1.0 INTRODUCTION

Problem definition

We might tend to think of words as being the primary building blocks from which we construct conversations. However, a number of other tactics are available to us when we try to communicate with others. We can gesture, growl, frown or draw a picture. Of particular interest to this research is our ability to exchange meaning through the use of images. Images and visual information are playing an increasingly important role in how we work and collaborate with each other in both face-to-face and virtual environments. In spite of the ubiquity of images in our daily communications, the various nascent areas of image-centered research have only recently begun to coalesce into integrated concepts regarding the role images play in communication practice and culture.

The research described here focuses on a common type of image represented by the “napkin drawing”: an ad hoc drawing made during the flow of a conversation, sometimes kept, sometimes abandoned, but clearly an important component in the process of communication between individuals. Rarely objects of great admiration for their own sake, these drawings answer to a different set of requirements than other constructed images (such as paintings and photographs). So-called napkin drawings can anchor, bridge, and facilitate the flow of information at crucial moments. What is it about these particular types of images that makes them such good conveyors of meaning within this context? Or stated another way, why do people start drawing while they are talking? Why make a mark rather than utter a word? It may be hard to think of this as anything but a natural, automatic and intuitive response and many will call up the adage “a picture is worth a thousand words.” However, this research seeks to probe and poke at this phenomenon, asking which thousand words are being replaced and why? And why, when given the choice between words, which have dictionary definitions and specific rules of grammar, do we seem to turn to the seemingly nebulous and ambiguous realm of
images in order to be more precise? Image-enabled discourse is the term used here to refer to these phenomena and will be discussed at length in this paper.

Within the field of information science, in particular, there is need for more robust theoretical research that addresses the role that visual information plays in the exchange of meaning during collaborative interactions between individuals. Answers to questions like those posed above could have a particularly strong impact on research in the areas of information retrieval and collaborative work. By improving our understanding of the dynamics of image-enabled conversations, we can build better tools to help people engage in more effective communication. Obviously on a certain level we are already experts at deploying images just when we need them. Bringing this expertise into a more conscious and deliberate domain will allow us to better exploit this seemingly innate human communication practice even in virtual environments. It will also allow us to train people to take better advantage of this strategic mode of communication. From an information retrieval perspective, the edge provided by this functional understanding of the role of images within conversation has great potential to enhance traditional metadata systems and retrieval models by incorporating notions of context and functionality into the overall meaning of an image.

**Research question**

The research described here will attempt to answer the research question: Why do people start drawing during predominately verbal conversations? An exploratory framework will be developed that seeks to explain why at times drawing is selected as a mode of communication. This analytic framework supports a basic tenet of image-enabled discourse: the notion that the communicative activity of creating an image, not just retrieving a pre-existing image, will contribute to more fully understanding the role of visual information in communication.

**2.0 LITERATURE REVIEW**

Review of existing research shows a need to develop more effective methods for investigating the functional contexts for face-to-face multimodal exchanges involving the construction of images. The study of image-enabled discourse seeks to bring together
previously disparate streams of research to help shed light on the unique and specific roles that visual information can play in overall discourse outcomes when an image is employed during the course of an exchange. In contrast to much research conducted in the broad area of image studies, image-enabled discourse focuses on the context of the creation of the image and de-emphasizes analysis of the image as an artifact. Underlying this position is the assumption that important and under-evaluated elements of perceived meanings can be identified through the analysis of the circumstances in which images are created and interpreted, that is, to study the communicative functionality imbedded in interactions related to the creation of images. This notion contrasts the perspective of most other areas of image studies where the image artifact is the primary unit of analysis. This distinction between the study of the image-artifact and attention to the act of image-creation determines a boundary between research that is highly relevant to modeling image-enabled exchanges and that research which is only superficially related to the topic.

Within the field of information science, research that might contribute to a framework for studying image-enabled exchanges is often limited by one of two issues: 1) primary focus on the artifact (such as in the case of much image retrieval research) or 2) primary focus on the image-generating system (as in the case of much information visualization research). When system building is the primary objective of research, issues related to user behavior are often of minimal importance. This is particularly true in the case of information visualization research [1-7]. D. M. Russell’s discussion of information needs in relation to information visualization systems stands out as an example of a more user-centered approach [8]. While the focus of this work is still on the creation of a visualization system, the author seeks to ground design decisions in an understanding of human sense-making activities. Other exceptions can be found in some image retrieval studies where researchers are seeking to bridge gaps in text-based retrieval models with user-focused analysis of semantic meanings associated with images [9-13]. However, even in these retrieval studies, often the unit of analysis is the image, rather than information behaviors [14]. In order to test hypotheses related to image-enabled discourse, rich data regarding behaviors will be required. Within the field of
information science, Dervin’s work on sense-making is an example of this type of approach [15, 16].

**Synchronizing levels of inquiry and multiple perspectives**

The unit of analysis of the research question presented here is at the interaction level, and decidedly functional in nature. This complicates the use of previous research for concept development because there is not a strong tradition in visual research of combining image-making, interactions and contextuality into one theoretical framework. While research has certainly been done in the three key areas discussed below, two factors contribute significantly to the challenge of bringing together what we know about each into a single framework. First, the research that exists has been conducted in widely diverse disciplines. For example, the nature of images has been discussed at length from a social and cultural perspective in the fields of art and design, visual anthropology, visual sociology, and visual rhetoric (for example: [17-28]); and from a computational perspective in the fields of information retrieval, cognitive science, and artificial intelligence (for example: [1, 9, 29-39]). In order to take advantage of any or all of this research, bridges need to be identified that can connect these divergent approaches. Second, and related to the task of building bridges, fundamental beliefs about the nature of knowledge and perception underlie assumptions across all of these disciplines. Care needs to be taken to maintain consistency of methodology (in assumptions, level and unit of analysis, methods, etc.) during the process of building exploratory models.

**Identifying relevant concepts in existing literature**

The preliminary conceptual structure for image-enabled discourse relies on major contributions from three primary areas of research:

- Categorizations developed in art, design and art history to identify functional aspects of images
- Theories regarding contextual influences on language, as developed in the areas of discourse linguistics and multimodal discourse analysis
- Principles of behavior and functionality related to communication practices, social construction of meaning and interactive effects on language use.
**Functional aspects of images**

In the field of art history, notable contributors who have expanded the notion of image studies in the direction of the function of images include Rudolph Arnheim [22], who discussed the strong relationship between cognition and visual representation in terms of art interpretation and appreciation, and more recently James Elkins who argues for the inclusive study of both art and non-art images, opening that discipline to a new range of images not previously studied. Elkins describes a typology of graphic forms that spans from alphabets to pure pictures, making distinctions based on context of use, the prevalence of formalized syntax (even a landscape painting can be “read” to a certain degree) and the possibility that a purely visual representation is possible, but very difficult to achieve (can we ever escape the desire to “read,” an inherently linguistic activity?)[20].

By incorporating the notion of user needs into the creation of information graphics, Tufte provides a good argument for merging information studies and the study of graphic representation, however his focus is on heuristics and the mechanics of visualization rather than context of use of visual information [17-19]. Similarly, the technical aspects of information representation are discussed in the field of cartography and GIS. This research is often of an applied nature, although some work extends into more conceptual territory [23].

Discussions of visual literacy are often found in the education literature [40, 41]. Education researchers have applied cognitive psychological models to study the effectiveness of mental models and visual representations within learning environments [40, 42]. This research tends to focus on learning styles and level of expertise, refraining from delving more deeply into the nature of the images themselves or the role visual information plays in individual exchanges of meaning at a more basic human behavior or cognitive level. Investigations of the act of mark marking and drawing as quasi-functional activities are reserved for literature in art education (with a bias toward self-expression) and the study of diagnostic practices that use drawing as an indicator of underlying symptom, rather than a communicative act in and of itself [43]. However, discussions related to cognitive load and mental processing can inform the identification
of potential contextual circumstances that may contribute to the decision to use images during conversations [44].

**Context of language use**

Discourse linguistics is the study of the influence of context on language. It encompasses research that looks at linguistic characteristics of passages of text, analyzes language use at and above the sentence level and looks at the linguistic structures of exchanges between individuals in a variety of contexts [45-50]. Discourse analysis, while sharing common ancestry with this more structural linguistic approach, takes a more socio-cultural approach by using text to identify underlying set of beliefs and assumptions held by the speaker that indicate a world view subtext [46, 51, 52]. It should be stressed that in the context of linguistic studies the term discourse can used in a number of ways: a discourse could be a self-contained passage of text (discourse linguistics) [49, 50], it could refer to the political beliefs held by a speaker (discourse analysis) [51], or it could refer to a series of coherent utterances that include “conversations” (conversation analysis) [45, 48, 53].

Although neither discourse linguistics nor discourse analysis specifically invite theories to be extended into the realm of images, there is an emerging subfield, multimodal discourse analysis, that seeks to identify the influence of mode and context on meaning, focusing on co-occurrence and interaction between image and text [54]. Researchers in this area have looked to the study of semiotics in order to extend discourse theories and methods to include visual information [55, 56]. Because of rich (and dense) discussions of the relationship between signs and meaning, readings in the history and philosophy of semiotics inform this connection and provide philosophical context for extending the discussions of language into the realm of multimodal (and image-enabled) discourse [57-59].

Researchers in the area of multimodal discourse analysis have also noted the strong connection between technology and multimodal communication, citing the increasingly complex communication environments in which we operate [60]. Researchers in the area of natural language processing [61], human computer interaction (HCI) and computer supported collaborative work (CSCW) [62-65] have also been
working to try to better understand the interdependent dynamics of multiple modes of communication within a single interface from a discourse-oriented perspective.

*Drawing as a communication practice*

Viewing drawing as a communicative practice aligns an emerging framework for image-enabled conversation with other theories of socially constructed meaning and interactive, dynamic language-based perspectives. Hanks has studied the effects of context on the construction of meaning during verbal interactions [66], addressing the notion that meaning is constructed through the use of language, rather than merely expressed by it. Combining social theory with functional analysis of language use, researchers in sociolinguistics have revealed the effects of social interactions on language, citing changes in structural linguistic indicators as evidence of meaning being created and changed over time [67]. Similarly, science historians Knorr-Cetina and Amann have investigated the role images play in scientific inquiry and the creation of new knowledge within the physics research community [68]. Viewing drawing as a generalized communicative practice (rather than a more specialized artistic mode of expression) is not a perspective commonly taken in the literature of art, design or communication research. However, evolving approaches to the investigation of language as an interactive and constructed phenomena can be extended to support the notion that drawing is a functional meaning-making activity serving a specific role within multimodal communication [69].

### 3.0 METHODOLOGY FOR CONSTRUCTING AN ANALYTIC FRAMEWORK

**Defining image-enabled discourse**

In order to examine the dynamics of image-centered communication practices, it is necessary to define the boundaries of the phenomenon. Image-enabled discourse is used here to refer to any interaction (face-to-face or virtual) between individuals that relies at some point on the interjection of an image in order to meet the goals of the exchange. The emerging framework discussed below focuses on a particular type of image-centered discourse in which drawing is the image-based communicative practice...
employed and where two individuals are involved in face-to-face conversation. This phenomenon is inherently bi-directional; each individual might have separate goals and the image may play different roles for each. Additionally, a temporal component to the model is key, allowing that the ad hoc nature of the act of creating or generating an image during an exchange is an important aspect of the contribution visual information makes to collaborative interactions.

Figure 1 describes a conception of image-enabled discourse that views conversations of a series of interactions between individuals and drawing as a communicative practice that allows people to utilize specific strategies in order to achieve desired outcomes. This conception of bi-directional interactions is constructivist in nature and is informed by linguistic theories of conversation and discourse strategies such as code-switching and contexuality [70].

People involved in conversations have certain interactions goals. We know from conversation analysis research that these goals can take a variety of forms, and awareness of them can be conscious or unconscious. People employ a range of communicative strategies in response to these goals, and as a result of the conditions in which the interactions take place [46, 53, 67].

Initially the occurrence of drawing during a conversation was conceived of as a complete switch from one channel to another response to an outright breakdown of interaction. However, during the data collection and analysis portion of this exploratory research (discussed below) it became clear that multiple strategies could be deployed concurrently or in close association. The need for a change or augmentation of strategy has been reconceived to be closer to a constriction in the flow of conversation or a change in the conditions of the interaction rather than a complete break in the flow. The model developed here seeks to account for the ability drawing gives people to create or re-establish salient, hospitable conditions for reaching goals within face to face interactions. The notion of co-occurrence of multiple modes of communication (or simultaneous semiotic systems) is supported by research in the area of multimodal discourse analysis as well as being aligned with some research in multilingual communication [69-72].
This framework introduces the concept of affordances applied to practices or activities. This term refers to those aspects of the nature of visual communication that make it uniquely suited to provide the conditions needed to employ certain communicative strategies. For example, drawing is by nature persistent, tangible and visible. These are affordances of visual communication. This idea of affordances is based on the notion that there are concepts that can only be created, expressed, perceived and/or interpreted in a visual format: they are inherently visual. The possibility of achieving or identifying a state of pure visuality is a topic of lengthy philosophical debate (for example, see Elkins discussion of Wittgenstein’s Picture Theory [20]). For the purposes of this exploratory research, we will accept the notion of the purely visual, and merge it with Gibson’s concept of affordances (via Donald Norman [73, 74]). If we do
this, we support the assumption that some concepts are inherently visual in form and expression, and the only way we can perceive them is in a visual context. This assumption disavows the adage that “a picture is worth a thousand words.” The existence of visual affordances means that at times, no number of words can replace a visual representation, because there are concepts (or information) in the world that are inherently visual.

Protocol for data collection

While support for the model described above can be found throughout the related literature, data was sought to provide further input to strengthen an exploratory framework. Semi-structured interviews were conducted, evoking rich descriptions of face-to-face conversations that included the creation of one or more drawings. A narrative approach is ideal for this purpose, resulting in a library of structured stories. In the absence of established narrative-based theory construction methodology in visual research, two research techniques commonly used in information science research were selected to guide design of the interview questions: critical incident technique and sense-making methodology.

Critical incident technique

Since the 1940’s researchers in the social sciences have used Critical Incident Technique (CIT) to generate rich, contextualized qualitative descriptions of organizational behavior. The basic components of CIT have not changed significantly since introduced by Flanagan in 1954 [75]. The core of the technique, as developed by Flanagan, still applies today:

- Only simple types of judgments are required
- Qualified observers can produce richly detailed descriptions
- Evaluation based on an agreed upon statement of purpose of the activity can ensure valid and reliable data.

Incidents are “any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about performing the act.” An incident is critical when “the purpose or intent of the act seems fairly clear to the observer and the
consequences are sufficiently definite to leave little doubt concerning its effects.” [75]
An incident should be considered significant when the observer is confident that it contributes to a positive or negative outcome in the activity of interest. According to this technique, an actor involved in the activity of interest can make observations or person external to the situation can provide witness. Acceptable methods for collecting the data include interview, focus group questionnaire or analysis of records or reports. Frequently, researchers using this technique ask informants to recall specific relevant events that happened in the recent past.

The power of CIT lies in its ability to provide complete coverage of a content domain, providing a detailed and comprehensive description of human activity [76]. The elements to be reported include: conditions of the incident, activities related to the incident, people involved and place or setting [77].

*Sense-making methodology*

Principles of sense-making also influenced the design of interview questions by presenting a strategy for systematically identifying patterns in conditions and consequences [15]. Similar to CIT's attention to the conditions of an incident, Dervin highlights the need, when looking at sense-making behavior, to devote empirical attention to conditions and change across time. Like CIT, sense-making seeks to situate respondents in a specific moment related to a phenomenon of interest. Applying this approach to the design of an interview protocol lead to a series of probes that prompt individuals to reconstruct a sequence of events and then share perceptions related to each step of the phenomenon of interest. This approach relies on the expertise that individuals have about their own movements through space and time. In the context of this research, people are viewed as highly sophisticated in their creation and deployment of images as communicative devices. The interview protocol seeks to focus these experts on a specific episode and gather detailed rich information about events, perceptions and conditions.

*Interview script*

Insight from both critical incident and sense-making methodology informed the design of a bank of questions that generated richly detailed and systematic descriptions.
The full interview script is included in Appendix A. In addition to gathering information about the reason for the conversation, the people involved in the conversation, their relationship to each other and their respective familiarity with the topic being discussed, the bulk of the interview was spent gathering details about what happened during the conversation. Following the sense-making approach, questions such as “Why did you do that?” were avoided because they require a relatively high degree of speculation from respondents and carry the possibility of widely divergent response data across interviews. Instead, the interview protocol systematically stepped respondents through the stages of their conversation, asking questions such as “What were you trying to do at that point?” and “Did it work?” Respondents described what was happened in the beginning, middle and end of the conversation; what was happening when the drawing began, what was happening while the drawing was being created and what happened after the drawing was completed. Respondents were also asked to provide details about what they were trying to accomplish at each point, what lead them to make certain conclusions about the success of the exchange, and what other techniques they tried to communicate their ideas. Triangulation was used to verify the story and provide further contextual detail. For example, respondents were asked about the focus of the conversation in at least three ways: What started the conversation? What was the reason for the conversation? What was the topic of the conversation? In some cases these questions yielded almost identical responses, however in many cases each response contributed to a broader understanding of the context and conditions of the interaction.

**Data collection for creating an exploratory framework**

Eleven semi-structured interviews were conducted. All respondents were adults between the ages of 25 and 40. Seven respondents were doctoral students in information studies, two were Masters students in library and information science, one was a doctoral student in public policy and one respondent was not a student.

Respondents were asked to think of a specific face-to-face conversation involving one or two other people when a drawing was created during the course of the conversation. The respondent could have been the one drawing and/or a conversation partner could have drawn. The focus on one-on-one interactions was motivated by a
desire to avoid descriptions of classroom teaching where drawing was used. Preliminary investigations revealed that the influence of a specific teaching technique or institutionalized practice might cloud descriptions of the more incremental interactions taking place. These interactions are the primary focus of the framework, so respondents were asked to recall a situation involving a limited number of people in a more informal context in order to provide richer details at this level.

Drawing was defined as a persistent and visible mark. For example, a hand gesture is not a drawing but a series of scratches in the dirt is a drawing. Drawings can contain alpha-numeric characters but do not have a strict right to left orientation in order to be meaningful. For example, a phone number written on a napkin is not a drawing because it needs to be “read” from left to right to make sense; a diagram showing numbered measurements for the construction of a box would be drawing because it does not need to be “read” from left to right.

At the beginning of the interview, if respondents were unclear about what was being asked of them, examples of situations where such conversation might take place were provided. These included:

- a work related problem
- recounting a story
- a description of a person, place or thing
- how to get to a certain location
- how to fix something
- how to make something

Analysis and findings

Respondents appeared to have little trouble reconstructing the details of the drawing-centered aspects of their conversation. Even when the beginning and end of the conversation as a whole where vaguely remembered, respondents reported a high degree of confidence in recounting the details of the creation of the drawing. As an example, in response to a question about what was happening when the drawing was no longer being used in the conversation, one respondent commented, “... then we started to shift gears into a different piece of the conversation altogether and, strangely enough, I think maybe
because the drawing was there, and I could sort of visualize it, I’m remembering that portion better than I’m remembering what happened afterwards.” This was a common sentiment: the conclusion of the conversation often paled in comparison to the portion of the conversation involving drawing. Additionally, when asked, many of the respondents said that they could reproduce the drawing they described in their narrative.

The semi-structured nature of the interviews guided inductive content analysis of the interview transcripts. Based on the interview protocol, responses were primed to yield rich information about the conditions and motivations surrounding the creation and use of drawing in conversations. Returning to the model of image-enabled exchanges described above, narratives were analyzed with four general concepts in mind: interaction goal, hospitable or salient conditions, communication strategies and enabling affordances. Inductive analysis was used to identify patterns in the narratives that lead to the identification of a set of tentative categories of image-enabled practices (Table 1).

Table 1. Categories of image-enabled practices

<table>
<thead>
<tr>
<th>Goal of interaction</th>
<th>Salient condition for interaction</th>
<th>Strategy for establishing condition</th>
<th>Enabling affordance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieve functionally similar understanding</td>
<td>Ability to synchronize disparate vocabularies</td>
<td>Bridging</td>
<td>Drawing allows people to build isomorphic bridges by enabling them to map their domain of knowledge to another’s through the use of a shared visual language.</td>
</tr>
<tr>
<td>Create shared space for collaboration</td>
<td>Ability to create new concepts in cooperation with others</td>
<td>Sandbox</td>
<td>Drawing allows people to establish a mutual, and tangible point of reference.</td>
</tr>
<tr>
<td>Verify the content of a message</td>
<td>Ability to check the reliability of communication</td>
<td>Transforming</td>
<td>Drawing allows people to transpose or transform the content of a message in order to verify the meaning being conveyed.</td>
</tr>
<tr>
<td>Share visual or relational information</td>
<td>Ability to accurately convey information</td>
<td>Showing</td>
<td>Drawing allows people to express visual information in a visual format.</td>
</tr>
</tbody>
</table>
Bridging

Bridging is used to describe the phenomenon where drawing is used to synchronize disparate vocabularies using a commonly familiar visual system of mark-making. It relies on the seemingly universal understanding of symbols such as arrows, arcs and boxes, as well as the information conveyed by the speed at which the mark is drawn and the weight of the line laid down on the page. For example, when an individual with a specialized domain of expertise, such as genetics research, enters into a conversation with a layperson unfamiliar with the specialized vocabulary of molecular science, the drawing can become a means of communicating complex concepts that might otherwise remain opaque and incomprehensible. The drawing allows the layperson to relate to the unfamiliar concept through a series of more rudimentary relationships as indicated by the marks on the page, mapping the basic relationships and concepts to more familiar domains of knowledge. This is just one example of isomorphic bridging. The category of interactions is generally marked by individuals conversing with different domain expertise and a need to find a common language in order to communicate specific information related to the topic of conversation. Generally, one person is trying to convey a concept with which they have a high degree of familiarity to another person who is less familiar with the specific concept. The drawing acts as an isomorphic bridge, allowing the participants to relate their own experience to the new concept through the mediating drawing.

Sandbox

This strategy relies on material affordances of the drawing, specifically the persistent and visible nature of marks made on a surface. The materiality of the drawing provides a comment focal point that allows individuals in a conversation to establish a mutual and tangible point of reference. An example of a drawing used to evoke a sandbox strategy was found in a story about a collaborative design project during which a team of individuals were studying the behavior and perceptions of museum patrons in order to design new information-rich services for visitors. The group was trying to synthesize abstract data gathered from a number of different sources with the goal of creating a unified concept. The drawing served as a collective vision of their evolving
ideas, as well as a record of the discussion. In the words of one respondent, “The drawing helped to [make it] concrete. This was real and we had actually done something.” Eventually this drawing was used to convey their proposed solution to the rest of the class. This type of image-enabled exchange is marked by a desire to create new concepts using input from all participants in a conversation. The concept is evolving and might not actually exist at the beginning of the conversation. In comparison to Showing interactions (discussed below), Sandbox interactions are more collaborative and bidirectional in nature.

Transforming

This was a very interesting and unexpected practice that emerged from the data. In these cases, a drawing served to be a kind of proving ground. The person drawing consciously transformed or transposed a concept occurring in the discussion in order to verify the accuracy of their understanding, to verify the accuracy of the other person’s understanding, or in order to test an emergent concept for themselves. Not unlike a mathematical transformation, a concept is converted into a different form using an alternative semiotic system with the sole purpose of verifying the content (or message). This is similar, in fact, to a common practice in beginning drawing classes. Students are told to stand with their back to their drawing and look at it drawing using a mirror. The resulting reversal of the image often reveals problems in proportions and perspective that had remained hidden under normal conditions. Reversing or transposing the image tests the soundness of the drawing. For example, one respondent recounted a story where she drew a diagram in order to prove to herself and her advisor that she fully understood the intricacies of a specific theory. Another person described her reason for drawing this way: “I was conveying to him the same information in multiple ways which helped him to think about it and remember it.” This respondent also commented that doing this increased her confidence that she was being understood.

Showing

This category of interactions is simply named “Showing” because some things are just easier to show than to say. Perhaps the most obvious of the categories, this refers to
the fact that sometimes it is just easier and faster to depict certain things, like spatial or abstract relationships, using a visually-based semiotic system. The mode and message are strongly aligned. The practice of drawing allows for the least amount of translation to take place, resulting in a more accurate delivery of intended meaning. Also, when employed along with the sandbox strategy, drawing produces as a persistent and tangible record of the information in a form that is closely aligned with its intended message. Examples of this type of interaction include a conversation where a wife was explaining to her husband how she wanted the holiday lights hung on the house, and a conversation where one man was giving directions to another about how to build a steel structure, specifically describing the configuration of weight bearing joints. In the words of this person describing this second conversation: “It was faster and much more precise [to draw] and clearly left far less opportunity for misunderstanding regarding the specific bit of information we were trying to exchange.”

4.0 DISCUSSION

Potentially generative concepts at the core of this research lay in the focus on strategies, affordances, conditions and interaction goals in relation to: 1) contextualizing the artifact in terms of the overall interaction and 2) the specific communication needs that are addressed through the practice of drawing.

The list of categories for image-enabled practices discussed above is certainly not exhaustive at this point, but should be seen as inspiration and support for an emerging model of image-enabled discourse. This evolving model states that image-enabled discourse practices possess certain interactive affordances that allow people to employ special strategies for creating salient conditions necessary to achieve specific interaction goals. Data collected during this exploratory phase of research revealed that drawing (a particular image-enabled practice) establishes hospitable conditions necessary for:

- Building isomorphic bridges
- Establishing a mutual and tangible point of reference
- Transposing or transforming the content of a message
- Accurately sharing relational information
Because little foundational work is available in the area of image-enabled exchanges, exploratory work like this is important for multiple reasons. It establishes baseline premises from which to build more empirically rigorous studies. It also serves as a basis for image-based research that seeks to introduce concepts of contextuality and functionality to our analysis of image-related communication. This approach could be applied to various forms of multimodal discourse practices, not just visually oriented interactions.

5.0 WEAKNESSES OF CURRENT RESEARCH AND FUTURE WORK

Semi-structured interviews will continue to be gathered and results of inductive content analysis will be compared to an evolving analytic framework for investigating image-enabled discourse. Specific attention will be given to expanding the sample to include non-student participants. Qualitative data collection for exploratory purposes will stop when no new categories of interactions are identified. At that point, preliminary experiments will be devised in order to further test and strengthen the proposed framework. The goal of this exploratory work, including systematic use of data for both framework construction and eventual hypothesis testing, is to begin to build the foundations for studying image-enabled discourse using methodologies relevant to a wide range of fields that embody information science research.
Appendix A: Exploratory interview protocol

Introduction

I am interested in learning more about how people naturally use images to during the course of normal conversation. I am gathering stories about situations where people start to draw when they are talking with another person.

I am going to ask you to think about a specific time when you were involved in a conversation with someone and one of you drew a picture during the course of the exchange. I’ll be asking you some specific questions about the conversation, but first I will give you an idea of the type of situation I am looking for. When you have a particular conversation in mind, you can stop me and we can get started with the questions.

I’d like you to think of a specific time when you were involved in a one-on-one conversation with another person when a drawing or drawings were created during the course of the exchange. This should be a situation when you were interacting face-to-face with a peer and you were both focused on the same topic of conversation. Examples of topics include, but aren’t limited to:

- a work related problem
- recounting a story
- a description of a person, place or thing
- how to get to a certain location
- how to fix something
- how to make something

A drawing is:

- A visible and persistent mark
  - A hand gesture is not a drawing.
  - Making a series of descriptive scratches in dirt is drawing.
- May include alpha-numeric marks but does not have to be read from left to right.
  - A phone number is not a drawing because it needs to be “read” from left to right to make sense.
  - A diagram showing numbered measurements for the construction of a box would be drawing because it does not need to be “read” from left to right.

Do you have any questions about the kind of situation I am describing?

Questions

1. Can you tell me about the conversation where a drawing was created?
   a. Who was the conversation with?
   b. What is your relationship to that person?
   c. What was the reason for having the conversation?
   d. What was the setting of the conversation?
   e. What was the topic of the conversation?
      i. How familiar were you with the topic of the conversation?
      ii. How familiar was the other person with the topic of the
conversation?
2. What started the conversation?
3. I’d like to get a few more details about the creation of the drawing during the conversation.
   a. What prompted the creation of a drawing?
   b. What was happening right before the first mark was made?
   c. What was happening while the drawing was being created?
      i. If you initiated the drawing:
         1. What were you thinking about when you decided to draw a picture?
         2. What were you trying to do with the drawing?
         3. Did it work?
         4. What else did you try to get the same result?
      ii. If you observed the drawing being created:
         1. What were you thinking about while the drawer was created the image?
         2. What do you think the drawer was trying to accomplish?
         3. Did it work?
         4. What else did they try to get the same result?
   d. Did only one person do the drawing?
   e. What made you stop drawing?
   f. Was there a point when the drawing was no longer useful or being used within the context of the conversation? How did you know?
   g. What happened in the conversation after you were finished with the drawing?
   h. What happened to the drawing?
   i. Could you recreate the drawing now?
4. How did the conversation end?
   a. Did you continue the conversation after the drawing was created?
5. How did the creation of the drawing help or hurt (affect) the progress of the conversation?
References


