	22
	Insight	*13*	*12*	0	0
	Changing Perspective	2	3	*14*	9
	Object Scan	0	8	7	5
	Alternating Gaze	1	2	**51**	**82**
	Zooming Closer	*16*	*13*	29	35
Movement Patterns and Human Beings****	Social Gaze	4	3	5	1
Other Movement Patterns		**26**	**42**	**39**	**136**

Table 3: Comparison of Movement Patterns Frequencies across All Four Sections of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

Movement Patterns and Orientation*

- **Major Orientation Gaze:**

  "Major Orientation Gazes" are performed rarely or never. This pattern is rather performed when entering a gallery/room. Nevertheless, all the selected sections are not at the entrance of a new gallery.

- **Minor Orientation Gaze:**

  Obviously, "Minor Orientation Gazes" are the most frequent movement patterns. Orientation in a smaller part of the exhibition seems to be an important issue for museum visitors to navigate through exhibitions and select exhibits for a more detailed appropriation.

- **Backward Gaze:**

  "Backward Gazes" are not as important for orientation as "Minor Orientation Gazes". This phenomenon is probably part of the avoidance of backtracking in circulation through a gallery as reported by Bitgood (2006; see *Chapter 1*).

Movement Patterns and Strolling**

- **Window Shopping**

  As Treinen (1988) already presumed correctly, display cabinets invite active snoozing and are often walked along without carefully viewing the exhibits within them. The length of a display cabinet seems to play a crucial role. Hence, if one wants visitors to perform less "Window Shopping" the display cabinet should be shorter.

- **Wandering Along**

  "Wandering Along", hence walking along a display cabinet without looking at it is performed seldom. As I will show exemplarily later on, it seems as if "Window Shopping" and "Wandering Along" are enough to get the gist of the displayed exhibits.

- **Turn**

  "Turns" are performed more often than other patterns of strolling like "Window Shopping" or "Wandering Along". "Turns" seem to be connected with orientation and "Alternating Gazes". Hence, they are performed more often. A heterogeneous display cabinet seems to minimize "Turns", probably because there are enough new exhibits to explore on the way along it. Therefore, less "Turns" are necessary. Thus "Turns" are a

good example that "saving steps" as a principle (Bitgood 2006) cannot explain every phenomenon encountered in exhibitions.

Movement Patterns and Exhibits***

- **Reading Text Panel**

  "Reading Text Panels" is performed more often, if the text panel is put closely to the respective exhibits. Thus, the conclusion for text panels is easy. Put it as close as possible to the related exhibits.

- **Reading Labels**

  "Reading Labels" is more often performed than "Reading Text Panels", probably because there are more labels than text panels. Apart from that, it seems that a heterogeneous presentation leads to more label reading than a homogenous presentation.

- **Long Gaze**

  Although photo shows on screens and special exhibits like the weaving example certainly invite visitors to perform "Long Gazes", a heterogeneous presentation invites "Long Gazes" the most. Hence, a heterogeneous presentation puts original exhibits in the middle of visitors' attention.

- **Insight**

  If exhibition makers want visitors to get a look inside an exhibit, they must present it freestanding or at least close to the front-wall of a display cabinet.

- **Changing Perspective**

  Although freestanding exhibits provide more options for viewing the three dimensions of an exhibit, "Changing Perspective" seems to be rather connected with hanging exhibits. "The Homogenous Display Cabinet" presented many exhibits hanging. Hence changing perspective is more often performed than at the other sections. "Changing Perspective" is a good example of one of the most important and distinguishing features that characterizes an exhibition visit compared to other mass media: the ability to go off and to explore in multiple possible ways and from a number of perspectives.

- **Object Scan**

  "Object Scans" seem to be performed at long lines of an exhibit, especially if the exhibit has a huge size like "The Original Outrigger Fishing Canoe from Yap".

- **Alternating Gaze**

  "Alternating Gazes" seem to be more possible and important for comparisons between exhibits, exhibits and their labels and exhibits and text panels displayed in display cabinets than for the single freestanding exhibits.

- **Zooming Closer**

  As one might expect display cabinets limit "Zooming Closer", but obviously do not prevent it. In contrast, even more "Zooming Closer" is performed at display cabinets. Maybe the limitation of the display cabinet not only provides security for the exhibits but also for the visitors.

Movement Patterns and Human Beings***

- **Social Gaze**

  "Social Gazes" are not connected with the affordances of the exhibit or the exhibition but with the occurrence of other people being around. "Social Gazes" are performed only rarely. One reason might be that only a few other museum visitors were around. Another reason might be the perception of other human beings in the periphery of the eye that is not captured by the single lens camera. Another reason might be the perception of other human beings by other senses like hearing them. An additional reason might be the task-oriented and socially desirable behaviour of the studied museum visitors viewing the exhibition and not human beings and because a museum visit is about "things" rather than about other "human beings" around.

Other Movement Patterns

Note that this big residual category "Other Movement Patterns" is connected to the different phases of analysis. This category includes all movement patterns identified in the second phase of analysis when I looked for the frequencies of the 15 movement patterns of phase one and occurrences of further movement patterns. Thus, the category "Other Movement Patterns" includes the three movement patterns: "Forward Gaze", "Fixation Walk" and "Zooming Further Afar". For a more detailed description of movement, pattern frequencies at each section please read the *appendices 10.2*.

- *Comparison of Total Numbers between the Sections:*

Section	Total numbers of movement patterns
Section 1: The Men's House Model from Palau (N = 7)	121
Section 2: The Original Outrigger Fishing Canoe from Yap (N = 6)	187
Section 3: The Homogenous Display Cabinet (N = 8)	287
Section 4: The Heterogeneous Display Cabinet (N = 7)	692

Table 4: Total numbers of movement patterns at each section of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

The comparison of the total numbers of movement patterns across all four sections (see Table 4) shows that although firstly, the samples are not full and small anyway, and secondly, there is a relation between the size of an exhibit/display cabinet and the frequency of movement patterns, there is an evident difference between the display cabinets (section 3 see Figure 25 and section 4 see Figure 26) and the freestanding exhibits (section 1 see Figures 19-21 and section 2 see Figures 23 and 24). More movement patterns are performed at the display cabinets. This is rather surprising because due to the display in display cabinets one would suppose that there is less affordance compared to freestanding exhibits. Nevertheless, it rather seems that although exhibits are displayed behind glass walls of display cabinets, it is possible to explore, appropriate them in a great variability. Probably the limitation of the display cabinet due to its walls not only provides security for the exhibits but also for the visitors. Due to this feeling or affordance of security might lead to a more relaxed and hence multi-faceted appropriation by particular movement patterns. These assumptions need further empirical validation in future visitor studies.

Another difference exists between "The Homogenous Display Cabinet" (section 3 see Figure 25) and "The Heterogeneous Display Cabinet" (section 4 see Figure 26): more movement patterns are performed at the display cabinet showing a broad range of different exhibits. First of all this result corresponds to the length of the display cabinet but secondly, the frequency

rates are too different to be just corresponding to the length of the display cabinets. Hence, it seems that a heterogeneous class of exhibits leads to more possible affordances and hence to more active visitor behaviour than a homogeneous class of exhibits in display cabinets. In sum: active visitor behaviours depend on the kind of presentation within a display cabinet.

- *Comparison of Total Numbers between Experts and Novices*

Section	Experts	Novices
1: The Men's House Model from Palau	73 (N = 4)	48 (N = 3)
2: The Original Outrigger Fishing Canoe from Yap	47 (N = 2)	140 (N = 4)
3: The Homogenous Display Cabinet	173 (N = 4)	114 (N = 4)
4: The Heterogeneous Display Cabinet	478 (N = 4)	214 (N = 3)

Table 5: Total numbers of movement patterns performed by experts and novices at each section of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

As there are not full samples for each condition and the samples are very small anyway (see Table 5), I only can speak of a possible tendency that experts presumably perform more movement patterns than novices. Hence, it seems that experts are more active visitors than novices.

As there are only full samples at section 3, "The Homogenous Display Cabinet", I will compare the different groups (experts vs. novices) here exemplarily:

- *Exemplary Detailed Comparison between Experts and Novices at Section 3 – The Homogenous Display Cabinet*

Exemplary Comparison between Experts and Novices at Section 3 – The Homogenous Display Cabinet:		MET Distribution Experts (N = 4)	MET Distribution Novices (N = 4)
Movement Patterns and Orientation*	Major Orientation Gaze	0	0
	Minor Orientation Gaze	**25**	*12*
	Backward Gaze	5	1
Movement Patterns and Strolling**	Window Shopping	7	6
	Wandering Along	2	0
	Turn	*10*	*12*
Movement Patterns and Exhibits***	Reading Text Panel	6	6
	Reading Labels	*18*	*17*
	Long Gaze	*12*	3
	Insight	0	0
	Changing Perspective	5	9
	Object Scan	4	3
	Alternating Gaze	**32**	*19*
	Zooming Closer	*18*	*11*
Movement Patterns and Human Beings****	Social Gaze	5	0
Other Movement Patterns (identified in the second phase of analysis)		**24**	*15*

Table 6: MET Study results – Comparison of Movement Patterns Distribution Section 3 (The Homogenous Display Cabinet) between Experts and Novices of the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum in Stuttgart

As in the general comparison of frequencies regarding experts and novices at each section, the same is valid for section 3 ("The Homogenous Display Cabinet"; see Table 6): experts perform more movement patterns than novices. Further differences can be identified: although "Alternating Gazes" are top movement patterns for experts and novices, experts perform a lot more "Alternating Gazes". Similarly, experts perform "Long Gazes" much more often. Hence

experts are much more involved in appropriating exhibits and knowledge. This more intense involvement with the exhibits needs more "Minor Orientation Gazes" in advance for selection of exhibits. Accordingly, experts also perform more "Minor Orientation Gazes" than novices. Another important result is that experts seem not only following the stick out affordance of a display cabinet: "Window Shopping". In contrast, they also wander along the display cabinet without looking at it and thus follow affordances that are more silent. Despite these differences, the movement behaviour of experts and novices is similar.

4.3. Cued Retrospective Reporting

The main difference between expert and novice visitors is the previous knowledge of the experts. This reflects the selection of the visitors. For detailed results of the CRR, see *Appendices 10.3*. Here a summary of the quantity of reporting shall suffice to demonstrate the difference between expert and novice visitors.

Total numbers of CRR by Experts and Novices:

Section	Experts	Novices
Section 1: The Men's House Model from Palau	24 (N = 4)	30 (N = 3)
Section 2: The Original Outrigger Fishing Canoe from Yap	27 (N = 2)	69 (N = 4)
Section 3: The Homogenous Display Cabinet	104 (N = 4)	46 (N = 4)
Section 4: The Heterogeneous Display Cabinet	214 (N = 4)	88 (N = 3)

Table 7: Total numbers of CRR at each section of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

Despite the irregular sample sizes across the four sections it is evident (see Table 7) that firstly, in total numbers experts verbalize more than novices in general and especially at the display cabinets and secondly, experts and novices both together verbalize the most at section 4 ("The Heterogeneous Display Cabinet"). This is in line with the frequency rates of the movement patterns. Hence, in sum, experts are more actively appropriating and processing the displayed issues and exhibits than the novices.

4.4. Individual Movement Patterns and Cognitive Processes: A Comparison between One Expert and One Novice at Each Section

According to the previous results, there are differences between the sections:

- more movement patterns at display cabinets vs. less movement patterns at freestanding exhibits and
- more movement patterns at "The Heterogeneous Display Cabinet" vs. less movement patterns at "The Homogeneous Display Cabinet".

Moreover, there are differences between the visitor groups: experts perform more movement patterns than novices.

Therefore, the prototypical examples in this paragraph were selected due to the following criteria:

- Differences between sections (freestanding versus display cabinet, homogeneous display cabinet versus heterogeneous display cabinet)
- Differences between visitors (single expert versus single novice)
- Typical contrasting examples
- Demonstrate several movement patterns

Hence, I selected one expert (E1) and one novice (N1) as representatives because the behaviours of E1 and N1 stand in contrast, they perform several movement patterns and I can compare their viewing behaviours according to the differences between the sections. Remember that E1 is a male expert of social anthropology who is 25 years old and visited the Linden-Museum once. E1 is very interested in the South Sea and completely interested in anthropological museums. N1 is a male mechanical engineer who is 36 years old and visited the Linden-Museum three times. He is interested in the South Sea and in anthropological museums. Now, I provide some examples of movement patterns and CRR combined for these selected museums visitors. According to a detailed description, I will provide the viewing behaviours recorded by the MET with still images out of the MET video data and the cognitive processes described in the CRR with the respective transcripts. Hence, the reader is able to get an impression of the particular movement patterns and the respective cognitive processes that go along with it in the course of viewing each section.

4.4.1. Section 1: The Men's House Model from Palau

E1 (dwell time: 00:25 min.)

Figure 33: Still image 1 – LONG GAZE by expert at "The Men's House Model from Palau"

(BEFORE: *"There I have also, there was written in the text that was on the other side, there it was written*) *something about the ornaments that were, right, what was it? One..."*

Figure 34: Still image 2 – WANDERING ALONG by expert at "The Men's House Model from Palau"

"...- I think – one rooster, or? That was on it or even many; here along the bottom".

N1 (dwell time: 00:12 min.)
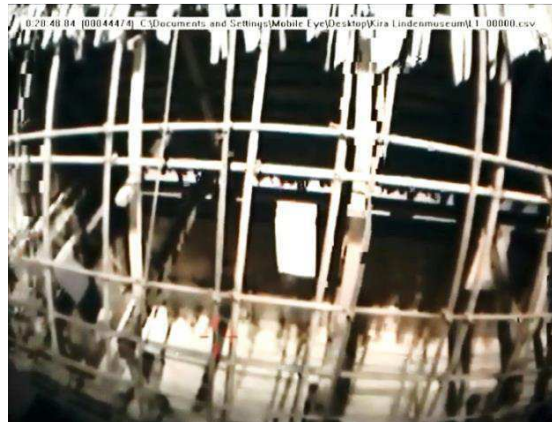
Figure 36: Still image 4 – INSIGHT by novice at "The Men's House Model from Palau"

"There one can view an indentation in the floor. Well, it is poorly visible in the film now, but there is an indentation in the house".

Figure 35: Still image 3 – MINOR ORIENTATION GAZE by expert at "The Men's House Model from Palau"

"Right, but I did comprehend that only at the third or fourth gaze. Firstly, I looked for them at the house where it was mentioned. And then I realized that it is the one ("The Men's House Model from Palau") besides that (galid house)".

Conclusion:

- Confusion with similar looking houses. Hence, the design suggestion is to avoid placing similar looking objects close to each other, especially not, if they demonstrate different issues.
- Details in the house painting invite "Long Gaze" (see Figure 33).
- "Wandering Along" (see Figure 34) is enough to get the gist of the display: the rooster.
- "Minor Orientation Gaze" (see Figure 35) is performed to get an overview of the display.
- The expert spent more time than the novice.

- "Insights" (see Figure 36) are likely performed when visitors walk along the open roof of the men's house model.
- This visitor is an engineer. This is probably the reason for his interest in technical issues like the indentation in the floor.

4.4.2. Section 2: The Original Outrigger Fishing Canoe from Yap

E1 (no data due to technical problems)

N1 (dwell time: 00:30 min.)

Figure 37: Still image 5 – MINOR ORIENTATION GAZE by novice at "The Original Outrigger Fishing Canoe from Yap"

"Right, now I arrived at the boat which I was interested in. Nearly run into it. Luckily there is an indication of water (laughing)".

Figure 38: Still image 6 – OBJECT SCAN Part 1 (from outrigger to canoe) by novice at "The Original Outrigger Fishing Canoe from Yap"

Figure 39: Still image 7 – OBJECT SCAN Part 2 (from outrigger to canoe) by novice at "The Original Outrigger Fishing Canoe from Yap"

"I think this is very interesting now and that it is displayed in original size so to speak".

Conclusion:

- Design suggestion: Exhibits not only can be protected by displaying them in display cabinets but also by using markers like tiny flat platforms (see Figure 37 – 39).
- "Object Scans" (see Figure 38 and 39) are likely performed at big exhibits to get the gist of its size. Size matters for this novice. Like he was interested in the indentation in the floor of "The Men's House Model from Palau", this engineer is interested in technical issues again.

4.4.3. Section 3: The Homogenous Display Cabinet

E1 (dwell time: 3:48 min.)
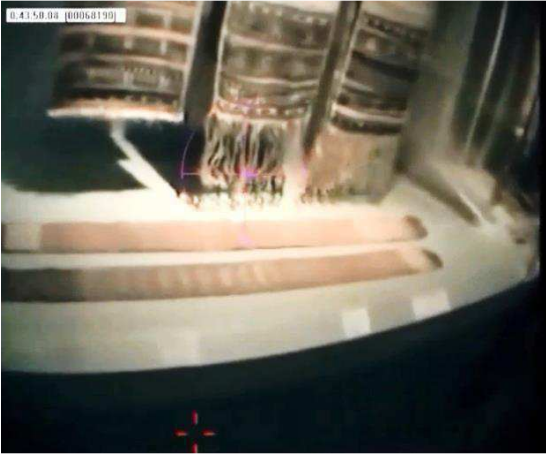
Figures 40: Still image 8 –
ALTERNATING GAZE Part 1 by expert
at "The Homogenous Display Cabinet"

N1 (dwell time: 00:19 min.)

Figure 46: Still image 14 – WINDOW
SHOPPING by novice at "The
Homogenous Display Cabinet"

"Yes, textiles, quick way through"

Figures 41: Still image 9 –
ALTERNATING GAZE Part 2 by expert
at "The Homogenous Display Cabinet"
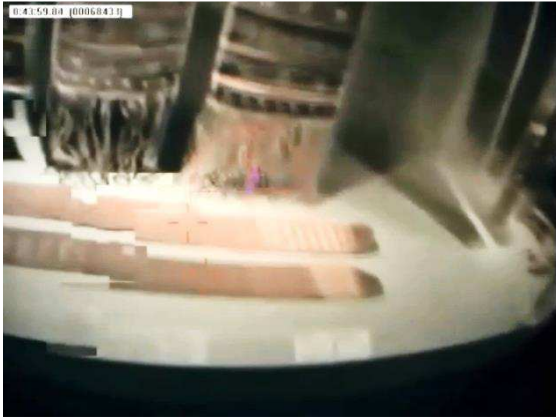
Figures 42: Still image 10 – ALTERNATING GAZE Part 3 by expert at "The Homogenous Display Cabinet"
"Well, I was not completely sure what is what regarding this display cabinet, these two display cabinets besides each other".

Figure 43: Still image 11 – LONG GAZE by expert at "The Homogenous Display Cabinet"

"Right, what I think this was pretty, also pretty tangling, this, this half-finished fabric where one can view at the unfinished part how chaotic it is and, or even these two examples here, how chaotic and detailed it is, how these warp threads are just laying mixed-up"

Figure 44: Still image 12 – ZOOMING CLOSER Part 1 by expert at "The Homogenous Display Cabinet"

Figure 45: Still image 13 – ZOOMING CLOSER Part 2 by expert at "The Homogenous Display Cabinet"

"I am moving closer here and really view this tangle of warps"

Conclusion:

- Here, "Alternating Gazes" (see Figures 40-42) are performed to compare similar looking exhibits. Again the design suggestion is: if you put similar looking objects close to each other, visitors likely get confused.
- This expert is interested in the making of the exhibits. Therefore, he performs a "Long Gaze" (see Figure 43) at the

- The novice is obviously not interested in viewing this display cabinet with the weavings. "Window Shopping" (see Figure 46) was enough to get the gist of the display.

weaving example and a "Zooming Closer" (Figure 44 and 45) at the weaving shuttle.

- The expert spent much more time and performed a lot more and a broader range of different movement patterns at "The Homogenous Display Cabinet" than the novice.

4.4.4. Section 4: The Heterogeneous Display Cabinet

E1 (dwell time: 07:19 min.)
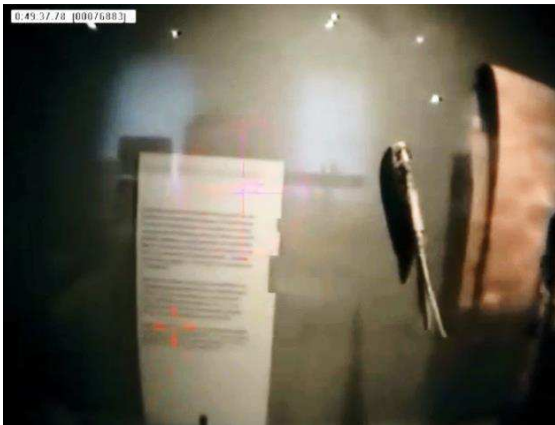
Figure 47: Still image 15 READING TEXT PANEL by expert at "The Heterogeneous Display Cabinet"

"Still reading text and (E1 laughs and claps his hands) come on – (BREAK) – Right, somewhere it is mentioned in the text that these combs are readily decorated with feathers also. I am not sure anymore, I think, (feathers) from the frigate bird".

N1 (dwell time: 01:14 min.)

Figure 56: Still image 24 – WINDOW SHOPPING by novice at "The Heterogeneous Display Cabinet"

"Here, I already decided from a distance – so to speak – due to the design of the exhibition – that this is interesting me less".

Figure 48: Still image 16 –
ALTERNATING GAZE (between combs)
Part 1 by expert at "The Heterogeneous
Display Cabinet"

Figure 49: Still image 17 –
ALTERNATING GAZE (between combs)
Part 2 by expert at "The Heterogeneous
Display Cabinet"

"That was done inexpertly because the combs that are displayed directly in front of the text panel are not decorated like such. There I looked for feathers a bit and did not find them. Only in the next display cabinet there is such a comb that has a tuft on it".

Figure 50: Still image 18 – CHANGING PERSPECTIVE Part 1 by expert at "The Heterogeneous Display Cabinet"

"And now I figured out the comb that really has feathers on it. Right, there it is. This one I viewed a tick longer".

Figure 51: Still image 19 – CHANGING PERSPECTIVE Part 2 by expert at "The Heterogeneous Display Cabinet"

"Then I wondered how this, this, I think it was a bone, (LATER ON WHILE VIEWING HEAD INCHWORM: *this part where there was a decoration element, where the wing is attached, with a grasp of the comb or well it is not a grasp at all, it is some kind of shaft because actually the comb was stuck into the hair, how these are fixed together, tied up with each other.)"*

Figure 52: Still image 20 – MINOR ORIENTATION GAZE by expert at "The Heterogeneous Display Cabinet" (jewellery)

"What got my attention at that moment is that the feathers are also artfully cut back so to speak"
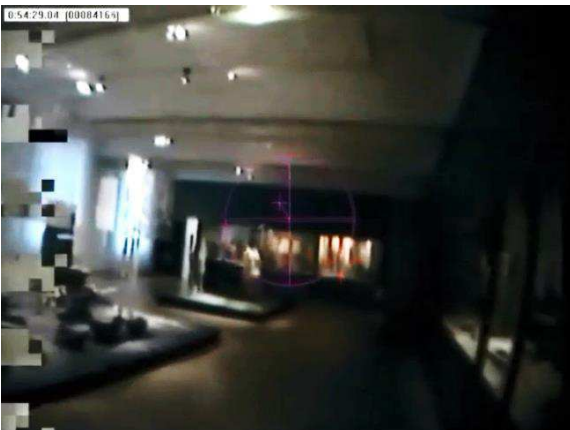
Figure 53: Still image 21 – BACKWARD GAZE by expert at "The Heterogeneous Display Cabinet"

"Ahhh, right! At that moment I, right…"

Figure 54: Still image 22 – ALTERNATING GAZE (between label and exhibit) Part 1 by expert at "The Heterogeneous Display Cabinet"

Figure 55: Still image 23 – ALTERNATING GAZE (between label and exhibit) Part 2 by expert at "The Heterogeneous Display Cabinet"

"…till that moment I wondered what the structure is like exactly, and at that moment I realized that the pieces are displayed according to islands. Well before, I missed that the issues are displayed compact and related and I wondered why at four different display cabinets at four different places textiles as well as combs as well as jewellery are displayed. And in this part I realized that at least these display cabinets are arranged according to islands. Whereas Palau, I think, was presented twice or was interrupted".

Conclusion:

- The expert was focused on the overall structure of the exhibition and one particular theme: the feathers, especially the feathers on the comb.
- The expert criticized the presentation. The combs close to the text panels had no feathers as it was described in the text (see Figure 47). In fact, his memory about the text panel was wrong. Nevertheless again the design suggestion: better put items that belong together close to each other. Additionally, if you want your visitors to read text panels put them as close to the belonging exhibits as possible.
- The expert spent much more time and performed a lot more and a broader range of different movement patterns (see Figure 47-55) at the heterogeneous display cabinet than the novice.

- The novice is not interested viewing this heterogeneous display cabinet with the broad range of exhibits. "Window Shopping" (see Figure 56) is enough to shortly evaluate the exhibits as not interesting for this visitor.

In sum: The expert spent more time, performed more and a broader range of different movement patterns and reported more than the novice, especially at the display cabinets. Hence, the novice is not as much appropriating the sections as the expert. The novice's appropriation of the exhibition is rather simpler or more reduced. The novice is especially interested in the freestanding exhibits with technical aspects. He only seems to be interested in constructional engineering. Probably because he is a mechanical engineer, he is rather interested in exhibits that demonstrate the skilful constructions of Micronesian boat and house building. The expert also acknowledges fine grained handicrafts.

At this point, I can only provide these exemplary examples. The observation study presented in the next chapter also provides general conclusions about visitor behaviour.

4.5. Conclusion

In conclusion, I want to stress firstly, that 18 distinct, recurrent and systematic movement patterns from the visitors' own perspective were identified that are performed to appropriate the temporary "South Sea Oases: Life and Survival in the Western Pacific" exhibition on   the

micro-level. This native's point of viewing exhibitions is characterized by a great variability of movement patterns that can be categorized into four types: movement patterns concerned with (i) orientation, (ii) strolling, (iii) exhibits and (iv) human beings. Thereby the previous findings by Treinen (1988) "cultural window shopping", Aleida Assmann (1995) "long gaze" and Mayr et al (2009) first insights in alternating and orientating gazes (see *Chapter 2*) were successfully proven. Thus applying MET in visitor studies and socio-cultural anthropology provided very new insights into the viewing behaviours of museum visitors. So many distinct movement patterns have not yet been reported in such large numbers and diversity by conventional methods like observation.

This proves that visitors actively appropriate exhibitions by performing a broad range of different movement patterns. These movement patterns shape the museum experience largely with performing increasingly different movement patterns leading to a more elaborate processing and hence deeper experience of the exhibition. By applying MET, the focus is clearly on the visual sense, the bodily and learning experience (for a critical reflection about applying MET read *Chapter 7*).

Secondly, these patterns are performed according to the affordance of an exhibit or the design of an exhibition section. There are differences between freestanding exhibits versus display cabinets, and homogeneous versus heterogeneous display cabinets. Thereby "The Heterogeneous Display Cabinet" leads to appropriation that is more active. Some affordances are more likely to be perceived and hence lead to more particular movement patterns than others. Hence, there are primary, secondary, tertiary and none movement patterns frequencies. There is a clear ranking in perceiving affordances. This is in line with Norman's (2013) finding that signifiers are needed sometimes in design for pointing towards important issues and exhibits when affordances are less likely to be perceived (see also *Chapter 6*). Thus the concept of affordance by Gibson (1979) is a useful concept to study the movement patterns of museum visitors and should be complemented with Norman's (2013) idea of signifiers in the design suggestions later on.

Thirdly, the analysis of cognitive processes expressed in the CRR shows similar results regarding the displayed exhibits and information than the movement patterns analysis. Furthermore the exemplary comparison between the CRR and movement patterns of one expert and one novice shows that their professions influences their agenda and hence their viewing behaviours and cognitive processes. This echoes the selection criteria of how the

experts and novices were selected. The only differentiation that was made was the professions. No further data about the kind of expertise or non-expertise was collected. Due to the small sample, only cautious conclusions can be made about the differences and similarities between experts and novices. This is a clear limitation of the study. Nevertheless, expert visitors are more active, perform a broader range of different movement patterns and react to more silent affordances compared to novice visitors.

Hence, it is likely a combination of design factors/exhibit characteristics and personal characteristics of visitors are determining or affording particular movement patterns, although I focused on frequencies across all visitors and not on frequencies on each single visitor. Thus, I follow largely the interaction approach represented by Bitgood (2006) and Rounds (2004), although I criticise this approach partially for its simple formula (benefits divided by costs as the value of the exhibition visit) in general and the "saving steps" principle by Bitgood (2006) in particular. Of course, this can explain visitors' viewing behaviours largely, but it cannot explain every phenomenon. There are exceptions that do not fit in the formula like "Turns" for example. "Turns" are frequently performed movement patterns of strolling that do not save steps. Nevertheless Bitgood is right that visitors save steps most of their visit. Visitors do not backtrack very often. They do not even look back very often. Think of the few "Backward Gazes" that were performed. Rounds (2004: 401) is right with his search rules that serve as "initial scanning mechanism". That is how movement patterns of strolling like "Turns", "Window Shopping" and "Wandering Along" work. Therefore, the movement patterns of strolling also serve for orientation like the "Minor Orientation Gaze" does. Indeed, orientation and strolling for orientation plays a crucial role for selecting exhibits or for performing more elaborate movement patterns that deal with the exhibits themselves.

Finally, yet importantly, the following preliminary suggestions for designing exhibitions can be summarized in detail so far. Note that each way of presenting exhibits has its trade-offs. Thus, these design suggestions are meant as suggestions and not absolute advice. These design suggestions are primarily made in the context of the possible eye movement patterns, which are probably evoked by the affordances of the exhibition design.

(i) Window Shopping/Wandering Along

If you do not want your visitors snoozing actively in your exhibition, hence, if you do not want them "Window Shopping" although you want to use display cabinets, make the display cabinets as short as possible. Be aware that you are not safe from active snoozing, just because you do not put the exhibits in display cabinets but present them freestanding. "Wandering Along" at freestanding exhibits is a similar phenomenon as "Window Shopping" at display cabinets. Short and changing inputs seem to be the solution that works against active snoozing.

(ii) Insight:

If you want your visitors to look inside an exhibit, the best you could do is present it freestanding with an opening.

(iii) Changing Perspective:

If you want your visitors to look at the exhibit from different perspectives, present it hanging, regardless of whether you put it in a display cabinet or not. As mentioned above this movement pattern proves one of the most important and distinguishing features encountered in exhibitions: the ability to go off and to explore in multiple possible ways and from a number of perspectives. This ability makes museums unique experiences and arguably, it is the main attraction of museums compared to other mass media like TV and computers for example.

(iv) Alternating Gaze:

If you want your visitors to compare exhibits with each other or exhibits with information, put these items close together.

In general:

(i) Orientation even in smaller sections of an exhibition plays a crucial role in visiting exhibitions. Hence, the overall structure of your exhibition should be kept as clear as possible applying a clear designed display. Seemingly, obvious signs or signifiers (cf.

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Norman 2013, see *Chapter 2*) are highly welcomed. However, be aware that backtracking and "Backward Gazes" are rarely performed to get the gist of an exhibition. Hence, notably visible initial information about the exhibition theme and structure could be provided right at the entrance.

(ii) To avoid confusion, place items apart from each other that do not belong to each other.

(iii) Likewise, place items together that belong together.

(iv) Heterogeneous presentation leads to more active visitor behaviour and cognitive processing. It puts the exhibits in the centre of visitors' attention, which increases the likelihood of even longer attention and hence "Long Gazes".

(v) We can provide the first evidence for one reason behind "museum fatigue" (Davey 2005 see *Chapter 2*): homogenous presentation.

(vi) In the end, display cabinets work well. Display cabinets work even better compared to freestanding exhibits, and better still if the display cabinets hold a heterogeneous range of exhibits. Display cabinets maybe are more effective than freestanding exhibits because putting exhibits behind glass creates an aura of value (Thiemeyer submitted). However, when the roles of affordances are considered, another explanation seems plausible. One might think that display cabinets limit the affordances or even prevent interaction, as can be concluded by Norman's definition of glass walls as constituting an "anti-affordance" (2013: 11); see *Chapter 2*). Norman is right insofar that visitors do not walk through display cabinets, thus display cabinets probably provide security not only for the exhibits but also for the visitors. Visitors may feel more comfortable with well-known display cabinets and their affordance of limitation by glass walls and thus perform more and a broader range of possible movement patterns than at freestanding exhibits. More research about the possible role of security must be conducted.

These design suggestions may seem familiar to exhibition makers, but until now a comprehensive system of design suggestions related to particular movement patterns and based on the theory of affordances was missing. This chapter marks a first step towards such a comprehensive system.

As it was demonstrated, the movement patterns are related to head, trunk and body movements largely and connected with cognitive processes. Thus, movement patterns of visitors in exhibitions demonstrate a clear case of embodiment. Whether these movement patterns are culturally learned and hence are cross-culturally different must be examined by further visitor studies. As a next step in this thesis, the movement patterns of these observable head, trunk and body movements will be confirmed by systematic observation. Furthermore, the observation study investigates the influence of the audio guide that was not investigated in this MET study. Due to the sensitive calibration of the MET device that is mounted on the visitors' head the audio guide, usage was excluded in to avoid slip outs of the MET position. However, audio guide usage does not interfere with external observation as will be described in the next chapter.

5. Observed Movement Patterns and Cued Retrospective Reporting: The Results of the Second Visitor Study at the Linden-Museum

This chapter reports the results of the systematic observation study conducted in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart in 2010. The systematic observation study had several aims.

The first aim was to determine whether the 15 movement patterns identified in the first phase of MET data analysis presented in previous *Chapter 4* could also be detected and validated using systematic observation. Thus, firstly, we must ask whether observation also validate the micro-level of movement patterns. Phrased differently, can the visitor's point of viewing exhibitions also be validated by an external observer? I will demonstrate that external observation can validate the visitor's point of view largely but not completely. MET is more precise than external observation.

The second aim was to determine the frequencies of the 15 movement patterns identified by the observation study and to compare the results of both studies with each other. Are there differences in the frequency rates of the movement patterns between MET and systematic observation, and if so why? I will show that the differences rely on the different applied methods with MET being more exact.

The third aim was to examine the influence of audio guide usage on the movement patterns and their accompanying cognitive processes expressed in the CRR. Presumably, audio guide usage must influence the visitors' movement behaviours by allowing visitors to view and listen at the same time. Remember that the audio guide provided additional information about the issues and exhibits of the exhibition (for a detailed description of the audio guide in this exhibition read *Chapter 3, paragraph 3.1.1*).

Does audio guide usage prolong the dwell time in exhibitions as previous research by Kuflik et al. 2011 and Lanir et al. 2013 (see *Chapter 1*) found? Yes, it does (for more information read *paragraph 5.3.2.*). In what way does this digital guide influence the movement patterns and the accompanying cognitive processes? Are Franklin et al. (1993) correct that further information leads to a different cognitive processing but not to a different guidance in viewing behaviour? No, they are wrong. Audio guide usage leads to directed viewing and a deeper cognitive processing due to the change of attention for particular affordances.

Are there differences in appropriating exhibitions between audio guide usage and non-usage? Are Smith & Tinio (2008) and Bitgood (2010) right that audio guide usage allows a parallel way of appropriation: viewing and listening at the same time? Or are the prejudices right that audio guide usage leads to more listening than viewing or even to zombie-like behaviour (Tallon 2006; see *Chapter 1*)? Remember that Tallon (2006) stresses the need to investigate whether audio guides allow behaviour that is more active. I will provide evidence that audio guide usage leads to a longer dwell time, more active movement behaviours and a deeper cognitive processing. Furthermore, I will provide evidence for parallel appropriation, which is an incorporation of the visual with the auditive sense. Audio guides are incorporated into the embodiment and therefore audio guide usage leads to an extended museum experience by incorporating the auditive sense in the appropriation of exhibitions. In the end, I provide further design suggestions for implementing audio guides in exhibitions.

This chapter is structured in five paragraphs: firstly, an introduction into the systematic observation study; secondly, a comparison of the MET study and the systematic observation study results; thirdly, an analysis of the audio guide's influence on the observed movement patterns; fourthly, examples of cognitive processes represented in the CRR of visitors who do not use the audio guide and visitors who use it at the four selected sections within the "South Sea Oases: Life and Survival in the Western Pacific" exhibition; and lastly, a summarizing conclusion including specific design suggestions.

5.1 The Systematic Observation Study

Before presenting the results, I will first describe the research process: the preparation, the observer's point of view at the four selected exhibition sections, the full sample of the participating visitors, the procedure and the analysis.

5.1.1   Preparation

The field study was conducted at the four selected sections in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition described above in *Chapter 3*. This observation study was systematically conceptualised based on the results of the first MET data analysis that identified 15 distinct, recurrent and systematic movement patterns.

5.1.2 The Observer's Point of View at the Four Selected Exhibition Sections

Therefore, once again I provide photographs of these sections but this time from the observer's point of view. Hence, the reader can reconstruct the observation conditions or perspectives. The observer observed which of the 15 movement patterns identified in the first phase of MET data analysis and how often the visitors performed them at each section. Thus, the occurrences as well as the frequencies of the movement patterns were observed.

- *Section 1: The Men's House Model from Palau*
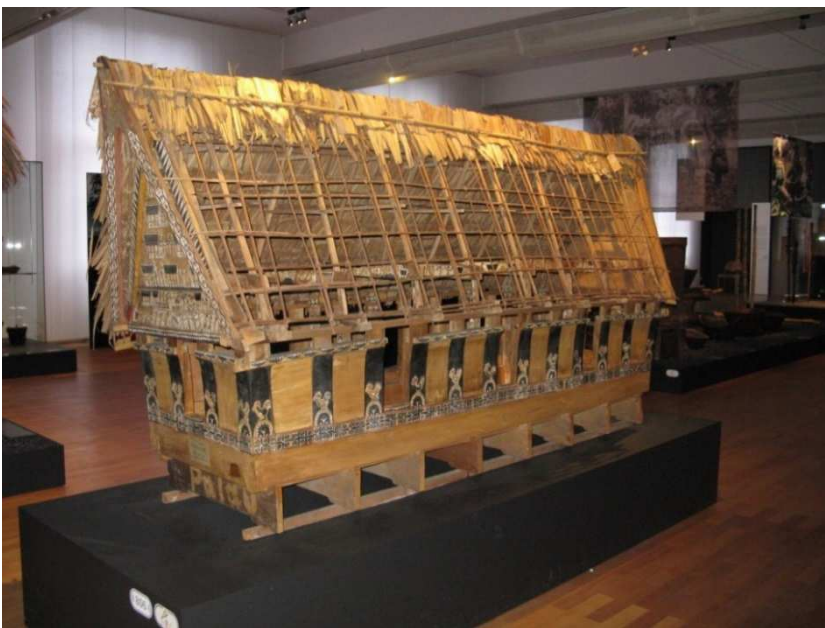
Figure 57: The observer's point of view at the men's house model from Palau (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

- *Section 2: The Original Outrigger Fishing Canoe from Yap*
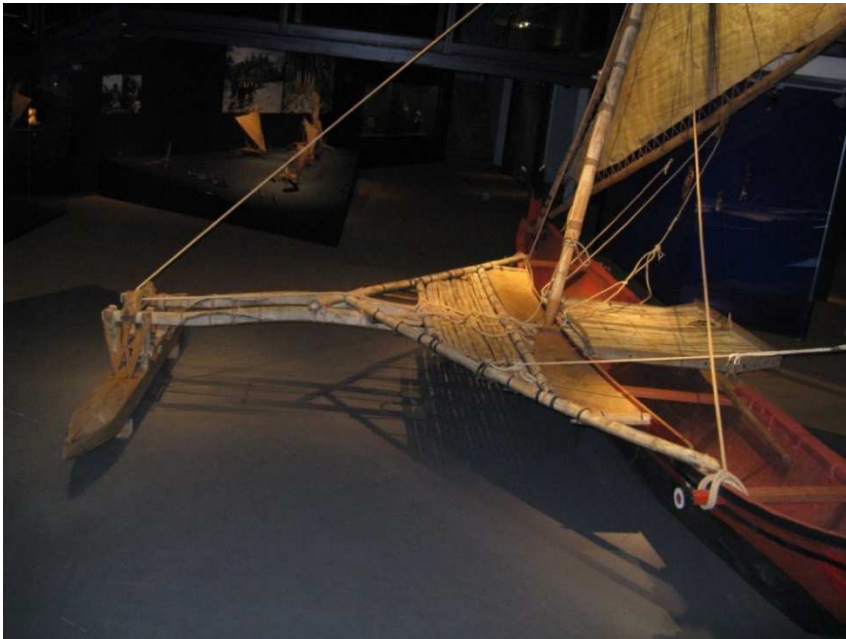
Figure 58: The observer's point of view at the original outrigger fishing canoe from Yap (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Figure 59: The observer's point of view behind the original outrigger fishing canoe from Yap at the text panel and photographs (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

- *Section 3: The Homogenous Display Cabinet*

Figure 60: The observer's point of view at the homogenous display cabinet (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

- *Section 4: The Heterogeneous Display Cabinet*

Figure 61: The first observer's point of view at the heterogeneous display cabinet (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Figure 62: The second observer's point of view at the heterogeneous display cabinet (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

In sum, these photographs (Figure 57-62) reveal that the observer's point of view is more restricted due to observing the visitor from one fixed position unlike the scene cameras of the MET that record the participant's perspective. Furthermore, other exhibits and human beings can obstruct the view of the external observer. Hence, details are more difficult to observe by external observation (for a detailed comparison of the potentials and limitations of MET and observation please look at *Chapter 7*).

5.1.3 Full Sample of Participating Visitors (N = 80)

Twenty visitors were observed at each of the four sections. In sum, 80 randomly selected visitors (37 female) were followed by an unobtrusive observer. Unlike the MET study, the group of visitors at each section were not the same.

The age was estimated into three groups: young (18-29), middle (30-59) and older (60+). Twenty visitors were young, 27 were middle aged and 33 were older.

Forty-three visited the exhibition alone, 30 in a pair of two and 7 in a group of maximum 5.

This does not demonstrate the natural way of visiting the exhibition because only these kinds of appearance (alone, in a pair of two and in a group of maximum 5) in the exhibition were selected for an observation. Bigger groups are just more difficult to observe.

Dwell Time:

Range between under 0.5 minutes and ten minutes.

Usage of Audio Guide:

The observer watched ten visitors who used the audio guide and ten visitors who did not use the audio guide at the four sections. Hence, the audio guide usage varied by the observer and therefore does not demonstrate the natural frequency of usage. Sometimes more museum visitors took away an audio guide but did not use it at the observed section; note that only use of the audio guide varied in this study. The audio guide could be used more than one time at the sections because there can be more than one audio station or because the visitor already listened to another audio station as she enters the section, as is reflect in Table 8:

Take-away of Audio Guide	Usage of Audio Guide	Frequency of Audio Guide Usage
51	40	46

Table 8: Audio Guide Take-away and Real Usage[2] in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

5.1.4 Procedure

The observation study was conducted unobtrusively at each section. The observed visitors were not explicitly told that they were personally being watched during their stay in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. However, an information panel and information sheets were placed before the entrance of the exhibition informing visitors in general that an observational study was taking place. Visitors who were unwilling to participate in the study could put a clearly visible button on their clothes. This is

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[2] Although there is probably a correlation, I did not analyse the correlation between the length of an audio guide spot and the dwell time.

a standard procedure used in observational studies and was approved by the local ethics committee of the Leibniz Knowledge Media Research Centre in Tuebingen, Germany.

The study was conducted at each opening day and across the opening day of the museum. The visitors were selected on a random basis, and every second museum visitor was observed. Each fifth observed museum visitor was also interviewed. Hence, 10 visitors that used the audio guide and 10 visitors that did not use the audio guide were observed at each section, and two visitors from each group were interviewed. After selecting a visitor, a trained observer documented all the actions performed by the visitor in a notation scheme (see *Appendices 10.4.*) including the estimated age of the observed visitors and the social context of their visit (alone, in a dyad, or as a member of a larger group of three to five).

5.1.5   Analysis

The data was analysed in two ways: first, analyses assessed the comparability between the observation study and the MET study; and second, analyses evaluated the influence of audio guide usage on the observed movement patterns and cognitive processes.

5.2. Comparison with the Mobile Eye Tracking Study Results

The sample from the MET study was compared with the sample from the observation study that did not use an audio guide for reasons of comparability. The MET study visitors did not use an audio guide due to sensitive calibration of the MET device that was mounted on the visitors' head, and hence providing accurate recordings.

Category	Movement Patterns	Section 1: Men's House Model from Palau		Section 2: Original Outrigger Fishing Canoe from Yap		Section 3: Homogenous Display Cabinet		Section 4: Heterogeneous Display Cabinet	
		MET (N = 7)	Observation (N = 10)	MET (N = 6)	Observation (N = 10)	MET (N = 8)	Observation (N = 10)	MET (N = 7)	Observation (N = 10)
Movement Patterns and Orientation*	Major Orientation Gaze	1	**0**	0	**0**	0	**0**	2	**0**
	Minor Orientation Gaze	21	**12**	24	**11**	37	**10**	149	**28**
	Backward Gaze	1	**1**	3	**0**	6	**0**	3	**2**
Movement Patterns and Strolling**	Window Shopping	0	**0**	0	**0**	13	**10**	46	**9**
	Wandering Along	8	**12**	13	**8**	2	**0**	0	**1**
	Turn	21	**1**	36	**9**	22	**7**	19	**2**
Movement Patterns and Exhibits***	Reading Text Panel	0	**0**	11	**4**	12	**7**	40	**4**
	Reading Labels	3	**1**	0	**0**	35	**0**	143	**0**
	Long Gaze	4	**2**	16	**1**	15	**1**	22	**4**
	Insight	13	**4**	12	**2**	0	**0**	0	**0**
	Changing Perspective	2	**0**	3	**2**	14	**0**	9	**2**
	Object Scan	0	**1**	8	**6**	7	**0**	5	**0**
	Alternating Gaze	1	**1**	2	**1**	51	**14**	82	**17**
	Zooming Closer	16	**0**	13	**0**	29	**6**	35	**1**
Movement Patterns and Human Beings***	Social Gaze	4	**0**	3	**2**	5	**3**	1	**0**
Other Movement Patterns (2nd phase)		26	**0**	42	**5**	39	**2**	136	**3**
Total Number		121	**35**	186	**51**	287	**60**	692	**73**

Table 9: Comparison between the MET study and the observation study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

Note that in the observation study different groups of visitors were investigated at each time: Ten visitors at each of the four sections; in sum 40 visitors were observed, whereas in the MET study the same group of six to eight visitors at each section was investigated, in order to compare the results and draw conclusions about the applied methods: observation versus MET (see Table 9).

5.2.1. Total Numbers

Table 9 shows the total numbers of movement patterns at each section. Firstly, precisely due to the different sample sizes between those studies, there is a clear tendency that more movement patterns are detected by MET data analysis than with traditional observation. Hence, with MET more movement patterns can be identified. For a further critical reflection of the applied methods, read description below and in *Chapter 7*.

Secondly, the same order of frequency rates occurs in each section: the most movement patterns are identified at section 4 ("The Heterogeneous Display Cabinet"), followed by section 3 ("The Homogenous Display Cabinet"), followed by section 2 ("The Original Outrigger Fishing Canoe from Yap"), followed by section 1 ("The Men's House Model from Palau"). Hence, it seems that the results of the MET study and the results of the systematic observation study are comparable, although the sample sizes differ a bit. Again, "The Heterogeneous Display Cabinet" leads to the most active viewing behaviour.

5.2.2. Individual Movement Patterns

First, except for "Major Orientation Gazes" all other movement patterns could be also identified by systematic observation. This provides further evidence of the movement patterns with a completely different method. Nevertheless, the individual results are more different than similar (see Table 9). Where do these different results come from? I will provide evidence that they are caused by a methodological problem.

Below I describe the results of Table 9 according to the movement patterns categories, focusing on the observation study and the comparison between the observation study and the MET study.

Movement Patterns and Orientation*

Altogether, "Minor Orientation Gazes" are the most frequent movement patterns in the observation study. This is a similar result compared with the MET study. Orientation in a closer part of the environment appears to be an important issue for museum visitors as they navigate through exhibitions and select exhibits for a more detailed appropriation.

In contrast, "Major Orientation Gazes" are never identified in the systematic observation study, at least in the non-audio-guide-usage condition. This pattern is performed when entering a gallery/room.

"Backward Gazes" are also identified less often than in the MET study. External observers seem to be more focused on obvious affordances and movement patterns.

Movement Patterns and Strolling**

"Window Shopping" and "Wandering Along" are identified according to the particular sections (freestanding versus display cabinet), whereas "Window Shopping" is more often identified by MET because with MET also shorter sequences of "Window Shopping" could be identified.

"Turns" are not identified as often as in the observation study as in the MET study because the rewind option of MET video data analysis helps to get results that are more accurate.

Movement Patterns and Exhibits***

"Reading Text Panels" is also performed especially often at display cabinets like in the MET study. Nevertheless, it is less often identified here than in the MET study because exclusive eye movements that do not need head or trunk movements cannot be identified by an external observer. Another reason might be the obtrusive measurement by MET that leads to socially desired behaviours.

"Reading Labels" is identified less often in the observation study than in the MET study. "Reading Labels" is often identified in the MET study because the resolution level is higher and it leads to socially desired behaviours.

"Long Gaze" is only performed more often at section 4 ("The Heterogeneous Display Cabinet") and the photo show at section 2 ("The Original Outrigger Fishing Canoe from

Yap"). Hence it provides further evidence that "Long Gazes" may occur more often with a heterogeneous presentation or because a screen is attracting visitors' attention. Nevertheless they are less often identified here than in the MET study because exclusive eye movements that do not need head or trunk movements cannot be identified by an external observer.

"Insights" are solely performed at the freestanding exhibits like in the MET study because display cabinets prevent "Insights" or at least make them less likely.

"Changing Perspective" is identified less often than in the MET study. It is not identified at all at section 3 ("The Homogenous Display Cabinet") where the exhibits are presented hanging, which was reasoned as affording "Changing Perspective". Perhaps this finding can be attributed to the small sample sizes in both studies not being sufficiently representative.

"Object Scans" are especially identified at big exhibits like the canoe (section 2: "The Original Outrigger Fishing Canoe from Yap") with its great dimensions, only one time at the smaller men's house model (section 1: "The Men's House Model from Palau") and not at all at the display cabinets. Note that "Object Scans" that are "small" are conducted solely with the eyes cannot be observed by an external observer.

"Alternating Gazes" are the second most often performed movement patterns in the observation study. It is especially identified at section three and four (the two display cabinets) like in the MET study. From this finding, it is evident that "Alternating Gazes" are especially likely at display cabinets where many exhibits and labels are displayed in short distances.

"Zooming Closer" is performed zero times at freestanding exhibits. This movement patterns can be better observed by an external observer at display cabinets because display cabinets provide a front line as a point of reference due to the pane of glass in the front. Additionally, as mentioned above, MET provides a higher resolution level.

Movement Patterns and Human Beings**

"Social Gazes" are performed less often than in the MET study or even not at all. One reason might be that only a few other museum visitors were around. Another reason might be the perception of other human beings occurred through other senses like the hearing. A third reason might be that a museum visit is about "things" rather than being about the   other

people. In contrast socially desired behaviours and the limits of a single lens camera can be neglected as influential factors in the observation study.

In conclusion, I must point out firstly, that the sample sizes are different, which makes the samples difficult to compare. Apart from that, MET appears to provide a higher resolution level as an observation method and hence more identified movement patterns. MET also provides the direct eye movements from the visitor's perspective whereas observation can only deduce eye movement by proxy movements of the head, the trunk and the whole body. Furthermore, "Other movement patterns" are rarely identified by observation. Concentrating on 15 different movement patterns at the same time is already difficult enough for the brain, although the observation sheet was formatted due to possible chunking of movement patterns. Being open for further new movement patterns is overloading the observer's brain. Likewise as an external observer who was trained to observe particular movement patterns, you are likely to be aware of obvious affordances and movement patterns. For example, no "Wandering Along" at display cabinets was observed.

Another difference is grounded in the different level of obtrusiveness between the two methods: whereas MET is an obtrusive measurement that leads to socially desired behaviours and hence to distortions in behaviour, the observation study was conducted as unobtrusively as possible. Furthermore with MET you have a rewind option for as many analyses you want. With observation that is conducted without video recording, the data only reflects the definite moment and the current awareness of the observer. Apart from that, the paper-and-pencil method applied for systematic observation slowed down the observation and distracts the observer's attention. This makes it highly doubtful that so many distinct movement patterns could ever be identified by traditional observation alone. To put it the other way, so many distinct movement patterns could only be identified through the application of MET. For a further critical reflection of all applied methods read *Chapter 7*.

5.3. The Influence of Audio-Guide Usage on the Observed Movement Patterns

This time I focus on the influence of audio guide usage onto the observed movement patterns. It is assumed that audio guide usage leads to different movement behaviours as it allows

viewing and listening at the same time. Therefore, the two groups (one group that used an audio guide versus one group that did not use an audio guide) were compared.

5.3.1. Total Numbers of Movement Patterns across All Four Sections in Both Conditions:

Across all Four Sections	Without Audio Guide Usage (N = 40)	With Audio Guide Usage (N = 40)
Total number of movement patterns	219	460

Table 10: Total numbers of movement patterns across all four sections of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition in both conditions

In general it seems that the usage of the audio guide leads to more movement patterns in sum (see Table 10): The total numbers of movement patterns between the two conditions "Usage of Audio Guide" and "Non-Usage of Audio Guide" show clearly that the audio guide usage leads to twice as many movement patterns as without audio guide usage. Hence, it seems as though audio guide usage leads to more active visitor behaviours evoking more involvement with viewing exhibits and not less as it could be presumed by the summarization of Tallon & Walker (2008). Thus, the prejudice about audio guides leading to zombie-like behaviour is a fallacy.

5.3.2. Comparison between Audio Guide Usage and Non-Usage for Each Section and Movement Pattern

Audio guide usage changes the chronological order of total numbers for each section. With audio guide usage, more movement patterns are still performed at section 4 ("The Heterogeneous Display Cabinet"), but this is followed by section 2 ("The Original Outrigger Fishing Canoe from Yap"), followed by section 1 ("The Men's House Model from Palau") and the least movement patterns are performed at section 3 ("The Homogenous Display Cabinet"). Hence, the usage of an audio guide evokes the most passive behaviour at "The

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Homogenous Display Cabinet" and the most active behaviour at "The Heterogeneous Display Cabinet" and the freestanding exhibits.

The results of the average dwell time (see Table 11) correspond with the results of movement patterns frequencies at each section. The more movement patterns one performs, the more time is needed for performing these movement patterns, which provides further evidence that time spent is in line with a more elaborate processing (see *Chapter 1*: Robinson 1928; Boisvert & Slez, 1995; Serrell, 1998). This finding is also in line with findings from previous studies (Kuflik et al., 2011; Lanir et al., 2013), which report that audio guide usage results in prolonged examination time because it offers additional information about the exhibits.

As there are more movement patterns, hence behaviour that is more active and more time spent. If visitors used an audio guide, then we have to carefully consider the content of the audio guide spots at each section for a critical reflection about the differences in behaviours between audio guide usage and non-usage. Note that the audio guide spots only provide pure information narrated by a female or a male voice without any music or further sounds (see *Appendices 10.1.1.*). The conclusions about the correlation between audio guide usage and viewing behaviours are preliminary so far. They have to be carefully confirmed through further visitor research. The following Table 11 compares frequencies of movement patterns between audio guide users and non-users. The biggest differences are highlighted.

Category	Movement patterns	Section 1: Men's House Model from Palau		Section 2: Original Outrigger Fishing Canoe from Yap		Section 3: Homogenous Display Cabinet		Section 4: Heterogeneous Display Cabinet	
		WITHOUT AG (N = 10)	WITH AG (N = 10)	WITHOUT AG (N = 10)	WITH AG (N = 10)	WITHOUT AG (N = 10)	WITH AG (N = 10)	WITHOUT AG (N = 10)	WITH AG (N = 10)
Movement Patterns and Orientation*	Major Orientation Gaze	0	0	0	0	0	0	0	1
	Minor Orientation Gaze	12	23	11	12	10	23	28	16
	Backward Gaze	1	1	0	2	0	2	2	8
Movement Patterns and Strolling**	Window Shopping	0	0	0	0	10	12	9	13
	Wandering Along	12	30	8	16	0	0	1	1
	Turn	1	9	9	22	7	12	2	10
Movement Patterns and Exhibits**	Reading Text Panel	0	0	4	4	7	5	4	9
	Reading Labels	1	5	0	0	0	3	0	3
	Long Gaze	2	7	1	6	1	3	4	6
	Insight	4	17	2	13	0	0	0	0
	Changing Perspective	0	8	2	7	0	0	2	2
	Object Scan	1	3	6	14	0	0	0	0
	Alternating Gaze	1	1	1	5	14	14	17	33
	Zooming Closer	0	2	0	1	6	6	1	3
Movement Patterns and Human Beings****	Social Gaze	0	3	2	6	3	5	0	4
Other Movement Patterns (2nd phase)		0	9	5	14	2	9	3	17
Total Number		35	118	51	122	60	94	73	126
Average Dwell Time		0,85 min.	3,25 min.	1,55 min.	4,95 min.	1,7 min.	2,7 min.	2,5 min.	6,1 min.

Table 11: Comparison between audio guide usage and non-usage at each section of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition and for each movement pattern

- *Section 1: The Men's House Model from Palau*

At section 1 – "The Men's House Model from Palau" – there are two audio guide spots (see *Chapter 3*): number 806 ("Palau House") and 807 ("Second House and Splayed Figure").

The audio guide spot 806 provides references about the carved and painted beams of the gables, painted facades, high roofs, the corner posts, the Mortise and Tenon joints and the outrigger canoe motif, the rooster motif and the story about taro roots and rays as well as a reference to the sacred house. The audio guide spot 807 describes the gable figure "dilukai", provides various interpretations about its spread legs and informs about its location on the chieftains' or men's houses.

The results (see Table 11) can be explained with the references in the audio guide text:

- "Wandering Along" (12 without AG:**30 with AG**) is performed the most due to the rooster motif that is painted all along the house.

- More "Minor Orientation Gazes" (12:**23**), "Turns" (1:**9**) and "Changing Perspective" (0:**8**) are performed due to the multiple references about the architectural structure and the components of the house. Visitors need to get an overview, turn in the mentioned direction and get a change of perspective at different points of "The Men's House Model from Palau".

- More "Insights" (4:**17**) are performed because the audio guide text provides references, for example about the Mortise and Tenon joints and carved and painted beams that are visible inside "The Men's House Model from Palau".

- More "Long Gazes" (2:**7**) are performed because the paintings and the rooster motif invite an intense and long view.

- More "Reading Labels" (1:**5**) as well as the "Other Movement Patterns" are performed also because the visitors gain more freedom in movement because they get the desired information about the exhibit anyway, no matter where they move and what they view.

Hence, this could be called a parallel way of appropriating exhibitions by listening and viewing at the same time. This is in line with Smith & Tinio (2008) and Bitgood (2010).

- *Section 2: The Original Outrigger Fishing Canoe from Yap*

At section 2 – "The Original Outrigger Fishing Canoe from Yap" – there is one audio guide spot (see *Chapter 3)*: 821 ("The Linden-Museum's Outrigger Canoe").

This audio guide spot provides information about the history, the usage and the mode of operation as well as the re-construction of the outrigger fishing canoe in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. Furthermore, it provides references to several components such as the outrigger, the bow, the stern, the sennit rope, the sail, the mast and the boat hulls. It also points to the impact of such outrigger canoes on modern catamarans and trimarans.

The results (see Table 11) can largely be explained with the references in the audio guide text:

- Accordingly, the visitor "Turns" (9:**22**) to the corresponding directions wanders along and around the canoe ("Wandering Along" 8:**16**) and changes the perspective ("Changing Perspective" 2:**7**).
- The visitor scans the large exhibit according to the mentioned components ("Object Scan" 6:**14**).
- The visitor looks inside the canoe to view the construction connected with ropes ("Insight" 2:**13**).
- Additionally the visitor views photo presentation with "Long Gazes" (1:**6**) and compares the photos with the canoe ("Alternating Gaze" 1:**5**).
- Surprisingly "Minor Orientation Gazes" have similar frequencies in both conditions.

- ***Section 3: The Homogenous Display Cabinet***
At section 3 – "The Homogenous Display Cabinet" – there is one audio guide spot (see *Chapter 3):* 811 ("Fiber Weaving"):
The audio guide spot 811 provides references to the various weavings (woven cloths, apron-like, warp-around skirts, patterned cloth, draw-string apron, mats), their origin from Asia and the influence of the missionaries. It also refers to several components of this handicraft: the loom and the natural fibres (banana and hibiscus). The position of the respective weavings is mentioned rarely and only vaguely. Accordingly, the visitors certainly feel confused the same as identified in the MET: the different weavings remain indistinguishable. More precise information about the position of the particular weavings may have helped distinguish between the single exhibits. Probably that is why there are fewer big differences between the movement patterns frequencies of audio guide users and non-users except "Minor Orientation Gazes" (10:**23**) and "Turns"" (7:**12**) which are performed to follow the audio guide spot's

content. This might also explain that audio guide usage evokes the most passive behaviour at the homogenous display cabinet.

- *Section 4: The Heterogeneous Display Cabinet*

At section 4 – "The Heterogeneous Display Cabinet" – there are two audio guide spots (see *Chapter 3*): 808 ("Money, Barter, Valuables, Food Transport") and 809 ("Chuuk, Curcuma"): Audio guide spot 808 provides references to the special kind of money on Palau and its current use in traditional life. It also refers to bracelets, the painting of the "money bird" on men's houses and the relation of traditional money – that reveals the person's status as well as food offers do – to the taro benches, molasses and vessels in the middle of the gallery behind the display cabinet.

Audio guide spot 809 provides references to curcuma paste and its various functions and usage, ponchos with spondylus discs, the feather combs and breadfruit (including a song text about breadfruit). Obviously, the two audio guide spots choose only single exhibits out of the diverse range of exhibits presented in the heterogeneous display cabinet.

- Accordingly, fewer "Minor Orientation Gazes" (28:**16**) were performed. The audio guide users concentrate on the described exhibits of the audio guide.
- They compare these exhibits ("Alternating Gaze" 17:**33**) and follow the references that also point to exhibits in the middle of the gallery backwards to the display cabinet ("Turns" 2:**10** and "Backward Gazes" 2:**8**).
- Surprisingly, the audio guide users read even more text panels than the non-users ("Reading Text Panels" 4:**9**) and they perform more "Window Shopping" (9:**13**). Both findings might be explained by the action possibility of parallel viewing and listening.

In sum, audio guide usage leads to more movement patterns and hence to more active visitor behaviour. However, audio guide usage does not increase gazes with minor affordances like the "Major Orientation Gaze" that is performed at the entrance of a gallery. The main difference in frequencies is between "The Homogenous Display Cabinet" with lesser movement patterns rate change and the other sections (the freestanding exhibits and "The Heterogeneous Display Cabinet") with more rate change. Hence it seems that with audio guide usage a homogenous presentation leads to less active behaviour. Instead,   other

presentation styles such as the freestanding and heterogeneous display cabinet lead to behaviour that is more active.

The reasons for the changed behaviour under audio guide usage seem to be firstly, that due to the information provided by the audio guide the visitor feels more freedom in behaviour as she gets the information anyway no matter where she looks. Hence, audio guide usage allows parallel ways of appropriating and experiencing exhibits and exhibitions: listening and viewing at the same time. This is in line with Smith & Tinio (2008) and Bitgood (2010). Secondly, the audio guide emphasized particular affordances of the exhibits/exhibition. Hence, the audio guide text seems to direct the movement behaviour. This finding is not in line with Franklin et al. (1993) who stressed that information like titles do not guide viewing behaviour differently, but they did not focus on digital media. Nevertheless, both reasons (freedom of movement and stressing of particular affordances) seem to be responsible for the change in movement behaviour.

Especially, the following results are salient for audio guide users:

- "Wandering Along" is increased at the freestanding exhibits and "Window Shopping" at the heterogeneous display cabinet but not at the homogenous display cabinet. Audio guide users perform "Social Gazes" more frequently. These three movement patterns indicate the freedom of movement audio guide users likely feel.
- "Turns" are the only movement patterns that are performed more frequently at ALL sections. This indicates that the audio guide leads the movement behaviour. Visitors turn to the mentioned direction.
- "Long Gazes", "Insights" and "Changing Perspective" are performed more often by audio guide users at the freestanding exhibits. This indicates that the audio guide leads the eye by providing precise references.
- There are differences in behaviour between the sections ("The Homogenous Display Cabinet" versus freestanding exhibits and "The Heterogeneous Display Cabinet").

Hence, it seems, that the movement behaviour of audio guide users is similar at freestanding exhibits and the movement behaviour is different at the display cabinets depending on the presentation within them (homogenous versus heterogeneous). Thus, visitors' behaviour depends on the presentation design. Now let us have a look, if these results (more active behaviour with audio guide usage, differences between homogenous presentation and other ways of presentation) are also measurable in the cognitive processing of the sections.

5.4. Cued Retrospective Reporting – Interview Sample

At each section, two visitors who used an audio guide and two visitors who did not use an audio guide were interviewed additionally after they had been observed. In sum, 16 visitors were interviewed. The interview took place directly after observation and right at the section, so the visitors still had the cue of the particular section and reported in retrospection, but this time without viewing their eye movements. The interview guide is provided in the *Appendices 10.5.* Before describing the results of their reporting, I will describe the sample in the next section.

5.4.1. Interview Sample (N = 16) out of the Full Sample (N = 80)

Eight visitors were female and eight were male. All interviewed visitors were asked about their age and later grouped into the categories mentioned above: Three were young, one was middle aged and 12 were older. Four visited the exhibition alone, eight in a pair of two and four in a group of maximum five.

Dwell time:

Range between under 0.5 minutes up to 10 minutes

Profession:

All interviewed museum visitor were novices regarding their professions.

Motivation:

Seven of 16 interviewed visitors visited the "South Sea Oases: Life and Survival in the Western Pacific" exhibition due to their particular interest in this exhibition. Two of 16 visited the exhibition due to their regular museum visiting. Four of 16 visited the exhibition due to personal relations like it follows:

- One female visitor, kindergarten teacher, 60+: worked for peace and against atomic tests in Oceania, hosted people from Oceania for three weeks in cooperation with the Linden-Museum, was on Tahiti for holidays
- One male visitor, soldier, 60+: son is development worker on Papua New Guinea (Bougainville)
- One male visitor, motor mechanic, 60+: was with his wife on holidays in New Zealand and saw the art of boat building by Maoris there
- One female visitor, real-estate assistant agent, 30-59: her brother worked on Kiribati

One visited the exhibition due to bad weather, one because she had free tickets and one made no statement. All of the interviewed visitors were German speaking and first time visitors in this exhibition like the visitors in the MET study.

Number of Visits in the Linden-Museum in Stuttgart:

Five visitors visited the Linden-Museum in Stuttgart for the first time, eight the second to tenth time and three more than the eleventh time.

Interest in South Sea (scale: 1= not interested to 5 = completely interested):

One visitor made no statement, no visitors indicated they were not interested or a little interested in the South Sea, respectively five were interested, very interested and completely interested in the South Sea.

Interest in Ethnographic Museums (scale: 1= not interested to 5 = completely interested):

One visitor made no statement, no visitors indicated they were not interested or a little interested in anthropological museums, respectively six were interested and completely interested and three were very interested in anthropological museums.

5.4.2. Comparison of Total Numbers Regarding the Cued Retrospective Reporting between Audio Guide Users and Non-Users

Sections	Frequency of CRR without AG Usage	Frequency of CRR with AG Usage	Total Numbers for Each Section
Section 1: The Men's House Model from Palau	14	22	36
Section 2: The Original Outrigger Fishing Canoe from Yap	10	8	18
Section 3: The Homogenous Display Cabinet	28	15	43
Section 4: The Heterogeneous Display Cabinet	13	30	43

Table 12: Frequency rates of CRR with and without audio guide usage in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

The frequency rates at each section are different (see Table 12). One cannot conclude a clear systematic order between audio guide usage and non-usage. This is probably related to the smaller size of the interview sample and the reading of text panels in the non-audio usage condition. Hence, it seems there are two methodological problems. Regarding the sample size, there was not enough time for data collection due to the time limit of the special exhibition "South Sea Oases: Life and Survival in the Western Pacific" and due to the short-staffed situation of only one observer. Apart from that, the problem with text panel reading is grounded in the consecutive research design that started explorative with MET and succeeded in a systematic approach of observation. Since text panel reading was allowed in the MET study, I did not extract it in the observation study for reasons of comparability.

5.4.3. Exemplary Examples of Cued Retrospective Reporting with and without Audio Guide Usage

Nevertheless, in the exemplary examples that will follow below, I can demonstrate that the audio guide seems to lead to a more elaborative processing of the subject matter.

- *Section 1: The Men's House Model from Palau*

Figure 63: Frontal side of the men's house model from Palau

(photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

At the section "The Men's House Model from Palau" (see Figure 63) two audio guide spots were provided: No. 806 "Palau House" and No. 807 "Second House and Splayed Figure", whereas the text panel was too far away to be observed as mentioned above.

No Text Panel observed	Audio Guide
	No. 806
	"Palau House"
	The audio guide spot 806 provides references about the carved and painted

beams of the gables, painted facades, high roofs, the corner posts, the Mortise and Tenon joins, the outrigger canoe motif, the rooster motif and the story about taro roots and rays as well as a reference to the sacred house.

No. 807

"Second House and Splayed Figure"

The audio guide spot 807 describes the gable figure "dilukai", provides various interpretations about its spread legs and informs about its location on the chieftains' or men's houses.

Visitor (No. 75, male; dwell time: 2 min.)

- **Without audio guide usage**
- **Without text panel reading**

"At that moment it rather was a comparing question. I only wanted to view, is it such one in addition (house model)…or something different".

Conclusion:

Only general statements that are grounded in the exhibition design of putting two houses close together.

Visitor (No. 61, male, dwell time: 0,5 min.)

- **With audio guide usage (No. 806 + 807)**
- **Without text panel reading**

"I paid attention to the merely Mortise and Tenon joints. I paid attention to the paintings, especially to the canoes and the rooster there. Nevertheless, the rooster caught my eyes first".

Conclusion:

Precise processing of some exhibit details that were provided by the audio guide.

- *Section: 2: The Original Outrigger Fishing Canoe from Yap*

Figure 64: The original outrigger fishing canoe from Yap from the outrigger side (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

At the section "The Original Outrigger Fishing Canoe from Yap" (see Figure 64), one text panel "At Sea" and one audio guide spot No. 821 "The Linden-Museum's Outrigger Canoe" were provided.

Text Panel

"At Sea"

The text panel describes how many people could come on board, the speed of the canoe, the ceremony before setting sail, the mode of operation, the particular task and position on board of each crew member and the meaning of canoes for Micronesian men.

Audio Guide No. 821

"The Linden-Museum's Outrigger Canoe"

This audio guide spot provides information about the history, the usage and the mode of operation as well as the re-construction of the outrigger fishing canoe in the exhibition. Furthermore, it provides references to several components like the outrigger, the bow, the stern, the sennit rope, the sail, the mast and the boat hulls. It also points to the impact of

such outrigger canoes on modern catamarans and trimarans.

Visitor (No. 147, female, dwell time: 1 min.)

- Without audio guide usage
- With text panel reading "At Sea"

"Yes, that, well actually you cannot imagine, when you view it here, that it is ocean-going. But I watched it in various documentations that it works. And also the description (text panel) says that ten to fifteen men could stay on it indeed. Well, that is quite amazing".

Visitor (No. 151; female; dwell time: 4 min.)

- With audio guide usage
- Without text panel reading

"Mainly, if it is really safe, because it is only connected with strings and does not have a permanent fixture at all. And the mast…arguably it is possible to shift it. And then I wonder, if it is really safe in these small…in these corners. If the wind does not beat you round the head with these. And well, that it is some kind of catamaran, a precursor, of what exists today".

Conclusion:

Processing of some exhibit details that were provided by the text panel.

Conclusion:

Processing of some exhibit details that were provided by the audio guide.

- *Section 3: The Homogenous Display Cabinet*

Figure 65: The homogenous display cabinet from further afar

(photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

At the section "The Homogenous Display Cabinet" (see Figure 65), one text panel "The Art of Weaving" and one audio guide spot No. 811 "Fiber Weaving" were provided.

Text Panel

"The Art of Weaving"

The text panel informs about the origin of those weavings coming from Asia, the art of weaving, the modern weavings, and the partial loss of this traditional handicraft due to missionary dress codes and decrease in population. It also refers to several components of this handicraft: the warp, the weaver's beam, the warping grid, banana and hibiscus bast fibres. It refers to several different weavings like belts, loincloths and machi and their usage in rituals etc.

Audio Guide No. 811

"Fiber Weaving"

This audio guide spot provides references to the various weavings (woven cloths, apron-like, warp-around skirts, patterned cloth, draw-string apron, mats), their origin from Asia and their multifunctional usage (especially the usage of machi in rituals), their history and the influence of the missionaries (loss of this traditional handicraft due to missionary dress codes). It also refers to several components of this handicraft: the loom and natural fibres (banana, hibiscus).

The position of the respective weavings is mentioned sometimes but only vaguely.

Visitor (No. 92, male, dwell time: 2,5 min.)

- **Without audio guide usage**
- **With text panel reading**

"I see, yes, well, what rather fascinates me is the exotic. That is why I am here actually because these are just things you cannot view here and which are not usual. That was always something special at the Linden-Museum. No matter where they (exhibits) come from Africa or Oceania or elsewhere. And secondly, if you ask me, is that it is just typically again: among other things it is mentioned here (text panel) that these people had their weaving technique and did it probably quite well and then the missionaries came and changed it all. And, well, I personally dislike missionaries".

Conclusion:

Puts some of the information provided by the text panel and the exhibits into a greater general comment about own interests and dislikes. No distinction between the different weavings.

Visitor (No. 105, male, dwell time: 2 min.)

- **With audio guide usage**
- **Without text panel reading**

"Yes, well, after all I wondered that they formerly had such a weaving loom, such loom-like things and how they could make that and wove that coloured here, with these materials with these natural fibres. And that just fascinates me".

Conclusion:

Processes some details of the information provided by the audio guide. No distinction between the different weavings.

- ***Section 4: The Heterogeneous Display Cabinet***

Figure 66: Further out-cut of the heterogeneous display cabinet

(photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

At the section "The Heterogeneous Display Cabinet" (out-cut see Figure 66) three text panels ("Palau – Money as Decoration", "Jewellery of the Nauru Island – Floating Impressions" and "Turmeric, Spondylus and Coconut Beads") and two audio guide spots (No. 808 "Money, Barter, Valuables, Food Transport" and No. 809 "Chuuk, Curcuma") were provided, whereas at this point I only refer to the single audio guide spot that is relevant for this observation and interview.

Audio Guide No. 808

"Money, Barter, Valuables, Food Transport"

This audio guide spot provides references to the special kind of money on Palau and its current use in traditional life. It also refers to

bracelets, the painting of the "money bird" on men's houses and the relation of traditional money – that reveals the person's status as well as food offers do – to the taro benches, molasses and vessels in the middle of the gallery behind the display cabinet.

Visitor (No. 117, female, dwell time: 2 min.)

- **Without audio guide usage**
- **Without text panel reading**

"Actually, on this artful handicraft. These are all very precisely produced things. No matter, if they are very delicate or a bit rugged. And in such countries, already children learn patience. You start small (laughs)".

Conclusion:

Only general statements and comments about the all exhibits in this heterogeneous display cabinet.

Visitor (No. 121, male, dwell time: 8 min.)

- **With audio guide usage (No. 808)**
- **Without text panel reading**

"Yes, there are individual exhibits, where certainly the patterns of the woven things attract attention or I view the jewellery, the material they are made off; the feathers for example. Or is there a reference about the sea with shark teeth? Or here in the front I wondered how thick this turtle shell is that you can even produce relatively deep bowls of it".

Conclusion:

Money could not be identified. A heterogeneous display cabinet is more difficult to connect with an audio guide.

In sum, if visitors just view the exhibition and do not gather information via text panel reading or via audio guide listening, then they only draw general conclusions about the exhibition based on the display. It seems as though text panel reading has a similar effect as audio guide usage. This reflects the similar contents provided by the text panels and the audio guide. However there are two big differences between text panel reading and audio guide listening. Firstly, text panels were rarely read completely but audio guide spots were usually listened to

completely. Hence, with audio guide usage more information is gathered. Secondly, the parallel appropriation or processing of viewing and receiving information about the viewed exhibits at the same time provides an extended period of dwell time and a more elaborate processing by movement patterns.

Apart from that, it seems that a homogeneous presentation does not lead to an elaborate processing at all, even with audio guide usage. Maybe big headers within the display cabinet that provide references about the different weavings would provide more helpful and precise information about the exact exhibits' position.

5.5. Conclusion

First, all 15 movement patterns identified in the first phase of MET data analysis were also validated by systematic observation. A comparison of the total numbers across the sections in both studies provides further evidence that the results are similar and hence comparable, although the samples sizes differ a bit. Thus, the first 15 movement patterns are robust also in method comparison. Again, the main result was that heterogeneous display cabinets lead to the most active viewing behaviours.

Secondly, although the total numbers are similar, the individual numbers of movement patterns in both studies are rather different. Additionally, more movement patterns are identified in general by MET than by observation. MET provides more precise results than observation. Hence, it seems that the difference between the individual movement patterns results is grounded in the different methods. Thus, an external observer can also validate the emic point of viewing exhibitions by visitors largely but not completely. Therefore, these two methods will be compared in detail in *Chapter 7*.

Thirdly, audio guide usage leads to more movement patterns. With audio guide usage, visitors have more capacity to appropriate exhibitions by particular movement patterns. This difference between audio guide usage and non-usage seems to be grounded in the parallel versus one-eyed way of appropriation and experience. Audio guide usage allows parallel viewing and listening at the same time. Thus, the embodiment of the exhibition is broadened by audio guide usage due to the merging of the visual and auditory sense while being in bodily action. Likewise, the audio guide usage broadens the museum experience and leads to a more elaborate learning and multisensory experience. Audio guide usage shapes the viewing

behaviour into more elaborate and complex viewing behaviours especially at freestanding exhibits and the heterogeneous display cabinet. This validates Smith & Tinio's (2008) and Bitgood's (2010) findings and demonstrates more empirical evidence in support of audio guide usage. The prejudices about digital guide usage summarized by Tallon & Walker (2008) are wrong, particularly that visitors are either more focused on listening than on viewing while they use audio guides or they are behaving like zombies and thus are rather passive while they use audio guides. This finding is also not in line with Franklin et al. (1993) who reported that titles do not influence the viewing behaviour at exhibits. However, these studies did not focus on digital media. In contrast, my research demonstrates that the references of the audio guide texts highlight particular affordances in the exhibition and accordingly guide the visitors' attention and viewing behaviour. In sum, audio guide usage changes the movement behaviour of visitors as it was presumed.

Regarding the cognitive processing of the audio guide spots by visitors, there is a clear tendency that no additional information consumption (neither text panels nor audio guide usage) leads only to a general processing of the display; in contrast audio guide usage and text panel reading both lead to a more elaborate processing. Although text panel reading seems to have a similar effect as audio guide usage, there is one main difference: the prolonged and hence more elaborate consumption of the audio guide spots in contrast to a shorter consumption of text panels. This is in line with previous research reported in *Chapter 1* about the prolonged dwell time of visitors using digital guides (Kuflik et al. 2011, Lanir, Kuflik, Dim, Wecker & Stock 2013).

Further research about audio guide processing and text panel processing must be conducted. On the one hand, research that varies systematically between the two conditions of text panel reading and audio guide usage and on the other hand, research about the natural frequency of audio guide usage and text panel reading.

Hence, my design suggestion for implementing audio guides in exhibitions is a careful consideration: What is the use of text panels that provide the same or similar information as an audio guide? What about dropping such text panels in favour of audio guides who lead to a more active and hence more elaborate appropriation of an exhibition and even allow a parallel appropriation of viewing and listening at the same time? Thus, what about using the audio guide as the only source of information instead of using it as an additional source of

information? Of course such a design is difficult to implement due to reasons of accessibility for every human being and because audio guide usage largely prevents social interaction.

However now, we will switch to the second MET study in an exhibition that uses a tablet-like digital guide as the only source of further information in a literature exhibition. This tablet guide also provides written text and therefore works different as an audio guide and hence it can be used as the only source of information more likely. Whereas the handling of the audio guide was easy and explained in the first audio guide spot (No. 800, see *Chapter 3*), the tablet-like digital guide in this literature exhibition claims more elaborate technical skills.

6. Mobile Eye Tracking and Cued Retrospective Reporting – Part Two: Results of the Visitor Study at the LiMo

This chapter will provide the results of the explorative mobile eye tracking (MET) study combined with cued retrospective reporting (CRR) in the "nexus" exhibition at the LiMo in Marbach a.N. in 2010. Remember that 18 distinct, recurrent and systematic movement patterns were identified in the first MET study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart (see *Chapter 4*). Fifteen of them were confirmed by systematic observation in the same exhibition (see *Chapter 5*). Can these or even further movement patterns be identified by MET in the "nexus" exhibition at the Museum of Modern Literature (LiMo) in Marbach a. N.? I will show that most movement patterns can also be identified in the "nexus" exhibition, whereas only some are missing and even further movement patterns are occurring (see Table 14). Thus, the results of this second MET study will extend our knowledge about the emic point of viewing exhibitions. Hence, this chapter works as an extension of the basic *Chapter 4*. Therefore, these chapters are weighted unequally. This chapter focuses "only" on the occurrences of movement patterns and does not provide their frequencies. In addition, it provides qualitative examples of movement behaviour and accompanying cognitive processes.

"nexus" is an exhibition about a different issue, namely literature, in a different, modern building with a completely different exhibition design, namely mainly homogenous display cabinets structured in four rows of manuscripts, books, letters and relics. Remember that although display cabinets in general lead to more movement patterns in sum than freestanding exhibits, homogenous display cabinets provide less affordances and hence lead to less complex viewing behaviour than heterogeneous display cabinets. How do visitors appropriate an exhibition with almost homogenous display cabinets? I will provide evidence that the homogeneous presentation in "nexus" leads to a different range of movement patterns. Furthermore, the completely glassy display cabinets lead to further movement patterns. The cognitive processing is largely influenced by the usage of the digital guide M3 (multimedia museums guide) especially when used by the experts.

Thus, the aims of this MET study were: firstly, to verify all 18 movement patterns in a different exhibition in order to determine whether they might be generalizable. Secondly, to look for further movement patterns that can be found in this almost homogenous exhibition.

Thirdly, the aim was to examine again the difference between experts and novices regarding their appropriation and experience of the "nexus" exhibition. Fourthly, the aim was to examine the influence of the tablet-like medium, M3, on the appropriation of exhibits by particular movement patterns and the respective cognitive processes as well as the consequent experience of the "nexus" exhibition.

This chapter is structured in five paragraphs: firstly, an introduction into the MET study in the "nexus" exhibition; secondly, an extended list of movement patterns that demonstrate that these movement patterns are also valid in a completely different exhibition; thirdly, an exemplary comparison of the viewing behaviour and cognitive processing by a single expert and a single novice who do not use the M3; fourthly, an exemplary comparison of the viewing behaviour and cognitive processing by a single expert and a single novice who use the M3, and lastly, a summarizing conclusion including specific design suggestions.

6.1. The Field Study at the LiMo

Before describing the results, I will firstly describe the research process of the explorative MET study in the "nexus" exhibition at the LiMo: the preparation, the participating visitors, the procedure and the analysis.

6.1.1. Preparation

The field study was conducted in the "nexus" exhibition described above in *Chapter 3*. Before the study was conducted, I had to find visitors without corneal dysfunctions and I had to find a MET that ensured a better video quality and could cope with the relative darkness of 50 Lux in the "nexus" exhibition. Together with colleagues of the KMRC who also worked with METs I assessed the Locarna PT Mini as the adequate device (designed 2010; http://www.locarna.com/products.html). Additionally I had to learn how to use this MET device.

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6.1.2. Participating Visitors

The sample size was eight participating visitors: four "experts" (persons with prior knowledge of the subject matter, e.g., students of German Studies and German Literature or Philology) and four "novices" (persons with only cursory or even no prior knowledge of the subject matter and with no knowledge about museology, museum education or exhibition design). No further data about their expertise and non-expertise was collected. Table 13 summarizes the basic information regarding the sample. All participants were German-speaking and visited the LiMo and the "nexus" exhibition for the first time and had no prior knowledge about this exhibition or how to navigate through it, like the visitors of the MET study at the Linden-Museum. Hence in sum, 16 visitors participated between the two MET studies described in this thesis. As far as I know, these two MET studies had the largest sample size for examining regular exhibitions applying MET technology at the time of data collection.

Sample of the MET Study in the "nexus" Exhibition at the LiMo in Marbach: Visitors' Social Data:

Visitor	Visitor Category	Gender	Age	Profession	Interest in German Literature (scale: 1= not interested to 5 = completely interested)	Interest in Literature Museums (scale: 1= not interested to 5 = completely interested)	M3 Usage	Behaviour as usual (scale: 1= not at all to 5 = exactly as usual)
E1	Expert	Male	23	Teacher trainee for German	Interested	Interested	No	Less
E2	Expert	Female	24	Teacher trainee for German	Very Interested	A little interested	No	Middle
E4	Expert	Male	27	Master degree in German studies	Completely interested	Completely interested	Yes	Largely as usual
E5	Expert	Male	24	Student of philology	Completely interested	Very interested	Yes	Largely as usual
N2	Novice	Female	23	Student of Roman philology and history	Very interested	Interested	No	Largely as usual
N3	Novice	Male	43	Technician for machine tools	A little interested	Not interested	No	Exactly as usual
N6	Novice	Male	24	Student of software engineering	Interested	A little interested	Yes	Exactly as usual
N7	Novice	Male	32	Student of philosophy and industrial mechanics	Very interested	A little interested	Yes	Largely as usual

Table 13: Sample of the MET study in the "nexus" exhibition at the LiMo in Marbach

6.1.3. Procedure

As mentioned above I applied the Locarna PT Mini for the MET study at the LiMo. Figure 67 shows the calibration of the Locarna PT Mini and Figure 68 shows the Locarna PT Mini in the field: in the "nexus" exhibition.

Figure 67: Calibration of the Locarna PT Mini (photograph by Kira Eghbal-Azar)

Figure 68: The Locarna PT Mini designed and applied in the "nexus" exhibition in 2010 (photograph by Kira Eghbal-Azar with kind permission from the LiMo)

The procedure was conducted the same as at the LiMo like at the Linden-Museum for reasons of comparability with two exceptions: I used a different MET (see Figure 67 and 68) and I varied the digital medium usage (see Figure 68). Two expert visitors and two novice visitors were equipped with the digital medium M3 for their exhibition visit and two expert visitors and two novice visitors visited the exhibition without the digital medium.

The M3 was described in detail in *Chapter 3*. There are several previously discussed details that are worth keeping in mind now: Each of the 1300 exhibits in the "nexus" exhibition was only labelled by year and author name. For further information, visitors had to use this code to log in to the M3 "nexus" menu. Hence the information level was completely divided from the display level. The M3 worked as an integral impartation medium and not as an additional subset as most digital guides are used in exhibitions. The M3 provided short information for each of the 1300 exhibits in "nexus", as well as a photograph and a transcription of each exhibit. It also provides possibilities to connect with exhibits of the same year, the same author or the same issue. Finally, it additionally provides several audio tours.

Due to the sensitive calibration of the MET that is mounted on the visitors' head, I did not provide earphones for the participating visitors in general. Similarly I did not provide the audio guide in the MET study at the Linden-Museum in Stuttgart. Without the earphones and hence the audio guide function the M3 did not interfere with the MET and its calibration. Hence it was possible to provide this digital guide in a reduced form in this MET study.

Again I applied the MET in an exploratory fashion, to help document and analyse the movement patterns of visitors, i.e., what visitors "really" looked at as they moved freely through the exhibition (for further information read procedure description of *Chapter 4*). All participants received the following open and standardized instruction for their exhibition visit after calibrating the MET: "Please view the exhibition naturally at your own speed, following your own wishes and needs. There are no further specifications, even no time specification on how to carry out this visit. Your knowledge acquisition about the exhibition will not be tested afterwards".

The visitor verbalised in retrospection with their own MET video as cue and again the following standardized instruction was given: "Now I present you the video recorded by the MET during your visit of the exhibition. While watching the video, please describe

spontaneously what you viewed, perceived, thought and felt at various points and what you paid attention to".

The local ethics committee of the Leibniz Knowledge Media Research Centre in Tuebingen, Germany approved this study.

6.1.4. Analysis

Like the MET study analysis at the Linden-Museum in Stuttgart, before data analysis of the eye movement recordings at the LiMo, the MET videos had to be synchronized with the reporting retrospectively according to video cues. One video without audio and one with audio were recorded for all participating visitors of the "nexus" exhibition.

According to the research aims, there were four phases of data analysis.

Phase one:

Phase one of data analysis examined the comparability of the two MET study results in both exhibitions. Hence, I analysed whether I could identify the 18 movement patterns in the "nexus" exhibition at the LiMo that were originally found in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart. For reasons of comparability I chose the four visitors that did not use the digital medium M3. I watched the complete videos of these four visitors in natural speed with rewind option looking only for occurrences and not for the frequencies of each movement patterns.

Phase two:

Phase two of data analysis searched for further movement patterns in the "nexus" exhibition that were not identified yet. Hence, I watched the complete videos of all eight visitors in natural speed with rewind option looking for new movement patterns.

Phase three:

Phase three examined the differences and similarities in movement patterns and cognitive processes exemplarily between the different visitor groups (experts versus novices). Therefore the prototypical examples were selected due to the following criteria:

- Differences between visitor groups (single expert versus single novice)
- Typical contrasting examples
- Demonstrate several movement patterns
- Visitors that did not use the digital medium, for reasons of comparability with the MET study at the Linden-Museum

Hence I selected one expert (E1) and one novice (N3) as representatives.

Phase four:

Phase four of data analysis examined the influence of the M3 in the "nexus" exhibition on movement patterns and the cognitive processes. This time I chose the visitors who used the M3 and looked for exemplary situations that demonstrate the influence of the M3 across one expert (E4) and one novice (N6).

6.2. Generalizability of the Movement Patterns

I will provide examples of all movement patterns detected in phase one of analysis at the "nexus" exhibition as evidence for a possible generalizability of the movement patterns across different kind of exhibitions. Note that there are some differences between the movement patterns lists of the two MET studies as you can see in Table 14. For comparison between the two MET studies I provide video examples of all movement patterns identified in the "nexus" exhibition at the LiMo on a DVD.

The list of movement patterns identified in the "nexus" exhibition contains movement patterns in bold print. These were identified in the first phase of data analysis. The aim was to confirm the 18 movement patterns of the first MET study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart. Some movement patterns do not occur in the "nexus" exhibition as mentioned in Table 14 due the

affordances of the exhibition design. The movement patterns in italic and bold print were identified for the first time in the second phase of analysis. The aim of this second phase was to identify new movement patterns in the "nexus" exhibition.

Note that even this extended list is probably incomplete. I expect the occurrence of further movement patterns in other exhibitions. Nevertheless this extended list is probably presenting the main movement patterns in exhibitions. Hence these movement patterns are presenting the emic point of viewing exhibitions in its great variability. All movement patterns are reciprocally excluded.

Movement patterns in the "nexus" exhibition:

Category	Movement Pattern	MET Video Example	Source and Cognitive Processes (CRR-Protocols)
Movement Patterns and Orientation*	**Major Orientation Gaze** (cf. Mayr et al. 2009; see *Chapter 2*)	DVD: MET LiMo 2010_KEA > Orientation > Major Orientation Gaze	E1: "Yes, orientating oneself firstly".
	Minor Orientation Gaze (cf. Mayr et al. 2009; see *Chapter 2*)	DVD: MET LiMo 2010_KEA > Orientation > Minor Orientation Gaze	E1: "Global Overview"
	Backward Gaze	DVD: MET LiMo 2010_KEA > Orientation > Backward Gaze	E2: No report
	Forward Gaze	DVD: MET LiMo 2010_KEA > Orientation > Forward Gaze	N3: No report

Movement Patterns and Strolling**	Window Shopping (based on Treinen 1988; see *Chapter 2*)	DVD: MET LiMo 2010_KEA > Strolling > Window Shopping	N2: No report
	Wandering Along	DVD: MET LiMo 2010_KEA > Strolling > Wandering Along	N3: No report
	Turn	DVD: MET LiMo 2010_KEA > Strolling > Turn	E2: No report
	Fixation Walk	Does not occur	
	Pull Back	DVD: MET LiMo 2010_KEA > Strolling > Pull back	N2: „…underlined it, well and there I viewed rather longer, well but so to speak due to personal interest, because I said for example, okay in this book (Hermann Hesse wrote or underlined something)"
Movement Patterns and Exhibits***	Reading Text Panels	Does not occur	
	Reading in Exhibits	DVD: MET LiMo 2010_KEA > Exhibits > Reading in Exhibits	N2: No report

	Reading Labels	DVD: MET LiMo 2010_KEA > Exhibits > Reading Labels	N2: No report
	Reading the M3	DVD: MET LiMo 2010_KEA > Exhibits > Reading the M3	E4: No report
	Long Gaze (based on Aleida Assmann 1995; see *Chapter 2*)	DVD: MET LiMo 2010_KEA > Exhibits > Long Gaze	E2: No report
	Insight	Does not occur	
	Changing Perspective	DVD: MET LiMo 2010_KEA > Exhibits > Changing Perspective	N2: No report
	Object Scan	DVD: MET LiMo 2010_KEA > Exhibits > Object Scan	N3: No report
	Alternating Gaze (cf. Mayr et al. 2009; see *Chapter 2*)	DVD: MET LiMo 2010_KEA > Exhibits > Alternating Gazes ➤ (i) Between exhibits ➤ (ii) Between label/exhibit ➤ (iii) Between display cabinets ➤ (iv) Within an exhibit ➤ (v) Between M3/exhibit	- (i) Between exhibits: N3: "there I was comparing" - (ii) Between label/exhibit: N3: No report - (iii) Between display cabinets: N2: "Where shall I go now?"

			- (iv) Within an exhibit comparing poem with picture: N2: No report - (v) Between M3 and exhibit: E4: "…maybe the smart device may help you. And actually the smart device provided…"
	Zooming Closer	DVD: MET LiMo 2010_KEA > Exhibits > Zooming Closer	N2: "because the book was so thick and looked important"
	Zooming Further Afar	DVD: MET LiMo 2010_KEA > Exhibits > Zooming Further Afar	E1: "yes, exactly"
Movement Patterns and Human Beings****	**Social Gaze**	DVD: MET LiMo 2010_KEA > Human Beings > Social Gaze	N2: No report

Table 14: Table of Movement Patterns in the "nexus" exhibition at the LiMo

The MET study in the "nexus" exhibition at the LiMo validated nearly all movement patterns that were found in the MET study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart. A few behaviours were not observed: (i) "Fixation Walk", (ii) "Text Panel Reading" and (iii) "Insights". (i) "Fixation Walks" were not possible because all exhibits were displayed in display cabinets, which were almost all in a homogenous presentation except the last row displaying relics. Hence no salient features

could be detected that would lead to a "Fixation Walk" towards an exhibit from far away. (iii) "Text Panel Reading" was not possible because there are no text panels or any other further information provided on the display level of the "nexus" exhibition at all. (iii) "Insights" were not possible because all exhibits are displayed within display cabinets and there was no exhibit with a hole presenting inner parts.

In addition the MET study in the "nexus" exhibition found further movement patterns: (i) "Pull Back", (ii) "Reading in Exhibits", (iii) "Reading the M3" and further "Alternating Gazes" – such as "Alternating Gazes" (iv) between display cabinets, (v) within an exhibit and (vi) between M3 and exhibit. (i) "Pull Back" is performed due to the attraction power of an exhibit, which pulls the gaze back to the exhibit although the visitor was already close to leaving. (ii) "Reading in Exhibits" is probably especially characteristic for literature exhibitions or any other exhibition that displays manuscripts, typo scripts, letters and books or any other readable exhibits. (iii) "Reading the M3" is especially characteristic for exhibitions that provide a tablet-like medium or any other media that provides text. Further "Alternating Gazes" like (iv) the "Alternating Gazes" between display cabinets are performed due to the affordance of comparison created by the rows of display cabinets. (v) "Alternating Gazes" within an exhibit are characteristic for exhibits with more than one part like books that feature texts and pictures. (vi) "Alternating Gazes" between the M3 and an exhibit are especially characteristic for an exhibition visit with a digital guide. Thus digital guides change the movement behaviour of visitors due to increased eye-hand coordination; especially with tablet like guides.

Again the newly identified movement patterns reveal the distinctive appropriation of the characteristic affordances of the "nexus" exhibition: multi-partitioned exhibits that can be appropriated and compared within themselves. Additionally the homogenous display cabinets themselves can be compared with each other. Thereby these homogenous display cabinets display exhibits that show their greatness only when viewed from shorter distances and hence pull back the attention from close distances and not from far away. Furthermore the digital guide M3 provides the only information about these exhibits. Hence exhibits can be compared with the M3.

Besides these aspects the characteristics of completely glassy display cabinets provide more action possibilities like the "Pull Back" from the side of the display cabinet back to the   front

like it is presented in the MET video example. Further movement patterns are more likely due to this presentation with glassy shelves. For example a "Zooming Closer" from distantly shelves to a lower or higher shelves. A "Changing Perspective" includes a movement to the viewable bottom side of an exhibit due to glassy shelves. An "Alternating Gaze" can be performed around the corner of a display cabinet, for example looking from the side to the front and back again.

In sum, the appropriation by particular movement patterns is adjusted to the particular affordances of this exhibition with completely glassy display cabinets presenting almost completely homogenous exhibits. The distinct, recurrent and systematic movement patterns found in both MET studies presumably can be identified also in further visitor studies.

6.3. Exemplary Movement Patterns and Cued Retrospective Reporting of One Expert and One Novice without M3 Usage

After verifying the movement patterns in a completely different exhibition, I want to examine exemplarily the differences between experts and novices viewing and processing the "nexus" exhibition. Therefore I will provide examples of experts and novices that did not use the M3. According to a detailed description, I will provide the viewing behaviour recorded by the MET with still images out of the mobile eye tracking video data and the cognitive processes described in the CRR with the respective transcripts. Hence the reader is able to get an impression of the particular movement patterns and the respective cognitive processes that go along with it in the course of the complete circulation through "nexus".

First, the dwell time by experts and novices is similar except for the dwell time of the visitor "N2" (see Table 15):

Visitors without M3 Usage	Dwell Time
E1	28:23 min.
E2	29:12 min.
N2	53:03 min.
N3	37:55 min.

Table 15: Dwell time of experts and novices without M3 usage in the "nexus" exhibition at the LiMo

I will compare exemplarily visitor "E1" with visitor "N3" regarding on-topic examples of their complete circulation in "nexus". These two visitors are typical candidates for their group and show contrasting viewing behaviour and cognitive processes:

Remember that E1 is a male expert visitor who is a teacher trainee for German and 23 years old. E1 is interested in German literature and in literature museums. N3 is a male technician for machine tools for a well-known German automaker in Stuttgart. N3 is 43 years old and only a little interested in German literature and not interested at all in literature museums.

Topic	E1 (dwell time: 28:23 min.)	N3 (dwell time 37:55 min.)
1. Theme of exhibition/curators' intention	**Example 1** Figure 69: Still image 1 "nexus" – expert *"After all what is that supposed to be a literature museum? ..."*	**Example 1** Figure 76: Still image 8 "nexus" – LONG GAZE by novice *"Also found weird things. Thus a piece of paper with car tire marks. Then I thought, man, what one puts all in there...is that also a manuscript, now? (laughs) I could also write some manuscripts like this (laughs) with different cars or tires".*

Example 2

Figure 70: Still image 2 "nexus" –
WINDOW SHOPPING by expert

"…where books are displayed…"

Figure 77: Still image 9 "nexus" –
READING IN EXHIBITS by novice

"That was the modern time, when poems are also printed on shopping bags".

Figure 71: Still image 3 "nexus" –
WINDOW SHOPPING by expert

"…what is not their purpose actually"

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Figure 72: Still image 4 "nexus" –
WINDOW SHOPPING by expert

*"To a great extent, I would say that not
books are displayed here, but
information about the books".*

Figure 73: Still image 5 "nexus" –
expert

*"Again and again I thought – as I was
walking through it – about the purpose
and value of such exhibitions, and also
the museum at all".*

Figure 74: Still image 6 "nexus" – expert

"Is it worth the money and so on – also for the staff of the museum – is it worth to put so much money for such an exhibition or also the museum itself?"

Gaze moves further:

"And that is an important question yet, if one does not view it only from the literary studies. It is also a political question. I mean there were made decisions about money, yes?! And I would like to know the reasons of these persons, what is intended with it?"

Example 2

Figure 75: Still image 7 "nexus" – READING IN EXHIBITS by expert

"…not only in literature, but actually in all forms of art, there is always the question: do we need the information behind? Also this historical information or do we need only the object itself?"

Conclusion: 1. Theme of exhibition/curators' intention

Expert visitor is very critical of this literature exhibition in particular and the museum in general although he is an expert. Does it rather occur because he is an expert? He questions nexus' and the literature museums' right to exist (see Figure 69-74).

He is also very reflective on the exhibits' right to exist (see Figure 75), for example, considering whether we need the letters of the authors for interpreting their work. A good example

Novice does not question the exhibition's right to exist. Although he only takes up humorously bits and pieces, he noticed two important intentions of the curator:

- The materiality of the exhibits or the traces on the exhibits like the car tire marks (see Figure 76). This example is funny, because this novice works for a big German automaker. His opinion reduces the curatorial intention to absurdity and

that probably points to his education as a teacher trainee.

In sum, the expert visitor seeks for the general intention of this exhibition.

the novice makes fun of this exhibit.

- The historical change (see Figure 77) that is demonstrated by the chronological order.

Example 1

Figure 78: Still image 10 "nexus" – READING IN EXHIBITS by expert

"That was always very interesting for me personally at this…"

Gaze moves further:

"…and the next display cabinet probably, when it gets close to the time of National Socialism".

Example 1
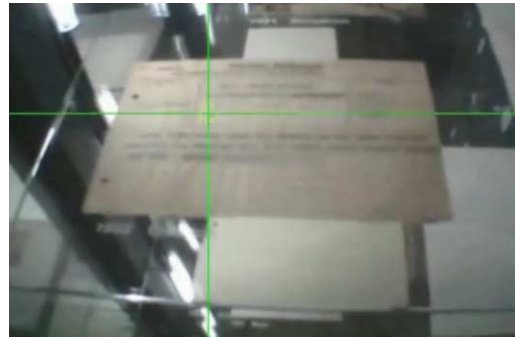
Figure 82: Still image 14 "nexus" – READING IN EXHIBITS by novice

"Yes, I think that is the telegram of Marlene Dietrich. I read it twice. It is it actually! I looked at the year, yes, certainly yet, could be".

Example 2

Figure 79: Still image 11 "nexus" –
WINDOW SHOPPING and MINOR
ORIENTATION GAZES by expert

*"…because usually it is always, from
my subjective point of view, it is
certainly often like that. No matter what
issue, if it is looked at diachronically,
then often the National Socialism is put
like a poster of that time…"*

Figure 83: Still image 15 "nexus" –
novice

*"Yes, here at the artefacts, it was a
bit more interesting for me, took a
bit more time".*

Example 3

Figure 80: Still image 12 "nexus" –
expert

"…And when you walk here through the

Figure 84: Still image 16 "nexus" –
LONG GAZE at weapon by novice

"A weapon. I believe even with

exhibition, then it is completely, well, it is neutral".

munition at the back".

Example 2
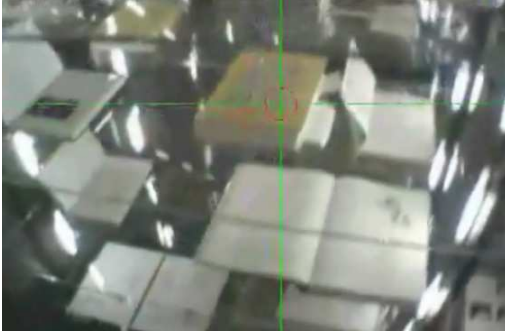
Figure 81: Still image 13 "nexus" – LONG GAZE by expert

"Ah, yes, exactly, that was a book about Adolf Eichmann or here the yellow one. Surely I was interested in it because it belongs to the second world war and I am also born in Poland".

Gaze moves further:

"Well, again I have links to the history. Nor did I know that there exists a biography about him".

Conclusion: 2. Exhibit selection

Expert visitor selects exhibits mainly related to the historical period of the National Socialism which he is

Novice visitor mainly selects exhibits that are rather artefacts than literary objects (see Figures 83 and

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particularly interested in personally and which demonstrates his agenda as a teacher trainee who thinks about the pedagogical consequences of the neutral display of the Nazi regime (see Figures 78-81). The chronological order of the exhibits provides a frame for selecting exhibits due to a specific time.

84). He is not attracted as much to the authors or the creators of the exhibits, but is more interested in authors as human beings, which is demonstrated intentionally by the letters (see Figure 82). He also probably lacks knowledge about authors. Accordingly, he is more interested in artefacts like the weapon (see Figure 84). The methodological reflection in *Chapter 7* provides an example of another novice visitor who is attracted by the same weapon. Note that it is the only weapon in this whole exhibition. Hence it is remarkable that the weapon attracts two novices of four but no experts.

3. Reading exhibits
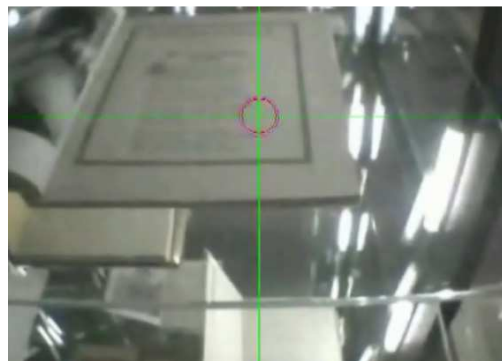
Figure 85: Still image 17 "nexus" – READING IN EXHIBITS by expert

"Again and again it is interesting, to read in between somewhere. But of

Figure 86: Still image 18 "nexus" – READING IN EXHIBITS by novice

"Tried to read a few manuscripts…"

course, everything is taken out of context".

At this manuscript:

"…but I could not make out everything (laughs)".

Conclusion: 3. Reading in exhibits

Expert visitor criticizes the decontextualizing of the exhibits when he is reading (see Figure 85).

Novice visitor criticizes the legibility of the manuscripts (see Figure 86).

Figure 87: Still image 19 "nexus" – expert

"And although I study German now, I must admit – I also study music –…"

Gaze moves further:

"…and there is also frequently work with originals, not works, but one looks at it frequently. But that does not mean that only because I study German I am also interested in it (originals)".

Conclusion: 4. Experts and novices

Expert visitor admits that although he is an expert he is not interested in manuscripts while he views a manuscript (see Figure 87).

Novice visitor does not report in this category.
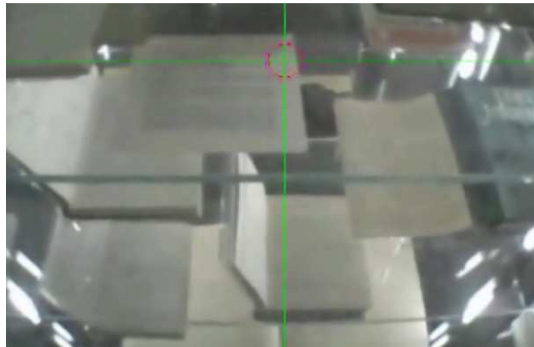
Figure 88: Still image 20 "nexus" – expert

"For whom? Literary scholars!"

Figure 89: Still image 21 "nexus" – MINOR ORIENTATION GAZES by expert

"What I assume about Marbach, that it was made for tourists, was made as a Schiller town. But when one thinks about it, Schiller has not much in common with Marbach itself except that he was born here. What would he say about it today?"

Figure 90: Still image 22 "nexus" – WINDOW SHOPPING by expert

"…not literature for everybody, but literature for an elite circle".

Conclusion: 5. Target group

Expert visitor names three target groups of nexus as being literary scholars, an elite circle and tourists while he is walking through "nexus" (see Figures 88-90).

Novice visitor does not report in this category.

Example 1
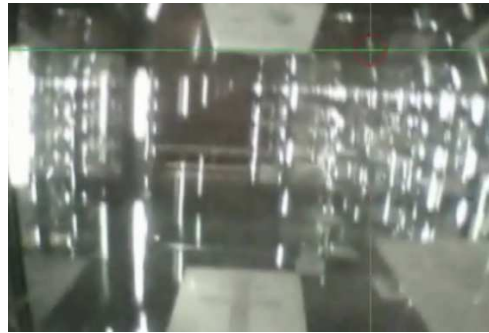
Figure 91: Still image 23 "nexus" – expert looks at shelf 5 of a display cabinet

"I must say that I thought that is unsuccessfully done in the exhibition…"
Gaze moves further:

"…well certainly meant well and so on, but that up there is – it is also technically difficult to view up there, of course".

Example 1

Figure 94: Still image 26 "nexus" – novice views christening robe of Thomas Mann

"And first I thought it was an optical illusion. There they even put three clothes on top of each other. Then I looked once again and actually saw three".

Example 2

Figure 92: Still image 24 "nexus" – expert looks at lower shelves of a display cabinet

Example 2

Figure 95: Still image 27 "nexus" – novice looks at shelf 5 of a display cabinet

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"also the lowest is difficult"   *"…but the one up…up there anyway not…"*

Example 3   **Example 3**

Figure 93: Still image 25 "nexus" – expert   Figure 96: Still image 28 "nexus" – novice views shelf 4 of a display cabinet

Shortly before the still image: *"…and here the same, for some it is inappropriate"*.

"That is like in the grocery when you go shopping. Where you look, there are the expensive things".

At the still image:

"If I am allowed to draw this unqualified parallel"

Conclusion: 6. Design/presentation practice

Both visitors (expert and novice visitor) report about their reactions to and their assessment of the glassy shelves in the display cabinets. Both criticized the highest and the lowest level (see Figures 91, 92, 95 and 96).

Additionally the expert visitor misunderstood the anti-semantic presentation when he compared the shelves of the display cabinets with shelves in a supermarket (see Figure 93).	The novice visitor was confused about the glassy shelves leading to the misconception of an optical illusion (see Figure 94).

General Conclusion between One Expert and One Novice without M3 Usage

At this point, I must state that between experts and novices who did not use the M3, the novice does not report as much as the expert even though the novice visitor N3 spends more time in "nexus" than the expert visitor E1. Hence the quantity of time spent in exhibitions is not always equal with the quality of processing exhibitions. Furthermore the quantity of the time spent does not seem to be a matter of expertise but probably the quantity and quality of reporting and hence more elaborate processing does.

Although the novice visitor only attends to bits and pieces, he identifies two important intentions of the curators, whereas the expert looks for the big picture of "nexus" and the pedagogical aspects of the exhibition. That is probably why there are fewer characteristic movement patterns that refer to the cognitive processes of the expert. Note that the expert visitor performs a lot of "Window Shopping" and "Minor Orientation Gazes". This provides further evidence that "Window Shopping" works as a search strategy like Rounds assumed in his search rules that are characterized by "initial scanning mechanism" (2004: 401). Additionally the increase in "Window Shopping" and "Minor Orientation Gazes" demonstrates the main affordance and thus the main way of appropriating the nexus exhibition. It seems as though "nexus" affords more scanning movement patterns due to the rows of homogenous display cabinets.

Furthermore, the novice visitor mainly selects relicts of the fourth row; in contrast the expert mainly selects exhibits that are connected to the Nazi regime, although the "nexus" exhibition does not focus on historical events. The chronological order provides possibilities to look for such events. As Habsburg-Lothringen (2012) pointed out correctly, there are possibilities for creating narrations due to the chronological order (see *Chapter 3*). The reading of the selected

exhibits also shows the level of expertise. Whereas the expert again looks for the big picture (the decontextualizing of the exhibits), the novice is more concerned about the immediate profane situation of his visit (the readability of the exhibits).

Regardless of their level of expertise, the expert and the novice visitors share one critique about "nexus". Both visitors are unhappy about the shelves below and above eye-level within the display cabinets. The expert visitor even compared the shelves of the display cabinets with shelves in a supermarket. Although museum staff is probably not fond of such a comparison, Eghbal-Azar et al. (2016) provide further evidence that the expert is somehow right, at least for the behaviour of the visitors. They also found evidence that exhibits on eye-level were accessed more in the museums guide M3, like consumer research found in supermarkets (Chandon, Hutchinson, Bradlow, & Young 2009, Drèze, Hoch, & Purk 1994).

In sum, the appropriation of nexus is largely dependent on the visitor's agenda as Falk et al. (1998) already pointed out. Thus being a German teacher trainee or working as a technician for machine tools for an automaker shaped the appropriation of nexus and the experience with "nexus". Furthermore there are references that the appropriation and experience of "nexus" are also a matter of expertise. Expertise leads to a more elaborate processing that seeks the big picture of the exhibition.

Based on the general conclusion about one expert and one novice visitor, the design suggestions are:

(i) If you want your visitors to know the exhibition's theme right from the beginning of their visit instead of searching for it, either provide an initial introduction, the big picture, the theme, or the intentions of your exhibition at the entrance.

(ii) To maintain the interest of your visitors and avoid "museum fatigue", provide a heterogeneous range of exhibits for various exhibit selection opportunities that reflect the interests of your target audience group(s).

(iii) Thus better keep your target audience (experts or novices) in mind when you create and design your exhibition.

(iv) If you want visitors' to view your highlight exhibits, put your highlights on eye-level or risk that they will not be attended.

(v) If you want to avoid confusion of display – as the misperception of the novice visitor demonstrates – avoid too many levels of glassy shelves.

6.4. Exemplary Movement Patterns and Cued Retrospective Reporting of One Expert and One Novices with M3 Usage

After providing exemplary the differences in behaviour and cognitive processing between one expert and one novice who do not use the digital medium M3, I want to examine exemplarily the differences between experts and novices who use the M3. Again according to a detailed description, I will describe the viewing behaviour recorded by the MET with still images out of the MET video data and the cognitive processes described in the CRR with the respective transcripts. Hence the reader is able to get an impression of the particular movement patterns and the respective cognitive processes that go along with it.

Before going into details, let us look at the dwell time of the expert and novice visitors in the "nexus" exhibition with M3 usage (see Table 25):

Visitors with M3	Dwell Time
E4	49:48 min.
E5	83:37 min.
N6	08:28 min.
N7	46:43 min.

Table 16: Dwell time of experts and novices with M3 usage in the "nexus" exhibition at the LiMo

M3 usage seems to lead to a longer dwell time (compare table 15 with table 16). Note that visitor E5 desperately wanted to visit the exhibition longer than the MET device can record.

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Hence we calibrated the MET a second time and the visitor visited the exhibition twice. The 83:37 min. is the addition of the first visit with 47:20 dwell time in the exhibition and the second visit with 36:17 min. Note that the Locarna MET can record one hour including partially the time of preparation and the time of moving to the exhibition.

Why did the novice visitor N6 visit the "nexus" exhibition only for a few minutes although he used the M3? To find out I will compare exemplary novice visitor N6 with expert visitor E4 (as his behaviour seems to be more typical than the behaviour of expert visitor E5 who was the only visitor who visited the exhibition twice). Remember E4 is a male expert visitor who has a master degree in German studies and is 27 years old. E4 is completely interested in German literature and completely interested in literature museums. N6 is a male novice visitor who studies software engineering and is 24 years old. N6 is interested in German literature and only a little interested in literature museums.

Topic	E4 (dwell time: 49:48 min.)	N6 (dwell time: 08:28 min.)
1. M3 handling	Figure 97: Still image 29 "nexus" – expert starts to activate M3 *"Well, did somehow, after you thrust me this thing into my hand, I tried to orientate myself via the electronics. Exactly, I managed to activate somehow the floor plan there".*	Figure 112: Still image 44 "nexus" – novice perceives log in sign to the "nexus" menu in the M3 *"I figured out that I can do something in this space…"*
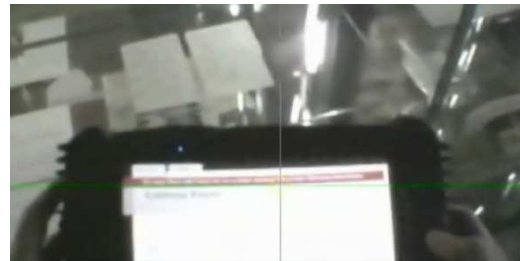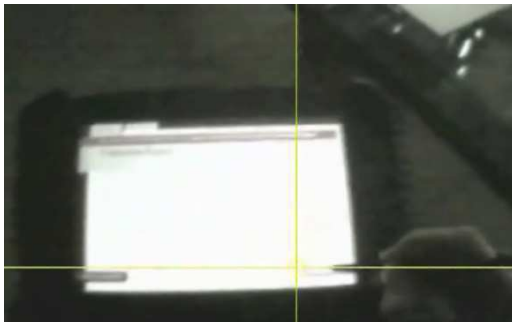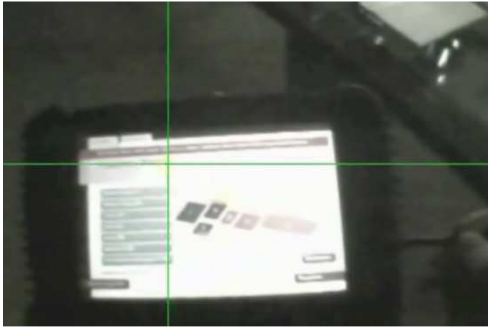
Figure 98: Still image 30 "nexus" – expert views floor plan on M3

"I even think I have – by the shape of the room – chosen the right room. Number five was somehow called nexus or something like that…"

Figure 113: Still image 45 "nexus" – novice logs in to the "nexus" menu of the M3

"…if I press here… "
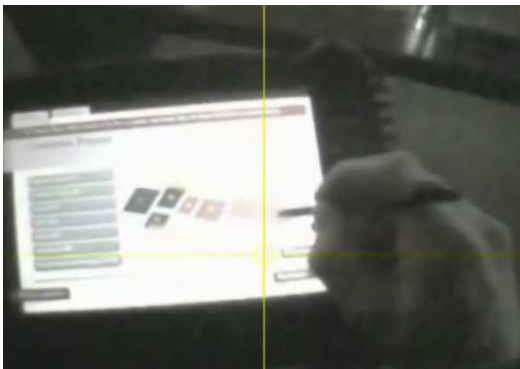
Figure 99: Still image 31 "nexus" – expert tries to log in to the "nexus" menu via the floor plan of the M3

"…exactly zag. Of course, one has to understand firstly, that you do not click here…"

Figure 114: Still image 46 "nexus" – novice reads introductory information about the "nexus" exhibition in the M3

"…and then I read that shortly".

Figure 100: Still image 32 "nexus" – expert tries to log in to the "nexus" menu via the floor plan of the M3 for the second time

"...but here, exactly".

Figure 101: Still image 33 "nexus" – expert reads short information about "nexus" on the floor plan in the M3

"and then a little bit was written, but that did not really help me...um well thus, I did not walk directly to the display cabinets and said, well I just view what is in there, but rather wanted to know firstly where I am and what is

Figure 115: Still image 47 "nexus" – novice presses the screen of the M3

"The display also did not really react, one always had to press forcefully"

Figure 116: Still image 48 "nexus" – novice selects audio guide tour in M3

"And that did not work as well, I actually wanted 'For hurriers' (German 'Für Eilige')"

displayed in the display cabinets".

Figure 102: Still image 34 "nexus" – expert asks museum attendant for help – museum attendant shows correct log in to the M3 menu

 "…and then I just asked how this thing works and where am I here?"

Figure 117: Still image 49 "nexus" – novice reads introduction to audio guide tour in the M3

"Then I chose 'For youth' (German: 'Für Jugendliche')"

Figure 103: Still image 35 "nexus" – museum attendant takes pen from the M3 and hands it to the expert visitor

 "So, pen".
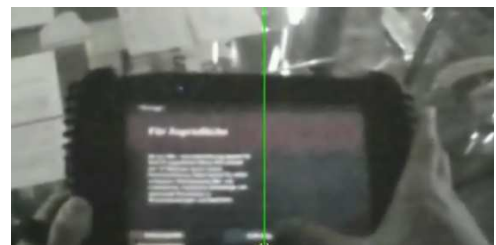
Figure 118: Still image 50 "nexus" – novice starts audio guide tour

 "…and then…"
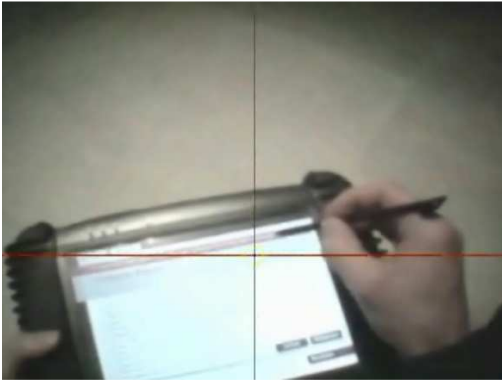
Figure 104: Still image 36 "nexus" – expert logs in to "nexus" menu of the M3

"Exactly"
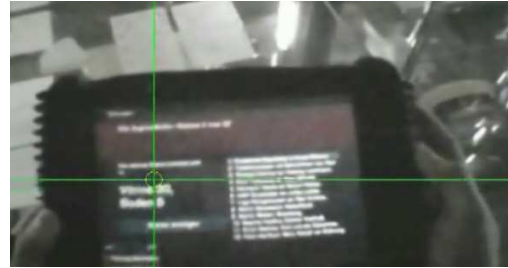
Figure 119: Still image 51 "nexus" – novice reads information of the audio guide tour in the M3

"…it was written that I have to go to display cabinet 35…"

Figure 105: Still image 37 "nexus" – expert quickly reads the introductory text about "nexus" in the M3

"Well, then the good woman explains it a little bit to me…"

Figure 120: Still image 52 "nexus" – novice performs WINDOW SHOPPING and searches for the correct display cabinet on eye level

"…but I did not see any number and that was a bit annoying…"

Figure 106: Still image 38 "nexus" – museum attendant shows log in at the display cabinet

 "…how it works and just showed me how to deal with it to get information".

Figure 121: Still image 53 "nexus" – novice finds the position of the display cabinet numbers

"…and there I think I detected the number of the display cabinet…"

Figure 107: Still image 39 "nexus" – museum attendant shows expert the position of the display cabinet numbers

No report by the visitor

Figure 122: Still image 54 "nexus" – novice searches for display cabinet number 35

"…then I searched for the number where the guide tour starts…"

Figure 108: Still image 40 "nexus" –
expert logs in a display cabinet for the
very first time

"I proceed rather systematically".

Figure 123: Still image 55 "nexus" –
novices uses M3 at display cabinet 35

"…and then I detected it…"

Figure 109: Still image 41 "nexus" –
M3 "nexus" menu shows the years
displayed in this display cabinet

*"Of course, I felt obliged to use this M3
somehow".*

Figure 124: Still image 56 "nexus" –
novices tries to activate a written
exhibit description at display cabinet
35 in the audio guide tour of the M3

*"…it was written that it is
somehow…"*

Figure 110: Still image 42 "nexus" – expert selects year in M3

"Well, okay…"

Figure 125: Still image 57 "nexus" – novice views exhibit

"…a can of an author…"

Figure 111: Still image 43 "nexus" – expert struggles with selecting the right shelf in the "nexus" menu

"So and then I had problems with the shelves…"

Shortly afterwards while reading the exhibit description:

"…well especially at display cabinets where um, I just say now under the same name, for example Blumenberg, somehow things were displayed in three
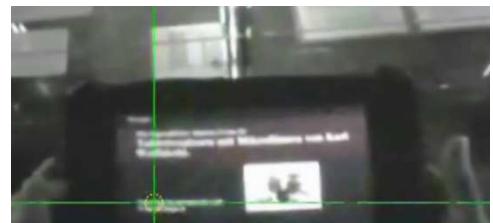
Figure 126: Still image 58 "nexus" – novice is "READING THE M3"

"…but no information was provided about it. That was also a bit strange".

Later on**:**

"My tolerance is rather low with such things. Well, if it is not directly shown, what and what about it is or any information that shall be given to me,

or four shelves and I did not know at the beginning, where is shelf one and where is shelf five, well that shelf three is in the middle was clear to me!"

and then frustration ensues quickly".

Figure 127: Still image 59 "nexus" – novice performs WINDOW SHOPPING

 "Yes, then I interrupted the guide tour and viewed the objects".

Conclusion: 1. M3 handling

Expert visitor searched for initial information in the M3 before he started to view the exhibition (see Figures 97-101). This example provides evidence that the exhibition is not even labelled as such visibly for visitors. It demonstrates the visitors' need for initial information like title and theme of the exhibition.

He did not manage to activate the menu

Novice visitor did manage to log in to the "nexus" menu determine (see Figures 112 and 113) and read the introductory text about "nexus" (see Figure 114). He failed to log in at the display cabinets; instead he opened the audio guide tours menu and tried to follow an audio guide tour (see Figures 115-126).

This example provides further

in "nexus" determine (see Figure 97-101). Hence his solution was to ask the museum attendant for help who showed him each step of activating the M3 (see Figures 102-107). Afterwards the visitor was able to log in to the M3 menu and navigate through it successfully (see Figures 108-110). This supports the importance of the fourth 'M' in "nexus": the museum attendants who help to break down barriers of handling the M3.

This example also shows problems with the shelves. This time identifying the right shelf from one to five (see Figure 111).

evidence that visitors look for information like display cabinet number on eye-level firstly (see Figure 120).

This visitor did not ask the museum attendant for help. Instead he reported elsewhere that he felt observed too obtrusively by the museum attendant who made him feel uneasy.

This visitor interrupted the exhibition visit (see Figure 127) because he felt frustrated about the M3 not working properly (see Figure 115 and 116) or his inability to make it work properly. This is a parade example of "technology fatigue" in exhibitions (cf. Filippini-Fantoni & Bowen 2008).

In sum, two steps seem to be crucial in activating the M3 properly. Firstly, to activate the log in to "nexus" itself and secondly, to activate a single display cabinet menu.

Example 1

Figure 128: Still image 60 "nexus" – expert views Hesse's manuscript "The Glass Beads Game"

"Yes, exactly, I also did not comprehend this for a long time, what that is supposed to be. Below there was written Hermann Hesse and I thought – but that are some cover sheets of journals – The Plough – I viewed it and thought okay that is weird, what is that dealing with Hesse?"

Shortly afterwards:

"Then I viewed it firstly and thought 'you will find it out'. Typical for philologists: of course, I looked on the cover sheets for where it is printed, where is the publishing company, when, how. I tried somehow to orientate myself".
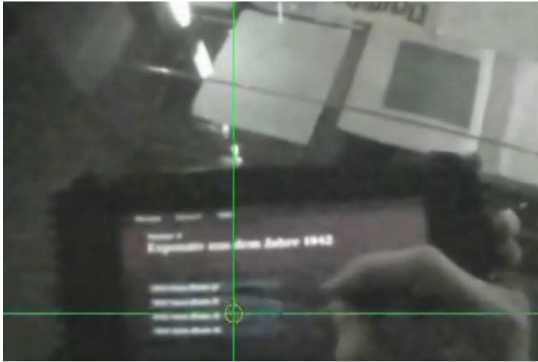
Figure 129: Still image 61 "nexus" – expert searches for information in the M3

"Till I thought sometime, ask the smart device, exactly, maybe the smart device may help you".

Figure 130: Still image 62 "nexus" – expert searches for the code (label with year and author name)

"And actually the smart device provided…"

Figure 131: Still image 63 "nexus" – expert is "READING THE M3 about Hesse's manuscript pages

"…the information that these cover sheets actually are only storage portfolios for Hesse, where he put his manuscript pages, supposedly partially with funny effects in so far, the title of these journal cover sheets could somehow be an ironic comment or the like for the content of the manuscript. Well, for example it is advertising glass beads and inside of it there are the manuscript pages of the 'Glass Bead Game'".

Figure 132: Still image 64 "nexus" –
expert views Hesse's manuscript pages
once again

*"…but okay. Then the philologist
grinned and thought, 'Oh, how nice'"*.
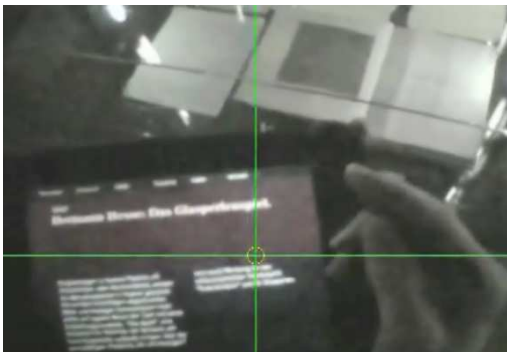
Figure 133: Still image 65 "nexus" –
expert is READING THE M3 about
Hesse's manuscript once again

*"But I must admit, well, without this
thing lot of items would have remained
quite inconclusively"*.

Example 2

Figure 134: Still image 66 "nexus" – expert is READING IN EXHIBITS

 "Ah, yes, there I was actually led once primarily by the board now, well, when I observe this and I think I can remember it; well, virtually, I saw the board first, thus coming from the right. Hilde Domin, a poet whom I like very much. And then received directly the covered, opened page. I think I did not even look for the label and the like. With a small note that she wrote somehow to a friend which is very, very nice".

Shortly afterwards:

"The trained literary scholar does the following, if he has no secondary literature at hand, which is providing additional information, he reads the primary text now, of course. The small note of Domin".

Figure 135: Still image 67 "nexus" – experts searches for more information about the note of Hilde Domin in the M3

*"And what does he do now? There I have my **electronic secondary literature**. Well secondary literature is not the appropriate term, but anyway a bit of information..."*
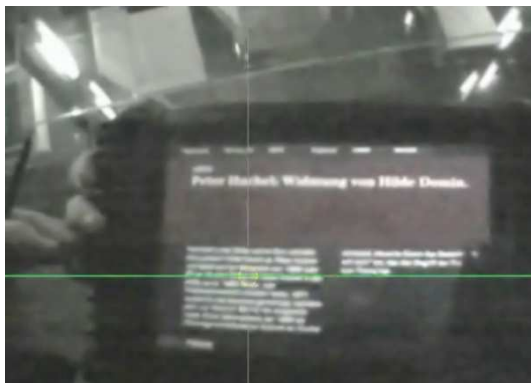
Figure 136: Still image 68 "nexus" – experts is READING THE M3

"...which I view to know a bit what it is. Exactly, dedication of Hilde Domin.

Right, yes, exactly attracted my attention retrospectively, that was not labelled as Hilde Domin but as Peter Hubert, if I can read this correctly".

Conclusion: 2. The Integral Impartation Guide M3 and the Exhibit Selection

Two examples of exhibit selection by the expert visitor were chosen:

Both examples show the cognitive dissonance created by the difference between the exhibit and its label (see Figures 128-136). In the first example this led to a further investigation using the information provided by the M3 (see Figure 128-133). In the second example the difference between exhibit and label was recognized only after the visit while viewing the visitor's own video (see Figure 136). Although the expert visitor mentioned elsewhere that he selected exhibits mainly by the label, he chose the second example for its own sake (see Figure 134).

Both examples also show that "Reading in Exhibits" and "Reading the M3" is complementary and not exclusively the one or another, probably due to the closeness of the M3 at the exhibit.

Both examples show a deeper cognitive

As the visitor could not cope with the digital medium M3 and thus interrupted his visit, he did not even start to select exhibits and use the M3 as an integral impartation medium.

processing and thus aesthetic
experience. The "Glass Bead Game"
example is also a vivid example for the
curator's intention to show that
literature is constructed.

Remarkably the expert visitor describes
the M3 as an integral impartation
medium when he defines it as
"electronic secondary literature".

General Conclusion between One Expert and One Novice with M3 Usage

In sum, M3 usage prolongs the dwell time in general. Eghbal-Azar et al. (2016) found further evidence about this prolongation after conducting an observation study in "nexus". They demonstrated that M3 usage prolonged the visit in the "nexus" exhibition by 60% (16 min.) in general. This MET study moves a bit further toward the qualitative data. Namely, that the prolongation of the dwell time depends on the media competence or the social competence to organize help and a high frustration tolerance. If visitors manage to handle the M3 properly, then M3 usage prolongs the dwell time in the "nexus" exhibition. If visitors do not manage to handle the M3 properly, then it may lead to an early termination of the visit. At least, "technology fatigue" can play a crucial role (cf. Filippini-Fantoni & Bowen 2008).

Note about all four visitors who used the M3, novice visitor N6 told me that he took part in the visitor study because he was curious about the MET. Thus, his agenda was driven by this curiosity. Note also that novice visitor N6 was not the only visitor who activated the audio guide tours. The other novice visitor N7 also managed to login to "nexus" himself and selected an audio guide tour ("For Readers"; German "Für Leser") and later another one ("For Onlookers"; German "Für Schaulustige"). As N7 could not find the mentioned exhibits, he was also annoyed and interrupted his M3 usage for a few minutes. Later he tried once again by himself via the help menu. After struggling with finding the position of the login for the display cabinets, he enjoyed using the M3 very much. As we saw, the expert visitor E4 asked for help, in contrast expert visitor E5 ran the M3 by himself very quickly.

The expert visitors mentioned repeatedly that they selected the exhibits mainly by the author name mentioned in the exhibit label – the code made of year and author name. This is in line with the findings by Eghbal-Azar et al. (2016). They figured out that the popularity of the author names lead to more accesses in the M3. The exhibit selection of the expert visitor E4 demonstrates that the M3 not only is intended as an integral impartation medium but that it really works as one in practice as long as you succeed in activating it. It leads to a deeper appropriation by further particular movement patterns. Contrary to the audio guide at the Linden-Museum in Stuttgart, which leads to a parallel appropriation and listening at the same time, the M3 usage without audio guide function leads to a separate appropriation of exhibits or M3, thereby both kinds of appropriation are complementary and not exclusive. Hence M3 usage leads to further movement patterns as demonstrated in the list of movement patterns in the "nexus" exhibition (see Table 6.2). Visitors even embody or incorporate the M3 as their "electronic secondary literature" device when visiting the "nexus" exhibition, provided they manage to handle it. Their museum experience is broadened by the haptic sense as the M3 allows visitors to 'touch' the exhibits indirectly and virtually. In sum, with M3 usage the experience of "nexus" is more exhaustive and leads to a more elaborate processing and haptic/emotional moments as the "Glass Bead Game" example and the note of Hilde Domin experience demonstrate. This is in line with findings by Schwan et al. (2008) that tablets can lead to more intense involvement with the exhibition's content.

Furthermore I asked all the visitors who used the M3 which potentials and limitation the M3 has. The expert visitors (E4 and E5) both appreciated that the M3 contains the information and that this information is optional according to the visitors' needs; thus text panels and textual exhibits did not interfere with each other. This conclusion is in line with the intention of the curators that text and textual exhibits should not compete with each other. Accordingly the M3 is the only source of information in the "nexus" exhibition. Expert E4 additionally criticizes the heavy weight of the M3 and thinks that the M3 handling must be shown to the visitors. Novice visitor N6 is not fond of the M3. He thinks the M3 has no advantages; on the contrary, he thinks that he would have probably visited the exhibition for longer if he did not use the M3. Novice visitor N7 appreciates the connecting functions but criticizes the login to the display cabinets and the picture function that does not show the picture of an exhibit according to the screen size.

Based on the general conclusion about one expert and one novice visitor using the M3 and the personal evaluation of all four M3 users, the design suggestions are as follows:

(i)   If you want your visitors to stay longer in your exhibition and engage with it more elaborately, provide digital guides.

(ii)   For an easier handling of the digital guide, keep your digital guide light. On the one hand, this advice is meant in the literal sense of the word: the weight of your guide should be light. On the other hand, it is meant in a metaphorical sense: the handling should be light, thus easy.

(iii)   Easy handling could be accomplished by automatic self-localization of the digital guide or by help information that is automatically given by the digital guide right at the start of the visit or by self-explanatory guidance. Due to the out-dated M3 technology, Marbach's museums – the LiMo and the Schiller-Nationalmuseum – introduced an app for smartphones that provides further information for visitors before, during and after their visit. In this context the LiMo put a new permanent exhibition on display called "Die Seele" ("The soul").

(iv)   The LiMo succeeded in training their museum attendants to provide information about the structure of "nexus" and how the M3 works. Thus train your museums attendants about how you want them to inform about your exhibition and do not muzzle museum attendants.

(v)   Nevertheless, the M3 only works as the only source of information and thus as an integral impartation guide, if the visitors manage to handle it.

6.5.   Conclusion

This chapter had four aims. Firstly, it wanted to demonstrate that the 18 distinct movement patterns found in the first MET study in the "South Sea Oases: Life and Survival in the West Pacific" exhibition at the Linden-Museum in Stuttgart can also be identified in a completely different exhibition like the literature exhibition "nexus" at the LiMo. The MET study in the "nexus" exhibition validated nearly all 18 movement patterns. Secondly, the MET study in the "nexus" exhibition found further movement patterns due to altered affordances caused by the almost purely homogenous presentation of multi-partitioned exhibits that show their greatness

only when viewed from shorter distances and not from far away. Additional movement patterns were also found due to the altered affordance caused by the digital medium M3 that provides the only information about these exhibits as well as the completely glassy display cabinets. The appropriation by these further particular movement patterns such as more forms of "Alternating Gazes" and more forms of reading, and no "Fixation Walks" but instead "Pull Backs", is adjusted to these particular affordances. In sum, the distinct, recurrent and systematic movement patterns found in both MET studies are likely characteristically for appropriating exhibitions in general. Thus they represent the emic point of viewing exhibitions.

Thirdly, this chapter aimed to provide further insights into the differences of movement behaviour and cognitive processes between experts and novices. I can provide evidence that time spent is not a matter of expertise and that the quantity of time spent does not necessarily lead to a better quality of processing the viewed exhibits. Novices seem to be more interested in artefacts. They attend only to bits and pieces and are more concerned about their immediate profane situation. In contrast, experts in German studies are not necessarily interested in manuscripts and are concerned with the intention and the big picture of an exhibition. Hence, the appropriation and experience of an exhibition seem to be largely dependent on the level of expertise. Of course, the level of expertise correlates somehow and sometimes with the visitor's agenda when visiting an exhibition.

Additionally, it became clear that the two visitor groups – experts and novices – are heterogeneous. Some experts have more expertise than other experts. For example, expert visitor E1 who is a German teacher trainee seeks pedagogical consequences of the "nexus" exhibition. Other experts are philologists and not interested in the pedagogical consequences of the literature exhibition "nexus". It seems that students of philology, the friends of speech – no matter what kind of philology – are more devoted themselves to "nexus" and its literary exhibits (like manuscripts and books) than other expert visitors, even more so than students that are becoming teacher trainees for German. A common feature of all participating visitors studying philology is that they remember more author names than the other participating visitors. They remember even more author names than teacher trainees for German. Hence it seems that there are different kinds of experts. As the expert visitor E1 declared, "nexus" is not an exhibition for ordinary experts like German teacher trainees but rather for sophisticated experts like literary scholars.

Like in the MET study at the Linden-Museum I did not collect further data about the experts and novices. This limitation of these two MET studies must be considered in further studies. Hence, this only allows cautious conclusions about experts and novices. Furthermore this inconsistency within the expert group and the novice group makes it difficult to compare experts and novices as planned but at the same time this is an important result: "nexus" is an exhibition for experts with more sophisticated expertise like "literary scholars". Thus, Hans-Joachim Klein is probably right that exhibiting literature is far more difficult and is only interesting for an expert audience (2001; see *Chapter 2*).

Fourthly, this chapter aimed to provide insights into the influence of the digital medium M3 on movement behaviour and cognitive processing in the "nexus" exhibition. The MET study in the "nexus" exhibition provides evidence that a prolonged dwell time is mainly a matter of M3 usage and less a matter of expertise about the exhibition issues. One might suppose that the novice visitor N6 should be able to handle the M3 properly as he studies software engineering and hence is an expert for software. Eghbal-Azar et al. (2016) provide quantitative evidence about the prolonged dwell time regarding M3 usage. However the MET study moves a step further and demonstrates qualitatively that M3 usage only prolongs the visit as long as the visitor is able to activate and handle the M3 properly, which implies succeeding in several steps of activation and thus overcoming several difficulties. Two steps seem to be crucial: Firstly, activating the log in to "nexus" itself and secondly, activating a single display cabinet menu.

Furthermore Eghbal-Azar et al. (2016) shown that only a third of the visitors are naturally using an M3 at all, whereas they only use it in 44 % of their stops and stop at fewer display cabinets. Hence M3 users behave more selectively than non-users. They also provide evidence that the selection of an exhibit in the M3 is only made after several steps of selecting, nearing and examining the exhibit itself have already been made. Selecting an exhibit in the M3 is therefore the last step in the selection process. The MET study provides examples of particular viewing behaviour and the cognitive processes that go along with it and thus provides insights about this last step in the selection process of exhibits. M3 usage separates gaze and attention between exhibit and information level like a text panel but it does not lead to a zombie-like behaviour. In contrast it leads to more distinct movement patterns and hence a more elaborate appropriation of the exhibition. Due to the embodiment of the M3 in visiting the "nexus" exhibition, the museum experience is broadened by the haptic sense of

touch the M3 that allows visitors to 'touch' the exhibits indirectly and virtually. Thus, as mentioned above, M3 usage leads to a more exhaustive the experience of "nexus" and to haptic/emotional moments.

The two examples of exhibit selection in the M3 by the expert visitor in the MET study show that the stops on earlier display cabinets like in the manuscript row and the book row and popular author names play a crucial role. Other reports of MET study participants also point to the fact that popularity of author names is guiding the exhibit selection process. Both are in line with the findings by Eghbal-Azar et al. (2016) who reported though statistical analyses of the content management data of the M3 that the vertical and horizontal position, size, and authenticity of exhibits and the popularity of author names play important roles in selection processes. Furthermore the MET study finds another reason for exhibit selection in the M3: cognitive dissonance between an exhibit and its label, which leads to an increased interest in further information provided by the M3.

In sum, the affordances of the "nexus" exhibition are **same but different** as the affordances of the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. The affordances of these exhibitions are the same insofar as most of the movement patterns could be identified in both exhibitions. At the same time the affordances of these exhibitions are different insofar as some movement patterns could not be identified ("Fixation Walk", "Reading Text Panels" and "Insights") but further movement patterns were identified in the "nexus" exhibition ("Pull Back", "Reading in Exhibits", " Reading the M3" and more forms of "Alternating Gazes"). Thus the appropriation of "nexus" by particular movement patterns changed due to the changed affordances of the almost homogenous presentation of multi-partitioned exhibits that have to be examined from a short distance, due to the completely glassy display cabinets and due to the provided digital guide M3 with its integral information function.

Thus M3 usage leads to more distinct movement patterns and more variability of movement patterns as far as there are more forms of "Alternating Gazes" and more forms of reading in this exhibition. In general, the appropriation of the "nexus" exhibition is characterized by a lot more "Window Shopping" and "Minor Orientation Gazes" as scanning strategies from close distances. Furthermore, the appropriation of this exhibition by particular movement patterns depends on the levels of expertise and hence the agenda of the visit, as the MET study at the Linden-Museum showed. Consequently, the experience of the "nexus" exhibition is largely

shaped by the homogenous presentation, the popular author names that are recognized, the integral digital guide M3 that provides further optional information for a further cognitive processing of the exhibits and the level of expertise with higher levels leading to more elaborate processing.

Thus, the summarized design suggestions are as already mentioned above:

(i)   If you want your visitors to stay longer in your exhibition and deal with it more elaborately provide a digital guide.

(ii)   Better keep your visitors orientated because they seek orientation.
   a. Thus provide clear initial information and titling of the exhibition at the entrance.
   b. Provide clear signs or signifiers for orientation like the numbers of the display cabinets and the log in to them.
   c. Put all these information and important exhibits on eye-level, if you want your visitors to recognize them.

(iii)   Note that a heterogeneous display is favoured, especially by novice visitors.

(iv)   If you use digital guides, especially multimedia guides, keep your technology updated and make it as light (weight and handling) as possible.

(v)   If you want to avoid confusion of display, avoid too many levels of glassy shelves.

(vi)   Finally, better be aware of your target audience.

So far, I reported the empirical results of this thesis. Before drawing general conclusions from the complete research, the next chapter will critically reflect on all applied methods with the main focus on MET and observation.

7. Critical Reflection on the Applied Methods in Visitor Studies and Anthropological Field Research in General

Applying a new method like mobile eye tracking (MET) in visitor studies and cultural anthropology as well as triangulating methods requires a careful methodological reflection before one draw conclusions about the research results. Apart from the particular methodological problems mentioned in the respective chapters, the applied methods have several potentials, limitations and prospects and lead to several reactions. This reflection is mainly concerned with my own research experiences. As limitations of one method can be linked with the potential of the other and vice versa, these two aspects are discussed together. The reaction section describes reactions from colleagues, cooperation partners, staff members of the museums, participating visitors as well as one reaction of the German press. At last, the prospects section works as a conclusion about the methods' worth and future. I will describe each aspect for each method as well as the triangulation of them. However, I will mainly focus on MET as a new method because this might be of special interest for social scientists. As a reminder the applied methods were as follows: (i) MET, (ii) cued retrospective reporting (CRR), (iii) interviews, (iv) systematic observation, (v) field notes about the own experience with the exhibition and the research process and (vi) documentation of the exhibitions.

7.1. Potentials and Limitations

Anticipating the prospects, I shall go on to suggest MET as a new feasible but complementary method for social scientists conducting field research. With MET we can "grasp for the native's point of view" (Malinowski 1922: 25) in its very literal sense. Before exploring this point, I shall illustrate some of the typical problems of this technology with reference to my use of MET in visitor studies. Based on these limitations, I will discuss the other methods that were combined with MET or were triangulated with it.

Mayr et al. (2009: 198-200) list eight limitations of MET:

1. No recording of "covert attention and mental spotlight" since eye fixations per se do not tell us anything about the goal of the participant's attention.

2. Only "limited conclusions about cognitive processing" are possible because the conclusions that we arrive at through MET are typically "interpretations of eye-tracking data that are often

based on assumptions and heuristics about underlying cognitive processes" (Mayr et al. 2009: 198).

3. Some "obtrusiveness of measurement", as data might be distorted because participants are aware of being evaluated by the MET or are irritated by wearing it.

One expert visitor in the "nexus" exhibition at the LiMo even reported about socially desired behaviour wearing a MET:

> "By the way, one should provide an eye-tracker for each visitor, and then he would certainly view the exhibits in more detail. Yes, that is automatically like this…I do not know how this is called in science now of course but there is certainly a rate that differs then. In that sense that the participant knows that he is examined and that is why he/this rate behaves differently as if he would not know".

In terms of visitor research, participation in such a study changes the agenda that is driving visitors' behaviours (cf. Falk et al. 1998).

4. "Selective sampling" in the sense that not everyone can wear a MET device since participants with corneal dysfunctions (that prohibit reflections of the infrared lights) or who wear regular glasses are disqualified (since the publication of Mayr et al. 2009 devices have become available, e.g., from Locarna, that allow wearing regular glasses in addition to the eye tracker.)

5. "Limited temporal and spatial accuracy" occurs because there is (currently) a time limitation due to the temporal resolution of eye-trackers that must be divided for the recording of two videos at the same time (hence 50 Hz in fact mean 25 Hz), so that very short fixations might be missed. If distances between the participant and objects often differ from the calibrated distance, then the spatial accuracy is not given at all times (p. 199; the parallax error see above). Like all lens cameras, the scene camera only records one part of the world and is more limited in scope than our vision.

6. "Laborious data analysis" is required in regard to eye movement patterns, like they were investigated in this research, because such data analysis still must be done largely manually

by the researcher. This limitation is due to the mobile setting that allows visitors to walk individually through galleries so that the stimuli and scenes change all the time. We may add here that this apparent disadvantage also provides some advantages because manual analysis includes possibilities for the researchers who are free to define what duration is counted as a fixation and how to classify scan patterns. If this were done automatically, then we would lose an opportunity for altering parameters and comparing results and potentially gaining new insights in the process. In the meantime some devices include software that allows some semi-automatic analysis. For example the Locarna PT Mini provides the annotator tagging tool and the SMI Eye Tracking Glasses provides the BeGaze software in 2010 or the Austrian Pflegervision company even provide automatic analysis while recording data in 2015. However, it is likely that researchers will always want to do some analysis manually for the reasons just mentioned (see Eghbal-Azar & Widlok 2013 for a calculation of the enormous amount of time for manual MET data analysis).

7. Costs were a limitation. METs were very expensive at the time of data collection in 2010 (each of the devices we used in our study costs around 25,000 Euro; binocular METs were sold at around 40,000 Euro). In the meantime in 2015 MET are much cheaper, some new binocular MET are sold around 10,000 Euro.

8. New "ethical concerns" because participants can hardly manipulate or hide their eye movements and this point must be included in procedures of consent. At the same time the accurate recording of eye movements is one of the important assets of this technology.

Furthermore, my research shows that you have to keep up with MET technology. The ASL MobileEye was already four years old when I applied it in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum. For example it was more difficult to calibrate and could not cope with darkness as well as the Locarna PT Mini that I applied in the "nexus" exhibition at the LiMo.

Additionally, when applying the older technology, I faced a lot of noise in the video recording in the form of image interferences at the Linden-Museum in Stuttgart. This noise was not replicable at other places like the LiMo or the Knowledge Media Research Centre. This can be explained technically due to eye blinks (Duchowski 2003: 119) or the outdated technology of the ASL MobileEye. It could also be explained humorously as noise of ancestors who are linked with exhibits (see 6.2. Reactions). I also lost data due to inexplicable technical

problems. However, in the end, when you are using technology you run the risk of technical problems.

Mayr et al. (2009) suggest combining MET with other methods such as interviews, questionnaires, or verbal reports to gain valid interpretations of scan patterns. One of the reasons why MET needs to be combined with other methods is that the marker (based on the eye camera) that is permanently shown in the processed MET video data cannot be equalized all the time with actual attention to the object or scene captured by the scene camera. While past research assumed a strong "eye-mind hypothesis" (Just & Carpenter 1980) as though eye movements would provide a direct insight into cognition, current research does not assume that we can draw simple conclusions from fixations and scan patterns to the goals of attention and to the underlying cognitive processes (Mayr et al. 2009; Land & Tatler 2009). Complementary to MET, there are three different kinds of verbal reporting which may be selected according to the research question or the task at hand and with respect to the relevant memory system. These are concurrent, retrospective and cued retrospective reporting (van Gog, Paas, Merriënboer & Witte 2005, van Someren, Barnard & Sandberg 1994; Ericsson & Simon 1993):

- Concurrent Reporting means thinking aloud while doing a particular task.

- Retrospective Reporting means verbal reporting in retrospection after completing the task.

- Cued Retrospective Reporting (CRR) means reporting after completing a particular task with a cue, in this case typically while watching the processed recording. Holmqvist et al. (2011: 256) describe this technique of "cued retrospective thinking aloud" as an increasingly common technique "to show the scan path to a participant just after his data has been recorded, and ask him to retell what he was thinking of during the initial inspection of the stimulus".

In my own studies, described in *Chapters 4* and *6*, I chose CRR since it promises to lead to more exact and controlled results as the given cue (a processed eye-tracking video) triggers more exact memories which would otherwise be constructed without the assistance of a cue (van Gog et al. 2005). Another reason for retrospective instead of concurrent reporting was that concurrent reporting might have led to changes in attention and behaviour.

Potentials of reporting, no matter which one you may choose, are that cognitive processes and attention processes can be identified. However, it is a laborious method since the reporting

must be transcribed and analysed by content analysis. Additionally the combination with MET affords connecting audio files with the video files as well as further analysis that pays attention to the connected video-audio data. Falk and Dierking (2000) report that by talking about displayed issues with other people cognitive processes are initiated. That might well be the case with CRR. Hence CRR probably leads to a deeper elaboration of the viewed exhibition.

Additionally, I combined MET with field notes and interviews. Interviews were indispensable for identifying social data. The analytical effort depends on the kind of questions with open questions leading to more effort. There are still many questions that have not been analysed yet and that do not contribute to the main issues of this thesis. In the end, less is more. Instead of being too ambitious, I should have been more focused.

Finally yet importantly, the writing of field notes was a complementary method during the whole research process, especially immediately around the time the studies took place. However, writing field notes interrupted the observation. Attention shifted from observing to writing. Finally field notes have to be processed for further analysis like any other data, which can be labour-intensive. Otherwise they are not expedient and only anecdotal.

Writing field notes definitely helped me gain insights about the real motivation of exhibition visits and participation in the MET study, which sometimes was the MET technology itself. It also helped me identify disinterests, namely disinterest in literature and literature exhibitions, in addition to the interests explicitly asked in the interview. Additionally, writing field notes definitely helped me reflect on the applied methods and the reactions to them as described in this chapter.

The results of the MET study combined with reporting, interviews and field notes were confirmed by systematic observation. In contrast to the MET studies, the systematic observation study was conducted unobtrusively. The observer was usually identified as another museum attendant who was sitting around in the gallery to take care of the exhibits. Hence it did not lead to much distortion in visitor behaviour. Furthermore there was no selective sampling. Everyone can potentially be observed no matter whether visitors wear glasses or have corneal dysfunctions. Data analysis can be kept to a minimum once technology is used in collecting data. The costs are low unless such technology is used. Finally ethical concerns are more common than with MET.

Nevertheless, like MET, systematic observation (i) does not tell us anything about the goal of the visitor's attention per se and therefore should also be combined with interviews or different forms of reporting or field notes as well. I combined systematic observation with retrospective reporting directly after observation at the respective section at least for a subset of observed visitors.

Furthermore, like MET, systematic observation (ii) by itself does not allow for conclusions about cognitive processing and (iii) also has limited temporal and spatial accuracy due to the limited awareness of observers – in case the observation was done spontaneously and not videotaped – and due to the observer's position to the observed visitor. In this regard the amount of visitors is crucial. Neither is the absence of visitors desirable nor having too many, because no visitors means no data and too many visitors means an obstructed view. An obstructed view can occur due to darkness and reflective lights or due to the exhibition design itself, such as other exhibits or display cabinets being between the observer and observed visitors. Such was the situation in the "nexus" exhibition. That is why it was impossible to conduct a systematic observation study about movement patterns on the same level as in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. Moreover "Other Movement Patterns" were rarely detected by observation. Concentrating on 15 different movement patterns at the same time is already difficult enough for the brain, although the observation sheet was formatted according to possible chunking of movement patterns. Being open for further new movement patterns is overloading the observer's brain, in case the observation was done spontaneously and not videotaped as mentioned above. Likewise an external observer is likely focusing more on obvious affordances and movement patterns.

Plus (iv) systematic observation, as opposed to the highly used participant observation, does not provide data that emerge from the field itself but instead of the researcher's brain. Hence issues that might never come up in the researcher's mind are therefore not identifiable with systematic observation (for an extended description and discussion of systematic observation compared to participant observation see Beer 2003: 119-141).

Now, let us have a look at the assets of MET compared to other methods. In their summary Mayr et al. (2009: 196-197) list four potentials of MET as a recording device, which can be taken as a useful point of departure:

1. "Data richness" through the inclusion of information about the environment (e.g., other visitors present, the visibility or approachability of objects and media).

2. High external "data validity" because data is recorded "objectively" by cameras (Mayr et al. 2009: 196) reducing perspective errors and providing more ecological validity due to applicability in natural settings.

3. Providing a "non-reactive measurement", because eye movement can hardly be manipulated due to its unconsciousness (see above) so that it can be usefully related independently to conscious reflection (see below).

4. Allowing statistical analysis, depending on the sample size and research question.

Mayr et al. (2009) listed twice as many limitations as potentials of MET for visitor studies. The first lesson suggested by my research is that it is worthwhile to first discuss the actual qualities of MET potentials before starting to compare potentials and limitations by simply counting them. What are, in fact, the benefits of applying MET in my research? After all, the costs (time, money, energy) are considerable. Is MET really worth doing?

Here are some details of my research that speak to these broad questions:

Detail one:

Eye-movements in action are very rapid (Land & Tatler 2009). For example, a sequence of one visit to the literature exhibition that lasted about ten seconds included no less than eight distinct movement patterns that the MET recorded. There is no way that applying conventional observation methods without videotaping could record such a large number of rapidly changing behavioural patterns in such a detailed manner over a long period. The observer is likely to miss some patterns because observation depends on the acute awareness of the observer (with no rewind option). By contrast, exploratory MET data can be stored and then analysed repeatedly.

Detail two:

In conventional observation head and body movements can be treated as a proxy for movement patterns but there are eye movements that are done without moving the head or the rest of the body which do show up in the MET record but which otherwise would remain

undetected (cf. also Mayr et al. 2009). For example we observed an "Alternating Gaze" between two tiny exhibits that are positioned very close to each other so that the visitor does not even have to move his or her head but only the eyes. Without MET these gazes would be undetected because there are no indicators from which an observer could conclude about the visitors' gaze.

Detail three:

Conditions in the museum gallery can make observation difficult or even impossible due to an obstructed view caused by the particular style of the presentation or simply by too many other visitors being in the way, as well as by light reflections or by relative darkness. At the LiMo this forced us to drop conventional observations at the level of objects in close proximity within the display cabinets in favour of the larger scale only (see Eghbal-Azar et al. 2016), while the MET allowed us to include the participants' perspective at all levels. The often unpredictable and uncontrollable obstructions that make conventional observation difficult were bypassed by applying MET.

Detail four:

Even when eye movements can be observed, fixations never can due to their very nature (cf. May et al. 2009). In the example given earlier (in detail one) eight fixations were made within ten seconds. Two of these eight fixations were directed at a pistol that was exhibited. While these fixations indicate that attention is being arrested, we still do not know the goal of attention and the reasons for paying attention until we combine MET data with other methods. MET therefore also serves a function as an exploratory tool and not just as a tool for quantifying observations and for testing assumptions as might be expected. It does not exclude other approaches to aesthetic experiences but it may complement them in interesting ways.

In sum, it would have been difficult or even impossible to identify and characterize such a rich and distinct array of movement patterns, if I had not used MET. MET provided very new insights in the viewing behaviour of visitors. The different frequencies rates between the observation and the MET study are likely connected to the applied methods and their characteristics.

From these details we may draw some intermediate conclusions, the most important one being the need for combining MET with other methods. These combinations may be similar to what Mayr et al. (2009) suggest but other, additional ideas for further possible combinations emerge from my case material. In my example it was the combination of MET with CRR that allowed us to say something about the goal of attention: the visitor, in detail four (above) said "There was a pistol; very interesting" but we still do not know why he was interested in pistols (in general or in the particular context of this exhibition). To understand this, we need more information about the individual in question, specifically the type of information that is usually generated through interview data. In this particular case the given information was not only about the interest of this visitor but also about his disinterest, namely an apparent disinterest in literature and its most typical manifestations (such as books, handwritings and typescripts). Interview data and field diary notes show that the visitor had little exposure to literature in his school education and professional life. Note that motivation, interest, prior knowledge and attention are considered necessary factors for informal learning in museums (Hein, 1998; cf. also Falk et al., 1998 about visitors' agendas). Information about these highly relevant aspects cannot be gained through observations alone, be they conventional or technology-assisted. It is important to underline, therefore, that not only reporting but also other additional methods should be combined with MET.

Finally yet importantly, all described results would not have been possible without the basic documentation presented in *Chapter 3*. This documentation was combined with a detailed description of the respective exhibitions. Floor plans with photographs help with imagining the field settings without visiting the exhibitions themselves. Whereas on the one hand documentation can never replicate the research setting one to one, it is fundamentally important to correlate the data and to be able to generalize the results on the other hand. Therefore documentation forms the basis of my empirical research.

7.2. Reactions

Being one of the first researchers who applied MET in visitor studies and being as far as I know the very first socio-cultural anthropologist who applied MET, I had to face many prejudices, fears, non-feasible hopes and great lack of knowledge about MET in general and MET in anthropology and in visitor studies in particular.

On the one hand fears were combined with prejudices and lack of information: Kaube (2010) questioned in the Frankfurter Allgemeine Zeitung (a major German newspaper) how one could ever measure gazes in exhibitions that aim to deliver aesthetic experiences. It was also a point of criticism for the journalist Jürgen Kaube in the FAZ press about our project applying MET in a literature museum at all. Kaube misunderstood our aims and the value of MET. He thought we would measure aesthetic experience with MET but instead we were looking for learning processes. Of course, as a good investigative journalist he should have asked us first about our aims and how MET really works. Nevertheless Kaube is partially right that, by applying only MET without combining it with other methods, aesthetical experiences are hardly measureable. However, below in the conclusion chapter in paragraph 8.1 I will present an example of MET combined with CRR that even allows first insights into the aesthetical experience at the beginning of the exhibition visit of a female visitor in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition.

Other anthropologists feared that with MET I could look inside people's minds as though eye movements would directly tell me the thoughts of people. Some colleagues confused MET with video research. Hence they were not aware of the difference between MET and traditional video research. MET provides the perspective of the visitor and its accurate eye movements with a fixation cross in the processed video data. In contrast, traditional video research usually provides the observer's perspective. Even when it provides the participant's perspective, it *never* provides his/her accurate eye movements.

On the other hand non-feasible hopes combined with lack of knowledge led to the obsession of colleagues and project partners that afterwards I could tell everybody which exhibits are really viewed in "nexus". This was despite the 1300 exhibits, the relative darkness of "nexus", which almost prevented any video recording and definitely prevented the identification of many exhibits, due to an obstructed view caused by glassy display cabinets and ubiquitous tiny blinding LED lights. Video data of eight visitors had to be analysed manually. Finally this was despite the fact that viewing exhibits is not an all in one process but rather comprises several steps from noticing, approaching, stopping, scrutinizing the exhibit and accessing additional information via text panels, labels or digital guides.

There was hardly any way to keep up with these prejudices during the research process: MET was either seen as a solution for almost all previous research problems and questions in visitor studies or as impedance to the museum's agenda. This shows that not only the participating

visitors were wearing goggles but also the various academics being too sceptical on the one hand and being too enthusiastic on the other.

Who else reacted to the MET studies? First, almost every museum attendant was curious and uncertain about the MET at the same time. I had to inform all concerned museum attendants before each research trial that a MET study would be conducted and that the museum attendants should not interfere with the MET wearing visitor. In this regard single museum attendants did not follow these instructions. They obstructed the visitor's pathway and provided information about the exhibition's content and structure although they had been explicitly told not to explain anything. Hence, museum attendants were the main confounding variable for the MET studies.

The anthropological curators explained the noise/the frequent mysterious image interferences humorously with reacting ancestors who are linked to exhibits in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. Thus the noise in the video data was attributed to ancestors who did not want me to record their belongings. Additionally, the curators, designers and other exhibition makers as well as public relation departments were open to and interested in the research process and its needs like a calibration room as well as they were interested in the research results. I definitely do not take this for granted.

Last but not least, the participating visitors also reacted to the MET: some were nervous during calibration, some were curious about the MET technique, some even took part due to the MET, some felt uncomfortable wearing it and some even got a headache from wearing it. One novice visitor even reported about vision interferences due to dirty MET glasses, but the MET has no glasses. They felt they had vision interference but it was a misperception. At this point (see Figure 141) he described his vision as:

Figure 137: Novice visitor about felt vision interferences

"Exactly like this, I also saw so blurred like now (laughs)".

As described above as "obtrusiveness of measurement" almost each participating visitor mentioned that he/she was aware of wearing the MET gear and most of them described their own behaviour as being largely as usual but neither one described his/her behaviour as completely usual. The participants reacted to the MET and were aware that their behaviour was recorded. They even admit this by describing their behaviour only as largely as usual.

Additionally, the CRR that was combined with MET led to reactions by the participating visitors: some felt uneasy verbalizing in general and some were not sure what and how much they should verbalize. Enlightening one expert reported about the reporting itself in the "nexus" exhibition at the LiMo:

> "…sometimes I do not have to speak, I think. It is equally in the
> exhibition, I do not think about each piece".

In line with the notion of less is more as mentioned above, the additional interviews in combination with MET and CRR were simply too much for the participating visitors. They were already exhausted by calibrating, wearing the MET, viewing the exhibition, reporting and then whew (!) another task: an extended interview. Even if they weren't   already

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experiencing "museum fatigue" and "technology fatigue", they might start feeling "research-fatigue" by now.

In contrast, field notes and documentation triggered less reaction than the other methods. It was only noticed that I was writing or documenting. Scientists are probably connected with writing in the minds of other people. Photographing the exhibit was the only aspect of documenting that led to concern by the museum attendants. They wanted to be sure that I had permission for taking photographs, which is their job of course.

7.3. Prospects

After describing the limitations and potentials of the applied methods as well as reactions to them, I will conclude by discussing their prospects. Besides MET all other applied methods are well established in the social sciences. Therefore, I will mainly focus on the prospects of MET as this might be of special interest. Based on the empirical examples given above, I may revisit the issue of MET potentials and formulate some implications for the field of visitor studies:

Firstly, equipped with MET data we may reconsider some of the unresolved controversies in visitor studies. For instance, can we equate stopping or the time spent looking at an exhibit with attending to this exhibit (Serell 1997, Yalowitz & Bronnenkant 2009)? The visitor who had given attention to the pistol (which is the only pistol displayed in the literature exhibition), not only spent time looking at it and fixating on it but reported on it afterwards. However, there were many other exhibits that he looked at for much longer but without reporting on them. By applying MET we might be able to conclude that more quantity (length and number of stops) that we spend looking at exhibits does not necessarily translate into a qualitative difference of cognitive processing – as Serell (1997) and other visitor researchers seem to assume. This principle may also apply more generally to exhibitions for that matter.

Secondly, with MET data we may also contribute more specifically to the debates as to i) whether there is an underlying universal principle that explains the behaviour of visitors and ii) whether it consists of the type of behavioural rules that have been previously suggested (cf. Bitgood 2006 and Rounds 2004). In other words we can discuss whether there is an "exhibition visit script" – as one may want to call it – for appropriating and experiencing museum exhibitions. On the basis of MET data, I suggest that it is possible to reconstruct this

script "bottom-up" by looking at distinct movement patterns that may form a repertoire of subscripts from which visitors draw as they combine these subscripts for their complex navigation strategies that help them to successfully meet the goals and agendas at the superordinate level (cf. Holmqvist et al. 2011 and cf. Falk et al. 1998). MET data thereby allows us to flesh out the presumed script and add substance to the assumption that scripts guide exhibition visits.

On the basis of the MET videos analysis we were able to compile a classificatory list of distinct, systematic and recurrent movement patterns that may be considered key elements of a distinct "exhibition visit script".

This in turn allows us to claim that there is some robustness of this movement pattern list across different methods of observation and two different exhibitions. This is remarkable because both exhibitions are very different in many respects so that it is not trivial to ask whether there is a similar script at work in visits to these two exhibitions. At least these distinctive movement patterns are very frequent in the way that visitors appropriate and experience exhibitions. They are good candidates for being part of the larger, general "exhibition visit script" that researchers have long assumed to be at work without having the detailed record to show what it consists of.

Although cognitive visitor research defines an exhibition visit as an "open-ended task" (Mayr et al. 2009: 191.), the motivations attributed to visitors are usually those of informal learning and receiving information. These appear to be passive strategies given that, in most cases, visitors are not allowed to act upon objects but only to look at them. By contrast, the MET data supports the view that visitors are much more active than they otherwise may appear to be. Visitor research by social scientists tries to accommodate motivations and goals that go beyond effective information gathering, considering visitors as appropriating and experiencing exhibitions in an active and embodied fashion (MacDonald 2002: 219).

We can therefore organize our MET observations not only in terms of a list of gazes employed by visitors looking for information. The observed movement patterns are also employed as navigation strategies looking for emotional and aesthetic experiences and with reference to social aspects to do with the presence of other persons as the reporting demonstrated. Based on these results I think it is plausible (and likely) that an "exhibition visit script" typically includes a number of navigation strategies and can flexibly accommodate a spectrum of agendas (see above). With this conclusion I can also deal with

scepticism towards MET and criticisms that the inclusion of an "objective" measuring device risks being reductionist. Applying MET does not entail that exhibition visits are reduced to information gathering strategies guided by principles of optimality and rational choice (cf. Bitgood 2006 and Rounds 2004). The observed movement patterns may result from different – and at times conflicting – motivations and contextual conditions. Milekic (2010) has noted that MET in visitor studies provokes controversies between the disciplines concerned because "the major problem in adopting these technologies is the divide that exists between traditional notions of Art and Science". We suggest that including the technology into different interdisciplinary approaches may help to design more integrated research questions and to arrive at more satisfying answers.

MET in combination with other methods can provide us with new insights into very individual experiences, appropriation strategies and goals of visitors. It can get us a step closer towards "strolling and viewing" an exhibition from the visitor's perspective. It may also help us to detect and outline unconscious "exhibition visit script(s)" that usually can hardly be verbalized by the agents themselves. These potential benefits matter to social scientists because MET opens the door towards an investigation that links unconscious aspects with socially and culturally constituted forms of embodied knowledge. It adds to our knowledge about what people look at, what they look for and why (cf. Land & Tatler 2009: 222.).

Cultural schemata and scripts, whether they apply to museum exhibition visits or to other practices, are notoriously difficult to investigate through external observations or through videotaping alone. The strength of MET is that it can help to break down fundamental questions of cognition and practice into very concrete queries such as "What do persons look at while they are interacting with other persons and why?" "What do persons communicate with their words and what do they communicate with their eyes?" The answers to such concrete questions can then be aggregated into more general ones such as "How robust is the scan pattern that an individual uses to view a particular scene?" and "How similar is this scan pattern between individuals?"

Thirdly, MET not only generates very detailed and precise data outside the laboratory but it also allows us to store that data so that it can be analysed again and again quantitatively or qualitatively with many possible variations depending on the research question. A single MET recording thereby potentially provides much more data than conventional observation without

videotaping. Only due to the application of MET so many distinct movement patterns could be identified. Of course, as with any other method, MET technology is limited in what it can provide. For instance, there are technical limitations surrounding the fact that our visual perception is only partially captured by a camera and that applying MET presupposes the availability of electronic gadgets under adverse field conditions. Future technical developments might reduce some of these technical limitations.

In sum, in the social sciences we will want to combine MET with other methods such as field diary notes, interviews, questionnaires and CRR that provide help when trying to link our observations to the agents' goals of attention. MET does not replace the investigator's sense of understanding the particulars of a research setting; instead, it presupposes such an underlying understanding because only on this basis can we tune its application to the requirements of the research context and the particular research question at hand. Applying MET is often laborious. However, the real challenge is the integration of this technique and the data that it produces into a social science research schema that by its very nature will always rely on a number of complementary methods. Triangulating MET with observation verified the MET results. Although the results would probably be difficultly or hardly derived by mere observation, observation costs (money, time, energy) are much lower. Hence, I do not expect that MET technology will completely replace these other forms of observation but that it will be complementary – in what ways remains to be seen. Nevertheless, I consider MET being an advantageous and recent method to grasp the native's point of viewing exhibitions and other fields in the future.

8. Conclusion

This thesis *Affordances, Appropriation and Experience in Museum Exhibitions: Visitors' (Eye) Movement Patterns and the Influence of Digital Guides* was developed within the interdisciplinary cooperation project *Knowledge & Museum: Archive, Exhibit, Evidence* funded by the German Federal Ministry of Education and Research (BMBF). The task of my subproject "Presentation Practice and Evidence Attribution" was to conduct visitor research in the permanent exhibition "nexus" at the LiMo and in the temporary exhibition "South Sea Oases: Life and Survival in the Western Pacific" at the Linden-Museum in Stuttgart. It sought generalizable results that are also valid in other exhibitions.

This thesis is also based on my personal interest in promoting visitor-centred exhibitions. As a socio-cultural anthropologist, my goal is to study the underprivileged visitors in museums and at the same time "to study up" (Naders 1972) (literature) museums at home in Germany. Conducting visitor studies as a socio-cultural anthropologist involves seeking the emic point of viewing exhibitions by the visitors and wanting to speak up for them and suggest improvement in exhibition design by giving detailed design suggestions.

This conclusion is structured into four sections. The first section evaluates the accomplishment of the aims defined in *Chapter 1*. The second section works as a short summary of the main aspects of the three theoretical key terms (affordance, appropriation and museum experience), provides a complete list of the 26 distinct, recurrent and systematic movement patterns that were detected in both MET studies and focuses on the influence of digital guides. The third section provides particular design suggestions based on the research results of all three visitor studies in both exhibitions. The last section projects the future of digital guides in exhibitions, the future of MET in visitor studies and social sciences, the new cognitive science approach and future visitor research.

8.1. Fulfilled Aims

This thesis pursued several aims in each chapter:

Chapter 1 introduced visitor research in general and in socio-cultural anthropology in particular. It reported about visitor research methods and previous findings about visitor circulation behaviour and use of digital guides. Additionally it introduced mobile eye tracking as a new method and presented an overview of the thesis outline.

Chapter 2 introduced three main concepts and terms: the "concept of affordance" by Gibson (1979), my latest notion of appropriation of museums by visitors, and the widely applied term of museum experience. These three concepts and terms helped to understand and contextualize the results of this research within the latest theoretical concepts. All three terms will be summarized in the next paragraph.

Additionally the field of the respective museums and their exhibitions, ethnographic and literature museums, were introduced as a preparation for the detailed descriptions of the two research fields in *Chapter 3*: the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart and the "nexus" exhibition at the LiMo in Marbach a. N. Due to these descriptions the reader was able to contextualize the results within the research setting and was able to transfer the results to other exhibitions.

Chapter 4 sought distinct, recurrent and systematic movement patterns due to particular "affordances" (Gibson 1979) in the exhibition design or the exhibit characteristics that were identified in the first study in the "South Sea Oasis: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart. For this research aim the recent method of MET was applied and combined with CRR to determine the goal of visitors' attention and the meaning of the movement patterns. In sum, 18 distinct movement patterns were identified in this exhibition. Furthermore it was found that expert visitors show a more active viewing behaviour by performing more and a broader range of movement patterns. Additionally experts process the viewed exhibition more deeply.

Chapter 5 moved a step further and validated 15 of the 18 identified movement patterns found in the first MET study using a completely different method, namely systematic observation, in the same exhibition. The second aim of *Chapter 5* was to analyse the influence of an audio guide on these movement patterns. It demonstrated that audio guide usage leads to a more active viewing behaviour and to a parallel appropriation by two senses listening and viewing at the same time.

Chapter 6 moved another step further and used MET to identify the movement patterns found at the Linden-Museum in Stuttgart exhibition in a second, different exhibition: the literature exhibition "nexus" at the LiMo in Marbach a. N. It validated almost all movement patterns and in addition, it identified even more distinct, recurrent and systematic movement patterns due to the changed affordances according to an almost completely homogenous   presentation in four rows of completely glassy display cabinets that are approachable from various

perspectives. In sum, 26 movement patterns were identified altogether. In addition this chapter investigated the influence of the tablet-like guide 'M3' in the "nexus" exhibition at the LiMo. It found that the usage of the tablet guide evoked further new movement patterns and led to a deeper cognitive processing of the exhibition.

Chapter 7 critically reflected on the applied methods concerning their potentials, limitations and prospects in visitor studies and in socio-cultural anthropology as well as regarding the reactions they trigger. The applied methods were MET, CRR, systematic observation, field diary notes, interviews and documentation of the two exhibitions. All methods were connected into a multi-angulation approach. The combination of these methods demonstrated truly a new cognitive science approach in visitor studies and socio-cultural anthropology requiring more effort of time and money. Additionally, this chapter provided an informed basis whether and how social scientists might apply MET-technology in their research.

The aims of *Chapter 8* are fulfilled in the next three paragraphs. Thus in sum, all aims were accomplished.

8.2.   Synopsis of Affordances, Appropriation and Experience in Museum Exhibitions

This visitor research not only sought purely empirical results of visitors' movement behaviour, it also connected these results with theoretical terms such as affordances (Gibson 1979), appropriation and museum experience.

Affordance is defined by Gibson (1979) as an action possibility inherent in the environment. This action possibility exists whether a person perceives it or not. It was demonstrated that perceived affordances lead to particular movement patterns. Explicit differences were found between freestanding exhibits and display cabinets as well as between homogenous and heterogeneous display cabinets. Thereby a heterogeneous display cabinet leads to more active appropriation. It was even demonstrated that some affordances are more likely to be perceived than others. This was concluded based on the different levels of movement pattern frequencies. Thus Norman (2013) asserts correctly, that we do need signifiers in design when affordances are less likely to be perceived.

Furthermore, the most important key term is my novel definition of the appropriation of exhibits and exhibitions through particular movement patterns. This active embodiment of exhibitions is characterized by "rolling and strolling" (Korff & Thiemeyer 2008) through

exhibitions, which shapes the museum experience. Thus affordance, appropriation and museum experience form an interconnected theoretical triad upon which my empirical results are based.

Besides Falk & Dierking's (2013) "Contextual Model of Learning", the museum experience was defined as encompassing the aspects of (i) learning, (ii) aesthetic, (iii) (more or less) multisensory, (iv) bodily, (v) emotional, (vi) social and (vii) entertaining. Of course, by applying MET the focus is clearly on the visual sense and the bodily experience. Nevertheless, the combined CRR provides not only information about meaning making, and thus learning, in exhibitions but also the involvement of further senses and aspects in exploring exhibitions:

Figure 138: Expert visitor enters the "South Sea Oases: Life and Survival in the Western Pacific" exhibition

The female expert visitor reported in cued retrospection what she attended to when she was entering the "South Sea Oases: Life and Survival in the Western Pacific" exhibition (see Figure 142):

> *"First of all, my attention was attracted by the smell of the sea and salty water. I think this was aesthetic and atmospheric, also the bickering of the aquarium".*

MET in combination with reporting can also provide evidence about aesthetic experiences in exhibitions, if you seek them. However, of course, pure MET data would not reveal that. MET instead revealed the following movement patterns in the two different exhibitions.

8.2.1. Visitors' Movement Patterns: The Complete Master List

In sum, 26 distinct, recurrent and systematic movement patterns and sub-patterns were identified in both exhibitions with MET as summarized in Table 17 below. As a point of departure previous findings by Treinen (1988: "cultural window shopping"), Aleida Assmann (1995: "long gaze") and Mayr et al. (2009) were considered when analysing the data. These patterns were successfully confirmed by the two MET studies in two different exhibitions. Furthermore, even more distinct, recurrent and systematic movement patterns were identified. A subset of these movement patterns was successfully confirmed by systematic observation. Hence the movement patterns are robust across different methods and different field settings. Note that precisely the differences between these two exhibitions/field sites, mainly concerning their subject matter and presentation styles, provided a great range of typical exhibition situations leading to the relatively large number of identified movement patterns. Accordingly these movement patterns may plausibly be found in further exhibitions.

Thus, concluding about the main aim of this thesis I must state that by applying MET it was shown that visitors' viewing behaviours in exhibitions are far more complex than previous visitor studies have found, such as those that solely applied observation or body tracking. MET therefore is a very useful method to gain insights about detailed movement patterns of visitors and thus MET is a useful method to grasp the native's point of viewing exhibitions.

The complete master list provides all 26 movement patterns and sub patterns. Note that this list is probably incomplete as I expect the occurrence of further movement patterns in other exhibitions. Nevertheless this list presents the main movement patterns in exhibitions. All movement patterns are reciprocally excluded. Furthermore these movement patterns were classified into four categories of movements that are concerned with orientation, strolling, exhibits and human beings.

Category	Movement Pattern
Movement Patterns and Orientation*	**Major Orientation Gaze** (cf. Mayr et al. 2009)
	Minor Orientation Gaze (cf. Mayr et al. 2009)
	Backward Gaze
	Forward Gaze
Movement Patterns and Strolling**	**Window Shopping** (based on Treinen 1988)
	Wandering Along
	Turn
	Fixation Walk
	Pull Back
Movement Patterns and Exhibits***	**Reading** (i) **In Exhibits** (ii) **Labels** (iii) **Text Panels** (iv) **Digital Guides (M3)**
	Long Gaze (based on Aleida Assmann 1995)
	Insight
	Changing Perspective
	Object Scan
	Alternating Gazes (cf. Mayr et al. 2009) (i) **Within one exhibit** (ii) **Between exhibits** (iii) **Between label/exhibit:** (iv) **Between text panel/exhibit** (v) **Between digital guide/exhibit** (vi) **Between display cabinets**
	Zooming Closer
	Zooming Further Afar
Movement Patterns and Human Beings****	**Social Gaze**

Table 17: Complete list of 26 distinct movement patterns

A minor research aim was to determine whether the viewing behaviour and cognitive processes of content experts and novices between the two MET studies are similar or different. I found that experts are more actively viewing exhibitions, which means they perform more and a broader range of different movement patterns and they even react to more silent affordances than novices. Similar results were found in analysing the CRR: experts also process the exhibitions more elaborately which means they report a lot more in cued retrospection than novices. Furthermore experts are more concerned with the exhibition's theme and the curatorial intention. In contrast novices are more concerned about their immediate situation, such as whether they can read literary exhibits properly or the digital guide works properly.

Furthermore, as mentioned above, it became evident that the professions of the experts and novices influence their agendas and hence their viewing behaviours and cognitive processes, with higher levels of expertise leading to more elaborate processing. This echoes the selection criteria of experts and novices. The only differentiation that was made between them was based on profession. No further data about the kind of expertise or non-expertise was collected. Due to the small sample size only cautious conclusions can be made about the differences and similarities between experts and novices. Sample size is a clear limitation of the two MET studies that must be considered in further visitor studies.

Upon evaluation, the two visitor groups – experts and novices – are more heterogeneous than first considered, at least at the literature museum. There are different levels of expertise within the expert group. In the end, one expert visitor declared correctly that "nexus" is not an exhibition for ordinary experts like German teacher trainees but rather for sophisticated experts like literary scholars. Hence, as mentioned above, Hans-Joachim Klein (2001; see Chapter 2) is right that exhibiting literature is far more difficult and is only interesting for an expert audience.

My research stresses the combination of design factors/exhibit characteristics and personal characteristics of visitors affording particular movement patterns. Thus, as mentioned above, I largely follow the interaction approach represented by Bitgood (2006) and Rounds (2004) although not completely. Their formula for as determining the value of the exhibition visits by dividing benefits by costs seems too simple to exhaustively explain the phenomena encountered in exhibitions. The "saving steps" principle largely explains the behaviour of visitors; for example visitors do not backtrack very often. Consequently, they also do not even

look back very often. Remember the few backward gazes that were performed. However the "saving steps" principle does not completely explain visitor behaviour. For example "Turns" while strolling is a frequently performed movement pattern that does not save steps. Nevertheless, as can be concluded by Rounds (2004: 401), it has become evident that movement patterns concerned with orientation and strolling serve as an "initial scanning mechanism" in selecting exhibits for a more detailed appropriation by movement patterns that are concerned with exhibits themselves. I did not test Rounds rules in detail because this would have needed the analysis of the complete circulation through an exhibition and some of Rounds theoretical rules are hardly workable as previously mentioned.

8.2.2. The Influence of Digital Guides

Digital guides influence the viewing behaviour. In general, usage of digital guides like handheld audio guides and multimedia tablet-like guides shares two characteristics. Firstly, the usage of digital guides rather than the level of expertise lead to a prolonged dwell time in the exhibition. This finding is in line with Tallon (2006) and Eghbal-Azar et al. (2016) who provide quantitative evidence about the prolonged dwell time in the "nexus" exhibition, if visitors use the digital guide M3.

Secondly, usage of handheld digital guides leads to a more active viewing behaviour in the sense that a lot more and a broader range of different kinds of movement patterns are performed. This contradicts the empirically unproven prejudices summarized by Tallon & Walker (2008) about handheld digital guide leading to a passive zombie-like consumption.

In contrast, providing no additional information (neither text panels nor digital guide) leads only to a shallow processing of the display. Although text panel reading also leads to a more elaborate processing, digital guide usage usually leads to a complete consumption of information (cf. Smith & Tinio 2008) in contrast to a partial consumption of text panels. This can inspire longer dwell times and a more elaborate processing with digital guides.

Furthermore, additional evidence is supplied about the parallel way of appropriating and experiencing exhibitions by listening to the audio guide and viewing the exhibits at the same time. This finding agrees with findings by Smith & Tinio (2008) and Bitgood (2010). Audio guide usage broadens the embodiment of the exhibition by merging of the visual and auditory sense while being in bodily action. Likewise audio guide usage broadens the museum

experience and especially leads to a more elaborate learning and multisensory experience. Thus viewing behaviour with audio guide usage becomes more elaborate and complex, and is guided by the information provided by the audio guide. This conclusion contradicts Franklin et al. (1993) who found that titles do not influence the viewing behaviour at exhibits. However unlike this thesis they did not focus on digital media.

Moreover, digital guides lead to an extended appropriation as further distinct movement patterns are performed. Due to the embodiment of the M3 as an "electronic secondary literature" device in visiting the "nexus" exhibition, the museum experience is broadened by the haptic sense of touch the M3 that allows visitors to 'touch' the exhibits indirectly and virtually. Thus, the usage of the M3 leads to a more exhaustive experience of "nexus" and to more haptic/emotional moments. In contrast to audio guide usage, multimedia guides without available audio guide function again separate gaze and attention between exhibit and information level like a text panel. Nevertheless, multimedia guides better incorporate the information level with the display level due to their closeness to the particular exhibit that is provided by their mobility.

The MET studies in both exhibitions provide examples of particular viewing behaviour and the cognitive processes that go along with the use of digital guides and thus provide insights about this last step in the selection process of exhibits. The MET study in the "nexus" exhibition as well as Eghbal-Azar et al. (2016) found that position and popularity of author names play an important role in this selection process. Furthermore the MET study finds another reason for exhibit selection in the M3: cognitive dissonance between an exhibit and its label lead to an increased interest in further information in the multimedia guide.

8.2.3. Summary

As it has become evident, all three key terms are interconnected with each other. Particular affordances lead to particular appropriations by particular movement patterns, which in turn lead to a particular experience. These three phenomena are interconnected with each other. Thereby the digital guide usage influences this interconnection. Usage of digital guides creates more affordances and shifts the perception of affordances in exhibitions. Parallel or successive and extended appropriation leads to an extended and more elaborate experience by extending the visual sense to the auditory and haptic senses. Performing particular movement

patterns largely shapes the museum experience. Performing more and a broader range of different movement patterns leads to a more elaborate processing and hence deeper experience of the exhibition. This validates previous research about digital guides in exhibitions (cf. Belotti et al. 2002; Helal et al. 2013; Kuflik et al., 2011; Mann & Tung, 2015; Webb & Mann, 2014, Viehöver 2006; see Chapter 1) and extends it by identifying particular movement patterns that are involved in this process.

The appropriation and experience of an exhibition seem to be largely dependent on the level of expertise that correlates with the visitor's agenda when visiting an exhibition. The affordances of the two field settings – the "nexus" exhibition at the LiMo and the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart – are the **same but different**. They are the same insofar as most of the movement patterns could be identified in both exhibitions. However, they are different insofar as further movement patterns were identified in the "nexus" exhibition. Furthermore, the appropriation of "nexus" by performing particular movement patterns is characterized by the affordances of an almost homogenous presentation of multi-partitioned exhibits that have to be examined from a short distance and by the provided digital guide M3 with its integral information function. M3 usage leads to more distinct movement patterns or more variability of movement patterns as far as there are more forms of "Alternating Gazes" and more forms of "Reading Gazes" in this exhibition. In general the appropriation of the "nexus" exhibition is characterized by a lot more "Window Shopping" and "Minor Orientation Gazes" as scanning strategies from close distances.

In contrast, the appropriation of the "South Sea Oases: Life and Survival in the Western Pacific" is characterized by a broader range of design that also includes freestanding exhibits, and both homogenous and heterogeneous display cabinets. Hence the viewing behaviour is more balanced than in "nexus".

The concept of affordance by Gibson (1979) is a useful theory to study the movement patterns of museum visitors and should be complemented with Norman's (2013) idea of signifiers in the design suggestions that follow.

8.3. Design Suggestions

Based on my research results I want to provide general and specific design suggestions regarding the particular affordances in exhibitions and the particular affordances of the digital guides for exhibition makers. Note that each design feature has its trade-offs. These design suggestions are crafted to promote visitor-centred design in museum exhibitions. Furthermore the design suggestions may seem familiar to exhibition makers, but so far a comprehensive system of design suggestions related to empirical evidence of particular movement patterns and based on the theory of affordances was missing. Thus exhibition makers can gain empirically based insights to make an informed decision about the design option they choose.

8.3.1. General Design Suggestions

The empirically supported general design suggestions include recommendations for orientating your visitors, presenting your exhibition, providing digital guides, focusing on your target audience and training your staff as mentioned already above.

- *Orientation*

First visitors seek orientation. Orientation plays a crucial role in visiting exhibitions as could be correctly concluded by the interaction approach of Bitgood (2006) and Rounds (2004). Thus you can provide clear initial information (visible titling, theme, intentions of the exhibition) at the entrance. You can provide signs or signifiers for orientation, and you can put all this information and important exhibits on eye-level or risk that they will not be attended.

- *Presentation Practice*

Think carefully whether you display exhibits freestanding, in homogenous or heterogeneous display cabinets. If you use display cabinets, consider carefully whether you want the visitors to view it only from the front side or from other sides as well. There are differences in appropriating the exhibits according to these display options.

The good news is display cabinets work well. Display cabinets work even better compared to freestanding exhibits and even better though the display cabinets showcase a heterogeneous

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range of exhibits. This is probably because putting exhibits behind glass suggests more value and ads an aura to the exhibits (Thiemeyer submitted). However this thesis is concerned with affordances, thus another explanation as mentioned already above might also be valid.

Think of display cabinets as limiting the affordances for interaction or even preventing it, as can be concluded by Norman's definition that glass walls constitute an "anti-affordance" (2013: 11). Of course, visitors do not walk through display cabinets. Thus probably display cabinets not only provide security for the exhibits but also for the visitors. Visitors probably feel more comfortable with well-known display cabinets and thus perform more and a broader range of possible movement patterns than at freestanding exhibits. More research about this presumed explanation must be conducted.

Secondly, homogenous presentation was identified as one possible reason behind "museum fatigue" (Davey 2005).

Thirdly, too many levels of glassy shelves within display cabinets, may lead to confusion but also to more action possibilities. For example "Changing Perspective" may also be performed to see the bottom side of the cabinets or "Alternating Gazes" around the corner of a display cabinet or "Pull Backs" through the glass shelves and walls or "Zooming Closers" from distantly shelves to lower or higher glass shelves.

Finally yet importantly, whether the exhibits are freestanding or within a display cabinet, you should place items that do not belong together apart from each other. Otherwise visitors become confused. The reverse is also true: place items together that belong together.

- **Digital Guides**

If you want your visitors to stay in your exhibition longer and view and process it more elaborately, then provide a digital guide. However consider carefully which guide you want to provide and how it shall work in your exhibition and how it can be handled. Though you want them to appropriate and process the exhibits in a parallel way, choose an audio guide. Audio guides allow listening and appropriating the exhibition at the same time in a parallel way and cognitive processing. Though you want to divide the experience between the display level and information level put all additional information into your multimedia guide. This could be advantageous if you display textual exhibits. Keep your digital guide light in its weight and handling. Easy handling could be accomplished by automatic self-localization of the digital

guide or by help information that is automatically given by the digital guide right at the start of the visit or by self-explanatory guidance. In the end, keep your digital guides updated technically and substantially.

- **Target Audience**

Keep your target audience in mind when you create and design your exhibition. If you want sophisticated expert visitors as your target audience, be brave and admit it. If you want to take care of your novice visitors display a heterogeneous range of exhibits.

- **Staff**

Train your staff deliberately and in standardized ways. Especially train your museums attendants to take care of the exhibits and museum visitors unobtrusively. Additionally do not muzzle your museum attendants, in contrast train them to provide standardized introductory information about the exhibition and the digital guides.

8.3.2. Specific Design Suggestions – a Selection

Moving from these general design suggestions, this section summarizes the more specific design suggestions that are connected to a selection of particular eye movement patterns and their affordances as already mentioned above:

- **Window Shopping/Wandering Along**

"Window Shopping" and "Wandering Along" as a scanning mechanism is necessary for the selection process. If you do not want your visitors "Window Shopping" too much although you want to use display cabinets, then make the display cabinets as short as possible. Be aware that you are not safe from disengagement, if you just do not put the exhibits in display cabinets but present them freestanding. "Wandering Along" at freestanding exhibits is a similar phenomenon to "Window Shopping" at display cabinets. Short and changing inputs seem to be the solution that works against active snoozing and museum fatigue.

- **Insight:**

If you want your visitors to look inside an exhibit, present it freestanding with an opening.

- **Alternating Gaze:**

If you want your visitors to compare exhibits with each other or exhibits with information, put these items close together.

- **Changing Perspective:**

If you want your visitors to look at the exhibit from different perspectives, present it hanging, no matter whether you put it in a display cabinet or not. As mentioned above, the "Changing Perspective" movement pattern highlights one of the most important and distinguishing features encountered in exhibitions: the ability to explore in multiple possible ways and from a number of perspectives. This is the main attraction of museums as mass media compared to other mass media like TV and Computers. And this is what provides unique museum experiences.

8.4. Projections

In the end, I want to project firstly, the future of digital guides in museum exhibitions; secondly the future of MET in visitor studies and socio-cultural anthropology; thirdly the future of the new cognitive science approach in visitor studies; and fourthly the future visitor studies.

8.4.1. The Future of Digital Guides in Museum Exhibitions

In the future, more digital guides and apps for smartphones will prospectively be applied in exhibitions. This research recommends this development. Digital guides were shown to be not as negative as portrayed, in contrast they lead to a prolonged dwell time, more and broader ranges of movement patterns, thus a more active viewing behaviours and a more elaborate cognitive processing. Digital guides do not hinder viewing and experiencing exhibits, they introduce a different way of parallel or successive and extended appropriation.

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8.4.2. The Future of Mobile Eye Tracking in Visitor Studies and Socio-Cultural Anthropology

In the future, MET will probably be more frequently applied as a complementary method in visitor studies and socio-cultural anthropology. We demonstrated that applying MET as a recent method in visitor studies provided totally new insights into visitors' unconscious movement patterns at exhibits and smaller exhibition sections that was lacking so far and would not be accomplished by purely applying observation with paper-and-pencil. Thus the critical reflection of the applied methods in *Chapter 7* prompts that MET can be advantageous for visitor and socio-cultural anthropologists who conduct fieldwork. MET is a productive method in fieldwork that aims to elicit unconscious movement behaviour in natural settings. With MET we can "grasp the native's point of view" (Malinowksi 1922: 25) in its literal sense. Hence, I follow the main aim of anthropological research. Thereby MET will not replace established methods in visitor studies and socio-cultural anthropology but can complement established methods to achieve deeper insights into the appropriation of the world by the visual sense, like this research accomplished.

8.4.3. The Future of the New Cognitive Science Approach in Visitor Studies

In the future, the new cognitive science approach that combines theories and methods from psychology and anthropology will probably catch on in visitor studies because visitor studies are already carried out by different disciplines of the so-called museum studies. Although this new approach needs interdisciplinary knowledge and sensitivity, it is worth pursuing. Its use revealed new concepts including the appropriation of exhibitions by performing particular movement patterns, a fruitful application of the psychological term "affordance" by Gibson (1979) and first empirical evidence for Rounds (2004: 401) rules. Furthermore, it leads to new knowledge about visitors' viewing behaviour and their particular agenda (taking part in an MET study for example). Following this approach, with its anthropological aim of studying the underprivileged museum visitors and seeking their emic point of view can have a great impact on creating visitor-centred exhibitions.

8.4.4. Future Visitor Studies

Future visitor research should focus on the occurrence of the 26 distinct, recurrent and systematic movement patterns in natural tasks outside of museum exhibitions. In contrast to other tasks in natural behaviour, viewing exhibitions requires less eye-hand-coordination. Therefore exhibition visits seem to be some kind of artificial behaviour; whereas the main sense that appropriates the exhibition is vision, or rather exhibitions are touched by the particular movement patterns. Thus future research should focus on the comparability of these two different types of behaviour and hence the transferability of my results to other behavioural possibilities in the three-dimensional space. It can be presumed that the movement patterns found in exhibitions form a subset of movement patterns in everyday life (Eghbal-Azar & Widlok 2013).

Finally yet importantly, Chua, Boland & Nisbett (2005; see *Chapter 4*) found first empirical evidence based on eye tracking that there are cultural differences in scene perception. Thinking of Benedict's cultural relativism in *Patterns of Culture* (1934/2005) or Bourdieu's (1969/1997) conclusion of museum visits as learned cultural patterns and his 'habitus' concept (Bourdieu 1977) the culture-cognition connection in attention processes is more than reasonable for socio-cultural anthropologists. Studying the previous results in visitor studies cross-culturally should be the general goal of visitor researchers because most of their research examines so-called WEIRD people (i.e., western, educated, industrial, rich and democratic) of so-called "Western" societies (Heinrich, Heine & Norenzayan 2010). Even psychologists are aware of the biases studying this population can impose. The psychologists Heinrich, Heine & Norenzayan (2010) found that research about these WEIRD people cannot be generalized to all human beings on this planet. Thus being a socio-cultural anthropologist, I want to finally conclude that future visitor research must study the 26 distinct, recurrent and systematic movement patterns found in German museums with German-speaking visitors cross-culturally.

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10. Appendices

The appendices contain original and translated texts of both exhibitions and their digital guides: the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart and the "nexus" exhibition at the LiMo. Furthermore, it provides the single results of the movement pattern frequencies at each section and the general results of the CRR regarding the "South Sea Oases: Life and Survival in the Western Pacific" exhibition. Finally yet importantly, it provides the observation sheet and the interview guide of the observation study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition.

10.1. The Exhibition and Digital Guide Texts

This paragraph provides the original and translated texts of both exhibitions. Regarding the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart, the audio guide texts in German and English were written by Tonwelt in cooperation with the Linden-Museum in Stuttgart. These texts are reprinted with kind permission from Tonwelt and the Linden-Museum in Stuttgart. The German text panel texts were written by the Linden-Museum in Stuttgart and are reprinted with their kind permission. These text panel texts were translated by the author, Kira Eghbal-Azar, and proofread by Emma Steinbach. Regarding the "nexus" exhibition at the LiMo, the original German text was written by the LiMo and translated by the author, Kira Eghbal-Azar.

10.1.1. The "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum in Stuttgart

- ***Introduction***

Audio Guide German Version:

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800 – Karte (2:35 min., Frauenstimme, keine Musik)

Herzlich willkommen in der Ausstellung „Südsee-Oasen: Leben und Überleben im Westpazifik"!

Die vielen kleinen Inseln im westlichen Pazifik, die Sie hier auf der Karte sehen und die gemeinsam als „Mikronesien" bezeichnet werden, liegen für uns sehr weit weg – im wörtlichen wie im übertragenen Sinne. Im blau-türkis-changierenden Meer gelegen, sind sie zwar betörend schön, doch besitzen sie weder Bodenschätze noch sonstiges Potential, auf das sich die internationale Aufmerksamkeit richten könnte. Erst durch den Klimawandel sind sie derzeit im Fokus – und es ist eine tragische Tatsache, dass in den nächsten 20, 30 Jahren viele von ihnen nicht mehr bewohnbar sein könnten.

Auch in der Vergangenheit waren vor allem die Atoll-Inseln, die nur wenige Meter über dem Meeresspiegel liegen, immer wieder von Stürmen und Flutwellen bedroht. Um diese Gefahren zu überstehen, entwickelten die Menschen verschiedenste Strategien, von denen wir in der Ausstellung berichten wollen. Eine Strategie beruhte auf der genauen Beobachtung der Naturphänomene zu Land und Meer und der genauen Kenntnis der Gestirne. Aber auch die spirituelle Ebene der Geister und Schutzgötter spielte eine wichtige Rolle.

Werfen wir nun einen genaueren Blick auf die Karte. Mikronesien erstreckt sich über eine riesige Entfernung von 4000 Kilometern. Ganz im Osten liegen die Inseln der Republik Kiribati *(sprich Kiribas)*. Weiter westwärts folgen die Marshall-Inseln, die sich in zwei Ketten von Süd nach Nord erstrecken – und die ebenso wie die Kiribati-Inseln fast nur aus Atollen bestehen. Nach Westen schließen sich die hohen Inseln Kosrae *(sprich Koschrae)*, Pohnpei, Chuuk, Yap und Palau an, zwischen denen sich die große Zahl der karolinischen Atoll-Inseln ausdehnt. Die Kulturen dieser weit gestreuten Inseln sind einander relativ ähnlich – was für eine beispiellose Vernetzung der Menschen untereinander seit Jahrtausenden spricht. Lassen Sie uns nun tiefer in die Kulturen Mikronesiens eintauchen.

Zu zahlreichen Exponaten hält der Audioguide Erläuterungen für Sie bereit – geben Sie bitte die entsprechende Nummer ein und drücken dann auf die Play-Taste. Eine ausführliche Bedienungsanleitung können Sie abrufen, indem Sie die Help-Taste drücken.

- *Section 1: The Men's House Model from Palau*

Audio Guide German Version:

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806 – Palau-Haus (1:33 min., Männerstimme, keine Musik)

Die geschnitzten und bemalten Balken der Männerhausgiebel von Palau gehören zu den außergewöhnlichen Kunstwerken Mikronesiens. Sie zeigen Mythen, historische Szenen und Fabeln, die immer eine Lehre beinhalten. Neben ihrer vordergründigen Moral verbergen sie häufig noch tiefere Bedeutungsebenen. Nicht nur die bemalten Fassaden, auch die kompakten Männerhäuser sind mit ihren hochgezogenen Dächern von bemerkenswerter ästhetischer Ausstrahlung. Die Häuser wurden von hoch angesehenen Baumeistern errichtet, und zwar ohne einen einzigen Nagel, nur mit Nuten und Zapfen. Die vier stabilen Außenposten stehen für die ersten vier Häuptlinge einer Gemeinde und symbolisieren gleichzeitig die vier „Gründungsdörfer" der palauischen Überlieferung.

Wenn Sie die einzelnen Szenen der Bemalungen betrachten, werden Sie feststellen, dass ein immer wieder kehrendes Motiv das Ausleger-Kanu ist. Auf den Palau-Inseln konnte ein solches Kanu sogar identitätsstiftend für ein ganzes Dorf sein.

Einen prominenten Platz nimmt auf unserem Haus der Hahn ein, der indirekt für das Sonnenlicht verantwortlich war, das die „Zeit der Götter" beendete. Auf dem Giebel findet sich dagegen eine Geschichte, die sich um den Kampf zwischen Taroknollen und Rochen rankt.

Das nach dem gleichen Prinzip konstruierte Haus daneben ist ein originales „Götterhäuschen", in dem die Ahnen einer Familie vom Familienvorstand geehrt wurden.

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807 – 2. Haus und Spreizfigur (1:51 min., Frauenstimme, keine Musik)

„Dilukai" heißen die Frauenskulpturen, die mit geradezu akrobatisch auseinander gespreizten Beinen eine recht ungewöhnliche Haltung einnehmen. Sie stammen ebenfalls von Palau, und schmückten dort früher die Giebel der Häuptlings- und Klubhäuser. Der Name Dilukai bezeichnet eine Frau, um die sich verschiedene Legenden ranken.

Da die Position der Figuren von palauischen Männern als beschämend empfunden wird, hieß es in den mündlichen Traditionen lange, dass damit „Prostituierte" dargestellt seien, die auf Zeit die Männer eines anderen Dorfes unterhielten. Nach einer anderen Legende war Dilukai eine Frau, die durch ihre Freizügigkeit ihren Brüdern die Schamesröte ins Gesicht trieb.

Eine modernere Deutung ist, dass die Skulpturen das weibliche Grundprinzip in dieser mutterrechtlichen Gesellschaft verkörpern. Zwar werden sie nackt gezeigt, doch sind sie mit Armbändern und Geldschmuck, also mit den Insignien einer „großen Frau" ausgestattet.

Lässt man die geschlechtliche Komponente der Skulpturen außer Acht, zeigen sie auf einer abstrahierten Ebene auch Anklänge an die Bootsformen Indonesiens, die dort die Basis eines Dorfes verkörpern. Ein indonesischer oder philippinischer Einfluss klingt auch in der Gestaltung von Gesicht und Frisur an. Er ist ebenfalls erkennbar an den kleinen Figuren, die die Griffe der Schöpfkellen zieren.

Bemerkenswert ist, dass in ganz Mikronesien kaum Skulpturen zu finden sind – nur auf den Inseln Palau und Yap und auf Nukuoro hat sich die plastische Kunst zu einem beachtlichen Grad entwickelt.

Audio Guide English Version:

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806 – Palau House (German version: 1:33 min., male voice, no music)

The carved and pointed beams of the gables on the men's meeting-house in Palau are among the most remarkable artworks in Micronesia. They show myths, historical scenes and fables that always carry some lesson. Apart from their obvious moral, they often had a deeper level of meaning. Not only the painted facades, but the compact men's houses themselves, with their high roofs, had a remarkable aesthetic vibrancy. They were built by highly respected architects without a single nail – exclusively with mortise-and-tenon joins. The four stable cornerposts stand for the first four chieftains of the community, and also symbolize the four predominant villages of the Palau founding myths.

If you examine the individual scenes on the paintings you see that a motif that occurs over and over again is the outrigger canoe. In Palau such a canoe could represent the identity of an entire village.

A prominent place on our house is occupied by the rooster, which is responsible for the sunlight that ends the "time of the gods" – or night. On the gable is a story about the battle between taro roots and rays.

The small house next to it is an original sacred house – in which ancestors were venerated by the head of the family.

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807 – Second House and Splayed Figure (German Version: 1:50 min., female voice, no music)

Dilukai is the name given to figures of women with acrobatically spread legs. Such carvings come from Palau where they decorated the gable above the entrance to the chieftains' house and men's club houses. The name Dilukai denotes a woman about whom there are various legends.

The posture of the figures is considered embarrassing to Palauan men and for a long time oral tradition identified them as prostitutes who serviced the men of another village. According to a different legend, Dilukai was a woman whose promiscuous behaviour made her brothers blush for shame.

A more modern interpretation is that the sculptures represent the feminine principle in this matrilineal society. While they are represented naked, they are adorned with bracelets and valuables, the insignias of important or high-status women.

Apart from the sexual components of the sculptures, at an abstract level they are also reminiscent of the boat shapes of Indonesia which there, too, are the basis of a village community. Indonesian or Philippine influences can also be seen in the design of the face and hairstyle. The same is true of the small figures that decorate oil lamps. Sculpture is rarely found throughout Micronesia, and it is remarkable that on Palau and Yap and the outlying atoll of Nukuoro carving was such a highly developed art.

- ### *Section 2: The Original Outrigger Fishing Canoe from Yap*

Text Panel German Version:

Auf See

Auf den großen hochseetüchtigen Booten konnten bis zu zwanzig Personen reisen, auf einem Auslegerkanu wie dem hier gezeigten sind es je nach Witterung fünf bis acht. Als Höchstgeschwindigkeit der größeren Reiseboote werden 12 Knoten geschätzt, die „normale" Reisegeschwindigkeit liegt allerdings bei 6 bis 8 Knoten und niedriger, wenn z.B. das Segel nass wird.

Vor dem Aufbruch wird der Mast begleitet von Zeremonien aufgestellt. Durch einen Gesang und ein leichtes Schlagen beim Einsetzen wird erreicht, dass er „leicht" wird und das Boot nicht seinen Weg verliert.

Die Boote sind so konstruiert, dass beim Kreuzen gegen den Wind nicht gehalst wird, sondern man das Segel vom Bug zum Heck versetzt, so dass der Ausleger immer dem Wind zugewandt bleibt. Bei großen Booten sitzt der Navigator auf einer dem Ausleger gegenüberliegenden Plattform, von wo er alles „im Blick" hat und mit der Segelleine das Segel kontrollieren kann. Im Heck sitzt der Steuermann mit einem mobilen Steuerruder, der mit dem Navigator zusammenarbeitet und dafür sorgt, dass das Boot trotz Einwirkung des Auslegers auf Kurs bleibt. Für das Umsetzen des Segels bei hohem Seegang wurden früher bis zu vier Männer benötigt, mit den heute benutzten modernen Segeltüchern ist das Umsetzen auch von zwei Leuten zu bewältigen.

Ebenso unverzichtbar wie Navigator und Steuermann sind diejenigen, die das durch hohe See hineingeschwappte oder durch die Nahtstellen eingedrungene Wasser aus dem Boot schöpfen. Obwohl das Reisen auf mikronesischen Auslegerkanus keine bequeme Angelegenheit ist, fühlen sich die Männer auf dem Meer ausgesprochen wohl – es ist von klein auf ein Teil ihrer Lebenswelt.

Text Panel Translated English Version:

At Sea

Up to 20 people could sail on the large sea-faring boats; on an outrigger canoe, like the one shown here, five to eight, depending on the weather. It is estimated that the speed of the larger boats can reach 12 knots, with the normal cruising speed between six and eight knots, and less when, for example, the sail is wet.

Before setting sail a ceremony accompanies the putting up of the mast. This involves singing and a low drumming to ensure it is "light" and the boat does not lose its way.

The boats are so constructed that while cruising against the wind the boat will not jibe; instead the sail is placed from bow to stern so that the outrigger is always facing the wind. On larger boats the navigator sits on a board opposite the outrigger where he has everything in view and from where he can control the sail with the sail rope. The helmsman sits at the stern with a mobile rudder which he uses, together with the navigator, to ensure that the boat stays on course despite outrigger's movements.

Up to four men were needed to hoist the sails on the high seas. With today's modern sails it is possible with only two people.

Equally as indispensable as the navigator and helmsman are those that empty the water that has collected in the boat from waves on the high seas or from penetrating the seams of the boat. Although far from being comfortable on their Micronesian outrigger canoes the men do feel remarkably at ease at sea – from a young age it is part of their way of life.

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821 Das Auslegerkanu im Linden-Museum (2:18 min., Männerstimme, keine Musik)

Das Auslegerkanu ist das bestimmende Gefährt der Südsee und ist deshalb in seiner Bedeutung weit mehr als nur ein Boot. Wir freuen uns sehr, Ihnen dieses Auslegerkanu im Linden-Museum präsentieren zu dürfen. Der Häuptling und Bootsbaumeister Bruno Tharngan, der selbst von der Insel Yap stammt, hat es vor über 20 Jahren als sein erstes großes Boot gebaut und im Vorfeld unserer Ausstellung nach Stuttgart überführt. Für den Transport wurde das Boot von seinem Ausleger getrennt, außerdem wurden Bug und Heck entfernt. Hier im Museum setzten Bruno Tharngan und der Navigator Ali Haleyáur mit ihren zwei Gehilfen Alfred und Niklas das Kanu wieder zusammen, dichteten es ab und versetzten es in segeltüchtigen Zustand, sodass sich unsere Besucher ein genaues Bild dieses hochseetauglichen Bootes machen können, das vor allem zum Fischen eingesetzt wurde.

Bei den Auslegerkanus in Mikronesien stehen Effizienz, Schnelligkeit und Sicherheit im Vordergrund – besonderen Komfort erwarten die Segler dagegen nicht. Der aus mehreren Teilen bestehende Bootskörper wird mit Kokosschnüren zusammengehalten, die für eine gewisse Flexibilität sorgen. Der Ausleger, ebenfalls fest mit dem Boot verbunden, sorgt für Stabilität. Oft sind die Bootskörper leicht asymmetrisch konstruiert, um die Zugwirkung des Auslegers auszugleichen. Beim Kreuzen gegen den Wind wird das Segel mitsamt dem Segelbaum vom Bug zum Heck versetzt.

Während der Kolonialzeit wurde das früher unverzichtbare Wissen um Bootsbau und Navigation unterdrückt, und später wurden traditionelle Boote fast überall von europäischen Konstruktionen und Außenbordmotoren verdrängt. Nur auf den kleinen Außeninseln konnte sich die alte maritime Tradition buchstäblich über Wasser halten. Es ist deshalb eine erfreuliche Entwicklung, dass der traditionelle Bootsbau und die Sternennavigation seit etwa 20 Jahren eine beachtliche Renaissance erleben. So werden heute Boote wie das hier Ausgestellte wieder für den Fischfang außerhalb des Riffs und für kürzere Hochseefahrten eingesetzt. Und die Vorbildfunktion für moderne Tri- und Katamarane ist ebenfalls nicht zu übersehen.

Audio Guide English Version:

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821 The Linden-Museum's Outrigger Canoe (German version: 2:18 min., male voice, no music)

The outrigger canoe is THE determining craft of the South Seas – and its significance goes beyond that of a mere boat. We are happy to be able to present the Linden Museum's outrigger canoe. Over 20 years ago it was the first big canoe made by Bruno Tharngan, a chief and master-boat-builder from Yap Island, and he brought it to Stuttgart ahead of our exhibition. The boat was separated from the outrigger for transport, and the bow and stern were removed. Here in the museum, Bruno Tharngan, together with navigator Ali Haleyalur and two assistants, Alfred and Niklas, reassembled the canoe. They caulked it, and made it seaworthy in order to give our visitors an exact impression of this ocean-going boat which is mainly used for fishing.

Micronesian outrigger canoes had to be efficient, fast and safe – sailors did not expect them to offer any great comforts or to hold provisions for more than a week or two. The body of the boat is made of several parts lashed together with sennit rope, which allows for a certain amount of flexibility. The outrigger, which is also tied to the boat, serves to stabilize it. The boat hulls are often longitudinally asymmetrical to compensate for the drag of the outrigger. When the boat crosses before the wind, the entire sail and mast are moved from the bow to the stern.

During the colonial period, the old boat-building and navigation skills were repressed. Later the traditional boats were almost completely replaced by western-style boats and outboard motors. Only the small Outer Islands managed to keep the old maritime traditions – literally – afloat. Happily, over the past two decades there has been a Renaissance of traditional boat-building and navigation methods in the region. Canoes like the one on display here are once again being produced for fishing outside the reef and for short ocean voyages. And the influence of these craft on modern catamarans and trimarans is plain to see.

- *Section 3: The Homogenous Display Cabinet*

Text Panel German Version:

Die Kunst des Webens

Die Faserweberei wurde vermutlich aus dem asiatischen Raum eingeführt und ist bis Kosrae im Westen verbreitet. Dort finden sich in den traditionellen Durchziehschurzen *tol* die feinsten Muster. Die Kette wird mit Hilfe von Kettbock und Schergitter auf das geplante Muster vorbereitet, wobei die unterschiedlich gefärbten Fäden mit feinsten Knoten aneinandergereiht werden.

Verwendet wird fein gesplissener Bananenbast, der sehr haltbar ist, und Hibiskusbast, der nach der Herstellung eher porös ist, aber Farben sehr gut annimmt. Aus den gleichen Materialien wurden auf Pohnpei Gürtel gefertigt, die, mit feinsten Mustern und zusätzlichem Muschelzierrat versehen, nur dem Adel vorbehalten waren.

Auf den Außeninseln wird bis heute gewebt, hauptsächlich mit modernen Garnen und einer entsprechenden Farbvielfalt. Neu erlernt wurde in den letzten Jahren die Kunst der machi-Herstellung. Diese Tücher wurden auf den Außeninseln Fais und Ulithi bei rituellen Anlässen – der Initiation der Jungen, der Einsetzung eines Häuptlings und bei Beerdigungen – genutzt und zeichnen sich durch feinste Musterflächen aus. In ähnlicher Technik wurden auf den Westlichen Außeninseln traditionell Durchziehschurze für die Männer und breitere Kleidertücher gearbeitet, die heute der Vergangenheit angehören.

Vor allem über die diffizile Webtradition auf Kosrae ist wenig bekannt. Hier wirkte die Bevölkerungsdezimierung und die Kleidervorstellungen der Mission Mitte des 19. Jh. zusammen, die *tol* als Kleidung zu ersetzen.

Text Panel Translated English Version:

The Art of Weaving

Fabric weaving was probably introduced from Asia and spread across to Kosrae in the west. Here the most elaborate designs are to be found in the traditional *tol* loincloths. The warp is prepared for the intended pattern using a weaver's beam and a warping grid where the different coloured threads are joined together with very small knots.

Fine strands of banana bast fibres, which are very durable, are used as well as hibiscus bast fibres which become porous after processing but absorb dyes well. On Pohnpei belts were made from the same material, with elaborate patterns and further decorated with shells reserved only for the high chiefs.

On the outer islands weaving is still done today, mostly with modern wool and a wide selection of colours. In recent years the art of machi making has been learnt. These fabrics, characterised by their exquisite patterns, were used on the outer islands Fais and Ulithi in ritual practices such as boys' initiation, appointment of a chief and at funerals. Using a similar technique men's loincloths and larger wraparounds (worn in the past) were traditionally made on the Western Outer Islands.

Little is known especially about the difficult weaving tradition on Kosrae. The decrease in population together with dress codes of the missionary replaced the *tol* as clothing in the mid-19th century.

- *Audio Guide German Version:*

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811 Faserweberei (1:56 min., Frauenstimme, keine Musik)

Die fein gearbeiteten Webstücke, die sie in dieser Vitrine bewundern können, sind im ozeanischen Raum eine Besonderheit der mikronesischen Kulturen. Ursprünglich stammt dieses Kunsthandwerk aus Asien. Es ist faszinierend zu sehen, wie aus feinsten Naturfasern mit einem einfachen Webstuhl solch filigrane Muster entstehen. Die Grundlage der Gewebe sind Bananenfasern, die äußerst fein gespalten werden können, Hibiskusfasern hingegen sorgen für die Musterungen. Letztere werden porös, wenn man sie mit Meerwasser benetzt, und lassen sich dadurch gut färben.

Auf der Insel Kosrae wurden die Gewebe als Durchzieh- oder Wickelschurze getragen – und zu Beginn der Missionierung durch so genannte Missionskleider ersetzt. Eine Vitrine weiter sehen Sie besonders gemusterte Gewebe, die dem Adel vorbehalten waren und äußerst delikat verziert sind. Die Durchziehschurze in der Vitrine rechts, die an den Enden mit feinen Musterstreifen versehen sind, waren traditionell den Männern vorbehalten, während die Matten der Frauen mit breiten Streifen gemustert sind.

Neben dem alltäglichen Gebrauch der Gewebe wurden sie auch für rituelle Zwecke genutzt, beispielsweise auf der Insel Fais. Mit den so genannten „machi"-Tüchern *(gesprochen Matchi)* wurden dort die Toten bestattet, die Einsetzung eines Häuptlings fand „unter einem machi" statt - Aufnahmen zeigen sie vor dem Haus eines Magiers - und bei Tributzahlungen konnte man für ein machi besondere Gegenleistungen verlangen. Im Gegensatz zu unserer an Gegenständen so überfrachteten Gesellschaft konnte in Mikronesien ein Objekt mehrere Funktionen zwischen profanem Alltag und spiritueller Welt erfüllen.

- *Audio Guide English Version:*

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811 Fiber Weaving (German version: 1:56 min., female voice, no music)

The finely worked woven cloths you can admire in the display case are a specialty of Micronesian culture. Originally this handicraft came from Asia. It is fascinating to see how, with the help of a simple loom, thin natural fibers are turned into such delicate designs. The basis of the weave is banana fiber, which can be finely split into threads. Hibiscus fiber is used for the patterns. It becomes porous when it is wet with seawater and can be easily dyed. In Kosrae, the fabrics were worn as apron-like or wrap-around skirts, but when European missionaries first came, they were replaced by "mission apparel." In the next display case you see the specially patterned cloth reserved for the nobility, which is very finely decorated. The draw-string apron to the right, decorated with a finely striped pattern at the ends was traditionally reserved for men, while the mats worn by the women were patterned with broad stripes.

Apart from everyday use, the fabrics were also used for ritual purposes, for instance on Fais Island. There the cloth known as "machi" *[PRONOUNCED: matchi]* was used for funerals; the installation ceremony of a chief took place "under a machi" and the machi was considered the most valuable item of tribute. In contrast to our so object-filled society, in Micronesia one object could fulfil numerous functions in both everyday life and the spiritual world.

- ***Section 4: The Heterogeneous Display Cabinet***

On the right:

Text Panel German Version:

Palau, wo Geld schmückt

Ob die Geldstücke Palaus – aus Glasfluss und keramischem Material bestehend und abhängig von Größe und Material in verschiedenste Kategorien und Unterkategorien eingeteilt – letztendlich von philippinischen Schiffen oder aus Indonesien stammen, wird vielleicht nie zu eruieren sein. In der palauischen Gesellschaft waren und sind sie von großem Wert und bis heute Teil aller traditionellen Transaktionen. Sie sind aber auch ein besonders geschätzter Schmuck, der zu mehreren Stücken nebeneinander um den Hals getragen und mit Sicherheit wahrgenommen und kommentiert wird.

Weniger Geld als Anerkennung für geleistete Hilfe ist das schalenförmige Frauengeld „toluk" aus Schildpatt. Reifen aus dem gleichen Material, aufeinander liegend zusammengefügt, bilden den Armschmuck großer Frauen, während nur Häuptlinge den Schmuck aus dem Rückenwirbel der Seekuh tragen durften.

Mit Haarkämmen steckten Männer wie Frauen früher ihre Frisuren am Hinterkopf fest.

Text Panel Translated English Version:

Palau – Money as Decoration

Whether Palau's coins – made from molten glass and ceramic material, and divided into various categories according to size and material – originated from Filipino ships or from Indonesia will probably never been known. They have been and still are very valuable to Palauan society and are still part of all traditional transactions. Worn as a necklace with several pieces next to each other they make a valuable piece of jewellery – bound to attract attention and be commented on.

Seen more as recognition for their help, rather than as money is the shell-shaped women's coin "toluk" made from tortoiseshell. Hoops from the same material joined together form bracelets for the more important women, whereas only chiefs were allowed to wear the jewellery made from the vertebrae of the sea cow.

The men, as well as the women, used to pin their hair on the back of their heads with hair combs.

Audio Guide German Version:

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808 – Geld, Tauschgüter, Nahrungstransport (2:12 min., Frauenstimme, keine Musik)

Stellen Sie sich vor, der Wert von einzelnen Geldstücken würde sich danach bemessen, welche Person diese vorher besessen hat. Um das genauer nachzuprüfen, würden „Geldspezialisten" die jeweilige „Geldgeschichte" speichern. Eine verwegene, aber auch faszinierende Idee – auf der Insel Palau gehörte dies zum Alltag. Natürlich galten auch andere Bemessungsfaktoren, nämlich die Größe und Beschaffenheit der einzelnen Geldstücke. Diese bestanden aus Bruchstücken von Armbändern, die vermutlich in voreuropäischer Zeit von gestrandeten Schiffen aus nach Palau gelangt waren. Den Mythen zufolge stammen sie vom „Geldvogel"; der häufig auf den Malereien der Männerhäuser auftaucht.

Traditionelles Geld wird bis heute vor allem dort eingesetzt, wo es um soziale Belange geht: als Brautpreis bei Hochzeiten, als „Bezahlung" während der Schwangerschaft für die „Schönheit des Kindes", für das „Bersten des Bauches" oder für das Recht, ein Kind zu adoptieren.

Doch auch die Dienste eines Heilers oder eines Tatauiermeisters wurden geldlich abgegolten - und es wurden von den Häuptlingen bei Vergehen für unser Verständnis sehr drastische Geldstrafen verhängt.

Status und Macht waren in allen mikronesischen Gesellschaften wichtig. Neben dem Geld waren es die auf Festen gereichten Speisen, die den Status erhöhten und festigten, wie die Präsentation in der Raummitte verdeutlicht. Auf Palau etwa revanchierte sich ein Empfänger von Geld durch große Festmähler, an denen die ganze Großfamilie mitarbeitete. Bei Dorffesten wurden enorme Mengen Taro auf so genannten Tarobänken angerichtet, Melasse aus großen Gefäßen gereicht, und weitere Speisen bereitgestellt. Bei solchen Festen wurde Essen auch den Göttern geopfert - irdische Genüsse und spirituelle Sphären waren also stets miteinander verknüpft.

Audio Guide English Version:

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808 – Money, Barter, Valuables, Food Transport (German version: 2:12 min., female voice, no music)

Try to imagine a society in which the value of individual pieces of money is determined by the identity of their previous owners. And in order to value them more accurately, certain money specialists retain the memory of each individual coin's history. It's a weird, but fascinating idea – and on Palau it was part of everyday life. There were other factors that also influenced monetary value – such as the size and make-up of the individual pieces of money. They consisted of fragments of bracelets thought to have arrived in Palau from stranded ships in precolonial times. According to myth, they came from the "money bird" that is often found in paintings on men's meeting-houses.

To this day the old money is used in traditional social situations, for example as dowries at weddings, during pregnancy as a "payment" for the "child's beauty", for the "bursting of the belly" or for the right to adopt a child. The services of a healer or a tattooing master were paid in traditional money and on occasion chieftains would impose drastic money penalties for certain social infractions.

Status and power were important factors in all Micronesian societies. In addition to money, the food offered at ceremonies served to raise and strengthen people's status, as the presentation in the center of this room shows. In Palau, for example, someone who received money returned the favour with great feasts which the whole extended family helped to prepare. At village ceremonies enormous quantities of taro was arranged on what were called taro benches, molasses was served from large vessels and many other dishes were prepared. Food was also offered to the gods at these feasts – an example of the constant link between earthly pleasures and the spiritual world.

In the middle:

Text Panel German Version:

Schmuck der Insel Nauru – von der Anmutung des Schwebens

Die Insel Nauru war die einzige Kultur Mikronesiens, in der Fregattvögel gezähmt und abgerichtet wurden. Gefangen wurden sie mit Hilfe von Schleudern, die sich um ihre Beine schlangen. Man hielt sie auf besonderen Anständen am Strand, wo sie so reichlich mit Fisch gefüttert wurden, dass sie immer wieder zurückkehrten.

Nirgends sonst sind ihre Federn so prominent im Schmuckdesign präsent wie auf Nauru: Sie bilden den beweglichen Teil von Haarbändern, Halsketten und Gürteln, die durch sie eine schwebende Komponente erhalten, die auch dem fragilen Ohrschmuck eigen ist, der u.a. mit kleinsten Haizähnen und Spondylus-Stückchen gestaltet wurde.

Die sogenannten Familienmatten, die vor allem von Schwangeren getragen worden sein sollen, wurden ebenfalls mit Federn besetzt. In der geometrischen Musterung der Flechtung kann man Anklänge der Kiribati-Flechtmatten – oder umgekehrt – erkennen. Zweifellos gab es einen regelmäßigen Austausch zwischen diesen beiden Inselregionen.

Text Panel Translated English Version:

Jewellery of the Nauru Island – Floating Impressions

The island of Nauru was the only culture in Micronesia where frigate birds were tamed and trained. They were caught using slings which were wrapped round their legs. They were kept special perches on the beach, where they were fed plenty of fish so that they always came back.

Nowhere is the use of the feathers so prominent in jewellery design than on Nauru: they form the flexible part of the headbands, necklaces and belts and give the impression of floating, which is also found on delicate earrings, which were decorated with the smallest sharks' teeth and pieces of spondylus and other materials.

The so-called family mats which were meant to be worn primarily by pregnant women were also decorated with feathers. Similarities can be found between the geometric pattern of the weaving and the Kiribati woven mats. Without a doubt the two islands regularly traded with each other.

On the left:

Text Panel German Version:

Kurkuma, Spondylus und Kokosperlen

Die Inseln von Chuuk waren berühmt für die Qualität ihrer Kurkuma-Paste, die ein wichtiges Handelsgut und Zahlungsmittel war. Auf den Inseln selbst wurde sie so intensiv wie möglich angewendet: Auf den Körper, aber auch auf Schmuck und Kleidermatten aufgetragen, trug sie wesentlich zum farbenfrohen Äußeren von Tänzern oder Autoritäten bei. Kombiniert wurde sie häufig mit Schmuck aus Spondylus-Schalen - ebenfalls ein wichtiges Handelsgut – und mit Gürteln und Armschmuck aus Kokosperlen.

Ob bestimmte Schmuckformen, wie z.B. die Haarkämme mit Fregattvogel-Federn, bestimmten Tänzen vorbehalten waren, ist nicht klar. Die Zusammenstellung aus geschmücktem Poncho, Federbesetztem Schmuckkamm und Arm- und Leibschmuck wurde während der Hamburgischen Südsee-Expedition bei einem Magie-Häuptling dokumentiert.

Ganz ähnlichen Schmuck trug man auf den Chuuk zugeordneten Außeninseln und – zu Beginn des 20. Jh. – auch auf Saipan, wohin zu Beginn des 19. Jh. eine große Gruppe von der Insel Satawal nach einem Taifun ausgewandert war.

Text Panel Translated English Version:

Turmeric, Spondylus and Coconut Beads

The islands of Chuuk were famous for their high-quality turmeric paste – an important trading commodity and means of payment. On the islands themselves it was used as extensively as possible: for the body, also applied on jewellery and mats to the colourful appearance of dancers or authorities. Often it was combined with jewellery made from spondylus shell – an equally important trading commodity – and with belts and coconut bead bracelets.

Whether certain pieces of jewellery - like, for example the hair combs with frigatebird feathers – were reserved for particular dances is not clear. The composition of a decorated poncho, a decorative comb with feathers, and arm and body jewellery was documented during the Hamburg South Sea expedition by a medicine manchief.

Very similar jewellery was worn on the Outer Islands of Chuuk and - at the beginning of the 20th century - also on Saipan, to where a large number of people from the Satawal Island emigrated at the beginning of the 19th century after a typhoon.

Audio Guide German Version:

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809 – Chuuk, Kurkuma (1:44 min., Frauenstimme Text, Männerstimme Gedicht, keine Musik)

Kurkuma – seit Einzug der asiatischen Küche ist uns das gelbe Pulver als Gewürz relativ bekannt. Eine ganz andere Bedeutung hatte Kurkuma auf den hohen Inseln der Chuuk Lagune – denn dort galt es als herausragendes Wertobjekt mit vielen verschiedenen Funktionen.

Ob in größeren Ballen oder zu kleinen Kegeln geformt, die Kurkuma-Paste war Handelsgut und Wertmesser zugleich. Auch den eigenen Körper schmückte man gerne damit. In der Vitrine sehen Sie verschiedene wertvolle Objekte, wie z.B. die Armreifen oder die fein gewebten Matten, die mit Kurkuma akzentuiert sind. Auch die dunklen Ponchos, die mit Spondylusscheiben verziert sind, waren Statussymbole. Besonders außergewöhnlich muten die Kurkuma-gelb gefärbten Haarraupen an – sie wurden bei Festen und Tänzen getragen und mit den ebenfalls ausgestellten Federkämmen besteckt, so dass sie wie Vogelschwingen wirkten und den Tänzern ein wahrhaft abenteuerliches Äußeres verschafften.

Doch so verwegen die Tänzer auch aussahen – Tänze und Gesänge wurden immer sorgsam einstudiert und folgten einer strengen Choreographie. Mit den Gesängen konnte man alte Überlieferungen vermitteln oder auch den Kräften huldigen, die beispielsweise die Brotfrucht reifen ließen. Bei einem Fest nach der ersten Brotfruchternte sang man zum Beispiel:

Du wirst herunterfallen

So dass mein Land reich ist,

die reiche Brotfrucht

esst die reiche Brotfrucht

damit wir erfrischt werden

an der großen Brotfrucht-Schale

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809 – Chuuk, Curcuma (German Version: 1:44 min., text by female voice, poem by male voice, no music)

Curcuma – or turmeric – is relatively well known in the west as a yellow powder used in Asian cooking. But in the High Islands of the Chuuk Lagoon curcuma is an object of great value with many different functions.

Whether in large bales or shaped into small cones, turmeric paste was both a trading commodity and a standard of value. People also used it to paint their bodies. In the display case you can see various costly objects like the arm ring or the finely woven mats that are accentuated using curcuma. The dark ponchos ornamented with spondylus discs were also status symbols. The most interesting objects are the hair ornaments dyed yellow with curcuma that were worn at festivals and dances. When studded with the feather combs you see here, their bird-wing-like appearance gave the dancers a wild and unusual look.

But as wild as the dancers may have appeared, their dances and songs were carefully rehearsed and followed a strict choreography. The songs told stories from the old oral tradition or praised the forces of nature, like those that made the breadfruit ripen. At the festival following the first breadfruit harvest people sang:

You will fall down

To make my land rich

The rich breadfruit

Eat the rich breadfruit

To refresh ourselves

At the great breadfruit bowl

10.1.2. The "nexus" Exhibition at the Museum of Modern Literature (LiMo)

M3 – Introduction:

nexus. Wie Verbindung und Verflechtung. Das, was vom 20. Jahrhundert, von der Literatur wie von ihren Schreibern und Lesern übrig geblieben ist. Eine Schausammlung mit den großen wie vergessenen Namen des Archivs – chronologisch von 1900 bis 2000 gelegt, sortiert in zwei große Wege: die Körper der Literatur (Manuskripte und Bücher) und die Relikte ihrer Autoren (Briefe und Lebenszeugnisse).

Sie können durch nexus verschiedene Wege einschlagen: flanieren, sich treiben lassen und einfach nur schauen oder Exponate eines Autors, einer Zeit oder mit einer bestimmten Eigenschaft ansehen. Der M3 hilft Ihnen beim Recherchieren, Identifizieren, Lesen, Hören und Verbinden von Exponaten.

10.2. Single Results of Movement Pattern Frequencies at each Section in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum in Stuttgart

- *Section 1: The Men's House Model from Palau*

Frequencies of Movement Patterns at Section 1 – "The Men's House Model from Palau":

Section 1: Men's House Model from Palau (N=7)		MET Distribution
Movement Patterns and Orientation*	Major Orientation Gaze	1
	Minor Orientation Gaze	**21**
	Backward Gaze	1
Movement Patterns and Strolling**	Window Shopping	0
	Wandering Along	8
	Turn	**21**
Movement Patterns and Exhibits***	Reading Text Panel	0
	Reading Labels	3
	Long Gaze	4
	Insight	*13*
	Changing Perspective	2
	Object Scan	0
	Alternating Gaze	1
	Zooming Closer	*16*
Movement Patterns and Human Beings****	Social Gaze	4
Other Movement Patterns (identified in the second phase of analysis)		**26**
Total Number		121

Figure 139: The Men's House Model from Palau from a Different Perspective (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Table 18: MET Study Results – Movement Patterns Frequencies at Section 1 "The Men's House Model from Palau" of the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum in Stuttgart

Interpretation of Results at Section 1 – "The Men's House Model from Palau":

Frequencies	Particular Gaze (in chronological order)	Affordance Description
1. Most Frequent	1. Minor Orientation Gaze 2. Turn	Orientation directly at the section seems to be of primary value for visitors. As the section consists of one freestanding exhibit, "Turns" have to be performed in order to gain a complete overview of the exhibit. These two movement patterns belong together.
2. Frequent	3. Insight 4. Zooming Closer	If visitors walk along the side of the men's house model with the open roof, they tend to use this affordance and zoom closer to get a view of the inside of the men's house model. These two movement patterns belong together.
3. Less Frequent	5. Wandering Along	As the men's house model was presented, freestanding visitors were invited to walk along and around it.
	6. Social Gaze	"Social Gazes" are not connected with the affordances of the exhibit or the exhibition but with the occurrence of other people being around.
	7. Long Gaze	The paintings on the men's house model invite visitors to perform "Long Gazes" as Aleida Assmann (1995) already correctly presumed.
	8. Reading Labels	Probably due to where exactly the visitor walks along "The Men's House Model from Palau" she is likely or not likely reading the label.
	9. Changing Perspective	Although the exhibit is presented freestanding, a change in perspective is rarely performed. This is rather surprising, as all three dimensions are offered.
	10. Major Orientation Gaze	"Major Orientation Gazes" seem to be rather characteristic when entering a new gallery.
	11. Backward Gaze 12. Alternating Gaze	The remaining movement patterns of this category are rarely performed, they seem to be less relevant for this section.
4. None	13. Window Shopping	The exhibit was presented freestanding and not within a display cabinet, hence "Window Shopping" was just not possible.
	14. Reading Text Panel	The text panel was put further away from "The Men's House Model from Palau". From the observer perspective in the systematic observation study presented in *Chapter 5* it was not observable due to other exhibits that obstructed the view. Hence for reasons of comparability it was not rated in this MET study.
	15. Object Scan	Probably due to the small size of the exhibit, "Object Scans" are less likely.

Table 19: MET Study – Section 1 "The Men's House Model from Palau" in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart – Interpretation of Results

- *Section 2: The Original Outrigger Fishing Canoe from Yap*

Frequencies of Movement Patterns at Section 2 – "The Original Outrigger Fishing Canoe from Yap":

Section 2: Original Outrigger Fishing Canoe from Yap (N=6)		MET Distribution
Movement Patterns and Orientation*	Major Orientation Gaze	0
	Minor Orientation Gaze	**24**
	Backward Gaze	3
Movement Patterns and Strolling	Window Shopping	0
	Wandering Along	*13*
	Turn	**36**
Movement Patterns and Exhibits*	Reading Text Panel	*11*
	Reading Labels	0
	Long Gaze	*16*
	Insight	*12*
	Changing Perspective	3
	Object Scan	8
	Alternating Gaze	2
	Zooming Closer	*13*
Movement Patterns and Human Beings**	Social Gaze	3
Other Movement Patterns (identified in the second phase of data analysis)		**42**
Total Number		186

Figure 140: The Original Outrigger Fishing Canoe from Yap from a Different Perspective (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Table 20: MET Study Results – Movement Patterns Frequencies at Section 2 "Original Outrigger Fishing Canoe from Yap" in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart

Interpretation of Results at Section 2 – "The Original Outrigger Fishing Canoe from Yap":

Frequencies	Particular Gaze (in chronological order)	Affordance Description
1. Most frequent	1. Turn 2. Minor Orientation Gaze	As the section consists of one freestanding exhibit "Turns" have to be performed in order to gain a complete overview of the exhibit. To get an overview and orientation directly at the section seems to be of primary value. These two movement patterns belong together.
2. Frequent	3. Long Gaze	The photoshow beneath the exhibit invited visitors to perform "Long Gazes".
	4. Wandering Along	As "The Original Outrigger Fishing Canoe from Yap" was presented freestanding, visitors were invited to walk along and around it.
	5. Zooming Closer 6. Insight	Due to the open canoe, visitors were invited to zoom closer to get a view of the inside of the canoe. At this section, these two movement patterns belong together.
	7. Reading Text Panel	The text panel next to the canoe invited visitors to read it.
3. Less Frequent	8. Object Scan	Probably due to the huge size of the exhibit visitors tend to perform "Object Scans" to realise the size and the dimensions of the canoe.
	9. Backward Gaze	"Backward Gaze" and "Changing Perspective" are rarely performed; hence they seem to be less relevant for this section.
	10. Changing Perspective	Although the exhibit is presented freestanding a change in perspective is rarely performed. This is rather surprising, as all three dimensions are offered.
	11. Social Gaze	"Social Gazes" are not connected with the affordances of the exhibit or the exhibition but with the occurrence of other people being around.
	12. Alternating Gaze	"Alternating Gaze" is rarely performed; hence it seems to be less relevant for this section.
4. None	13. Major Orientation Gaze	"Major Orientation Gazes" seem to be rather characteristic when entering a new gallery.
	14. Window Shopping	Due to its big size, the exhibit was presented freestanding and not within a display cabinet, hence "Window Shopping" was just not possible.
	15. Reading Labels	As there was no label provided for this huge exhibit no one was able to read one.

Table 21: MET Study – Section 2 "The Original Outrigger Fishing Canoe from Yap" in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart – Interpretation of Results

- ***Section 3: The Homogenous Display Cabinet***

Frequencies of Movement Patterns at Section 3 – "The Homogenous Display Cabinet":

Section 3: Homogenous Display Cabinet (N=8)		MET Distribution
Movement Patterns and Orientation*	Major Orientation Gaze	0
	Minor Orientation Gaze	**37**
	Backward Gaze	6
Movement Patterns and Strolling**	Window Shopping	*13*
	Wandering Along	2
	Turn	**22**
Movement Patterns and Exhibits***	Reading Text Panel	*12*
	Reading Labels	**35**
	Long Gaze	*15*
	Insight	0
	Changing Perspective	*14*
	Object Scan	7
	Alternating Gaze	**51**
	Zooming Closer	**29**
Movement Patterns and Human Beings****	Social Gaze	5
Other Movement Patterns (identified in the second phase of data analysis)		**39**
Total Number		287

Figure 141: The Homogenous Display Cabinet from a Different Perspective (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Table 22: MET Study Results – Movement Patterns Distribution Section 3 "The Homogenous Display Cabinet" in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum in Stuttgart

Interpretation of Results at Section 3 – "The Homogenous Display Cabinet":

Frequencies	Particular Gaze (in chronological order)	Affordance Description
1. Most frequent	1. Alternating Gaze	Due to many similar exhibits within this display cabinet, the main value for the visitors is to alternate the gaze between the exhibits, probably in order to compare them.
	2. Minor Orientation Gaze	Again to get an overview of and orientation at the section is crucial.

		3. Reading Labels	Due to many exhibits within this display cabinet, reading labels seems to be of more importance to identify the exhibits than at single freestanding exhibits.
		4. Zooming Closer	Although one might presume that a display cabinet limits "Zooming Closer", it does not prevent it. In contrast, especially the weaving example invites "Zooming Closer".
		5. Turn	Although the exhibits are presented in a display cabinet, "Turns" are made very often. "Turns" seem to be connected with orientation and "Alternating Gazes".
2. Frequent		6. Long Gaze	Especially the weaving example invites "Long Gazes".
		7. Changing Perspective	Although the exhibit is not presented freestanding, but in a display cabinet "Changing Perspective" is often performed. This is rather surprising because one would suppose that presentation in a display cabinet limits the three-dimensional view.
		8. Window Shopping	As Treinen (1988) already presumed correctly display cabinets also invite active snoozing and are often walked along without carefully viewing the exhibits within them, but it seems to provide enough information to get the gist of the display. Hence "Window Shopping" is performed as an "initial scanning mechanism" (Rounds 2004:401) that is guided by the visitors curiosity and interests (see *paragraph 4.4.*).
		9. Reading Text Panel	The text panel next to the display cabinet invited visitors to read it.
3. Less Frequent		10. Object Scan	The long lines of the weavings invite "Object Scans".
		11. Backward Gaze	"Backward Gaze" is probably performed to integrate new information with previous viewed information.
		12. Social Gaze	"Social Gazes" are not connected with the affordances of the exhibit or the exhibition but with the occurrence of other people being around.
		13. Wandering Along	Obviously one can also walk along a display cabinet without looking at it. Other exhibits probably were more attractive to look at. But this is rarely performed.
4. None		14. Major Orientation Gaze	"Major Orientation Gazes" seem to be rather characteristic when entering a new gallery.
		15. Insight	Due to the presentation in a display cabinet insights are just not possible or rather there are no exhibits presented in the display cabinets that allow an insight.

Table 23: MET Study – Section 3 "The Homogenous Display Cabinet" in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum in Stuttgart – Interpretation of Results

- ***Section 4: The Heterogeneous Display Cabinet***

Frequencies of Movement Patterns at Section 4 – "The Heterogeneous Display Cabinet":

Section 4: Heterogeneous Display cabinet (N=7)		MET Distribution
Movement Patterns and Orientation*	Major Orientation Gaze	2
	Minor Orientation Gaze	**149**
	Backward Gaze	3
Movement Patterns and Strolling**	Window Shopping	**46**
	Wandering Along	0
	Turn	*19*
Movement Patterns and Exhibits***	Reading Text Panel	**40**
	Reading Labels	**143**
	Long Gaze	**22**
	Insight	0
	Changing Perspective	9
	Object Scan	5
	Alternating Gaze	**82**
	Zooming Closer	**35**
Movement Patterns and Human Beings****	Social Gaze	1
Other Movement Patterns (identified in the second phase of data analysis)		**136**
Total Number		692

Figure 142: A Cut-out of the Heterogeneous Display Cabinet (photograph by Kira Eghbal-Azar with kind permission from the Linden-Museum in Stuttgart)

Table 24: MET Study Results – Movement Patterns Distribution Section 4 "The Heterogeneous Display Cabinet" in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum in Stuttgart

Interpretation of Results at Section 4 – "The Heterogeneous Display Cabinet":

Frequencies	Particular Gaze (in chronological order)	Affordance Description
1. Most frequent	1. Minor Orientation Gaze	Again to get an overview and orientation of the section is crucial or rather the most important task at hand.
	2. Reading Labels	Due to many exhibits within this display cabinet "Reading Labels" seems to be of importance to identify the exhibits.
	3. Alternating Gaze	Due to many exhibits within this display cabinet one of the main value is to alternate the view between these, probably in order to

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			compare them.
	4.	Window Shopping	As well as at section 3 this display cabinet also invites "Window Shopping". This time even more probably due to the length of the display cabinet.
	5.	Reading Text Panel	This display cabinet even provides three text panels presented within the display cabinet. The display of the text panels within the display cabinet invites reading more "Reading Text Panel" than presenting the text panels outside the display cabinet.
	6.	Zooming Closer	Although the display cabinet limits "Zooming Closer", it does not prevent it.
	7.	Long Gaze	Probably due to the presentation of different exhibits within one display cabinet "Long Gazes" are invited more in "The Heterogeneous Display Cabinet" than in "The Homogenous Display Cabinet".
2. Frequent	8.	Turn	Turns are made less often at "The Heterogeneous Display Cabinet" as at "The Homogenous Display Cabinet".
3. Less frequent	9.	Changing Perspective	Although the exhibit is not presented freestanding but in a display cabinet, "Changing Perspective" is performed. This is rather surprising as described at section 3. It seems as "Changing Perspective" is especially invited by hanging objects. Probably because less exhibits are hanging in "The Heterogeneous Display Cabinet" but are primarily laid at the bottom of the display cabinet, changing perspective is less performed than at "The Homogenous Display Cabinet".
	10.	Object Scan	The long lines of the combs invite "Object Scans".
	11.	Backward Gaze	"Backward Gaze" is probably performed to integrate new information with previous viewed information.
	12.	Major Orientation Gaze	"Major Orientation Gazes" seem to be rather characteristic when entering a new gallery.
	13.	Social Gaze	"Social Gazes" are not connected with the affordances of the exhibit or the exhibition but with the occurrence of other people being around.
4. None	14.	Wandering Along	"The Heterogeneous Display Cabinet" in contrast to "The Homogenous Display Cabinet" does not invite visitors to wander along without viewing it.
	15.	Insight	Due to the presentation in a display, cabinet insights are just not possible or rather there are no exhibits presented in the display cabinets that allow an insight.

Table 25: MET Study – Section 4 "The Heterogeneous Display Cabinet" in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart – Interpretation of Results

10.3. General Results of Cued Retrospective Reporting in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum

This part describes the results and interpretations of the cued retrospective reporting (CRR) that was analysed in analysis phase 3 of the first MET study in the "South Sea Oases: Life and Survival in the Western Pacific" exhibition at the Linden-Museum in Stuttgart:

After analysing each video without audio, I watched the videos again but this time with audio to identify the categories for the content analysis of the CRR.

The CRR was analysed separately after the transcription of the audio files. The relevant parts were cut and pasted together per section and per visitor group (experts/novices) to analyse the reports for commonalities and differences between experts and novices with a content analysis according to Mayring (2010).

Superordinated Category	Subordinated Category	Results and Interpretation
Exhibition Level	**Identification of the Exhibit(s)**	- At display cabinets (section 3 and 4): Experts name more exhibits than novices (91:39). ➢ Experts seem to appropriate more at the display cabinets than novices. - At freestanding exhibits (section 1 and 2): Novices name more exhibits (8:26). ➢ This time novices seem to be more engaged. - In sum, experts verbalize more than novices (99:65). ➢ Probably experts have more knowledge or gain more additional knowledge about the exhibits.
	Provenance of the Exhibit(s)	- If there are reports at all, then they were made by experts (6:0). ➢ Probably experts have more knowledge or gain more additional knowledge about the exhibits.
	Materials	- In sum, more reports at the display cabinets by both, experts and novices. - One great surprise: only one female novice named banana and hibiscus fibres at section 3 "The Homogenous Display Cabinet" with the weavings.

		- More reporting was made by experts (22:5). ➢ Probably experts have more knowledge or gain more additional knowledge about the exhibits.
	Workmanship	- In sum, experts verbalize more than novices (14:9). ➢ Probably experts are more able to evaluate the workmanship of exhibits than novices.
	Appraisal	- In sum, experts verbalize more than novices (27:10). ➢ Probably experts are more able to evaluate exhibits/exhibitions than novices.
	Application of Exhibit(s)	- Only at section 4 "The Heterogeneous Display Cabinet", where experts and novices verbalize equally as much (2:2).
	Presentation/Design of Section	- In sum, experts verbalize more than novices (16:6). ➢ Probably experts are more able to evaluate the exhibition design.
Information Level	**Text Panel**	- At section 1 "The Men's House Model from Palau" and section 4 The Heterogeneous Display Cabinet": experts verbalize more than novices (6:2). - At section 2 "The Original Outrigger Fishing Canoe from Yap" and section 3 "The Homogenous Display Cabinet"): novices verbalize more than experts (1:6).
	Labels	- Only one statement by an expert at section 4 "The Heterogeneous Display Cabinet".
Media	**Audio Guide**	- Only one statement by a female expert at section 1 "The Men's House Model from Palau". Reason: no audio guide was available in this visitor study. Female expert talks about other visitors she was looking at.
	Photographs/Illustrations	- In sum, experts and novices verbalize equally as much (11:11), whereas at section 1 "The Men's House Model from Palau" nothing is verbalized due to

		the lack of a photo.
	Hands-on Exhibits	- Only one statement was done by a female expert at section 4 "The Heterogeneous Display Cabinet". Reason: no hands-on exhibits were examined by the study. The reporting was done in reflection of her own viewing behaviour and what the MET recorded elsewhere.
Knowledge	**Previous Knowledge**	- In sum, experts verbalize more than novices (8:3). ➤ They have more previous knowledge, of course.
	Lack of Information, Misunderstandings, Questions, Unlearned Issues	- In sum, experts verbalize more than novices (70:27). ➤ Experts want to know more about the exhibits and they are more aware of their knowledge gaps.
	New Knowledge	- Novices verbalize more than experts (12:10). ➤ Novices probably learn more due to their lack of previous knowledge.
	Self-reference	- Only at section 4 "The Heterogeneous Display Cabinet" by a novice (4:0): novice learns by self-reference.
MET	**MET as a Method**	- At section 1 "The Men's House Model from Palau": one novice about the quality of the end data/MET video. - At section 2 "The Original Outrigger Fishing Canoe from Yap"): experts about how it feels to wear a MET. - In sum, experts verbalize more than novices (3:1).
	One's Own (Viewing) Behaviour	- In sum, experts verbalize more than novices (59:52). ➤ Reflections about one's own viewing behaviour are triggered by the cue (the visitor's own MET video).
Others	**Interest**	- Novices verbalize more than experts (17:9). ➤ Probably a visit by a novice is more interest-driven or maybe curiosity–driven (Rounds 2004) than a visit by

		an expert.
	Motivation	- Only at section 3 "The Homogenous Display Cabinet": Experts and novices (2:1) both verbalize about their non-motivation of viewing "The Homogenous Display Cabinet".
	Attention	- Only one statement by an expert about his loss of attention viewing "The Homogenous Display Cabinet".

Table 26: Summarized Results and Interpretation of the CRR Content Analysis ("South Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum in Stuttgart)

Salient results are the three most frequent categories and the categories with zero reporting:

The three most frequent categories are:

- Identification of exhibit (experts: 99, novices: 65)
- Lack of knowledge etc. (experts: 70, novices: 27)
- One's own viewing behaviour (experts: 59, novices: 52)

The categories with zero reporting are:

- Experts: self-reference
- Novices: provenance of exhibit, labels, audio guide, hands-on exhibits and attention.

Apart from that the "previous knowledge" of the experts makes THE difference between expert reports and novice reports not only regarding the so-called category "previous knowledge" but also regarding other categories like "identification of the exhibit", "provenance", "workmanship", and "appraisal" that are associated with "previous knowledge".

This difference probably echoes the selection of experts and novices. They were selected only due to their profession (experts = persons with prior knowledge of the subject matter, e.g., students of cultural anthropology; "novices" = persons with only cursory or even no prior knowledge of the subject matter and with no knowledge about museology, museum education or exhibition design). No further data about them was collected.

10.4. The Observation Sheet of the Observation Study in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum

Observation Report

Place, Weekday, Date, Time:

ID Number, Gender, Estimated Age:

Context Data:

Section:

Total number of visitors:

Event?

Other matters?

Sequence Numbers (SN) consecutively:

Category	SN	Content
Take-away of audio guide		
Usage of audio guide		
Reading Text Panel		
Reading Labels		
Major Orientation Gaze		
Minor Orientation Gaze		
Insight		Zw.
Zooming Closer		

Changing Perspective		
Object Scan		
Window Shopping		
Wandering Along		
Long Gaze		
Backward Gaze		
Turn		
Alternating Gaze		
Social Gaze		
Other matters		
Dwell time		

10.5. The Interview Guide of the Observation Study in the "South Sea Oases: Life and Survival in the Western Pacific" Exhibition at the Linden-Museum

Visitor number:

1. Age
2. Gender
3. Profession
4. Motivation for visit:
5. How many visits in this exhibition_____/ museum_____?
6. "Please describe spontaneously what you viewed, perceived, thought and felt at various points and what you paid attention to at this section".
7. Other matters: