

AttrakDiff

Determining the attractiveness of exhibitions via pairs of opposites

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Introduction

The standardized AttrakDiff questionnaire is an empirical tool for measuring how individuals assess the overall attractiveness of a product (Hassenzahl, Burmester and Koller 2003).¹ It was developed to support the design process and improve results. In the context of exhibitions, AttrakDiff can be recommended for analyzing how exhibitions or their prototypical versions affect visitors. Results may reveal the need for specific analyses (summative evaluation) or be a guide for conceptual decisions (formative evaluation).²

Using this questionnaire for an exhibition analysis constitutes a twofold transfer: AttrakDiff (= attractiveness differential) was developed in the specialist field of user experience design to evaluate interactive products, for instance office applications, logistics, and accounting systems.³ It thus originates from other professional con-

- 1 Questionnaire and instructions for use are available from Diefenbach, Lenz, and Hassenzahl (2014). The evaluation graphics shown here were created using the online version of AttrakDiff, which was discontinued at the end of 2024 (see www.attrakdiff.de).
- 2 Summative evaluations have the function of assessing how an exhibition performs overall and monitoring the extent to which it fulfils predefined objectives. They are the most frequently used type of evaluation (Wegner 2011: 245). Formative evaluations are carried out during the design process.
- 3 AttrakDiff is widely used for this application; it is “one of the most widely used tools amongst researchers to assess the global perceived quality of interactive systems” (Lallemant 2015: 19). AttrakDiff is one of the three most recognized standardized questionnaires for ubiquitous computing and ambient intelligence to evaluate user experience and among these three, the most widely used, as Díaz-Oreiro et al. (2021) summarize in their systematic literature review. Diefenbach, Kolb and Hassenzahl (2014: 305–314) examined scientific publications that explicitly address the hedonic aspect of human-machine interaction. Of the 150 papers examined, 74 used scales to analyze perceived hedonic quality. Of these, forty-three papers (58%) used the AttrakDiff as a measuring tool.

texts than the pertinent disciplines that concern themselves with exhibition evaluation such as museology, cultural studies, semiotics and anthropology. And it was designed for products other than exhibitions.⁴ The question in how far this unaltered transfer of AttrakDiff is nevertheless productive was tested in the research project *Exhibiting Design – Exhibiting through Design* (2015–2017), which the author conducted together with Dagmar Rinker at the University of Design Schwäbisch Gmünd and provides the case study discussed below.⁵

AttrakDiff is designed as a semantic differential,⁶ i.e. as a question methodology with twenty-eight pairs of opposites, such as *simple–complicated* or *confusing–clear* (Fig. 1).⁷ These opposing adjectives describe product features that partly overlap semantically in order to psychometrically capture the different facets of a quality (for instance, the pairs *isolating–connecting* and *separates me–brings me closer*). The respondents can choose from seven levels between these opposites; they do not necessarily need to opt for one tendency or the other, or need to choose per se for a tendency, but can give a neutral or middle rating precisely between two pairs of opposites. The individual pairs of opposites are divided into four areas, which in the evaluation represent different product qualities: pragmatic qualities (PQ), hedonic qualities – stimulation (HQ-S), hedonic qualities – identity (HQ-I), and attractiveness (ATT). Attractiveness as an overall evaluation is a dimension in its own right; the categories are explained below.

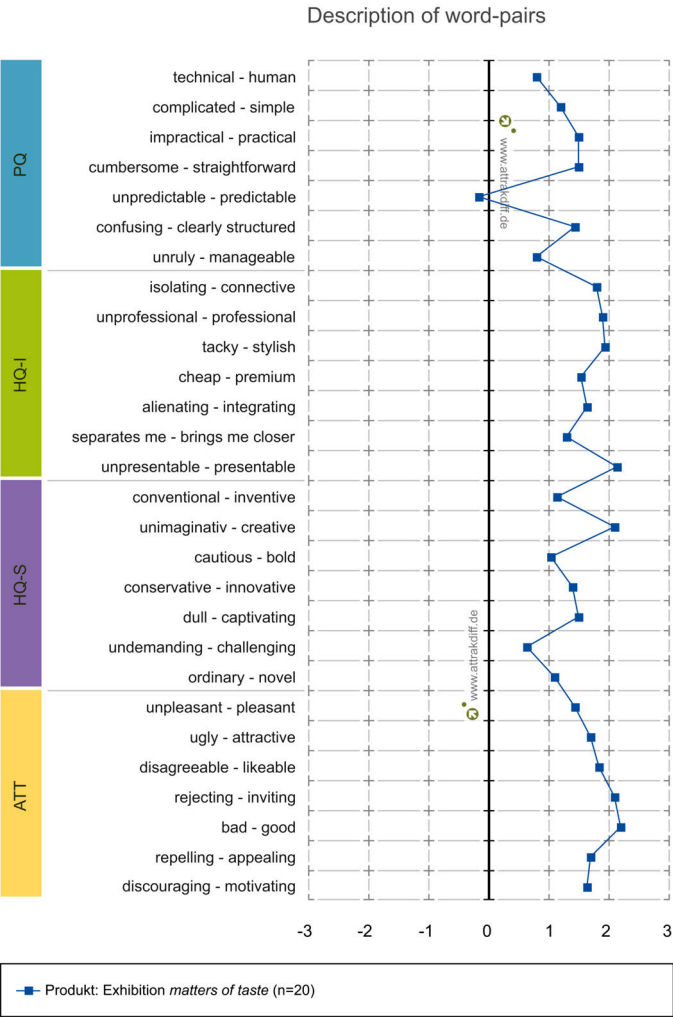
4 Until the end of 2024, it was possible to create the questionnaire online. The options for 'product type' and 'product industry' suggest that the developers had not intended this questionnaire for the cultural sector or for exhibitions. This was confirmed by the author's enquiry to Michael Burmester, one of the three developers.

5 See the German project documentation of *Design ausstellen – Ausstellen durch Design* at www.hfg-gmuend.de/forschung/design-ausstellen-ausstellen-durch-design (31.03.2025). The present method description also benefits from valuable feedback from students: Students in the BA program Museology and Material Culture at the University of Würzburg commented on the text as part of their seminar *Reflecting on and trying out methods of exhibition analysis* in the winter semester 2022/23 and tested the methodology in the Deutsches Museum Nürnberg – das Zukunftsmuseum (German Museum Nuremberg – the Future Museum) in a joint workshop with the editors Carla-Marinka Schorr and Luise Reitstätter and myself.

6 The semantic differential is a Likert scale developed by Charles Osgood and colleagues (Osgood, Suci, and Tannenbaum 1957) that can be used to empirically determine the semantic content of a term.

7 There is also a short version called 'AttrakDiff mini' with ten pairs of opposites (Diefenbach, Lenz, and Hassenzahl 2014, 46; Hassenzahl and Monk 2010).

Fig. 1: The figure shows the AttrakDiff “profile of word pairs”, here with results from the Geschmackssachen – Formen, Normen, Kaffeekanne (Matters of taste – Forms, Norms, Coffee Pot) exhibition, which is explained below. Twenty visitors evaluated the exhibition on the basis of twenty-eight pairs of opposites. The underlying model of the AttrakDiff differentiates between the pragmatic quality or usability (PQ), the hedonic quality – identity (HQI), the hedonic quality – stimulation (HQS) and the overall attractiveness (ATT) of the exhibition. Source: Automated evaluation of results via the website www.attrakdiff.de, which was still active at the time (own translation).



Pragmatic qualities (PQ) refer to usability, that means, in how far a person considers the product effective and efficient for their purpose (see footnote 8; Hassenzahl, Burmester and Koller 2000, 202). A plane, for instance, that is blunt and does not have a good grip has few pragmatic qualities. Similarly, an exhibition is rated as not very pragmatic if its wayfinding system is confusing and the object texts are poorly illuminated. Hedonic qualities (HQ) – sometimes also referred to as hedonistic⁸ – relate to non-utilitarian features of a product, i.e. attributes such as exclusive, beautiful, modern, cool or original (ibid.). The reason one should aim for hedonic qualities is because they are associated with enjoyment and well-being, and generally the avoidance of displeasure. They are differentiated according to the two dimensions of “stimulation” and “identity” (Hassenzahl, Burmester and Koller 2003): some product qualities appeal to human needs for stimulation because they offer sufficient novelty and variety without being overwhelming (HQ-S). A well-thought-out dramaturgy, varying the depth of information provided by individual exhibits, using light-dark contrasts in the room, combining exhibits from different categories and using a multimedia mix could all be used to stimulate exhibition visitors in a balanced way. The second hedonic dimension (HQ-I) refers to the need for identity and is fulfilled when users identify with the product and it helps them to emphasize their own image in the desired way. Exhibitions could, for instance, meet this need by highlighting connections between their topics and the everyday reality of the visitors’ lives or by giving visitors the opportunity to communicate, via smartphone, their exhibition visit in a manner that suits them.

Pragmatic and hedonic qualities contribute in equal measure to the perceived attractiveness of a product (ATT); a low hedonic quality can be compensated for by a high pragmatic quality – and vice versa (Burmester 2002, 34). For instance, if an exhibition is perceived as sensually appealing due to its high visual aesthetics, an innovative design and interesting possibilities for interaction (high hedonic quality), but at the same time its information content is relatively limited (low pragmatic quality), then it will be perceived on average as relatively attractive. Both dimensions can trigger emotional responses such as frustration and annoyance or satisfaction and joy (Hassenzahl, Burmester and Koller 2003). Pragmatic and hedonic qualities together impact the experiences of exhibition visitors.

Design and development processes were further developed to take both aspects of this subjective visitor and/or user experience into account in the planning as best

8 The Ancient Greek word *hēdonē* (ἡδονή) means ‘pleasure’, ‘enjoyment’ or ‘delight’. Hedonism also refers to the philosophical tradition of Epicureanism, co-founded by Epicurus (c. 341–271/270 BCE), whose highest goal is the maximization of pleasure – not found in opulence and luxury, but leading to a pleasurable peace of mind and the avoidance of pain precisely through inner liberation from such fleeting circumstances and sources of pleasure (Arnold 2016, 43–45).

as possible: While the user centered design (UCD)⁹ primarily only refers to pragmatic qualities – here referred to as usability¹⁰ – the user experience design (UXD) also incorporates hedonic qualities, thus continuing the UCD approach in a holistic way.¹¹ With the aid of AttrakDiff, which was developed under the premises of user experience design, it is possible to carry out evaluations that foreground the subjective perceptions and emotions of users. AttrakDiff thus ties in with the increasing museological attention paid to emotions and subjective production of meaning which is referred to as the “didactic turn” (Fackler and Pellengahr 2019: 36) or the “affective turn in museum studies” (Varutti 2022: 63) and which attempts to evoke the emotional participation of visitors through specifically participatory, process-oriented, multisensory or immersive exhibition formats.¹²

Aim of the method

AttrakDiff is a tool for visitor-centered evaluations. It is designed for exhibition makers¹³ who are interested in their audience and want to know how visitors evaluate an exhibition or its prototype in its entirety in retrospect. As a questionnaire, it is

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- 9 This term was coined by Donald Norman and Stephen Draper in the 1980s and describes a design process that is centered on the user (Chow 2005, 19). It aims to improve the usability of design (Erlhoff and Marshall 2007, 425).
 - 10 Usability is the extent to which users can use a product in a specific context to achieve their goals effectively, efficiently and satisfactorily (DIN EN ISO 9241–11). If an exhibition text is difficult to understand or a multimedia guide does not work, the usability of the exhibition is compromised, that is, its pragmatic qualities.
 - 11 The methodology and practical application of user experience design overlap with service design and design thinking. Three characteristics distinguish the approach of user experience design: a holistic understanding of the user experience, a focus on subjective perceptions and positive experiences instead of just avoiding usage problems (Burmester 2015, 1). In the context of exhibitions, the term “visitor experience” is operationalized as a triad of museum, visitor and social context (Falk and Dierking 1992), from which John F. Falk and Lynn D. Dierking developed the “interactive experience model” (Falk and Dierking 2013); this seems to be associated with a similar notion as in UXD.
 - 12 While curatorial practice takes visitors’ subjective experiences into account, these experiences are not sufficiently considered in evaluations (Reitstätter 2015, 31). One counterexample is the project *Hauptsache Publikum!? Das besucherorientierte Museum* (The Audience-Oriented Museum) by the German Museums Association. Its guidelines are available at <https://www.museumsbund.de/publikationen/hauptsache-publikum-besucherforschung-fuer-die-museumspraxis/> (31.03.2025).
 - 13 Exhibition makers are understood here to mean all groups of people involved in the conceptual work of an exhibition, that is, in addition to curators, also designers who, depending on their training and approach to their work, also call themselves scenographers, interior architects or exhibition designers.

able to record what people say – but not what they do. It provides exhibition makers with feedback on the extent to which the exhibition is functional and comprehensible, and also to what extent it is enjoyable. This is because AttrakDiff differentiates whether an exhibition needs to be optimized in a pragmatic or a hedonic regard. In addition, exhibition makers can see how much the audience agrees, i.e. whether multiple visitors evaluate the exhibition similarly or very differently. The results can serve as feedback to improve the evaluated exhibition or to inform the planning of future exhibitions.

Step-by-step guideline

AttrakDiff is a user-friendly tool that requires neither a lot of prior knowledge nor extensive practice. It is recommended if you wish to obtain a pattern of opinions about an exhibition and is well-suited for the initial phase of an exhibition analysis, which can be followed up with further methods to gain more specific insights.¹⁴

One person-day should be allocated for preparing the AttrakDiff questionnaire. The evaluation can be carried out using your own spreadsheet and, depending on the number of completed questionnaires, can take up to half a person-day. One should schedule a further half person-day to prepare and document the results for downstream processes. However, this calculation does not include the amount of time needed for interpreting the results, planning follow-up analyses based on specific research questions, or for perhaps even determining potential measures such as improvements.

1. Before conducting the survey

The AttrakDiff questionnaire is taken from Diefenbach, Lenz, and Hassenzahl (2014, 49). The survey can be designed as an individual project, as a comparison between two exhibitions or as a before-and-after comparison of an exhibition modification. You should refrain from making any changes to the questionnaire; the pairs of opposites were specifically selected and validated in studies. If necessary, sociodemographic categories such as age group, place of residence and level of education can be additionally queried.

14 As Díaz-Oreiro et al. (2021) show, the AttrakDiff and its related questionnaires meCUE and UEQ (User Experience Questionnaire) are used in 61.5% of the 553 evaluated studies in combination with one or more other methods, including, in order of frequency, the SUS questionnaire (System Usability Scale) for subjective assessment of user-friendliness, self-developed questionnaires, semi-structured interviews, the PANAS (Positive and Negative Affect Schedule) questionnaire to record feelings and emotions, and other methods.

2. Conducting the survey

The supervisory staff involved in conducting the survey or any other designated person can invite visitors leaving the exhibition to participate in the survey, so that as many visitors as possible evaluate the exhibition. In addition, due to the limited number of people and the available staff, guided tour groups can be expected to be particularly willing to participate. Five to ten completed questionnaires can indicate trends, but fifteen or more people are better. A small give-away could help to encourage visitors to participate. It takes around ten minutes to answer the AttrakDiff questionnaire.

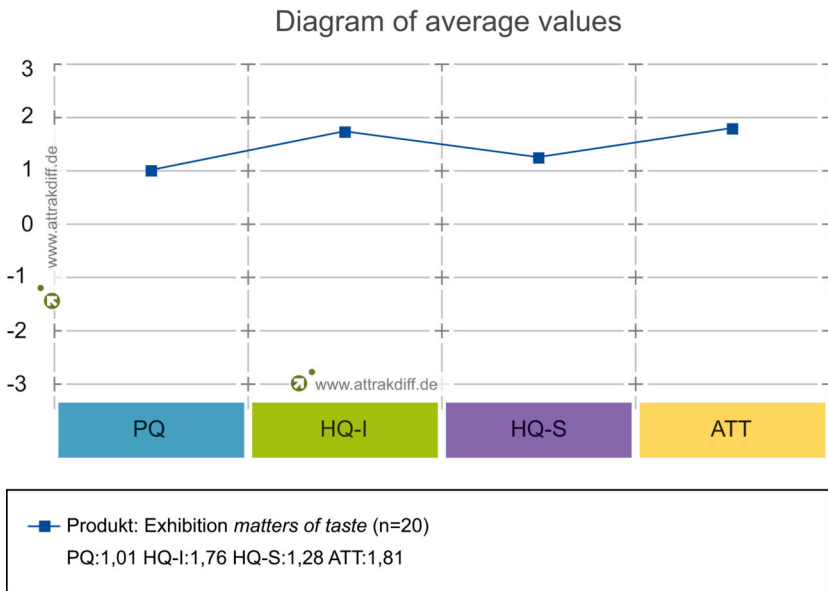
3. After conducting the survey

The results are evaluated by means of three diagrams: the profile with the word pairs (Fig. 1), a diagram of the mean values (Fig. 2) and the portfolio view (Fig. 3). In addition, it is possible to view individual data sets in toto as well as assess the interpersonal distribution of answers to specific questions. These latter data are enlightening in that they show to what extent visitors agree on a specific pair of opposites.

The *description of word pairs* (Fig. 1) displays the mean expressions of the individual word pairs. A score is calculated for the four different dimensions measured by AttrakDiff, which can range between a very negative rating (here -3, in the manual template 1) and a very positive one (here +3, in the manual template 7). In this case, attention should be paid to the outlying values, which indicate particularly characteristic properties of the exhibition being evaluated and show which properties were assessed as being above average in terms of criticism or praise. For example, if an exhibition is rated as very negative on the opposing pair *conservative – innovative* with -3 and thus receives an overall low score in the dimension of hedonic quality, this is also reflected in the portfolio view. Or vice versa: if an exhibition is ranked as *too task-oriented* in the portfolio view and thus lacks hedonic qualities, this can be more thoroughly tracked in the profile of word pairs. An exhibition that has been rated as *conservative* in a negative sense can thus be improved towards a more *innovative* presentation.

The diagram of the average values (Fig. 2) represents the mean expressions of the four examined dimensions. The evaluations in the four dimensions can be conveniently compared with this representation, so that, for instance, different average values of hedonic quality – stimulation (HQ-S) and hedonic quality – identity (HQ-I) become visible.

Fig. 2: The diagram of the mean values shows the mean scale values for PQ, HQ-I, HQ-S and ATT. With regard to the exhibition Geschmackssachen – Formen, Normen, Kaffeekanne (Matters of taste – Forms, Norms, Coffee Pot), this diagram clearly shows that visitors have rated its pragmatic quality the lowest, with a value of 1.01 just above the threshold of the average to above-average range. Source: Automated evaluation of results via the website www.attrakdiff.de, (own translation).



The portfolio (Fig. 3) shows the average expression of pragmatic quality in the vertical (bottom = low expression) and of hedonic quality in the horizontal (left = low expression). The combination of the two qualities can result in different types of exhibitions, which are summarized here in nine different fields and partly named: *superfluous*, *neutral*, *desired*, *task-oriented*, *too task-oriented*, *self-oriented* and *too self-oriented*. A disproportionately high pragmatic quality is referred to here as *too task-oriented*. This means that the exhibition can be used effectively and efficiently; the emotional response is satisfaction – but without creating a strong bond (Hassenzahl, Burmester and Koller 2003, 189). If visitors are also satisfied with the hedonic aspects, the evaluation indicates a *self-oriented* exhibition that binds visitors and triggers enjoyment, “because self-related goals are usually more persistent and personally relevant” (ibid.). Whether an exhibition collects more approval in pragmatic or hedonic terms is not a matter of better or worse but depends on the intentions of the exhibition organizers. If AttrakDiff is used as a basis for exhibition optimization, the portfolio shows the dimension in which improvements can be made depending on

the goal. The portfolio also indicates via the confidence rectangle how homogeneous the feedback from visitors is. The smaller the rectangle, the more visitors agree.

Fig. 3: The “Portfolio View” shows the relative expression of hedonic quality (vertical axis) and pragmatic quality (horizontal axis). The position of the point indicates the mean value of all feedback, i.e. the overall tendency. The confidence rectangle represents the distribution or standard deviation. The smaller this rectangle is, the more visitors ‘agree’ and the more certain it is that the exhibition can be assigned to a specific area. For the exhibition Geschmackssachen – Formen, Normen, Kaffeekanne (Matters of taste – Forms, Norms, Coffee Pot) analyzed here, which is explained below, the confidence rectangle is small; visitors agree that the exhibition has high pragmatic and high hedonic qualities. Source: Automated evaluation of results from the website www.attrakdiff.de, (own translation).



Case study

The following description presents the testing of the AttrakDiff as part of the research project *Exhibiting Design – Exhibiting through Design*. Working from the premises of user experience design, the exhibition makers involved in the project used AttrakDiff and other methods, with the aim to understand the visitors' perspective in order to derive insights for design processes. The established methods in the range of reception-analytical exhibition evaluation were considered sub-optimal by exhibition designers at least for tightly calculated processes, since they are often time-consuming and resource-intensive (e.g. *Observation*), or focus on objectivity rather than subjective experience (e.g. *Mobile Eye Tracking*). By contrast, the methods of user experience design seemed to be more pragmatic to work with. This needed to be tested.

Fig. 4: Prologue of the special exhibition *Geschmackssachen – Formen, Normen, Kaffeekanne* (Matters of taste – Forms, Norms, Coffee Pot) on opening day (February 25, 2016), © Tabea Schmid.



AttrakDiff was combined with the ‘user camera study’, a method in which visitors take photographs of the exhibition and then comment on them; it shows what visitors notice, find important and how they document it photographically (Stanford 2011, 11). As a qualitative, non-standardized method, the user camera study provides snapshots of impressions and thus complements the quantitative AttrakDiff ques-

tionnaire, which presents an overall picture. In this respect, these methods combine well, although to our knowledge no such combination has been attempted so far.¹⁵

Both methods were tested in the special exhibition *Geschmackssachen – Formen, Normen, Kaffeekanne* (*Matters of taste – Forms, Norms, Coffee Pot*), which took place from February to May 2016 in the HfG-Archive Ulm (Fig. 4). This exhibition of cultural history showed design objects and everyday items from three collections (HfG-Archive Ulm, Collection Hans (Nick) Roericht, Archiv der Alltagskultur/Archive of Everyday Culture Tübingen). Fifty-three people participated in the AttrakDiff survey and thirty-one others in the user camera study. AttrakDiff was laid out as a printed questionnaire in the exhibition foyer and offered by the supervisory staff. For the user camera study, visitors, who had been approached prior to their visit, were asked to photograph a maximum of three moments of the exhibition that made an impression on them using a specially provided tablet and to briefly describe their selection on a form.

The AttrakDiff survey showed that the exhibition tended to be perceived as simple and clear and at the same time original rather than conventional, and innovative rather than conservative. This means that the participating visitors were able to find their way around the exhibition with ease (pragmatic quality) and at the same time felt pleasantly stimulated by novel and surprising elements (hedonic quality). The user camera study showed that visitors mainly photographed individual exhibits of the exhibition as impressive highlights to which they had an emotional connection.

Both methods could be brought together in a visual preparation of the results. A combined visualization can, for instance, show clusters in visitor perception; it facilitates the communication of the results and can therefore increase decision-makers' motivation to make improvements. It would also be possible to expand this to a user experience map that documents various facets of use in a chronological form, such as a person's actions, their emotions, attitudes and perceptions (Martin and Hannington 2013).

15 The researcher and designer Johanna Barnbeck conducted a user camera study in the Rijksmuseum in Amsterdam to capture the expectations of visitors. This formative evaluation was carried out as part of the *Augmenting Masterpieces* project, which developed exhibition media to enhance the visitor experience. See the website of the *Augmenting Masterpieces* project: <https://www.uncinc.nl/en/work/rijksmuseum-augmented-masterpieces> s, Barnbeck's presentation *Visual Feedback Methodology in Museum Settings* at the conference *Museen verstehen* (30.10.2015) at the University of Tübingen (Barnbeck 2016). Equipping users with cameras to gain insights into their experiences is a common practice in design (research) projects and, in particular, is part of the methodology of *cultural probes* (Gaver, Dunne and Pacenti 1999).

Method reflection

The testing in the HfG Archive Ulm showed that the pairs of AttrakDiff characteristics also suit the medium of exhibitions – in contrast to those of the UX questionnaire, for example, which can also be used to record a user experience (IAO 2015). AttrakDiff helps exhibition makers sharpen their awareness of the visitor's perspective. As a method for analyzing exhibitions, AttrakDiff is valuable in that it differentiates visitors' experiences into pragmatic and hedonic aspects. In doing so, it answers to the design and curatorial challenge of addressing visitors in a balanced manner without boring them or overwhelming them – and thereby enabling a good exhibition experience. AttrakDiff can also be recommended for various practical reasons: The method is easy to learn and its implementation requires relatively little effort. The questionnaire is accessible free of charge and its use is not dependent on any proprietary software infrastructures, which ties in well with the limited resources of many exhibition venues, especially small ones. Last but not least, AttrakDiff enables a comparative evaluation of different exhibitions – for instance, several variants of the same exhibition in the conception phase.¹⁶ In addition, AttrakDiff could be valuable for comparative feedback from different visitor groups, for example, to inform the curatorial team how school children evaluate an exhibition compared to senior citizens.

However, the method only affords an overall impression and no specific visitor perception of individual elements, because AttrakDiff only queries abstract attributes, but not specific quality features. The method therefore does not show which exhibition elements are particularly attractive or which ones present problems for visitors. For such analytical purposes, it is only suitable as an initial or follow-up survey in combination with other user-centered methods such as *Questionnaire* (or the comment function included in AttrakDiff), *Observation*, *Mobile Eye Tracking* or *Space Syntax*. Analyses of specific exhibition areas – for example hands-on elements – would increase the informative value of AttrakDiff. It should also be noted that the method can only be used with visitors who are well versed in the German language. Although AttrakDiff has been translated into English and other European languages, these linguistic transfers were often not tested for their validity (Lallemand 2015, 19).

In summary, the low-threshold application of AttrakDiff can help museum professionals start adopting a visitor-centered approach or find an introduction to ap-

16 Diefenbach, Lenz, and Hassenzahl (2014) locate the application of AttrakDiff in the design process in the selection phase, in order to reduce the design options based on the evaluation of several prototypes. It is a matter of debate whether two-dimensional designs of planned exhibitions can be analyzed in this way, even though they do not simulate physical-spatial experience.

plication-oriented visitor and audience research. By focusing on the subjective experience of visitors, AttrakDiff can expand self-referential perspectives, support reflection processes and act as a need analysis for more specific evaluations.

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