

Web browsers prescribe the ways we access and navigate knowledge and communities online. Since the 1990s browser software has been an arena for artistic interventions ranging from quirky standalone browsers to performative pieces to minimalist browser add-ons. The (im)possibility of navigation is not taken for granted and is probed, questioned, and reformulated through such software practices. We propose navigation as a mode of exploring interactive software that allows researchers to collectively document manifold facets of artists' browsers.

Navigation

Reihe
Begriffe des
digitalen Bildes



Navigation



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Users' perspectives: Dealing with JODI's %WRONG Browser.co.kr

The research project *Browser Art. Navigating with Style* examines artistic browsers and the idiosyncratic ways in which they display Internet content.¹ The project seeks to make the seemingly opaque operations of the digital infrastructure tangible and understandable. To go beyond generalized structural diagrams – which only reflect basic technical settings – this study deals with the creation and comparison of time-based portraits that shed light on the browsers' respective mode of function. Thus, the research team extends the range of analyses from the screen output perceived by the senses to the processes of program mechanics. The question of how also to preserve the endangered heritage of Internet-based art and cultural production for posterity has become an unexpected addition to the research endeavour.

The idea and experimental setup for this issue on navigation has its roots in the project and the aspect of looming software retirements which tend to disrupt art browsers as well.

Back in 2017, Adobe officially announced that it would be ending support for its Flash software at the end of 2020. While the content itself was not affected per se, major browsers would not be able to display Flash-based media out of the box from December 31, 2020 onwards.² This seemingly insignificant – from an everyday use perspective – and anticipated retirement of the legacy software framework is, however, obliterating access to the vast troves of artistic production that relied on this technology throughout the last two decades.

1 Browser Art. Navigating with Style, <https://kg.ikb.kit.edu/hinterwaldner/2433.php> [accessed 9.4.2022].

2 Cf. T.C. Sottek: Adobe Flash rides off into the sunset. It's the end of the line. In: The Verge, 31.12.2020, <https://www.theverge.com/2020/12/31/22208190/adobe-flash-is-dead> [accessed 3.12.2021]; Gregg Keizer: Adobe lays Flash to rest. In: Computerworld, 11.12.2020, <https://www.computerworld.com/article/3601108/adobe-lays-flash-to-rest.html> [accessed 2.2.2022].

Triggered by the prospect of Flash shutdown, we decided to hastily document all Flash-based artists' browsers we had on our list, in the best way we could. The task was urgent and simple: capture the browser in all its facets (as if it would completely cease to exist tomorrow) in a way that would allow posterity to get a good *impression* and *feel* of what it was like to use the software.

This rushed and 'emergency' research mode delivered some useful insights. First, we suspected there would be only rather marginal differences between our approaches. The 'best' approach is, after all, a superlative – in its everyday meaning – and how many of these could there be? However, when we compared our personal best practice documentation approaches, we were astonished at how diverse our solutions were. Thus, we decided to reflexively describe how we documented the works and why we pursued our individual paths.

Preliminary work

In our first comparative study³ we found that different browsers shape the Internet in various ways, highlighting ever new facets yet not necessarily leading to a coherent picture of 'the' web. Browsers – like all media and interfaces – filter our view of the Internet and shape the ways in which users can intervene therein. To establish a methodological layout – as an interdisciplinary group of four researchers – we accumulated and fused our findings on five artistic browsers and analyzed how they configured the web and the access(es) to it. Here, 'the' user remained a seemingly neutral, and somewhat problematic, even generic, category.

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3 Daniela Hönigsberg et al.: Negotiating the way to the Internet. On the impact of software design on browsing experience and user interaction. In: Journal Visual Culture Studies, vol.1, no.3, 2022, forthcoming.

Now, we would like to use the opportunity given to us with this special issue on navigation to present an experimental setup that addresses the diversification of use scenarios and users. It is generally obvious and in line with Karen Barad's theorisation that human agents are factors that impact the 'epistemic thing' (notion according to Hans-Jörg Rheinberger).⁴ In this issue we would like to shed some light onto that aspect, which was previously omitted in our study.

Domains of navigation

One of the first web browsers in 1994, Netscape Navigator had 'navigation' already written in its name. It seems to be a given, to talk about accessing the information provided on the World Wide Web in terms of navigation. Indeed, this notion has been central to web browsing since the inception of the web. The concept of navigation is one of the main tenets in *Information Management: A Proposal* authored by Tim Berners-Lee in 1990, laying out the foundational structure of what would become the World Wide Web. In his proposal, Berners-Lee emphasizes the importance of facilitating navigation as a means for preventing the user from getting "lost in hyperspace"⁵. Indeed, navigation soon became reified as a navigation interface in the first web browser called WorldWideWeb. The term cyberspace⁶ – understood as the Internet's infrastructure – also implies it is a space to be navigated as it shares the prefix with the ancient Greek κυβερνήτης (kybernetes) – steersman, captain, pilot or navigator, indicating a whole semantic field that spans a spectrum of meanings from 'piloting' to 'governing'. For a deeper insight scan this QR code:



4 Karen Barad: Meeting the Universe Halfway. Quantum Physics and the Entanglement of Matter and Meaning. Durham/London 2007; Hans-Jörg Rheinberger: Toward a History of Epistemic Things. Synthesizing Proteins in the Test Tube. Stanford 1997.

5 Tim Berners-Lee: Information Management. A Proposal. In: CERN, May 1990, <https://cds.cern.ch/record/369245/files/dd-89-001.pdf> [accessed 14.6.2021], p.14.

6 A term famously coined by the sci-fi novelist William Gibson in 1982 in a story published in Omni magazine and then in his book *Neuromancer* (1986).

Our take on navigation

In a departure from the ways that designers and scholars think about (controlled) navigation and the web, we consider navigation as a mode and mood of exploring interactive software that does not take “navigational freedom” for granted. In our case study, the %*WRONG Browser .co.kr* by JODI, adopting navigation as a mode of exploration helps us to deal with a browser that overloads our sensory capacities and resists conventional attempts to capture it precisely and systematically. That is not to say that a methodologically applied navigation strategy cannot start out playfully, as trying things out and getting an intuitive idea of what the software does when we interact with it. Navigation then may become an empirical means for exploring the browser’s features, bugs, static elements, dynamic patterns, and its technological environment. As such it becomes essential to our documentation approach.

Navigation in/with/on (digital) imagery

In the digital domain we are dealing with a socio-technical environment, in which some (human) actors seem to acquire a more influential, defining position than others. This is reflected in studies as they either focus on persons engaged in navigation (users piloting) or on those providing the framework for navigation (producers governing). The producers modulate navigation for the users by providing navigation tools and creating the sites in which the users navigate. In other words, digital environments are designed *for* navigation. The producers preform the navigation to a certain degree.

And, if we want to go as far as Thierry Bardini's interpretation of Douglas Engelbart's stance, simultaneously create the conforming/corresponding user.⁷

The communication studies scholar Patricia Aufderheide examines navigation along three axes: simple versus global navigation design, navigation metaphors adopted from other media, and navigation related to interactive functions, whereby: "Different navigational needs drive different navigational designs, depending on how the project construes the user's relationship with the material."⁸ Here, the navigation as an aesthetic feature is carefully crafted to fit the individual project. Navigation can be bold, clear, minimalist, limited and strategically withhold information from the users.⁹

The web browser as software *renders* a website: it makes the website visible by creating an image following a specific road mapped out in the negotiation between its programming and the HTML of the accessed web page. We could say the browser's rendering engine navigates the image¹⁰ (aka rendered websites) into existence. The digital images assembled by the web browser are not only code-based, as one would expect for digital images, they are also distributed and partially open ended or unfinished. They are gathered and composed out of text elements, embedded hyperlinks, control elements, pictures, graphics, sound, animations etc. That is why in our research we understand web browsers as 'image creating machines'.

Focusing on the image created by the browser, at least three distinct processes are performed that can be described as navigation: a) the navigation to a specific webpage, b) the navigation through the menu and functions of the web browser software and finally, c) the navigation of the rendering process to create the image displayed on the screen (assembling the

7 Cf. Thierry Bardini: *Bootstrapping. Douglas Engelbart, Coevolution, and the Origins of Personal Computing*. Stanford 2000.

8 Pat Aufderheide: *Interactive Documentaries. Navigation and Design*. In: *Journal of Film and Video*, vol. 67, no. 3-4, Fall/Winter 2015, pp. 69-78, here: p. 72.

9 *Ibid.*, p. 73.

10 Here, 'images' are broadly seen as being programmed, operative and potentially multimodal configurations, cf. Inge Hinterwaldner & Markus Buschhaus (eds.): *The Picture's Image. Wissenschaftliche Visualisierung als Komposit*. Munich 2006, pp. 206-221; Inge Hinterwaldner: *Programmierte Operativität und operative Bildlichkeit*. In: Roman Mikuláš, Sibylle Moser & Karin S. Woźonig (eds.): *Die Kunst der Systemik*. Münster 2013, pp. 77-108.

picture by navigation). That of course also leads to a very specific way of looking at the Internet and at what is being navigated when ‘moving’ through it. Considering what we have determined until now, isn’t what we are doing on the Internet actually navigating *through* and *with* images?

However, navigating the images together is not strictly limited to the Internet. This process of creation is relevant for all kinds of digital images for two reasons.

Methodology and experiment design

What do we gain from reinstating the notion of navigation as a mode, and ultimately a method of inquiry? If we consider the perspective of new materialist informatics inspired by Karen Barad’s writing, we may see that the difficulty of documenting networked software principally involves the ontological inseparability of the artwork, the user, and the milieu. In other words, artists’ browsers cannot be neatly objectified. Their external effects and embodied affects – what they do to the user – cannot be separated from the user and their interaction with the software. As phenomena, (artists’) browsers are complex entanglements of human and non-human agencies. Considering navigation as a method offers us a possibility of making an “agential cut”¹¹, i.e. a way to distinguish between the “subjects” and “objects” of our inquiry through a set of material navigation practices.

If we acknowledge our own and our interlocutors’ interactions with the artwork as a number of agential cuts, we have a better chance of obtaining a less essentialist, that is, less reductive and objectifying account of the artwork in its many facets. We do not try to isolate and disentangle the work from the user and formulate the final, finite, resolved document.

Instead, we arrive at a conjunction of observations, intuitions, feelings, and various documentation approaches. By proposing navigation as a method, we aim not only to compare but to *bring together* multiple embodied perspectives and ways of documenting software.

In the final loop of navigation in our experiment, we asked the contributors to reflect on their own efforts by elaborating on their methodological journey of documentation and drawing things together, thus rendering their specific image of the artistic browser. They elaborate on their methodological journey at the later stage of the experiment. This is the moment when navigation becomes productive as a method for generating insights. It may even enable us to conceptualize novel approaches to documenting software-based artworks and allow for cross-pollination between various fields and disciplines.

A similar approach has already been attempted in the book *10 PRINT*. Here, scholars from code and software studies centered their articles around a single one-line command “10 PRINT CHR\$(205.5+RND(1)); : GOTO 10”. This minimalistic BASIC program proved extremely inspiring as it became a point of departure and was “treated as a distinct cultural artifact, but it also [served] as a grain of sand from which entire worlds become visible; as a Rosetta Stone that yields important access to the phenomenon of creative computing and the way computer programs exist in culture.”¹² The publication seems to promote an experimental approach insofar as all the contributors agreed to accept it as the focus of their attention. However, we could also say, it is a typical multi-authored monograph focused on a unique work and is an established format in the humanities.¹³ Adopting an approach opposite to the ‘distant reading’ or ‘distant viewing’ often used in digital humanities, their book is said to “operat[e] as if under a cen-

trifugal force, spiraling outward from a single line of text to explore seemingly disparate aspects of culture.”¹⁴ Ten contributors “chose a process of communal authorship”¹⁵ and thus decided to speak with a single voice while nonetheless offering multiple points of view. This sparked some criticism: “I think that if the authors of *10 PRINT* had clearly identified their voices, actively shown disagreement, and argued their points, perhaps regarding the entire method, it would have made a more compelling read instead of the route of anonymous verbosity taken.”¹⁶ The criticisms of this book by the programmer Håkan Råberg identified pitfalls that we tried to avoid with our conceptual design.

Our request to the contributors went beyond the analysis of a single browser of our choice and then building up their own interpretative path to or from it. Instead, we aimed to achieve something more binding or authoritative – namely a ‘best practice’. The software we selected was *.co.kr*, one of the *%WRONG Browsers* (2000) by the artist duo JODI (alias Joan Heemskerck and Dirk Paesmans).

Our contributors were asked to navigate the web using *.co.kr* and document their journey in any way that they felt suitable. The approaches and media that the participants used were implicitly and explicitly informed by their backgrounds and experience, thus inscribing the difference in the documented interaction. The embodied performance of such navigation acknowledges the researchers themselves as attuned instruments of inquiry. Our aim is not to test and evaluate different audiences, we are not looking to generate user studies. We simply suspect that a modus operandi of ‘synchronized research’ with a flat hierarchy, comparing the outcomes together and drawing consequences from that for future steps will yield benefits for the research results.¹⁷

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13 For instance on the computer game “Portal”: Thomas Hensel, Britta Neitzel & Rolf Nohr (eds.): “The Cake is a Lie”. *Polyperspektivische Betrachtungen des Computerspiels am Beispiel von Portal*. Münster 2015.

14 Montfort et al., p.4.

15 Montfort et al., p.V.

16 Håkan Råberg: Lost in a Maze of Code. In: *Computational Culture. A Journal of Software Studies*, vol.3, 16.11.2013, <http://computationalculture.net/lost-in-a-maze-of-code/> [accessed 31.10.2021].

There is one scientific experimental setup we would like to present to illustrate our specific approach. One of the largest research endeavours of our times in astronomy adopted parallel synchronization procedures.¹⁸ In 2019, four different research groups who were deliberately not in contact with each other were sent on a mission for “blind imaging”. They were provided with an identical measurement dataset from radio telescopes located around the world and instructed to derive the theoretical appearance of a black hole from this data. Using their own individual algorithmic techniques, software packages and imaging pipelines, they (re)constructed the data. Finally, they compared and fused their outcomes in order to stabilize one joint message.

In our experiment on documenting one browser, we started from a similar stance. The authors were asked to find an individual solution in isolation and given only the task instruction and the URL where the executable could be downloaded (Fig. 1). To ensure comparability (not for augmenting robustness), we decided to define one case study for all in order to learn how the disciplinary backgrounds and methodological preferences play out in the author’s decisions of how to look at this browser, how to document it, how to describe it with which foci and why. Respecting these differences, in our own work, a three-step procedure has proven useful and was also proposed to the potential contributors we approached: a) the actual documentation (including all the screenshots, for instance), b) the polished formulation of the essence of the browser that should be passed on to posterity, and c) after-the-fact self-reflection regarding micro decisions that were taken in order to come to a solution for the challenge posed in b). Most of the divergences were expected in c). Therefore, the first two parts of each contribution needed to be elaborated in order to

17 For this we held a joint authors’ workshop on March 25, 2022.

18 EHT Collaboration: First M87 Event Horizon Telescope Results. IV. Imaging the Central Supermassive Black Hole. In: *The Astrophysical Journal Letters*, vol. 875, no. L4, 2019, pp. 1–52, DOI: 10.3847/2041-8213/ab0e85; Katherine L. Bouman: Portrait of a Black Hole. Here’s how the Event Horizon Telescope Team pieced together a Now-Famous Image. In: *spectrum.ieee.org*, February 2020, pp. 22–29; Paula Muhr: “What We Thought Was Unseeable”. Die mediale Konstruktion der ersten authentischen empirischen Bilder eines Schwarzen Lochs. In: *Zur Authentizität und Inauthentizität von (medialen) Artefakten*, eds. Amrei Bahr & Gerrit Fröhlich. Bielefeld, forthcoming.

form the working basis for the following reflections but are not relevant here. In this issue, we are publishing 'only' the individually preferred approach, the 'best-of-documentation' of the specified browser.

For this endeavour we were able to win the services of a cultural anthropologist and STS scholar (Anne Dippel), a historian of technology (Mirjam Mayer), a game studies scholar (Sonia Fizek), a film director & game designer (GVN908), a trio from business information systems (Barbara Dinter, Sarah Hönigsberg, Henrik Wache), and a cognitive scientist (Maria Hedblom). Extending the experiment by inviting contributors from further domains takes the methodological reflection – that began in our core group – to the next level.

Web browsers impact users, their experience and their Internet

JODI's *.co.kr* browser suggests the user explore a geographically determined subspace of the Internet, namely primarily the (South) Korean websites with the very economically attractive two-letter domain names by autonomously initiating searches with corresponding URLs. The shorter the domain names, the more attractive and expensive they are. This was the case in the mid-1990s and continues to be so today. That means a specific sector of the web – one that turned out to be predestined for financial speculation and thus being strategically laden in terms of economics – is presented on stage as if favourable, while the rest of the Internet has to be typed in by the user themself.

One reason for choosing this browser was the *%WRONG Browser series'* overall importance in the realm of early net art. However, it was also selected because having a lot of theoretic-

cal context knowledge is not a significant help when the user is trying to come to terms with the browser. In other words, even if we in our group knew more about the artist duo's oeuvre, this did not catapult us miles ahead of all the contributors we basically asked to jump in at the deep end without prior preparation.

Limitation of the experiment

When designing the experiment, we did not have access to the source code. Thus, there was no possibility to pursue the static code analysis. Accordingly, in our brief, we asked the participants to download and run the executable binary file. For some of the contributors, this added the task of dealing with compatibility issues. We had to consider how the individual software/hardware setup affects the outcome. In addition to that, we suggested to our contributors that they encounter the artwork in a phenomenological manner, lest they have the knowledge and skills necessary to retrieve information from the binary file itself. The aspect of generativity – that would be at least partially visible in the source code – needed to be derived from the captured user experience. In its turn, the user experience may have required the contributor to interact with the browser at the same time as setting up and keeping an extensive visual and technical record of the software's runtime. The description of generativity that may have been inferred from this record would not necessarily be full. There was a risk that some generative aspects would not have been triggered or recorded.

In order for the browser to work, the authors needed to download and install it. The executables for Mac and Windows are freely available online (Fig. 1). We also asked the

authors to specify the OS they were working on as the hardware and software constellation might cause differences in the performance of the web browser. In 2021, the newest MacOS versions caused difficulties, and contributors working on Linux needed to emulate another OS. While these differences were welcome, we wanted to keep all other starting conditions as equal as possible for everyone. At the same time, we were aware of being biased to varying degrees due to the point in time at which we could dedicate ourselves to this experiment and our pre-knowledge of the artist duo whose browser we had selected.

Contributions at a glance

Art history: Daniela Hönigsberg first determined what was relevant (behaviours) and second what questions would result in a systematic interrogation of the application. These were mostly related to functionality and interactivity. Her documentation setup was designed to capture a holistic picture of online- and offline activities.

Cognitive science: Maria Hedblom searched for ways to determine the software's purpose and meaning. The plan was to break down the components by cutting their affordances to interaction into functions that then could be depicted metaphorically as image schemata. Due to the specifics of the given software piece, she shifted from interacting to identifying interconnections in terms of activity and from semantics to purpose in terms of focus.

Computer science: Martina Richter's method of systematically approaching the task was to first look at the whole, then break it down into smaller units, analyze them independently and assemble them again. She differentiated between a user

perspective and a software specialist perspective, targeting the technical structure of the application by applying compilation methods.

Design research: Konstantin Mitrokhov invested in a sophisticated setup for the multisensorial capture of the reception situation, leaning towards a video-based ethnographic method. Conceptually, he saw the code performance through a variety of lenses which rendered the situation as partial and open-ended per definition.

Anthropology: Anne Dippel used method of writing a stream of experience and mimicked for the purpose of the experiment an entry into a field diary from a participant perspective.

Game design: GVN908 schematically depicted the processes of gathering and processing documentation while encountering compatibility issues. This visual contribution reflected on the “technological gap”, and the frustrations as well as difficulties it posed. In terms of aesthetics or method, the bits and pieces of text mimic the disambiguous quality diagnosed in the browser.

Game studies: Sonia Fizek began with a close reading of the browser performance, then changed to another interpretative ‘cruising altitude’ (distant reading) that was meant to address the meaning of the piece. She did this by analyzing the displayed HTML code (text).

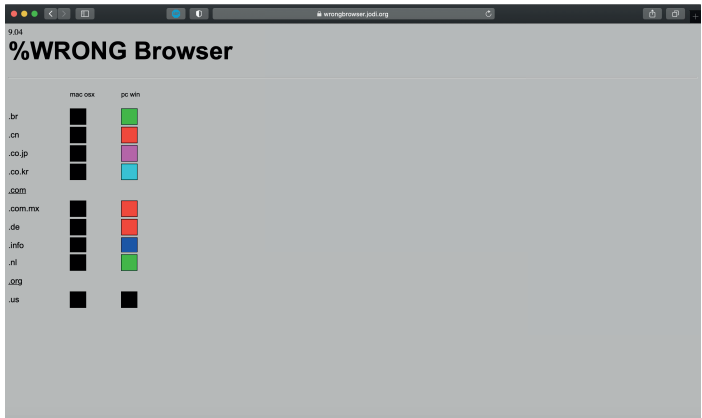
History of technology: When she began her study, Mirjam Mayer was initially convinced that she could clarify the phenomena by taking notes and reordering her written accounts. She combined vastly disparate data such as collected inventory items or text information on browsers. She switched from distanced observation and the idea of getting rid of obscurity, to immersed interaction and the need for orientation.

Image theory: Inge Hinterwaldner focused on how the elements of the browsers were related to each other and what patterns they formed together. She also relied on further analytical software assisting her criminalistic and forensic approach. After recording the interlacing structures and functions in a relatively unsystematic way, she then set up several series of tests to clarify the unknowns step by step more systematically.

Information systems: Hendrik Wache, Sarah Hönigsberg and Barbara Dinter mapped the findings and identified parameters in a structured table (morphological box). That helped break down the browser performance into smaller elements that were simpler to handle. The table revealed gaps and thus ensured a certain degree of completeness. It also led to the research group inventing labels for everything and could be used as a blueprint for a narrative documentation.

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Fig. 1. Executables for versions (Mac and Windows) of 11 browsers of the %WRONG Browser series can be downloaded at <https://wrongbrowser.jodi.org/>.



Users' perspectives (continuation)

Conceptualisation of the assignment and the object of study

As expected, the approaches differed considerably, partly due to the way that each person explicitly or implicitly interpreted the task at hand (document this browser in the best way or develop a framework for documenting all browsers in the best way) and how he or she defined the browser for herself, namely for instance as a digital artefact (Wache et al.), a generic Graphical User Interface (Hönigsberg), a system with meaning and purpose (Hedblom), an epistemic thing and puzzle (Hinterwaldner), an obscurity to be enlightened into a coherent picture (Mayer), a site of multiple diffractions (Mitrokhov), a spectacle and glimpse into the subface (Fizek) or an instance affecting the observer (Dippel).

Methodological adjustments

Most of the contributors reported at least one kind of U-turn in their method, due to a variety of reasons. For Mayer it was the necessity of giving up the distance to the studied source, for Fizek the failing of the hermeneutical approach of close-reading, for Mitrokhov the program running in a buggy way, for Hönigsberg the choice of documentation setup was cumbersome and did not fuse the information as envisioned and the software performance was not compatible with the pre-established structured approach, for Hedblom the own methodology works only with less chaotic systems and for Hinterwalder the choice of documentation led to interpretative mistakes.

While several participants adopted a decidedly analytical approach, some had stronger conceptual filters than others in place: separating syntax from semantics, then breaking down into smaller semantic entities (Hedblom), separating insider and outsider perspectives, then fine-tuning the breaking down and isolating affordances of interaction (Richter); others had a more indeterminate or open way of exploration at first, but then came up with labels for structuring the findings (Wache et al., Hinterwaldner). A third group seemed to go for a more synthesized outcome from the start (Hönigsberg, Dippel). Some chased the ghost of ‘completeness’ (Hönigsberg, Hinterwaldner, Wache et al.), for others this was not an aim; it might even have been incompatible with the underlying theory (Mitrokhov).

Focus

All contributors had an implicit or explicit focus when conceptualizing the documentation.

For Wache et al. it was guiding design principles and suitability for the purpose of browsing, for Dippel what cultural positions and theories could be linked to the browser’s phenomenological dimensions, such as persistence and repetition, for both Dippel and Mitrokhov it was being exposed, for Fizek remaining playful, for Hedblom decomposing the system into an ontological hierarchy in order to end up with small semantic patterns of concepts that could be operationable, for both Hedblome and Richter it was identifying the interconnectivity between components and their purpose or performative patterns for Hinterwaldner, for Hönigsberg showing the application behaviour through targeted user interventions with a GUI (Hönigsberg) and for Mitrokov it was contingency of (dys)functionality.

Many centred a good portion of their attention on the scope of interactivity: some did this in general terms with less performing guidelines (Mayer), some strived for a more specific stance, for instance opening up ludic or creative kinds of intervention (Fizek), viewing it as a situated and embodied experience (Mitrokhov) or performing paratactically more normalized interventions (Hönigsberg, Richter) suitable for repetition or verifiability respectively.

These differences were the immediate findings that grabbed our attention when we received the contributions. To further discuss what we could learn about this methodological experiment, we held an authors' workshop on March 25, 2022. Our aim was to address questions such as: what did we learn about documentation from considering navigation as a method? What did we learn about the artists' browsers? What did we gain methodologically? What would be the obvious next steps? Several considerations arose that we shall address briefly here:

First, we came to the conclusion it would be advantageous to involve scholars from several more disciplines. Their prospective contribution could considerably enrich the breadth of the solutions. Especially professionals specialized in musicology or performance studies, fields used to tackling the challenges raised by ephemeral phenomena, could make seminal contributions.¹⁹ As it is closely aligned to the concept of a musical score, we would like to mention Richard Rinehart's approach for digital and media art forms – including Internet art or software art – as a further promising path worth exploring in its scope. Like comparable approaches (PANIC, Brisbane; CMCM, v2 Rotterdam etc.) his Media Art Notation System (MANS, UC Berkeley) is a descriptive framework based on XML as an expression format and on the Digital Item Dec-

19 Cf. for instance: Gabriella Giannachi & Jonah Westerman (eds.): *Histories of performance documentation. Museum, artistic, and scholarly practices*. London 2018; Michael J.H. Woolley: *Documenting performance art. Documentation in practice*. In: *International Journal of Performance Arts and Digital Media*, vol.10, no.1, 2014, pp.48-66; Pip Laurenson & Vivian E.J.P. van Saaze: *Collecting Performance-based Art. New Challenges and Shifting Perspectives*. In: Outi Remes, Laura McCulloch & Marika Leino (eds.): *Performativity in the Gallery. Staging Interactive Encounters*. Oxford 2013, pp.27-41.

laration Language (DIDL). While Rinehart considers the code also as being a kind of score, he sets out to develop something ‘universal’ and language or platform independent, akin to a musical score. He foresees three levels of implementation all of which are supposed to be machine-processable: from general to very fine-grained descriptions. Rinehart aims to produce notations on media art works on such a “level of detail necessary not just to describe the works but to recreate them.”²⁰ This links his endeavour to the profession of preservationists which it would also be obvious to include: LIMA’s symposium *Transformation Digital Art 2021* resulted in three collaborative workshop summaries discussing strategies for the documentation of media art works as there is still no standard solution for this task. All the case studies led to a recreation of the respective artwork, which informed the documentation and is beyond the scope of this article.²¹ The strategy by Centre Pompidou, for instance, included the extraction of code into a human-readable pdf or even visual maps of the artwork’s interactive parts in a classification that was designed to be understood quickly and visually.

Second, it turned out to be very likely that there were different expectations and views not only on a phenomenological level, but also regarding what to find on the source code level. It may be profitable to run a follow-up experiment of parallelised analyses by different code-literate scholars that focus on this particular part of a browser.

Third, the question arose as to what to do practically with the rich variety of paths taken. The experiment was revealing. Although it is neither practical nor feasible to generate a whole variety of documentations for each individual browser, it is not completely beyond the scope of the project either: on a smaller scale, a hybrid method combining four+ different

20 Richard Rinehart: The Media Art Notation System. Documenting and Preserving Digital/Media Art. In: Leonardo, vol.40, no.2, 2007, pp.181-187, here: p.183.

21 LIMA: Transformation Digital Art 2021. Symposium 24.-26.3.2021, <https://www.li-ma.nl/lima/article/transformation-digital-art-2021> [accessed 28.3.2022].

views (the artist, two scholars, and ‘the audience’) of one artwork, was elaborated by Lizzie Muller and Caitlin Jones in 2007 during their collaboration at Fondation Langlois.²² Their focus on the artist’s intention as well as the audience response allowed them to address the possible tension between expectations and factual experiences.

There are arguments for and against unifying as many facets of the different approaches as possible. With the prospect of providing the documentation results in a database²³, a compromise could be to bring all the approaches to a formalized level and to conceive the many steps as modules in a possibility space of methods. Each person engaged in the documentation could then still work according to their individual preferences and abilities, but by checking boxes for the methodological modules they integrated, each documentation would gain transparency through added meta data.

Fourth, and related to the previous idea, was the question of the degree to which the different approaches taken would actually be formalisable and could be formulated as prescriptive steps everybody could adopt. Astonishingly, Inge Hinterwaldner, who always saw her contribution as being among the most unstructured approaches (her self-perceived meanderings are clearly depicted in Fig.1 on page 98), and the contribution by Henrik Wache, Sarah Hönigsberg and Barbara Dinter as being the most structured (expressed in Table 1 [p.110]), seemed to find common ground in the discussion. The scholars from the area of business information systems found the image theoretician’s way of exploring the browser as being very similar to what they did before then formalising their steps. What first seemed to be the extremes of a range now turned out to be possible consecutive stages of investigation. This led to reflections on what requirements

22 Caitlin Jones, Lizzie Muller & David Rokeby: *The Giver of Names* (1991-). Documentary Collection. Introduction to the Collection. In: La Fondation Daniel Langlois, 2008, <https://www.fondation-langlois.org/html/e/page.php?NumPage=2121> [Accessed 1.4.2022].

23 Cf. Dušan Barok et al.: *Archiving Complex Digital Artworks*. In: *Journal of the Institute of Conservation*, vol.42, no.2, 2019, 94-113.

must be met in order to work towards a set of generalisable instructions. Unlike all other contributions, Hinterwaldner's narration included setting up a series of test arrangements that were prepared for improved visibility of the performative outcome, executed, evaluated, and eventually repeated. Some of the test ideas could be generalisable and transferrable to other applications, for instance the comparison between the HTML-code of a website as seen in the source code viewer of a commercial browser with its appearance in artistic browsers; or the analysis of the sound events. She and Wache et al. share a relatively open approach to gathering information about the browser. Furthermore, these are the only contributions to provide labels for addressing and capsuling the findings.

Since not all contributions were based on such a series of 'system tests', they do seem to have different degrees of affinity to and compatibility with the Wache et al. approach due to their chosen focus. One further crucial aspect regarding how easily findings can be fused into one structure, has to do with how strongly they are rooted in an individual sensation or a specific theory building which needs to remain attached as a pretext.

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Das DFG-Schwerpunktprogramm ‚Das digitale Bild‘ untersucht von einem multiperspektivischen Standpunkt aus die zentrale Rolle, die dem Bild im komplexen Prozess der Digitalisierung des Wissens zukommt. In einem deutschlandweiten Verbund soll dabei eine neue Theorie und Praxis computerbasierter Bildwelten erarbeitet werden.

