Preliminary Findings: Image-Enabled Discourse and the Creation of Visual Information

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ABSTRACT
Preliminary findings are presented from a qualitative investigation of image-making as information-driven, communicative practice. Ad hoc visualizations are images spontaneously created during the natural flow of a conversation (e.g., napkin drawings). The activity of drawing in these situations is an informal information sharing practice occurring within an interactive, dynamic context. For this study, a discourse-oriented methodology was developed for the direct observation and analysis of drawing during face-to-face conversations. This poster briefly describes this approach, including the novel protocol designed to capture video recordings of conversations involving the creation of ad hoc visualizations. Inductive, qualitative analysis of video data followed an iterative, grounded theory approach to multimodal social interactional analysis. A summary of preliminary findings highlights the dual nature of drawing as both information artifact and communicative activity. These findings have implications for visual information literacy, collaborative work, and image representation and retrieval.

Keywords
image-enabled discourse, ad hoc visualization, image-making, communicative practice, conversation, multimodal interactional analysis, video data

PROBLEM STATEMENT
You are sitting across the table from a friend in a restaurant. The conversation turns to your latest home improvement project or perhaps the route of that infamous road trip the two of you took several years ago. You reach for a napkin, dig a pen out of your pocket and make a few hasty marks, eliciting a nod of agreement from your friend as you draw. After your meal, the drawing is left on the table, along with the tip.

This scene is not unique. As an informal information sharing practice, the spontaneous act of drawing during face-to-face conversations is ubiquitous, in both personal and professional contexts. Often corresponding to moments of heightened clarity, insight or coordination, marks on a napkin or diagrams sketched on a white board are visual information artifacts that embody the exchange of meaning between individuals. These spontaneously constructed visualizations can anchor, bridge, and facilitate the flow of information at crucial moments in a conversation. Image-enabled discourse is the term introduced here to refer to this phenomenon in a broad sense. Ad hoc visualizations (Figure 1) are drawings created for a particular purpose within a specific context, without consideration for any possible wider application.

Ad hoc visualizations answer to a different set of criteria than other constructed images, such as art or advertisements. The intended meanings or purpose of

Figure 1. Examples of ad hoc visualizations
specific visual elements cannot always be easily reconstructed. These drawings are sometimes kept, sometimes abandoned, and are notoriously cryptic for those not present at the time they were created. Therefore, it can be argued, a primary communicative impact of these images lies in the action of making the mark rather than (or in addition to) in the artifact itself. In this sense, visualization and mark-making are akin to speech act or utterance. The act of creating such visualizations can be viewed within a broad communicative context, alongside linguistic and other non-textual modes of conversation.

In the next sections, a methodology for the study of image-enabled communicative activities is described. Preliminary findings are reported, highlighting specific communicative practices associated with the activity of mark-making as an interactive, information-driven activity.

**RESEARCH QUESTIONS**

This study addressed the following research questions:

- **RQ1**: What communicative activities are taking place when people draw during face-to-face conversations?
- **RQ2**: What role do these activities play in higher-level communication structures?
- **RQ3**: Which specific affordances or attributes of visual communication (specifically drawing) enable the use of image-enabled strategies in these ways?

**RELATED RESEARCH**

Information science research often focuses primarily on the image artifact, being concerned with problems such as:

- **Image representation and retrieval**, e.g., (Datta, Joshi, Li, & Wang, 2008); (Liu, Zhang, Lu, & Ma, 2007); (Vogel & Schiele, 2007)
- **Information visualization**, e.g., (Ellis & Dix, 2006); (Shneiderman & Plaisant, 2006); (Heer, Viégas, & Wattenberg, 2009); (Huang, Eades, & Hong, 2008)
- **Visual literacy**, e.g., (Naps et al., 2003); (Harrison & Treagust, 2000); (Cook, 2006)

In contrast, image-enabled discourse focuses on the context of the creation of the image and de-emphasizes analysis of the image as an artifact.

The study discussed here supplements existing artifact-focused visual research by offering a contextualized look at image-making in order to expand current visually-oriented information science research. In particular, this research complements those image studies that acknowledge that context can influence the ways that an image can be used as an information resource (such those cited above plus many more not mentioned here due to space constraints).

**THEORETICAL FRAMEWORK**

Building on foundations in discourse linguistics, a model of *image-enabled discourse* (Snyder, 2011a, 2011b) extends Hanks’ theory of communicative practice (1996) into the realm of visual communication. Clark’s notion of common ground (1996) and Gumperz’s work on discourse strategies and code-switching (1982) are used to supplement this foundation. Norris’ work on multimodal interactions (2004; 2011; 2005) is used to link these text-derived theories of discourse to a visual context. These constructs highlight the importance of defining and identifying image-enabled communicative activities (Hanks, 1996) in order to better understand the role image-making plays in information sharing practices.

**METHOD**

A protocol was designed to systematically capture image-enabled interactions in a naturalistic, observable environment. Participants were asked to engage in informal conversation with a partner they had never met before, in a lab-like setting. Standardized conversation prompts were used to initiate and focus interactions between volunteers.

The primary and exclusive role of the conversation prompt in this protocol was to enable direct observations of communication behaviors by instigating a naturalistic conversation. These conversation starters and the setting for the interactions were designed to provide favorable circumstances for the creation of drawings, while not being overly prescriptive. The prompts were designed not to explicitly prevent the creation of a drawing, but they also were crafted in such way as to not explicitly dictate the use of drawing.

The intent of this design was not to create a controlled experiment, but instead to create situations where observations could be made in an unobtrusive and consistent manner while creating an authentic experience for participants. Video recordings of prompted conversations provided empirical data for analysis.

The protocol was administered to 8 pairs of participants (16 volunteers), with 3 pairs run in a pilot, and 5 pairs run in the main study. Video data from the main study was logged based on conversation prompt, yielding 15 conversations clips (3 per pair), each of approximately 5-15 minutes in length. Drawing spontaneously occurred in seven of these 15 conversations. Initial review of recordings for quality and richness confirmed that the data corpus size was adequate for the qualitative, inductive approach to analysis described below.

**ANALYSIS**

Och describes the important role that transcription plays in the analysis of spoken language (1979). This perspective greatly informed the mapping of the transcription process to Charmaz’s approach to grounded theory (1983). Charmaz advocates a two-phased inductive procedure that allows researchers to qualitatively identify emergent themes within
a dataset (what she calls initial coding), then apply structured codes derived from these themes (focused coding in her system) in order to create rich, systematic descriptions.

Transcription of video data involved several iterative passes through each conversation and comprised the first phase of analysis. This procedure resulted in a set of detailed transcripts capturing both verbal and non-verbal behaviors. Key analytic themes were identified during initial coding, and focused coding was used to systematically tag verbal and non-verbal markers of communicative behaviors related to drawing.

PRELIMINARY FINDINGS
Preliminary multimodal discourse analysis of the fifteen video-recorded conversations revealed that while the form of specific instances of mark-making in interactions varied, overarching communicative practices involving image-creation are evident.

RQ1: What communicative activities are taking place when people draw during face-to-face conversations?
Responding to the first research question, seven communicative activities associated with drawing were identified:

- **Hijacking**– This is an attempt to independently determine the focus of the discussion. One person seizes (or attempts to) control of the conversation.
- **Translating/Transforming**– The form or format of a message is changed.
- **Showing** – There is an attempt to literally and visually represent a tangible object (i.e., easier to show it than to say it).
- **Clarifying**– A gap or missing information is addressed by providing additional information or details.
- **Integrating**– An attempt is made to merge ideas
- **Inventorying**– All that is known is consolidated, gathered, listed. Known information is pooled. Creating a scaffold for laying out known and unknown elements.
- **Connecting**– Conceptual relationships are explicitly shown (not literal, physical connections).

This is what people are doing, communicatively speaking, when they create ad hoc drawings during their conversations. While it would be expected that drawing would be used in order to convey information that is specifically of a visual nature (i.e., showing someone something), the activities above reflect a more diverse range of communicative behaviors associated with drawing.

RQ2: What role do these activities play in higher-level communication structures?
In order to address the second research question, further analysis looked at these episodic activities in relation to overall conversation structures. This revealed that mark-making activities play important roles in higher-level communicative strategies, in particular those used to establish, maintain or alter the primary frame of reference (Goffman, 1974, 1979; Tannen, 1993). Drawing is used to establish, test and expand frames of reference by using visible, persistent spatial representations to bridge invisible boundaries created by differences in knowledge domains. The activity of drawing is used to frame or establish the boundaries of a conversation, both physically and conceptually.

Specifically, by examining the conversations in terms of framing behaviors, two image-enabled communicative practices occurred relatively frequently: 1) drawing used to inventory what is known about a topic as a means to establish a frame of reference for a discussion; and 2) drawing used to clarify the meaning or intention of an exchange as a means to maintain a frame of reference. A third special case was also highlighted through this analysis: the use of drawing in order to step outside a dominant frame of reference. In each of these three cases, the activity of drawing played a role in coordination and conversational involvement beyond the more local activity identified in the first phase of analysis.

The most important aspect of both of these sets of observations is that they provide evidence that image-enabled communicative practices are embedded in and closely related broader discourse strategies, both verbal and non-verbal. This means that when we look at visual communication as an information-driven practice, we also need to be aware of the context in which these images are created, for there is a high degree of interaction between various modes of communication.

RQ3: Which specific affordances or attributes of visual communication (specifically drawing) enable the use of image-enabled strategies in these ways?
However, these findings also raise the question of what, if anything, is unique about visual modes of communication? All of the activities and strategies associated here with drawing can also be accomplished through other modes of communication. What makes drawing different?

This question, referencing the last of the three research questions, was addressed by focusing on the observable affordances or attributes of drawing that came into play during the recorded conversations. Within the interactions, drawing existed as both an activity and an artifact, sometimes even simultaneously. Further, the salient attributes of drawing occurring as an activity (sequential, performative, embedded in the greater conversation structure) were at times sharply contrasted to features of the drawing artifact (non-linear, persistent, discrete) being exploited at the same time or in close proximity. The dual nature of drawing as simultaneously both artifact and activity could explain why the meaning of images can sometimes be so challenging to capture and represent. It also speaks to what is unique about image-enabled
discourse: this mode of communication has the ability to exploit the flexibility offered by dual nature, while also remaining integrated into more conventional conversation and communication structures.

IMPLICATIONS
This research contributes to our basic understanding of the role images play in communication by offering a discourse-oriented approach as a supplement to existing artifact-focused work in the area of visual studies. Specifically, these initial findings indicate that:

- The full range of communicative activities associated with the creation of ad hoc visualizations (not just those related to “showing”) need to be adequately supported by visually enabled ICTs such as virtual collaboration tools.
- In terms of understanding collaborative communication behaviors, it is important to remember that interactions related to coordinating and establishing common ground or common frames of reference may look different when visually-enabled means are put into play (e.g., lack of eye contact does not signify lack of connection; signs of coordination such as echoing or unison might cross modal boundaries).
- Representations of images (such as those used in retrieval systems) can and should acknowledge the dual nature of constructed visualizations as both artifact and activity. Properties of the image artifact might contrast or even contradict properties of the image-making activity, however both contribute to the meaning of the image.

In addition to these preliminary findings, the methodology has yielded a standardized multimodal dataset documenting image-enabled communication activities, available for future research.

REFERENCES