The Picture of Health: Visual Representation as Communicative Practice in Healthcare Settings

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Abstract

Recent research has shown that visualization practices can play important roles in communicative activities by contributing to conversational coordination and involvement [1, 2]. While researchers have examined the use of informal visualization techniques such as sketching by designers and engineers, this position paper argues for extending this work to the domain of healthcare. From professional consultations to educational programs, patient care environments can be characterized by multiple needs for communication between individuals with different levels of expertise, disciplinary training, goals and intentions. Focusing issues of visual representation and materiality in this area has the potential to influence the development and evaluation of tools to support informal communication throughout the patient care process.

Author Keywords

Drawing, credibility, visualization, visual information, discourse analysis, interactional sociolinguistics.

ACM Classification Keywords

H.5.1. Information interfaces and presentation (e.g., HCI): Multimedia Information Systems: Evaluation/methodology.

Introduction

From information graphics to complex data visualizations, images are playing an increasingly important role in communication and collaboration, especially in cross-disciplinary contexts [3-5]. Our cultural relationship with images, combined with advances in image-making tools, has greatly increased our opportunities to use visual information artifacts to communicate in personal and professional settings. *Visual materiality* refers to how things are made visible, which things are made visible, and the politics of visible objects [6]. In the healthcare domain, for example, the lens of visual materiality can be applied to the imaging technologies used to reveal aspects of the human body previously invisible to examination and diagnosis; the role of visualizations in the transfer of information from technician to physician to patient; and the impact of using visual representations of data to reveal information previously un-noted or unnoticed. Visual materiality provides a framework for understanding these practices as sociotechnical and embedded in the complex communication landscape of medical settings.

Visual representation as social interaction

Since before the advent of digital technologies, the ability to spontaneously create and share images in order to clarify, explain, or enhance a conversation has been part of our communication toolbox. Although the ease with which we can make and share images on the fly has greatly increased due to technological advances, these tools are enhancing behaviors that in many ways were already embedded in our communication practices. When visual representations are deployed in collaborative contexts, they become part of a dynamic social landscape. The roles that visual representations can play in communication and social interaction often evolve beyond what was originally intended, sometimes in unanticipated ways. Aspects of the relationship between visual materiality and social interaction are also evident in situations where verbal communication is compromised or disrupted, such as the trauma teams studied by Sarcevic et al [7]

Building on sociolinguistic principles of conversational involvement and coordination [8], a recent study found that when drawings are created during the course of a face-to-face conversation, the *activity* of making a physical, visible mark performs key communicative tasks not necessarily evident in the image *artifact* [1, 2]. For this study, spontaneous drawing practices used in face-to-face conversations were examined as naturally occurring, minimally technology-mediated instances of collaborative visualization. These types of images have been called "napkin drawings," "sketches" [9], or "spontaneous visualizations" [10]. In the context of this workshop, drawing can also be viewed as an informal communication practice in which aspects of social interaction, materiality and performativity are particularly evident [2].

Informal visualization practices in situated contexts

Research related to informal visualization practices has typically focused on sketching as practiced by engineers [11] and designers [9]. Studies that examine the influence of drawing practices on role-based group dynamics (such as between engineers) and on specific collaborative outcomes (such as design ideation) typically focus on the social or collaborative benefits of the drawn image within the design process.

Although not often discussed explicitly in this literature, the sketching practices of designers (as well an engineers and architects) are institutionalized, reflecting years of special training. These studies highlight the ways in which drawing and sketching contribute to specific design processes. The use of informal visualization practices by other types of groups, especially those not formally trained in design or drawing, has not received nearly as much attention to date. For example, documenting practices associated with coordination activities in emergency rooms include the deployment of visual and material phenomena such as color coding, the material presence of file folders, and the physical proximity of people and information displays [e.g., 12]. However these strategies are typically not viewed as visualization practices, though they are closely associated with *how*, *what* and *to what end* information is made visible in these contexts.

Informal visualization in healthcare settings
Mathison [e.g., 12] points out that images have a reputation for being accessible and easily understood by a wide range of people. For that reason, they are more likely than other types of data to be used in public communication, news media and cross disciplinary contexts, where notions of credibility might be quite diverse. Intuitions and assumptions we have about visual representations can further complicate the process of interpreting and establishing the credibility of informal visualizations in these settings. The perceived credibility of health information may be deeply influenced by material and social factors, especially those related to visual representation.

During its lifecycle, many different audiences might evaluate a visual information artifact, often under

evolving conditions. This is especially true in environments like health care settings where individuals with different levels of expertise, disciplinary training, goals and intentions are required to collaborate under challenging conditions [3]. Imagine, for example, a situation where a set of data about the flow of blood through a patient's heart is visualized and interpreted by a technician. That visual representation is then handed over to a health care provider such as doctor who makes decisions about treatment based on what he or she sees. The doctor might then share visualization with a patient, or sketch on a piece of paper a simplified version highlighting only the most relevant details related to the recommended course of treatment. The patient brings the simplified drawing home and shares it with a family member of caregiver. While the original visualization was not created for the patient, it nevertheless is part of a chain of communicative activities that ultimately can influence the daily, at-home care of the patient.

Extending the study of informal visualization practices into the domain of healthcare will provide a wider perspective on visual materiality and the use of visual representations in information-driven contexts, complementing current investigations like those mentioned above. This line of inquiry is not present (or at least prevalent) in current visual studies literature and presents an opportunity for investigating multimodal discourse practices [13] in an information rich and relevant domain.

Conclusion
As the description for this workshop highlights, what constitutes informal communication in medical work and what role it plays in patient care is not yet clear.

This short position paper introduces an argument that considering the specific role of informal visualization practices in these situated, collaborative contexts can contribute to the design of interactions, experiences and systems that facilitate communication in healthcare environments. Participation in this workshop would provide an opportunity to interrogate this claim and to build collaborative relationships for future research in this area.

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