Introducing the Method of Exhibit-Based Research

Kathryn Eccles*
Oxford Internet Institute, University of Oxford
kathryn.eccles@oii.ox.ac.uk

Laura Herman*
Oxford Internet Institute, University of Oxford
laura.herman@oii.ox.ac.uk

Caterina Moruzzi*
Design Informatics, School of Design,
University of Edinburgh
cmoruzzi@ed.ac.uk

Maggie Mustaklem*
Oxford Internet Institute, University of Oxford
maggie.mustaklem@oii.ox.ac.uk

*Authors are listed in alphabetical order and share equal authorship.

SIGDOC
Special Interest Group for Design of Communication

acm
Association for
Computing Machinery

Advancing Computing as a Science & Profession

Introducing the Method of Exhibit-Based Research

Kathryn Eccles*
Oxford Internet Institute, University of Oxford
kathryn.eccles@oii.ox.ac.uk

Laura Herman*
Oxford Internet Institute, University of Oxford
laura.herman@oii.ox.ac.uk

Caterina Moruzzi*
School of Design, University of Edinburgh
cmoruzzi@ed.ac.uk

Maggie Mustaklem*
Oxford Internet Institute, University of Oxford
maggie.mustaklem@oii.ox.ac.uk

*Authors are listed in alphabetical order and share equal authorship.

ABSTRACT

This paper introduces a method, Exhibit Based Research (EBR), in which we deploy standalone gallery exhibits as a central component of our research program. We adopt this method to distill complex visual research problems and problematize technological affordances. In the two case studies outlined in this paper, we deploy this method to articulate the role played by algorithms in processes of inspiration, design, and curation. EBR includes a practice-based component, the co-design of an exhibit, a participant engagement component, and interactive, multimodal data collection. The EBR approach creates a dynamic engagement between the public, academia, and creatives, increasing the relevancy of findings across audiences and advancing public understandings. This methodological paper aims to encourage other researchers in the community to consider EBR as an inclusive, immediate, and effective means of revealing opaque concepts and mechanisms via exhibition design.

CCS Concepts

Human-centered computing, Software and its engineering

Keywords

Elicitation methods, Exhibits, Practice-based research, Participant recruitment, Visual elicitation

INTRODUCTION

The technological systems used in creative production are often poorly understood by researchers, creatives, and the public. In two recent projects, we developed a practice-based research approach to articulate the roles played by algorithms in processes of inspiration, design, and curation. In most practice-based research approaches, researchers use technology to create or generate artifacts, and their findings describe their personal experience of creating those artifacts (e.g. Berio et al., 2016; Soon, 2018). Such practice-based approaches do not incorporate a) processes other than creating, such as curating or inspiration-gathering, which are key sites of technological implications and b) participant involvement beyond the standard experience of a research team. In this paper, we present a new methodological approach that we used to engage a broad community in the consideration of technological implications across the creative process: Exhibit-Based Research (EBR).

The exhibit is central to EBR, as a site of co-design where key research questions are shaped and animated, and an experimental space in which those research questions are performed and data collected. EBR includes three core components: (i) *research co-design*, a practice-based component where researchers co-design and co-curate a gallery-based exhibit, (ii) *participant engagement*, where researchers invite public participants into the exhibit for an embodied elicitation experience, and (iii) *data collection*, where multimodal, interactive data is collected from participants. EBR leverages embodied exhibits to surface the role of technological affordances, value-laden design elements that both intake and influence users' input into a technological system (Norman, 2004).

By physically displaying interactive visuals that explain and enact complex concepts, and by using them as an elicitation mechanism with participants, the proposed EBR approach provides a situated, dimensional environment to deepen participants' understanding of what are often opaque technological systems. This allows us to facilitate a deep and clear understanding of the research problem for participants, in order to enable them to productively confront research questions in collaboration with researchers. It heeds Glăveanu and Beghetto's call for a more embodied, contextual

approach to considering creativity (Glăveanu & Beghetto, 2021). In our method section, we describe in more detail how the practice-based component of EBR answers this call.

EBR draws upon a synthesis of visual elicitation, data visualization, and co-design methods. In effect, this approach uses images instead of language as a first step toward communicating research questions and contextualizing them for participants. In so doing, EBR is inspired by visual elicitation, an established qualitative research method in which researchers use photos to deepen qualitative interviews, especially across cultural contexts and with marginalized populations (Rose, 2016). This method's use has grown in recent years to study tacit knowledge and non-traditional knowledge (Tötzer et al., 2011). Technology, which is often opaque to those who engage with it, is particularly well suited to using elicitation methods, as evidenced by Eslami et al.'s work (2016) on understanding newsfeed content.

Building upon visual elicitation methods, EBR then draws from data visualization's focus on narrative storytelling (Segel & Heer, 2010). Data visualization boosts learning and engagement for users but is often overlooked as a legitimate output within research (Hohman et al., 2020). However, as a device for conveying complex concepts, data visualization can be incredibly clear—and easy for experts and non-experts alike to interpret. The combination of visual elicitation and data visualization methods is an effective epistemological device for knowledge transmission (Engebretsen & Kennedy, 2020). In EBR, we expand upon this method by using interactive exhibits to elicit contextualized participant conceptions of technological affordances.

The EBR method described here offers a fresh approach that serves the communication and design community's mission of promoting research on interdisciplinary practices of communication design. This methodology fosters an inclusive, immediate, and effective means of simultaneously gathering and communicating research results, empowering researchers to elicit and convey findings in innovative ways that resonate with a wide range of audiences. EBR's methods and presentation formats allow researchers to co-create projects. This enables findings that are both affirming and empowering (Pain, 2012). In the two case studies outlined in section 2, researchers were able to use visual art as a device to understand contemporary societal issues. At the same time, EBR requires being mindful of the limitations of researchers' positionality (Rose, 1997). Thematic choices made in co-designing the exhibitions and activities shaped subsequent conversations between researchers, artists, designers, and the audience. Ultimately, the EBR approach resonates with the community's goals of producing a dynamic engagement between the public, academia, and creatives, increasing the relevancy of findings across audiences and developing public understandings.

CASE STUDIES
In the section below, we outline the two exhibits we staged as we developed EBR as a methodological approach.

Design, Interrupted
Inspiration is instrumental to what is sketched, prototyped and ultimately produced. This means the images accessed for inspiration are ultimately widely influential in shaping visual culture. Despite its influence on subsequent steps of the design process, the use of algorithmic images in searching for inspiration on platforms like Pinterest and Instagram is poorly understood. *Design, Interrupted*

focused on understanding algorithms' role in inspiration search for design ideation through an interactive gallery exhibit. The exhibit took place over ten days at Kiosk N1C in Kings Cross, London in June 2022.

The exhibit's pedagogical aim was to teach visitors about the differences between analog and algorithmic search before having participants engage in making interactive research artifacts and providing semi-structured interviews.

The design and implementation of the exhibit involved *research co-design* with a team including author Maggie Mustaklem, exhibition designers Parasite 2.0, curator Vickie Hayward, graphic designer Elena Jarmosh, and fine artist and motion graphics designer Eve Allen. Building upon pilot interviews, researchers Mustaklem and Allen developed six themes used in both the film and the exhibit displays to distill top level concepts around analog and algorithmic search methods. Mustaklem and Jarmosh developed corresponding visuals to support these themes. They served to organize the exhibits' visual design. Colors and fonts further delineated the exhibit's content between the analog and algorithmic displays. The interactive exhibit included displays, a short film, and space for creating the interactive task. In developing example content for the displays, Mustaklem completed an autoethnographic exercise using the designated prompt to generate an analog mood board. Through this practice-based method co-designing the exhibit, our collective understanding as researchers, artists and curators developed, advancing the relationship within our team between teaching and understanding.

The timing and location coincided with a large digital design conference, CogX, such that the gallery space would have additional relevant foot traffic. After viewing the exhibit, *participant engagement* included inviting participants to make research artifacts (mood boards) and then provide semi-structured interviews reflecting on their experience of making and the topic problematized through the exhibit. Professional designers were also invited to workshops where they participated in an extended, collaborative version of the same task. Engagement was gamified, with participants invited to choose between analog and algorithmic approaches, and then select between two keywords to structure their inspiration search.

Data collection from the exhibit included visual analysis of the research artifacts, digital and analog mood boards, in conjunction with coding the interviews and workshops. The practice-based exercise of inviting participants to make mood boards before reflecting on algorithmic image search procured richer findings. Through making, especially within the context of visually driven explanations, participants identified a range of dimensions to image search that would not have surfaced otherwise.

Figure 1: An image of the *Design, Interrupted* exhibit in a gallery space in London. Here, the analogue display board and the table where participants completed their interactive task are displayed. Image and exhibit design credit: Parasite 2.0.

The Algorithmic Pedestal

Algorithmic recommendation systems are increasingly taking on curatorial roles, determining which visual content is being rendered visible to whom and when, and we were keen to probe the "black boxes" underlying these decisions. For better or for worse, these algorithmic systems are gaining outsize power in the art world, and many young artists experience pressure to attract an algorithmically-mediated "following" before they are deemed eligible for gallery representation. This project involved embedding within Instagram's algorithmic system to reflect on how this site of cultural gatekeeping makes curatorial decisions—and how those decisions influence our society's visual ecology.

In order to do this, authors Laura Herman and Caterina Moruzzi produced an exhibit that would contain multiple curatorial realities. We conducted *research co-design* by inviting both Instagram's algorithm and a London-based artist to curate a selection of images for public display. Our material was the Metropolitan Museum of Art's Open Access collection; we gave each "curator" access to the same randomized subset of ~1,000 images from the collection. In the case of Instagram, each image was uploaded to a new Instagram account (@thealgorithmicpedestal), and the "Home" feed revealed which of the ~1,000 images were selected for display—in which order and layout. Similarly, artist Fabienne Hess selected certain images to display in a particular order and layout.

Authors Laura Herman and Caterina Moruzzi were intimately involved in each stage of the *research co-design* process—observing and supporting both Instagram's and Fabienne Hess' curatorial practices. Valuable results emerged from two primary aspects of this Exhibit-Based Research: first, the differences and similarities between the curatorial *processes* that the machine and the human engaged in. For instance, Instagram engaged in seemingly simultaneous perception and instantaneous selection, while Fabienne Hess spent months engaging with the collection, gradually making selections and then changing her mind. Both curators, however, did not disclose or abide by publicly-available metrics to make their decisions, rendering each process non-replicable and unexplainable, albeit for different reasons. Second, we were able to analyze the similarities and differences between the

curatorial outputs themselves. For instance, Instagram's curation prioritized instantly recognizable objects, in comparison to Hess' tendency to select images with inscrutable subjects. This, of course, can be explained by computer vision approaches to object detection. As another example, Instagram appears to prioritize images that follow widely-accepted design principles—symmetry, the rule of thirds, color balance, etc. Hess, on the other hand, was clearly attuned to the materiality of each image, thinking beyond screen-based displays.

Furthermore, the selected images were displayed at an exhibit at J/M Gallery in London in January. Called *The Algorithmic Pedestal*, the exhibit evoked Marcel Duchamp decreeing a urinal as art by simply putting it on display. Each set of images was arranged on silk fabric hanging from a curved metal rail dividing the exhibit space; on one side of the fabric, the algorithmically-curated images were displayed in Instagram's grid-like format. On the other side of the fabric, Hess laid out her selected set of images, which overlapped and varied in size. Both sides were clearly labeled, such that the audience was invited to reflect on the differences between algorithmic and human curation. Due to the timely nature of conversations surrounding art & artificial intelligence, the exhibit received widespread press coverage, including by arts (ArtNet, Wallpaper*, Apollo) and general media (BBC, Forbes, New Scientist) publications. This yielded an influx of visitors and subsequent *participant engagement*, as visitors participated in questionnaires, workshops, surveys, and semi-structured interviews in the exhibit space as part of our Exhibit-Based Research. This qualitative and quantitative *data collection* affords an in-depth and rigorous reflection on the different dimensions that curation assumes when carried out by both humans and algorithms.

Figure 2: An image of *The Algorithmic Pedestal* exhibit in a gallery space in London. Here, the algorithmic curation is displayed on one side of the silk fabric. Image and exhibit design credit: Parasite 2.0.

METHOD

In the section below we outline the EBR methodological approach in more detail. We break EBR into its three key sections: research co-design, participant engagement and data collection (see Figure 3).
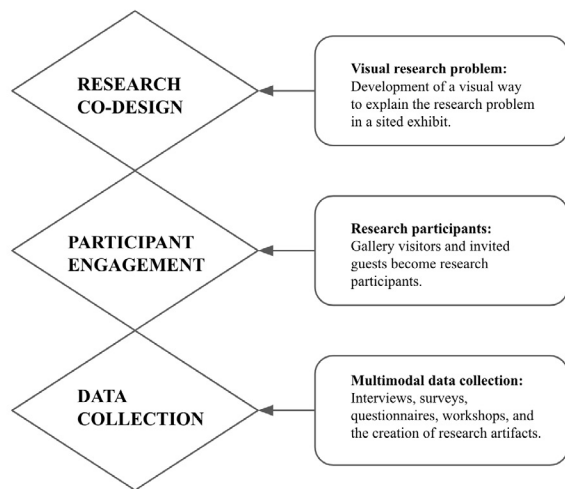
Figure 3: Flow Chart illustrating the implementation of the EBR's method

Research Co-Design

The first stage of EBR is the research co-design (see Figure 3). In this case, it is a practice-based co-design approach that involves the researcher(s) and a network of curators, exhibition designers and others to develop the exhibit's content and exhibition design. A close collaboration with curators and/or exhibit designers helped researchers to achieve a more practical understanding of the research topic, bridging gaps between theory and practice.

The design of the exhibits themselves thus became an opportunity for an enriching research experience. Indeed, using technology central to the exhibits' topics allowed researchers to better understand its limitations and challenges. For instance, leveraging an algorithmic newsfeed as an exhibit "curator" contextualized the curatorial process occurring for artworks in online contexts.

De Rojas and Camarero (2006) also stressed the importance of the affective experience of exhibitions and the impact this has on positive responses to stimuli. In order to garner compelling responses and information from research participants, careful consideration of the presentation of data in the exhibit is crucial. EBR is therefore grounded within a body of literature that promotes the embodied, affective potential of the exhibition. At the same time, EBR contributes to and extends this literature by proffering the exhibit as a method of physical elicitation—one which is key to the understanding of complex questions that extend from software platforms to real world cultural engagement. The physical exhibit that results from this practice-based research can be subsequently used to engage the public in various research activities, which are described in the next section.

Participant Engagement

The second stage of EBR develops when the exhibit is staged. Once the exhibit is live, visitors, with their consent, can participate in the research protocol. Exhibits are desirable sites of cultural engagement, yielding a natural inflow of visitors.

While exhibit-goers are typically geographically and socioeconomically bound, they do tie research to the local community beyond academic walls. Perhaps most importantly,

visitors are choosing to participate in this cultural experience. In this way, the research becomes a mutually beneficial experience in which the participants are given the time, space, and tools to reflect and engage culturally, while researchers yield ready participants for their studies. As a site of participant recruitment, idea sharing, and public engagement, EBR enables the transmission of insights between researchers, artists, designers, and the audience.

Staging an exhibit allows us to draw on ideas of embodied learning from museum studies, such as Falk and Dierking's Contextual Model of Learning (Falk & Dierking, 2004), which stresses that all learning is contextual, cannot be isolated in the laboratory, and involves the personal, the physical, the sociocultural and the flow of time (Falk & Dierking, 2004). Through this form of data gathering, EBR operationalizes a "contact zone" in which ideas and materiality are brought together to promote a deeper understanding of the questions under study (Geismar, 2018).

Data Collection

The third stage of EBR involves data collection from research participants. The images, text, and videos that are displayed became multimodal prompts for visitor reflections that were collected through interviews, surveys, questionnaires, workshops, and the creation of research artifacts. These various data streams were collected on site, with researchers and facilitators interacting directly with their audiences, creating an ongoing, iterative form of engagement.

With EBR, the exhibit becomes a participant-facing embodied elicitation mechanism. In our case studies, the research artifacts that emerged through participants' responses illuminated knowledge about practice derived directly from reflection in practice (Candy, 2021). Using the exhibit as a place to stage research-through-making yields rich, dynamic data about participant reactions in real-time. The incorporation of interactive, multimodal data collection within EBR reflects the community's interest in mixed, qualitative, and quantitative studies of communication design and usage.

CONCLUSION

In sum, we propose a new methodology, Exhibit-Based Research, that enables researchers to use exhibition design as a mechanism to examine how the public responds to technological affordances in sociocultural contexts. We have vivified this approach through two recent practice-based research projects into AI in the context of design.

Some of the types of findings that we uncovered through the EBR method included more productive interviews, as participants were responding not only to researcher's questions but their own experience of seeing the exhibits and making their own research artifacts. Furthermore, on-site activities allowed for an immersive environment where participants were not just responding to workshop prompts but also to the collective environment. For example, in *The Algorithmic Pedestal*, holding interviews in the exhibition space allowed participants to physically engage with artifacts that demonstrated the algorithmic curation effect, thereby begging the research questions. The hanging silks showed images selected by Instagram, which could be directly compared—on the other side of the installation—with images selected by a human artist. This physical interaction with the environment afforded reflections on the socio-technical impact of human and algorithmic curation which could hardly be replicated outside of the exhibition space.

This methodology provides multisensory insights into human relationships with technology. EBR advances a unique and inclusive approach to communicating research results, offering an alternative to traditional forms of research communication, which can be exclusive, slow, and less effective in engaging diverse audiences. Indeed, by providing immediate and embodied experiences, EBR allows researchers to effectively engage with a wide range of audiences beyond the academic community. While initially developed within the context of art and design, EBR offers an innovative approach to communication design and theory-to-practice connection that can be applied by researchers in the community across various disciplines. It can empower them to transcend the boundaries of traditional modes of dissemination and, in so doing, expand their reach and render their findings accessible to a broader audience.

REFERENCES

Berio, D., Calinon, S., & Leymarie, F. F. (2016). Learning dynamic graffiti strokes with a compliant robot. In *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 3981–3986. IEEE. https://doi.org/10.1109/IROS.2016.7759586.

Candy, L. (2021). Reflective practice variants and the creative practitioner. In C. Vear (Ed.), *The Routledge international handbook of practice-based research* (pp. 415–425). Routledge.

Engebretsen, M., & Kennedy, H. (2020). *Data visualization in society.* Amsterdam University Press.

Eslami, M., Karahalios, K., Sandvig, C., Vaccaro, K., Rickman, A., Hamilton, K., & Kirlik, A. (2016). First I "like" it, then I hide it: Folk theories of social feeds. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16)*, *Association for Computing Machinery, New York, NY, USA,* 2371–2382. https://doi.org/10.1145/2858036.2858494.

Falk, J. H., & Dierking, L. D. (2004). The contextual model of learning. Reinventing the museum: Historical and contemporary perspectives on the paradigm shift. In Anderson, G. (Ed.), *Reinventing the museum: Historical and contemporary perspectives on the paradigm shift* (pp. 139–142). Rowman Altamira.

Geismar, H. (2018). *Museum object lessons for the digital age.* UCL Press.

Glăveanu, V. P., & Beghetto, R. A. (2021). Creative experience: A non-standard definition of creativity. *Creativity Research Journal, 33*(2), 75–80. https://doi.org/10.1080/10400419.2020.1827606.

Hohman, F., Wongsuphasawat, K., Kery, M. B., & Patel, K. (2020). Understanding and visualizing data iteration in machine learning. In *Proceedings of the 2020 CHI conference on human factors in computing systems,* 1–13. https://doi.org/10.1145/3313831.3376177.

Norman, D. (2004). Affordances and design. *Unpublished article, available online at:* http://www. jnd. org/dn. mss/affordances-and-design.

Pain, H. (2012). A literature review to evaluate the choice and use of visual methods. *International Journal of Qualitative Methods, 11*(4), 303–319. https://doi.org/10.1177/160940691201100401.

Rojas, M. D. C. D., & Camarero, M. D. C. (2006). Experience and satisfaction of visitors to museums and cultural exhibitions. *International Review on Public and Non Profit Marketing,* 3, 49–65. https://doi.org/10.1007/BF02893284.

Rose, G. (1997). Situating knowledges: positionality, reflexivities and other tactics. *Progress in human geography, 21*(3), 305–320. https://doi.org/10.1191/030913297673302122.

Rose, G. (2016). *Visual methodologies: An introduction to researching with visual materials.* Sage Publications.

Segel, E., & Heer, J. (2010). Narrative visualization: Telling stories with data. *IEEE transactions on visualization and computer graphics, 16*(6), 1139–1148. https://doi.org/10.1109/TVCG.2010.179.

Soon, W. (2018). Executing liveness: An examination of the live dimension of code inter-actions in software (art) practice. *Leonardo, 51*(5), 530–530. https://doi.org/10.1162/leon_a_01669.

Tötzer, T., Sedlacek, S., & Knoflacher, M. (2011). Designing the future—a reflection of a transdisciplinary case study in Austria. *Futures, 43*(8), 840–852. https://doi.org/10.1016/j.futures.2011.05.026.

ABOUT THE AUTHORS

Professor Kathryn Eccles is Associate Professor and Senior Research Fellow in Digital Culture and Heritage at the Oxford Internet Institute, University of Oxford. Her current work focuses on how museums and cultural organizations can implement new tools and technologies to promote public engagement with and awareness of cultural heritage collections, to measure and enhance visitor engagement, and to elicit new information about users and usage, including formal and informal learning.

Laura Herman specializes in emerging technologies' impact on artistic & creative practices. Currently, she is a doctoral researcher at the University of Oxford's Internet Institute, funded by UKRI's Arts & Humanities Research Council, and a Senior Research Lead at Adobe. Laura has previously held research roles at Harvard, Princeton, and Intel and has worked with arts institutions such as the Serpentine Galleries, the Tate, Studio Olafur Eliasson, and Ars Electronica.

Caterina Moruzzi is a Chancellor's Fellow in the Design Informatics Institute, School of Design and research affiliate of the Edinburgh's Futures Institute at the University of Edinburgh. Her research lies at the intersection between the philosophy of art, history and philosophy of human and artificial creativity, and the philosophy of AI. She holds a Ph.D. in philosophy from the University of Nottingham and an artist diploma in piano performance from the Conservatorio G.B.Martini, Bologna, Italy. In her ongoing projects, she collaborates with researchers, artists, and technology companies to investigate modes of shared agency and creativity between humans, data, and technology.

Maggie Mustaklem is a doctoral researcher and design lead focusing on the implications of AI in design. Maggie's research project,

Design Interrupted, centers on the "everyday AI" in platforms like Pinterest, Instagram (and increasingly generative tools) that creatives use to search for inspiration. She is interested in how these tools may be flattening what designers see for inspiration, influencing what they ultimately produce. Maggie holds a Master of Arts in History of Design from the Royal College of Art and Victoria & Albert Museum and a Bachelor of Arts in Psychology from the University of Michigan.