

# How Can We Encourage Collaboration in Mapmaking?

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**Abstract.** This paper examines some of the dimensions of collaboration in mapmaking using web-based and web-enabled tools. The authors explore mapmaking as a complex social process and outline some of the potential challenges involved in developing tools to support collaboration among mapmakers who may share little but an internet connection and a common interest. Finally, the authors describe some of the methodological challenges associated with an ethnographic approach to the study of mapmaking.

**Keywords:** distributed processes, mapmaking, technology and social interaction, ethnographic approaches to mapmaking

## 1 Introduction

Mapmaking is an oddly social effort, one often done alone but impossible to do in isolation. Web-based and web-enabled mapping tools make this alone-with-others quality even more apparent. While some online maps are highly personal (e.g. driving directions), others are made to be shared, opening the possibility that the audience will participate as consumers, critics and - potentially - as collaborators. Whether their subject matter is banal or controversial, shared maps encourage readers to become collaborators.

As members of a user experience team working on geo-applications, our goal is to understand mapmaking as a social process and to find ways to support collaboration. In this brief position paper we try to describe some of the dimensions of collaboration and outline some of the methodological challenges we face.

## 2 Mapmaking as a Distributed, Social Activity

Previous work with online GIS tools shows that collaboration almost always requires negotiation, or argumentation. To facilitate distributed asynchronous discussions in domains such as city planning, Rinner introduced the concept of Argumentation Maps, or Argumaps [1]. This tool allows users to post geographically referenced comments on a map and engage in a debate that is presented visually, within a GIS.

The comments and map objects are then cross-referenced, allowing them to be viewed in multiple ways. Rinner argues that such debates facilitate the work of city planning by effectively capturing the contributions of many in the right way. We take this work as a reference for understanding the importance collaboration on maps in other contexts. However, tools like Google maps or Google Earth are intended for non-specialists whose only connection to each other may be that they have access to the internet and share an interest. In this context, we would add two elements as markers of successful collaboration: the ability to identify contributors and to sense a common purpose, what we could call “community”.

In the maps we’ve included as illustrations, we can see some of these elements to varying degrees. Some maps, such as those debating where to find the best food, can be the source of lively debate. But where might we draw the line between maps as bulletin boards and maps as forums for social interaction? Maps that focus or filter information about the physical and built worlds offer important insights. A good map of San Francisco’s city center doesn’t just show where the coffee shops, bars and restaurants are located; it will also suggest how to find the best coffee, cocktails and food. Such recommendations are based on input from various contributors and, importantly, require that users make judgments about the quality of the information on the map. Collaboration, we would argue, requires specific cues for users to make such judgments. Further, content creators require tools to enable them to create an identity through their contributions.

Maps such as the ones shown here strive to be qualitative filters whose content is the collective signature of their authors. Ratings, comments and even general-interest postings become more valuable when their creators can be identified and understood in context. ‘Who’s rating this restaurant?’ may be just as much a part of users’ interpretive frame as ‘what kind of food do they have?’ or ‘what kind of scene should I expect?’ The identity of content creators becomes part of the map’s core value. An example in Figure 1 shows a map of restaurants in New York City. In addition to the locations of restaurants, it provides qualitative comments and invites users to submit feedback on each of the establishments. However, it does not tell its users whose opinion is represented in the notes attached to restaurants, thus reducing the value of the comments.

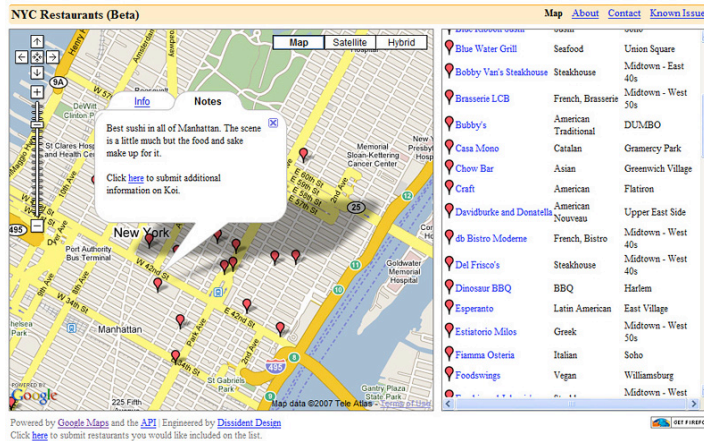


Fig. 1: Best Sushi in all of Manhattan (<http://www.dissidentdesign.com/maps/nyc.html>)

With the possibility of multiple users contributing to and reviewing changes to a map, the social or community-like quality of a map becomes more evident. Google Earth, for example, can be used to share photos, to create place marks with comments, to add geo-referenced descriptions. While similar content might be available elsewhere (e.g. Wikipedia), some of the features added by mapmakers are uniquely suited to geo-referencing. Collections of swimming pools, prisons, military sites and airplanes in flight (Figure 2) are among the kinds of things you might find in Google Earth's specialized content layers. To be successful, these mapped collections require collaboration; no single user will likely be able to find all of a specific type of content that fits a given interest. Moreover, such collections are often the site of exchanges between map creators, who might debate the specifics of a given entry, or collaboratively decide which are most and least relevant or noteworthy from a field of potential entries.

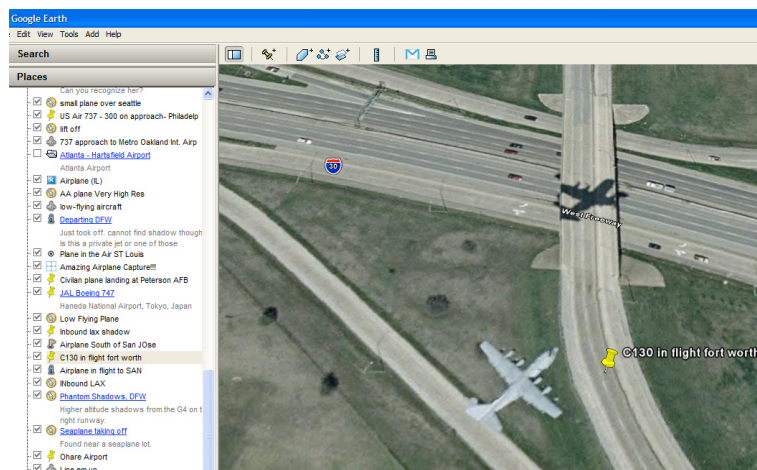


Fig. 2: Airplanes in flight on Google Earth.

### 3 Mapmaking Tools to Support Collaboration

Web-supported maps illustrate some of the challenges in designing tools for collaboration. Based on our pilot field studies, we know that interactions between mapmakers are most often asynchronous, are frequently anonymous and do not always involve any real exchange between people. In the case of the most active maps, there must be an underlying base of work before it becomes a community forum. This is usually done by a group of core enthusiasts, who are joined later by more numerous but less prolific contributors.

Our research has shown that content creators tend to work alone, though seldom in isolation. A married couple is planning a road trip; they discuss every stop they will make, but only the wife enters this information into a KML file. The exchanges that lead to route selection largely occur outside the context of the mapmaking tool. Similarly, a hang glider enthusiast who maintains an informational website collects reviews of tracks to fly, places to stay, and things to do during non-flying weather. He then creates and shares maps with this information. The content for these maps comes from multiple sources, including personal recommendations, but there is only one mapmaker. Is this because the others lack the appropriate tools, or because in this scenario this is the arrangement that makes the most sense?

The web-based or web-enabled tools currently available to mapmakers do not support direct synchronous social interaction (i.e., chat, screen-sharing, or voice communication). For instance, while it is feasible to collaborate on creating custom layers for Google Earth, the process is not easy. Mapmakers have to send KML files to each other and take turns editing, since it is impossible for two to work on one file at the same time. Adding features that would support real-time collaborative mapmaking activities may result in more innovative uses of mapmaking tools. Adding the right tools might also help to bring those who do not have KML editing skills into the mapmaking process.

As map users become mapmakers, the need to negotiate the value of content also grows. While much of the user-generated geo-referenced content is valuable, there's no reliable and scalable way to assess the usefulness and verify the validity of every place mark, review or a blog entry that gets posted to applications like Google Earth. As a result, some maps are overwhelmed by content, much of it of interest only to its creators. It is unclear whether the collaborative editing model that works well for Wikipedia.org is applicable to geo-referenced tools such as Earth. There are at least two options to address this problem: rate and promote only high-quality content or provide robust searching and filtering tools that will allow those consumers to choose from among entries.

Of course, these two options require us to ask the obvious: how can we help would-be mapmakers understand what is relevant and what is not? How can we build awareness about the qualities that are appreciated in a map without stifling users' creativity and innovation? We understand that, as a collaborative enterprise, making content layers needs to be better supported to foster the right kinds of interaction between collaborators. But how do we go about finding the right kinds of interaction to support in the tools we develop?

## 4 Methodological Considerations

There is no single or simple method to find the right combination of tools to support collaborative mapmaking, let alone to define usability standards for them. Steinmann et al. identified two main reasons as to why usability is especially important for collaborative mapping environments. First, online GIS has specialized functionality that increases the complexity of the interface relative to browsers. Second, the amount of content available within geographic systems and the skills needed to interpret that content introduce an additional cognitive burden on users, especially non-experts [2]. Part of the reason that we work to improve the human-facing aspects of Google's geo-referencing products is to open these up to new groups of users. We hope that as we do so, new groups of users will begin to use these products.

Studying collaborative mapmaking presents some important challenges. For example, [wikimapia.org](http://wikimapia.org) is an annotated map that anyone can edit. The map has multiple authors who are geographically dispersed. The map itself is ever-changing – it does not have a final state, and new contributions could keep coming in at any time. Studying such process not only requires a long-term commitment but also requires a method of capturing qualitative information from collaborators who are not co-located.

At present, we are employing an ethnographic approach to understanding collaborative content creation. We engage mapmakers in settings that allow us to observe the context of their activities. This approach helps gain an understanding of tacit user needs that may be difficult for users to articulate [3]. By observing mapmakers over time, we are able to see the kinds of ancillary tools they use in creating specific kinds of content. We are also able to see how tools change by task, by phase of development and by the temperament of the user.

Some of the constraints we face are familiar to others in HCI. Time constraints dictate that we use rapid ethnography methods that are more suitable for deadline-driven development cycles. This limits our fieldwork to a relatively small number of visits that typically last two or more hours. As documented elsewhere, additional data is usually obtained over email or by phone [4].

It is also important to note that what ethnography hides from us is perhaps equally important. We cannot see the totality of the social interaction with collaborators, since these tend to be dispersed in both time and space. We also cannot understand how the introduction of specific tools might influence the mapmaking process. If we are developing a tool, we can run a controlled experiment in a laboratory setting to make sure that it works as designed. But to use it in the field, we need to ensure that not just the mapmaker but all of her or his potential collaborators have access to and understand the intent of the tool. This is not a simple task in an experimental setting, since we are not always able to accurately map the network of collaborators.

Finally, ethnographic observations necessarily focus on the cluster of interactions between mapmakers and their mapmaking tools that were observed. One of the problems we have encountered is sampling: how do we know that our observations are a reasonable cross-section of the process? This question is especially pressing since we know that maps are most often made through many small changes rather than through discrete, concentrated work sessions.



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