

# Information Seeking by Experimentation: Trying Something Out to Discover What Happens

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**Abstract.** Experimentation is the process of trying something out to discover what happens. It is a widespread information practice, yet often bypassed in information-behavior research. This article argues that experimentation complements prior knowledge, documents, and people as an important fourth class of information sources. Relative to the other classes, the distinguishing characteristics of experimentation are that it is a personal – as opposed to interpersonal – source and that it provides ‘backtalk’. When the information seeker tries something out and then attends to the resulting situation, it is as though the materials of the situation talk back: They provide the information seeker with a situated and direct experience of the consequences of the tried-out options. In this way, experimentation involves obtaining information by creating it. It also involves turning material and behavioral processes into information interactions. Thereby, information seeking by experimentation is important to practical information literacy and extends information-behavior research with new insights on the interrelations between creating and seeking information.

**Keywords:** backtalk, experimentation, information behavior, information seeking, learning by doing

## Introduction

Experimentation is the process of trying something out to discover what happens. It brings about new information and, thereby, serves as a method for information seeking in the many situations that are too complex, novel, or situation-dependent to be understood on the basis of preexisting information. Yet, the research on information behavior tends to bypass experimentation in favor of a focus on how people seek information in documents and by asking other people (e.g., Case & Given, 2016; Fisher & Julien, 2009; Hertzum, 2014; Willson et al., 2022). This article contends that information-behavior research would benefit from attending to experimentation because it is a widespread information-seeking practice and because it extends previous studies on the interrelations between creating and seeking information (e.g., Brown & Duguid, 1996; Cole, 1997; Huvila, 2022; Willson, 2022).

Experimentation is a generative information practice. It involves obtaining information by creating it rather than looking it up. In this way, experimentation is related to processes such as learning by doing (von Hippel & Tyre, 1995), trial and error (Callander, 2011), reflection in action (Schön, 1983), and design thinking (Rowe, 1987). All these processes revolve around replacing the think-before-you-act precept with one of acting and then attending to the resulting feedback to explore and learn from the consequences of the action. In Schön’s (1983) terms, the resulting feedback is known as the ‘backtalk’ from the materials or situation. If the backtalk is satisfying, the information-seeking process has been successfully concluded. If not, it may inform further experimentation. In this way, experimentation fuses the creation and seeking of information into a dynamic process that exploits how backtalk shows the situated consequences of actions. People tend to be better at attending to backtalk than at anticipating the consequences of actions on the basis of pre-action information.

Existing information-behavior models acknowledge that information cannot simply be transferred from source to seeker; the seeker must actively make sense of it and is thereby creating information,

not merely receiving it (Case & Given, 2016; Fisher et al., 2005). However, this information creation by seekers is often considered a complication rather than an asset. For example, several studies catalog the substantial work invested in increasing the clarity and precision of source information to minimize seekers' reinterpretations of it (e.g., Bowker & Star, 1999; Daston & Galison, 2007). This article makes the case that information creation in the form of trying things out to discover what happens is an asset that makes experimentation an important information source.

## Example

The following example shows how a research and development (R&D) engineer engaged in experimentation to obtain the information needed to solve a work problem. The example was provided during an interview about how engineers seek information (see, Hertzum, 1999).

In the studied organization, they wanted to bond the materials macromelt and glass fiber together. However, when they tried, it did not work. They could take the materials apart again, even though the specification sheet for macromelt stated that it could be bonded to the specific type of glass fiber. The specification also stated that the bonding process should be performed at 180 degrees Celsius. The engineer went on to explain the experimentation that ensued:

"We simply thought that when the display read 230 [degrees] and the process only needed 180, then it was sufficient. But it wasn't. I put a thermo sensor in the center. When the material was injected, it was cooled off – by the tool – to only 80 degrees even though it had been heated to 230. That is, it was cooled rapidly during the transport and could not melt the other material in there. Then we increased the temperature and, voila, it worked. You cannot look up how something like this works. You have to work with the machine."

To elaborate, the experimentation performed by the engineer was a multi-step information-seeking process in which each step made new information available. First, the engineer consulted the specification sheet – a document source – and attempted to bond the two materials together by following the specifications. However, this attempt failed even though the material had been heated to above the required temperature. Second, the engineer put a thermo sensor in the center of the machine where the bonding should happen and tried again. This second attempt produced new information: The material was below the required temperature. Third, further experimentation revealed that heating the material to higher temperatures prior to injection produced higher sensor readings. The relation between the pre-injection temperatures and the sensor readings made the engineer realize that the material was cooled rapidly during the injection into the machine. Fourth, this realization made it straightforward to arrive at the required temperature. The engineer just had to experiment with heating the material to still higher temperatures until the sensor reading indicated that the material had the required temperature when it reached the center of the machine. Fifth, inspecting the outcome confirmed that at the specified temperature the two materials were bonded together.

## Discussion

Information seekers, like the engineer in the example above, can obtain information from four source classes (Table 1). The classes are defined by whether the source is personal or interpersonal and whether it provides feedback or not. *Prior knowledge* leaves information seekers to their own devices. They consult their personal stock of knowledge and they get no assistance in identifying relevant pieces of prior knowledge or in applying them to the current situation (e.g., Mishra et al., 2015). *Document sources* are interpersonal in the sense that they make information created and recorded by others available to the seeker. However, it is still up to the seeker to see the relevance of the information, comprehend it, and apply it (e.g., Huvila, 2022). *People sources* provide access to information created by others and kept in their head as opposed to externally recorded. Furthermore, the source not only supplies information in the abstract but also additional feedback that assists in

bridging the gap between the information and the seeker’s situation (e.g., Hertzum, 2014). Finally, *experimentation* circumvents this gap by manipulating the seeker’s situation and, in that way, creating information about it. This information – the backtalk – becomes available to the seeker as an experience of what the situation is like (e.g., Ruthven, 2022).

**Table 1.** Four sources to consult when seeking information

	No feedback	Feedback
Personal	<i>Prior knowledge</i> – seeking information by calling to mind one’s own knowledge and prior experiences	<i>Experimentation</i> – seeking information by trying out something to discover what happens
Interpersonal	<i>Document sources</i> – seeking information by looking it up in documents or other records	<i>People sources</i> – seeking information by asking other people, such as colleagues, relatives, or experts

Information-behavior research finds that the shift from personal to interpersonal sources is commonly triggered by increased domain complexity, which prevents single individuals from possessing the full breadth of required information (Byström, 2002; Reddy & Jansen, 2008). In contrast, the shift from no-feedback to feedback sources is commonly triggered by increased situational complexity, which prevents a complete up-front analysis, or mental pre-computation, of the involved parameters (Schön, 1983; von Hippel & Tyre, 1995). Experimentation replaces a complex, and uncertain, cognitive process of analyzing or projecting what will happen with the simpler process of recognizing what happens when experiencing it. Many people find that this replacement justifies the effort involved in creating the conditions for experiencing one or several of the options available.

The people who engage in experimentation to obtain information include architects (Schön, 1983), engineers (Gerstberger & Allen, 1968), makerspace users (Einarsson & Hertzum, 2021), patients with diabetes (Low et al., 2016), people going through life transitions (Ruthven, 2022), and visual artists (Hemmig, 2009). Some of these people experiment by creating prototype models. For example, Einarsson and Hertzum (2021) find that makerspace users obtain information through experimentation 25% of the time, thereby making it a more frequent source than documents (18%) and prior knowledge (15%) but less frequent than people (41%). Other people experiment by changing their behavior or lifestyle. For example, Low et al. (2016) find that diabetes patients try out treatment options to experience their effects. Experimentation is necessary because the effect of the options varies across patients and therefore cannot be determined in advance. Similarly, Ruthven (2022) finds that people who go through life transitions try on new practices and lifestyles to experience their fit. Life transitions are associated with strong emotions and considerable uncertainty. Experimentation helps manage the emotion and uncertainty by providing information about whether the new practice or lifestyle feels right when performed. All these groups of people share that they turn material and life processes into information interactions, that is, into processes that generate backtalk.

Information seeking by experimentation is sufficiently common to recede into the background in many situations. We try out system options to discover whether they have the intended effect, rather than consult the manual; we turn left at the next junction to discover whether that takes us to our destination, rather than ask for directions; and so forth. These everyday examples complement the grander ones of experimenting with macromelt or lifestyles. Relatedly, experimentation is often not called out in analyses of information practices but, for example, subsumed in discussions of how information is obtained by learning through participation in a community of practice (e.g., Harlan et al., 2012; Lave & Wenger, 1991). When experimentation is called out and compared to other information sources, it is rated as a source that provides high-quality information (Einarsson &

Hertzum, 2021; Gerstberger & Allen, 1968). Two central reasons for the high perceived quality of the information are:

- *Situatedness*: The information is generated by the characteristics and particulars of the situation. This situatedness lends authenticity to the information, which does not have to go through an uncertain translation process to be applied to the situation.
- *Directness*: The information is acquired without any apparent effort. Once the preparations for the experimentation have been done, it is as though the information pops out of the situation in a manner that involves no analysis or other cognitive processing.

The high perceived quality helps justify that experimentation, including the preparations necessary to set up for it, may be more resource demanding than other ways of seeking information. However, more research is needed to expand on experimentation and the conditions under which it is preferred over other information sources. Some studies suggest that experimentation may be particularly suited for acquiring how-to information (Koh et al., 2019). Other studies provide theoretical frameworks for conceptualizing experimentation as the offloading of cognitive processes to the material world (Hutchins, 1995). Collectively, the existing but fragmented research on information seeking by experimentation shows that it is important to practical information literacy – the ability to use information to learn (Bruce, 2000).

## Conclusion

Experimentation is a common information practice but understudied and undertheorized in information-behavior research. Acknowledging experimentation as an important information source will (1) create an awareness of the – currently fragmented – mentions of experimentation in information-behavior research, (2) open a space for focused empirical investigations of experimentation and its relations to other information sources, (3) invite new theorizing about the interrelations between creating and seeking information, and (4) help connect information-behavior research to neighboring research fields such as design thinking. With this article the author hopes to contribute to the recognition of *information seeking by experimentation* in information-behavior research.

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