

RESEARCH-IN-BRIEF

The sociotechnical walkthrough – a methodological approach for platform studies

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Abstract

The increasing use of platforms and the availability of data are driving the media and communication transformation in society. Platformization, namely “the penetration of infrastructures, economic processes, and governmental frameworks of platforms in different economic sectors and spheres of life” (Poell, Nieborg, & van Dijck, 2019, p. 5), poses enormous challenges for communication research which deals with data flows, data usage, and the media practices intertwined with platform use. Against the background of the change in digital communication brought about by datafication and platformization, we turn to previous research on platforms and studies applying walkthroughs. We discuss the application of the walkthrough approach at the intersection of science and technology studies (STS) and social semiotic technology research (SST), raising methodological questions for the future study of adaptive learning platforms for illustration. We illustrate the sociotechnical walkthrough as a methodological approach, using our analysis of an adaptive learning platform (Area9) and the associated usage practices. Our analysis features the application of different research personae in order to grasp algorithmic personalization. We conclude with a critical reflection on how the sociotechnical walkthrough approach could fit into a toolkit of traditional and digital methods for future interdisciplinary communications research.

Keywords

datafication, platformization, walkthrough approach, science and technology studies, semiotic technology research, focused ethnography, qualitative online research

1 Introduction

Datafication as a transformative process, and the intertwined increasing availability of data are driving the media and communication transformation in society (e.g., Houben & Prietl, 2018). Furthermore, datafication raises an awareness of technology as an actor that is shaping public communication (e.g., Keller & Klinger, 2019), and challenging communication research, for example, by capturing and reconstructing datafication phenomena (Katzenbach, Pentzold, Kannengießner, Adolf, & Taddicken, 2018) or contextualizing large amounts of data (Breiter & Hepp, 2018). However, data are not neutral products of automatic computation, but rather represent the decisions of those who produce computer al-

gorithms (Kitchin & Lauriault, 2014). Such sociotechnical transformations and the accompanying lack of transparency in digital communication and platformization (e.g., Poell, Nieborg, & van Dijck, 2019, p. 5) pose enormous challenges for communication research. This is particularly the case for research that deals with data flows, data usage, and the media practices intertwined with platform usage, especially in terms of which methodological approaches can be used to investigate datafication processes and empirically capture digital technologies in terms of their sociotechnical constitution (Schäfer & Wessler, 2020).

With our contribution we address the ongoing discussion about “digital” methods, which is becoming louder in communication studies in view of the socially-



situated media change (e.g., Strippel et al., 2018). We also address the need for research approaches that enable us to make the affordances and ambivalences of platforms accessible for research by drawing on the “walkthrough” approach (Light, Burgess, & Duguay, 2018). Our aim is not to simply add another empirical study that utilizes this approach (e.g., Decuyper, 2019; Kaye, Chen, & Zeng, 2021; MacLean & Hatcher, 2019) but rather to elaborate two arguments: First, we add a not yet in-depth discussed theoretical perspective that addresses algorithmic personalization of platforms at the intersection of science and technology studies (STS) and social-semiotics applying the concept of a research persona. Second, we utilize walkthrough examples from an adaptive educational platform¹ that provide an understanding of the method’s actual application, highlighting its algorithmic personalization. Using these theoretical and empirical specifications, we are able to discuss the potentials and limitations of the approach for future communication studies.

2 Communication research, science and technology studies and the development of the walkthrough approach

Pablo J. Boczkowski and Leah A. Lievrouw’s (2008) discussion of the theoretical and methodological bridges between STS and communication studies were part of the catalyst for STS finding resonance in the latter discipline. Practice-theoretical perspectives from communication studies have, for example, been combined with STS approaches in order to highlight critical perspectives on datafication and to explore adaptability for communication studies (e.g., Gentzel, 2017), or to exploit

the potential of STS for media analysis (e.g., Gauthier & Sawchuk, 2017).

The walkthrough approach originates from, and was first applied in, software development, especially in usability studies, for example by Peter G. Polson, Clayton Lewis, John Rieman, and Cathleen Wharton (1992), who developed the “Cognitive Walkthrough,” and by Lars-Ola Bligard and Anna-Lisa Osvalder (2007). These approaches were applied to predict and identify usage errors and usability problems (Mahatody, Sagar, & Kolski, 2010) and aim to improve software. These are task-specific approaches to improve usability – not necessarily algorithmic personalization – in contrast to more holistic usability inspections. The approach was further developed in STS by Ben Light, Jean Burgess, and Stefanie Duguay (2018), whose cultural studies-oriented approach combined critical technology studies with cultural studies and involved “a way of engaging directly with an app’s interface to examine its technological mechanisms and embedded cultural references to understand how it guides users and shapes their experiences” (Light et al., 2018, p. 882). The walkthrough used the researcher’s perspective to analyze the affordances of sociotechnical systems. Inspired by the cultural studies-oriented changes to the initial cognitive walkthrough approach, further research followed that made thought-provoking suggestions to combine it with other concepts and methodologies, such as media logics (Duguay, 2018), discourse analysis (Kaye et al., 2021), and grounded theory (Zulli & Zulli, 2020).

Regarding the focus of previous research applying the approach, we highlight two particular research gaps: 1) Algorithmic personalization has barely appeared on the research radar, despite datafication and algorithmization gaining socio-political importance (e.g., Jarke & Macgilchrist, 2021). We therefore shift the theoretical focus to “*media affordances*” (Pentzold, Fraas, & Meier, 2013) in the following chapter, which is a concept from the social-semiotic research perspective. 2) Previous research has not prioritized an explication of the approach’s implementa-

1 “[Learning platforms are] efficient management systems that provide materials appropriate to a students’ proficiency level. [...] Based on initial testing, the platform develops tailored reporting of student progress and behaviours to students, teachers, and parents” (Bulger, 2016, pp. 6–8).

tion (Light et al., 2018). With our contribution we provide examples of walkthrough protocols, field notebooks and additional material to reconstruct a step-by-step guide for further application.

3 The walkthrough approach at the intersection of science and technology studies and social semiotic technology research

Turning to social semiotic technology research (SST) (Kress & van Leeuwen, 2001) helps to discuss how technologies are shaped by social interests and ideologies, as does the concept of “affordances,” which was discussed by James J. Gibson (1977) and re-examined by Nicole Zillien (2008) as a bridging and relational concept between social and technical determinisms. The affordance concept is often used to make the structural contexts of social-semiotic environments tangible and to identify those artefacts that guide media use. It is used to describe the structural quality of sociotechnical environments that “afford” certain possibilities for (inter)action and disallow others (Schäfer & Wessler, 2020).

Recent work (e.g., Geboers, Stolero, Scuttari, Vliet, & Ridley, 2020; Pentzold, 2016) that contrasts with Gibson’s original concept applies a differentiated understanding of the concept. It takes media seriously in its dual role as a material object and mediator of coded messages, and extends the previous understanding of technical-material affordances to media affordances (Pentzold et al., 2013). In this sense, the functional, propositional character of an object is understood as “a relationship that is socially and culturally constructed between the users and the artefact in the lived world” (Vyas, Chisalita, & van der Veer, 2006, p. 93). Applying the affordance concept to platforms, we assume that adaptive platforms have agency, because they not only map reality but reconfigure practices, relationships and priorities (e.g., Jarke & Macgilchrist, 2021). For example, they convey certain messages, orchestrate and provide feedback to the user based on algorithmic personalization and

machine learning. Adaptivity as a term is used by learning software developers and understood as the adaptive capacity with which input (learning) data is analyzed in real-time to bring learners to a required learning goal as efficiently as possible (Bulger, 2016; Groff, 2017). Algorithmic personalization is to be understood synonymously in this concrete sense, but is conceived in a broader sense, as it not only characterizes the automated adaptation of content and presentation modes to the needs of the users by an algorithm, but also depends on further metrics, such as engagement, geo-information or browsing history (Pariser, 2011). In the following, drawing on Eli Pariser (2011) and Tanya Kant (2020), we understand algorithmic personalization as filtering, reordering, and producing information for an individual user based on his / her interaction with a sociotechnical system and the system’s underlying training data.

Through interaction, platforms also appeal to and affect self-images of users. Platforms as sociotechnical actors invite users to think in a certain way or to perceive themselves and the world in particular ways. Consequently, platforms encode visions of sociality (Decuyper, 2019). Two characteristics of adaptive platforms (e.g., Decuyper, Grimaldi, & Landri, 2021) will be of particular interest for the following methodological considerations and will be reformulated by us into empirical questions: (1) Platforms basically “offer” an incalculable number of affordances, which can result from the interaction between the individual user and the platform. The learners are – consciously and unconsciously – co-creators of their learning environment, so for us as researchers the question arises: *How can we empirically research the affordances of a socio-technical system, if they always express themselves slightly different depending on the user-platform interaction?* (2) In terms of algorithmic personalization, the type of feedback given by the platform also depends on which user is active. Drawing on this aspect, we ask: *How can we empirically capture algorithmic personalization if it*

only emerges through the practical use of different individuals?

4 Our methodological approach

Drawing on Michael Dieter et al. (2019) and Light et al. (2018), we apply the sociotechnical walkthrough approach particularly in its understanding within STS utilizing an example from our own research. In doing so, we assume that norms and sociality are inscribed in software through data, and realized through the use of the technology. By complementing the STS perspective with the SST approach, we are able to examine the medial affordances. Thus, it becomes possible to illuminate some aspects of “algorithmic personalization.”

Considering that algorithms are mathematical formulas on the basis of which the relevance of information is calculated (Mahnke, 2015), personalized learning depends on user-machine-interaction which is affected by the user’s perspective. Some aspects of algorithmic personalization of the platform can be better empirically grasped if the same user walks through a platform several times. By recording the situationally experienced moments and reflexive assessments from the perspective of the respective person in think-aloud transcripts, the different feedback from the software, some of which is only experienced in a nuanced way, can be analyzed. Personalized learning paths and feedback emerge and are displayed individually according to user interaction with the platform. In the following, we explain 1) the benefits of applying a *research persona* (Dieter et al., 2019) – which assumes the role of the user running through the platform multiple times without prioritizing individual usage – to empirically grasp aspects of algorithmic personalization. We also describe 2) our survey data, and 3) give examples of the two phases of our “sociotechnical walkthrough.”

1) A strategy of adopting the perspective of a *research persona* is described in ethnography as “othering” or “estrangement” from one’s own culture (Hirschauer & Ammann, 1997).

The *research persona* is used as a tool that runs through abstract user scenarios based on theoretically derived questions. As such, the *research persona* is required to adapt its user behavior, thus encountering variations in feedback and experiencing different learning paths. Through the ethnographically-informed approach and the perspective of the *research persona*, we put ourselves in the position of a marginal observer in order to get in touch with the platform (Hirschauer & Ammann, 1997). The advantage of the alienated *research persona* is the ability to explicate local knowledge that would not be linguistically accessible to participants in a study because it derives from the mode of the self-evident and the “embodied routine” (Hirschauer & Ammann, 1997).

- 2) The primary data capture took place with the walkthrough observation book, in which observation notes were recorded (observation log) alongside documents, screenshots and videos captured during the walkthrough. The walkthrough and the interaction with the platform additionally provided transcripts that were recorded using a think-aloud-method, the aim of which is to record the processes, inner thoughts, and interpretations of the *research persona* (Dieter et al., 2019). As many thoughts, feelings, opinions, and expectations as possible, which resulted from the use of the software, were documented. The data captured in the field notebook and the think-aloud transcripts provided the basis for subsequent reflexive interpretation and analysis. The data capture was conducted with the awareness of being involved as an actor, agent, or mediator. An “objective” report containing incontestable facts is neither possible, nor the aim of this approach.
- 3) We present a sociotechnical walkthrough as an adaption of the formerly-applied cognitive and technical “walkthroughs,” using the learning platform Area9 as an example. Area9 originally developed adaptive learning platforms for business enterprises. Its recently

developed platform *Rhapsode Learner* is used in schools in Denmark and Germany, advanced in the level of algorithmic personalization compared to other learning platforms, and therefore an ideal research object for our approach. Our walkthrough is split into two phases. Phase one addresses the environment of the platform to get contextual information about cultural or social-semiotic aspects. Step two is a technical “walking through the platform” in order to become familiar with it. Both steps are a combination of descriptive data collection and analytical interpretative data analysis.

5 Familiarizing with our learning platform example – data capture and analysis

Step one – the analysis of the platform environment: As a first step to engage with the system and to understand how the user is (implicitly) addressed, we need to obtain information about the socio-economic and cultural aspects of the platform, such as its mission statement (vision) or intended use or aspects of governance. We retrieve information about the vision of the platform, for example, through analysis and interpretation of the product website, from user manuals, or promotional materials. Governance aspects are, for instance, inscribed in the FAQs, the terms of use, or the privacy and copyright licenses. In our example, the Area9 website addresses the learner: “Personalized learning activities that adapt to help you reach content mastery” or “monitor your status towards learning” (Area 9, 2022a) but also explains to educators the “benefits of adaptive learning” in comparison to “traditional training,” such as “Cuts training time in half; Creates higher proficiency; No one left behind; Eliminates boredom and frustration; Improves business outcomes etc.” (Area 9, 2022b). This twofold user appeal implicates a developer’s understanding of the learning processes from an economic / market-oriented logic, by measuring effi-

cient learning outcomes while at the same time cost reduction being key.

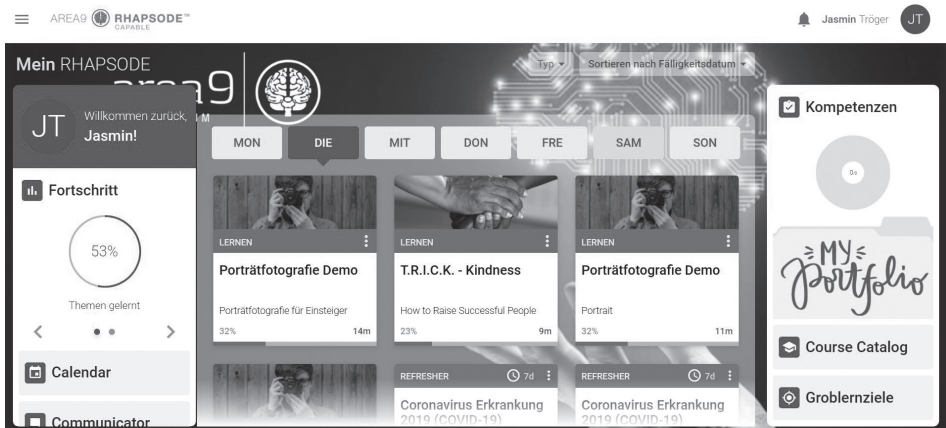
Step two – walking through the platform: In the second step we familiarize ourselves with the platform by descriptively focusing on different platform characteristics: the user interface components, functions and features, such as buttons, menus, navigation, connection with other accounts, or pop-ups. We collect data in two ways: by entering basic information such as location, time, and *research persona* into a walkthrough observation log and by filling in further information on observations, issues, or theoretical reflections. Screenshots document every step of the walkthrough. We also record thoughts or irritations in an audio file, which is later transcribed, resulting in think-aloud transcripts.

To illustrate these steps, we examine the *Rhapsode Learner* example: After logging in on the platform, the learner dashboard (Fig. 1) appears and the observation log is filled by us with a description on what we see in the user interface.

The learner dashboard includes three areas: the left-hand area provides an overview of one’s own profile, shows the performance index (53 %), and contains a calendar and a communicator. [...]. The performance index is highlighted and in a prominent position; it is bigger than other information. View direction from left to right: implies that this key figure is central and should be perceived first and foremost. Learners should orientate themselves on this key figure. Indicators show what is measurable and can be operated, and what the learner is interested in improving (Observation log 2, walkthrough area9, lines 2–7).

The description addresses the visual and textual elements that the *research persona* notices when entering the platform. This descriptive moment is interwoven with an analytical moment. Entangling the descriptive and analytical moments is our attempt to apply the above discussed social semiotic approach to grasp the links between cultural associations and usage scenarios.

Figure 1: Area9 Rhapsode Learner, example learner dashboard



Today I need to complete three modules and repeat two modules. On the left I can see that I have learnt 53% of the topics, yesterday the percentage was higher. I feel that the system is encouraging me to improve this score. The overview of skills on the right is not yet visible, when I have finished these modules then I will be able to develop more skills there. I quickly decide to complete a module that will bring my progress to 100%. (Think-aloud transcript 1, 00:00:8–4)

Our research data (the think-aloud transcripts and screenshots) imply that the way the platform affordances prompt users to increase their learning performance, be it via buttons, diagrams, or textual elements (such as the percentage of learning progress visualized in a learning performance indicator), appeals implicitly to the learner. The think-aloud transcript states: “On the left I can see that I have learned 53% of the topics, yesterday the percentage was higher.” We can say that the learning platform contains the *affordance of competition*, which encourages learners, in the logic of ranking and comparison, to make their learning success dependent on numerical interpretative representations of knowledge acquisition and performance. One could assume that it is not about learning or actual learning success, but about increasing one’s own metric of learning success.

The repeated log-in, whose progress and specifics are noted in the observation log and the think-aloud transcript, allows the learner to access the changes in progress on the platform. This notification of progress only appears because of the specific interaction of the *research persona* with the platform, and thus adapts its “outcome” to the assumed user. The depicted percentages adjust downward over time as modules need to be “refreshed” by a user after a while. In this way, algorithmic personalization in respect to one’s own learning performance metric on the platform becomes apparent when the dashboard is viewed over time.

6 Concluding thoughts

The walkthrough method, which originated in software development where it was applied to identify programming errors to improve software, has been criticized for its focus on technological artifacts – leaving the user’s perspectives and (opposing) practices unaddressed (e.g., MacLean & Hatcher, 2019). While the methodology has been further developed into a cultural studies-oriented approach that affords direct engagement with app interfaces to analyze how the technology shapes user experiences (Light et al., 2018, p. 882), it continued to be critiqued. Even Duguay (2018,

p. 4) attested limitations to the truncated, cultural-studies-informed walkthrough, calling it “a snapshot of the platform,” unable to “trace how platforms shape user activity over time.” What studies thus far paid little attention to is to explicate how algorithmic personalization of platforms could be grasped with the application of a research persona in a walkthrough approach. A gap that our contribution strives to fill. Therefore, our sociotechnical walkthrough enables three things: Firstly, it can be used to analyze how digital technologies are made accessible in terms of their sociotechnical constitution. Secondly, it identifies affordances of the platform. And finally, it provides empirical examples of how the architecture and the socio-material-technical constitution of the platform frames algorithmic personalization.

Moreover, unlike exclusively text-analytical or data-synthesizing procedures, the walkthrough invites the viewer to perceive not only textual elements but also audio-visual content, the materiality of the platform, and to connect situated perceptions by thinking aloud. Research focused on capturing such interrelations and making them analyzable benefits from this approach just as much as studies that are focused on the “meaning-making potentials built into the technology” (van Leeuwen, 2005, p. 5). Through the close, decelerated engagement with the platform with simultaneous systematic recording, our application of the walkthrough approach is similar to that of digital ethnographies (e.g., Knox & Nafus, 2018).

Even with our theoretical (STS & SST, affordances), thematic (algorithmic personalization), and methodological (research persona) expansion there are various limitations to this approach that continue to be challenging for future research. The walkthrough may be a time-consuming procedure, that can bring forward thick descriptions, but does not allow for generalization, e.g., on platform personalization. Even if the walkthrough enables to reconstruct affordances of socio-technical systems, it does not permit cognitive-psychological conclusions about actual user behavior. Also, the consistent

implementation of the research persona in the double requirement of alienation and reflection is challenging and requires the permanent oscillation between an outside and an inside view.

We perceive the approach as a methodological enrichment, which, however, must be accompanied by other digital methods in the concrete empirical setting in order to fully meet its claim of dense description and empirical depth. Our walkthrough example focused on an adaptive learning platform. However, the steps we took can, in principle, also be applied to other platforms. The questions regarding how to analyze platform affordances by focusing on algorithmic personalization also highlight key issues for future research on platform usage. The data obtained through the walkthrough can be an exciting interpretive basis for both a systematic, structured (text) analysis, and for ethnographically-inspired research that is interested in the situatedness of data. The walkthrough, as a methodological “border crosser,” combines qualitative and quantitative moments and is thus particularly attractive for those research contexts in which interdisciplinary work is to be bridged.

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Conflict of interests

The authors declare no conflict of interests.

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