EXPRESSING TERRITORIALITY IN ONLINE COLLABORATIVE ENVIRONMENTS

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Jennifer Thom-Santelli

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Jennifer Thom-Santelli, Ph. D.

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Territoriality, the expression of ownership towards an object, can emerge when social actors occupy a shared social space. In this research, I extend the study of territoriality beyond previous work in physical space in two key ways: 1) the object in question is non-physical and 2) the social context is an online collaborative activity. To do this, I observe the emergence of characteristic territorial behaviors (e.g. marking, control, defense) in 3 studies of social software systems.

Study 1 describes a qualitative interview study observes the behaviors of 15 Maintainers, a small group of lead users on Wikipedia. Findings suggest that The Maintainers communicate their feelings of ownership to other editors by appropriating features of the system, such as user templates and activity monitoring, to preserve control over the articles they maintain and communicate their knowledge of the article editing process to potential contributors. Study 2 describes a qualitative interview study observing the behaviors of 33 users of social tagging systems deployed within a large enterprise organization. Findings suggest that self-designated experts express territoriality regarding their knowledge and their status within the organization through their tagging strategies. Study 3 describes a field study of expert and novice users of a mobile social tagging system deployed within

an art museum. Findings suggest that compared to novices, experts feel more personal ownership towards the museum and their tags and express territoriality regarding their expertise through higher levels of participation and are more likely to vote down novice-generated tags in a defensive manner.

My dissertation draws from observations from these three studies to construct a theoretical framework for online territoriality to provide researchers and designers of groupware with guidelines with which to encourage ownership expression when appropriate. Topics for discussion and future work include clarifying the characteristics of non-physical territories, closer study of the possible reactions to territoriality, and describing the potential of territoriality as design resource for motivating experts to contribute.

BIOGRAPHICAL SKETCH

Jennifer Thom-Santelli received her Bachelor of Science in Human Service Studies in 1997 from Cornell University. She also received a Master of Science in Human Factors and Ergonomics in 2004 also from Cornell University, where her thesis research evaluated the usability of a multi-touch text entry surface. Before returning to graduate school, Jennifer worked first in film production as a production coordinator on commercials and then as a story editor at Universal Pictures. She then made the transition to web production for Eve.com and AOL Digital City as a content producer.

As a doctoral student in Communication at Cornell, Jennifer was a member of the Human-Computer Interaction Lab and of the Culturally Embedded Computing Group. She served as the co-chair for the Cornell chapter of ACM SIGCHI and co-organized its Invited Lecture Series. Jennifer also spent a year as a visitor at the School of Information at the University of Michigan and completed internships at Google and IBM Research.

In her free time, Jennifer and her husband Josh seem to have fallen into the habit of renovating houses in college towns. She enjoys running, yoga and snowboarding -- all of which helps to support her habit of eating anything and everything.

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CHAPTER 1

MAKING THE CASE FOR ONLINE TERRITORIALITY

Homer: Stop it, you two. This is Thanksgiving, so glue friendly or I'll take your glue away and then no one will have any glue to glue with.

Lisa: Dad, this isn't about glue. It's about territoriality. He only wants the glue because I'm using it.

Bart: Oh yeah? Prove it.

Lisa: [hands him the glue] Here.

Bart: Hey man, I don't want your stupid glue. -- The Simpsons

1.1 Introduction

For the most part, humans are social beings that regularly interact with other humans in a variety of contexts that require cooperation and collaboration. We regularly enter spaces that are inhabited by others, but simultaneously attempt to avoid conflict by observing physical and social boundaries. We recognize that not every object we see or touch belongs to us but at same time, we temporarily own or occupy publicly accessible objects. For instance, we put down coats, bags and books to save a spot at a favorite table at a cafe. The placement of personal belongings helps communicate to others in the space that someone currently occupies that specific table, so that unwanted parties do not also sit in the same spot. The development and expression of these strategies are characteristic of territoriality, a pattern of social behaviors that are used to express ownership toward a target (e.g. the territory), whether physical, social or cognitive (Brown, Lawrence, & Robinson, 2005).

Without these indicators communicating that certain pockets of space are under our jurisdiction, conflict between fellow patrons may emerge as others enter into already occupied space. In the opening quote, Bart Simpson wants to use the glue, primarily because Lisa currently possesses it and he does not. When Lisa does not control it or own it, the glue as territory becomes less valuable, and it is less important for Bart to express ownership of the glue. In online collaborative activity, territoriality may serve a similar purpose, so that collaborators may be better able to read the social landscape. Expressions of territoriality may tell group members something about which individuals have asserted control, what territories are perceived to be desirable, or may also demonstrate group boundaries. Territoriality can provide collaborators with signals that there are parties who feel a sense of ownership regarding aspects of the shared activity.

The behavior that is most associated with the outward expression of ownership is *marking*, "placing an object or substance into a space to indicate one's territorial intentions (Gifford, 1997)." Marking can be accomplished through physical or symbolic means. For example, jackets and books can be left on a vacant library carrel to signal control of territory (Becker, 1973) while arcade game players have been observed to stake out their favorite games by leaning on them or by simply touching them (Werner, 1981). Political boundaries between nation-states are instances of symbolic marking on a global scale (Sack, 1986). Marking is preventative behavior because it signals to others that someone has claimed ownership of a space.

Personalization is a specific type of marking in a way that indicates one's identity. Because it is tied so closely to identity, personalization is often described in the context of private, highly controllable spaces. Offices in the

workplace are decorated to show different facets of their occupants' identities, such as diplomas and certificates to demonstrate professional competence and pictures of one's family to put aspects of one's personal life on display (Brown et al., 2005). Dormitory rooms have been observed to be personalized in a similar way so that it is clear which part of the room is inhabited by each roommate (Kaya & Weber, 2003). Personalization has, however, been observed in contexts inhabited by various social actors, such as graffiti as a symbol of gang turf (Ley & Cybriwsky, 1974).

Conversely, territoriality can be behaviorally expressed through *defense*. Defense is distinguished from marking in that it is in response to a fear of invasion of an established territory whereas marking behaviors construct an object of interest as a territory. For example, members of a group may choose to use a very specific insider terminology in order to keep outsiders from breaching an already established private social territory (Goffman, 1971). Generally, defensive behaviors can differs depending on several factors (Knapp & Daly, 2002). Who the infringer is and the infringer's intent, whether accidental or not, can determine the strength of the response. For example, one might react to an armed robbery of one's home much differently than someone taking your favorite seat on the subway.

While much of the research on territoriality has primarily focused on physical space but as implied in the motivating example, I suggest that the study of territoriality should be extended with respect to intangible targets. The concept of ownership, both as psychological and legal states, is one that has been applied to non-physical objects, such as one's identity and ideas (Pierce, Kostova, & Dirks, 2003). In addition, Goffman (1971) and Altman (1976), in particular, propose that humans can display territorial behaviors towards

ideas. As an example of this proposition, Altman (1976) suggests that copyright and patents are explicit adaptations that have emerged, in part, so that humans can lay claim to ideas they believe they own while sharing them publicly with others. Furthermore, Brown et al. (2005) proposes that individuals can be territorial towards their job roles, projects and the employer.

Contributions to an online social system may also serve as targets of ownership, particularly if they are representative of one's ideas or a signal of one's job role and status. In the context of an online community engaged in producing artifacts of lasting value (Cosley, Frankowski, Terveen, & Riedl, 2006), one could imagine that members could then display territorial behaviors towards the artifacts, the roles they play in the artifacts' construction, and perhaps the community itself in the case of defending itself from outsiders. Because these social interactions are then mediated by the social system, it is possible that the expressions of territoriality are then accomplished through the system's communicative features. Depending on the design, these territorial behaviors may emerge through direct communication or through more subtle measures. When an online social system supports collaboration, these expressions of territoriality may affect how each user coordinates and participates in joint activity. To make this proposition less abstract, I now provide a motivating example to detail how territoriality can influence participation and coordination in online collaboration.

1.2 Why encourage territoriality in collaborative activity?

Jenn has decided that she wants to co-author an article about the emergence of territoriality in online social interactions describing research that she has conducted over the past few years. Since Jenn perceives that much

of the intellectual work underpinning this paper is hers and she has led the research process, she and her collaborators agree that she will be the first author since her co-authors are experienced researchers but do not have as much expertise as she does on the topic. The position of first author is a desired one because the convention in this particular publication venue signals that the first author has contributed the most amount of work. More broadly, as the first author, she will accrue reputational benefits within her field as an expert on the topic of territoriality (Birnholtz, 2006).

Jenn and her collaborators decide to use an online wiki as a platform to organize, edit and author the paper. Because the subject of territoriality is one in which Jenn feels like she has developed some expertise she takes control of the writing process by creating the project outline and posts it online. She invites the others to comment on this outline and promptly monitors all changes made to this online document. Although she is open to their suggestions, she feels that she makes the final decision regarding what will go in the paper, due to her position as the expert author and because a sense of ownership she feels towards the content within the paper. Jenn communicates her status as lead co-author to the others in a few ways. First, she responds quickly to her collaborators' contributions through the online discussion features enabled by the authoring tool, providing an indicator that she actively monitors the changes made on the page. Second, the content of her responses reflect her knowledge of the subject, in that she uses terminology (e.g. "marking" or "linguistic collusion") that appropriately describes the characteristics of territoriality (Lyman & Scott, 1967). Third, she takes the initiative in creating the outline and assumes control of the authorship of process.

How are these actions related to territoriality and the collaborative process? Jenn has already developed feelings of ownership towards the subject of territoriality because she has conducted research on the topic and feels that her expertise qualifies her for a leadership role. As a result, she assumes control of an online document in which the content will reflect the subject of her expertise. Jenn also communicates her sense of ownership regarding the paper and its content by acting as the steward of the collaborative process by responding to others' comments and making decisions regarding the content. She also uses language to reinforce her expertise about the topic of territoriality to her collaborators.

These actions, which can be related to outwardly expressing one's sense of ownership of a territory – in this case, one's expertise and the collaboratively authored article --- benefit the collaborative process as they serve as acts of coordination and leadership at a time when a project is just getting off the ground. In situations where these needs are greater (e.g. high coordination costs), encouraging territoriality may help ensure that collaborative activity begins well. However, as this type of management style becomes less necessary or inappropriate to the activity at hand, territoriality may become something to discourage. In this example, if Jenn continually ignores the contributions from her co-authors, they may feel discouraged if they feel their participation is marginalized. As a result, my research aims to observe how these behaviors may become exclusionary in nature or less helpful to the collaborative process.

This example also begins to describe the research questions that will be addressed in this thesis:

What are the possible targets of ownership in online collaborative systems? I suggest that individuals can express ownership through territoriality regarding expertise and reputation within a group or organization. I extend this proposition to hypothesize that online collaborative systems will support this expression of ownership towards non-physical objects and the products of activity within the system also become territories. The prior example of co-authorship also describes another possible target of ownership – one's contribution in a collaborative system.

What are the characteristic expressions of territoriality in online collaborative systems? To ground my research, I employ the existing metaphors of marking, personalization and defense as characteristic territorial behaviors. However, it is unclear how exactly these behaviors might manifest in an online environment. I propose that users of these systems will appropriate available features of the interface to signal ownership to other inhabitants of shared social space. For instance, when possible, individuals may use jargon or specialized language as a marker of their position as expert so that others may know that they feel ownership of their knowledge.

When is territoriality beneficial to the collaborative process? If individuals can express ownership regarding certain tasks, territoriality may help to clarify the uncertainty of "who does what" during collaboration, particularly if the process requires high levels of coordination. Jenn can communicate her intentions to act as the lead author through territorial expressions, such as employing aspects of a system as markers of ownership or by defending her ideas during discussions of the article outline that she posted. As a result, the

encouragement of territoriality at appropriate points in the process may allow project to get off the group more smoothly and perhaps assist newcomers in figuring out what role they should play initially.

When is territoriality detrimental to the collaborative process? On the other hand, turf wars between collaborators may erupt due to disputes related to ownership. If individuals become territorial to the point of excluding other contributors or marginalizing potentially valuable participants, the expression of one's sense of ownership becomes less helpful to shared activity. In order to better figure out what territorial behaviors may be beneficial to collaboration, it is also important to observe both when they interfere with cooperation and if there are specific expressions that are more likely to do so. For instance, while Jenn's actions as the lead author in organizing the paper may help to galvanize action and encourage progress towards completion, her potential refusal to incorporate her coauthors' contributions may lead to their disengagement from the process and in the end, may affect the quality of the scholarly work.

1.3 Overview of Approach

To answer these research questions, I employ an iterative approach. First, I use descriptive, exploratory methods to observe how territoriality emerges in online space in two distinct online social systems. After observing expressions of territoriality commonly emergent between the two cases, I then conduct a field study of a mobile social tagging system in a museum

environment to observe language use and communicative behaviors by users who possess expertise about art and the museum.

1.3.1 Case Study 1: Collaborative Authoring

Wikipedia is a collaboratively created encyclopedia built upon a wiki platform that has emerged as a member-maintained community (Cosley et. al., 2006). It is a shared social space in which editors with various types of expertise and motivations enter to collaborate and cooperate on different aspects of authoring. Participation in Wikipedia can be extremely time consuming and high commitment for a number of editors, but at the same time, the likelihood of any edits simply disappearing is extremely high (Viegas, Wattenberg, and Dave, 2004). As a result, the cultural ideal of Wikipedia suggests that one should participate knowing that one's work will be altered and that the expression of ownership may be a detriment to successful collaboration.

Despite this, I propose that territoriality does emerge among a subset of expert editors and that their stewardship of articles may have a positive influence if quality is a goal. Previous research has observed that Wikipedians become invested in the health of Wikipedia as a whole as they mature as members of the community and gain expertise in the process of editing and contributing (Bryant, Forte, & Bruckman, 2005). This suggests feelings of ownership may develop as an individual becomes more committed to Wikipedia, as he or she becomes an active member. As a result, expert members may express territorial behaviors differently than novice contributors because of their longer tenure of membership and continued commitment. For

example, a novice member may be more likely to express territoriality in the context of articles that he or she has directly edited. On the other hand, a mature Wikipedian may be territorial with respect to the community as a whole and act defensively over a variety of domains, such as fighting vandalism on a larger scale or citing and developing policy during community discussions (Kriplean, Beschastnikh, McDonald, & Golder, 2007).

Within a large and complex community as Wikipedia, identifying specific groups of users who consider themselves as experts poses a challenge. However, the concept of expert as a social role one plays can provide a way to systematically analyze how users communicate their knowledge to others. For instance, Welser et. al. (2007) employ a combination of social network analysis and content analysis to identify the substantive expert as a social role. This type of expert is an editor with deep content knowledge in specific subject areas and will edit and discuss the articles that are related to their expertise. However, it is likely that there are other domains in which editors may be likely to contribute according to their expertise, such as copy-editing or knowledge of the different processes in obtaining peer review or policy governing appropriate actions within the community (Kriplean et al., 2007). As a result, there may be multiple types of expertise towards which users might express territoriality.

One such emergent social role is the Maintainers, so called because of the visible template this particular group of users place on article discussion pages (Thom-Santelli, Cosley, & Gay, 2009). The Maintainers, according to the application guidelines of the template, are active monitors of the page who are willing to answer questions that any editor may have with the article being maintained (“Template talk:Maintained - Wikipedia, the free encyclopedia,”

n.d.). Despite language included on the Maintenance template warnings against ownership, I observe through interviews that the editors who identify with this social role do feel possessive towards the articles they maintain and express this state through marking and defensive behaviors. First, the template itself is applied as a marker to signal one's expertise about the content of the article and/or the history of the article. Second, the Maintainers observed in this study defend and control their territory through different features of the interface, such as reverting unwanted edits or by keeping tabs on Maintained articles through watch lists. Third, the Maintainers adopted an editing style that allowed them to signal ownership of their articles to others.

The results from this case study suggest that expertise about an article and the norms of the community may contribute to the likelihood that territoriality will be expressed. Territoriality, when used as part of a strategy to control the process of editing articles, may prove to beneficial when expressed during periods of high coordination needs and complex activity. In addition, there are both direct and indirect ways to communicate one's ownership through defensive territorial behaviors in response to other editors' actions. At the most indirect level, an editor can revert changes with a click of a button without directly contacting the other community member who has altered the page. Editors can also directly confront perceived invaders through discussion pages (e.g. Talk pages), if necessary, which may result in more aggressive displays of territoriality.

1.3.2 Case Study 2: Organizational Social Tagging

In this case study, I examine social tagging use within a large enterprise (Thom-Santelli, Muller, & Millen, 2008). Social tagging systems provide an interesting case for study because it is not immediately obvious how territoriality might emerge. For instance, users do not necessarily create the tagged content but they do author the tags. The amount of effort expended to tag is relatively low so the territory may be perceived to be less valuable and therefore, more unlikely to be threatened. Because this particular tagging system leverages individual benefit in organizing one's informational resources in order to create group benefit, there is no central leadership structure guiding how users should tag, making it less likely that territoriality might be expressed through assertion of control.

Social tagging, however, can be a broadcast medium between the tagger and an audience (Marlow, Naaman, Boyd, & Davis, 2006). Because tags are textual, users may be able to employ linguistic strategies to express ownership through territoriality. Within a defined organizational context, such systems may serve to be a platform for users to publicly signal territoriality regarding their position as experts on topics of interest, similar to the displays of expertise by the substantive experts (Welser et al., 2007) and the Maintainers (Thom-Santelli et al., 2009). Territoriality may also emerge as groups form around these topics of interest, as group members might employ insider terminology through tag choice to communicate the boundaries of the community, which serves as a social territory (Lyman & Scott, 1967). Community membership would then be signaled by whether or not an individual understands the jargon employed to describe the tagged resources (Goffman, 1971).

How then might users conceive social tagging as a collaborative activity? One such way would be to remind them that their contributions, as a whole, benefit a greater goal through collaboration with others. This can be accomplished through explicit reminders of other contributors, as is the case in Peekaboom, where users play against other users (Von Ahn, Liu, & Blum, 2006). In the case of an organization, top-down messages may remind users that their actions will benefit their enterprise, while professional benefits, such as career advancement, may motivate users to contribute (Schein, 1992). At the time of data collection in the summer of 2007, the observed social tagging systems are collaborative in that contributions formed a repository of tagged resources to be displayed as search results in the company intranet. The enterprise publicized this initiative through announcements and user updates in an attempt to encourage users to contribute tags so that a large number of diverse resources would be tagged. Accordingly, it is possible that these messages primed contributors to consider their actions as part of an effort to collaboratively build a repository of resources.

Compared to a collaborative authoring environment like Wikipedia, territoriality within organizational social tagging systems may also emerge differently for a number of reasons. First, the design features available in each system will likely influence how the system is appropriated for territorial expression. In social bookmarking sites, little direct discussion occurs around tagged resources as opposed to the conversation supported by the talk pages found within Wikipedia. As a result, territoriality in social tagging will likely be expressed in more indirect ways, such as through tag choice, as I suggest earlier. In addition, Wikipedia and social tagging systems support different ideals of collaboration. The culture of Wikipedia is such that editors expect to

collaborate with others to create articles ("Wikipedia:Ownership of articles - Wikipedia, the free encyclopedia," n.d.) but social tagging is less explicitly conceived as joint cooperative activity. Social taggers participate both for individual benefit (e.g. to organize one's own resources), and their efforts are then aggregated to create labeled repositories of content (Golder & Huberman, 2006). With respect to the research questions I pose, social tagging serves as an interesting contrast to collaborative authoring in that the expressions may emerge in different ways and cooperative processes are also distinct from each other, but there may be common territories (e.g. one's expertise and one's position as an expert) to be marked and defended.

In a series of interviews of 35 taggers within this enterprise, two socially-motivated roles emerged in which ownership may be expressed more strongly: evangelists and the small-team leader (Thom-Santelli, Muller, and Millen, 2008). The evangelists employed specific topical tags for others of similar interests to rally around and served as a core connector between those with similar interests within the organization. Additionally, the evangelist is concerned with raising the profile and reputation of the community of those with similar interests that he or she represents. The small team leader chooses tags that have meaning only to the members of the work group, such as project names or terms that are descriptive of their work. The insider tags chosen re-emphasize the boundaries of the team, which have been drawn primarily by job function. As the manager, the small team leader may feel a sense of ownership towards the team and wants other parties within the organization to know what the group is working to raise its profile. At the same time, she or he may not necessarily want competing groups to know too much

detail about the small team's work, lest there is a pool of finite rewards or resources (Pfeffer & Hinds, 2002).

Overall, I observed that both the evangelist and the small team leader chose specific tags to broadcast and communicate their expertise regarding topics of interest to the other inhabitants of the online space. I propose that the tags may be a marker of territoriality in that those actors within these social roles are trying to communicate ownership regarding the knowledge they hold in specific subject areas. However, there is a difference in how tags are used to call attention to their expertise. Evangelists perceive themselves as thought leaders on certain topics (e.g. project management or attention management) and choose certain tags to make sure that others can find their tagged resources so that they can gain the most exposure possible and retain their position as an expert. By also using tags to call attention to their roles, evangelists defend and maintain their status as leaders by continually reinforcing to their audiences that they are experts. On the other hand, small team leaders selectively reveal their expertise by using specialized tags that only members of their team know, to both define the boundaries of the group and to signal productivity without giving too much away to competing groups, who may be working on similar projects.

This particular study does suggest that individuals perceive that expertise confers higher status and the position of expert is one that is valuable enough to claim through linguistic strategies to express territoriality. For instance, evangelists deliberately chose trademark tags in order to build a public identity as someone knows about x topic, and often hoped to be the first to tag a resource in order to maintain position as the first mover.

Because there is less support for direct conversation in social tagging systems, expressions of territoriality may manifest through tag choice, which help to communicate ownership of one's status as a leader within the organization.

1.3.3 Field Study: Art Expertise and Social Tagging

Drawing from the empirical observations gathered in the interview studies of social taggers and the maintainers on Wikipedia, I designed a field study to further observe how experts may be likely to express territoriality in contrast to novices. In the Wikipedia case, Maintainers signaled their expertise regarding the content and history of the article by marking the article's discussion page with a template that indicated their active involvement and knowledge with the content. In the organizational social tagging case, individuals communicated their expertise by choosing tags that reflected the content in which they held knowledge.

To further observe and test how content-related expertise may influence the expression of territoriality, I conducted a field study of the use of a mobile social tagging system deployed within a museum environment. The museum context fosters several types of expertise. First, there is one's knowledge about art, more generally, and at a more granular level, there is more artifact-specific knowledge regarding each of the art objects in a gallery space. In addition, the museum gallery space has been socially constructed as a site for top-down information transfer with knowledge passing from experts (e.g. curators, docents) to museum visitors who are more likely to play the role of the novice. In this case, I suggest that experts will express ownership of

one's knowledge about art through territorial behaviors when they perceive a challenge to this knowledge by social actors who know less about art.

I observed use of MobiTags in a quasi-experimental field study. MobiTags is a mobile social tagging system designed to highlight a selection of objects within open storage cases at the Johnson Museum at Cornell University (Cosley et. al., 2009). The system provides two ways to for users to contribute by 1) creating and entering unique tags and 2) providing a voting interface to rate existing tags. Like the systems observed in the organizational social tagging case study, there is little opportunity for direct social interaction between users. However, the specific context Because the MobiTags design has been observed to provide some sense of social presence, I propose that territoriality may still emerge as users are aware that other visitors will use and have used this system (Cosley et. al., 2009).

To summarize the methodology of this field study, we asked 32 participants (14 experts, 18 novices) to spend 45 minutes using the MobiTags system. The experts were drawn from a sample of docents, museum interns, art history and art students. To prime for greater awareness that others would be using the system, the researchers told participants that the museum was looking for the best set of tags possible and that the 5 best tags from each object would be displayed permanently in some way. We operationalized territorial behaviors through down votes on tags as a defensive strategy, insider jargon as a marker of expertise and signal of group boundaries, and the amount of tag created as a marker of expertise and commitment to the organization. These measures were informed both by prior research on how expertise influences how one categorizes art objects and the observations regarding territoriality from the first two case studies.

Results suggest that expert users were more likely to participate in the social tagging system, more often voted tags down than novice users and expressed higher levels of ownership, as measured by a modified version of Pierce et. al.'s (2001) ownership inventory, than novices. One's expertise may influence how territoriality is expressed, where perceived invasions of territory are likely to be defended to protect one's status within a hierarchy. In addition, I suggest that high ownership may be potentially utilized to incent participation in collaborative systems but that defensive expressions of territoriality might be redirected away from well-intentioned newcomers and novices. Theoretically, these results provide some initial support for the notion that one's position as an expert can be defended and marked within an online social system.

1.4 What lies ahead

My dissertation research is an initial step towards suggesting that territoriality, the communicative expression of ownership, however, may have a beneficial influence on online collaboration when encouraged appropriately. Through 3 case studies, I aim to extend the current state of territoriality research by observing characteristic behaviors when the territory is not a physical space and describe the contexts in which territoriality can be both beneficial and less productive when individuals work together to create content cooperatively. To make the argument for this contribution, I have structured my thesis as follows. Chapter 2 describes the prior literature on territoriality in physical, political and social space and then positions my proposed extension of this theory into online environments. The initial observations regarding specific expressions of territoriality in online collaborative environments follow in Chapters 3 and 4, which describe the case studies observing Maintainers

within Wikipedia, and organizational social taggers respectively. Drawing from these formative studies, I then present a closer look at how expertise may influence how territorial behaviors through the observations gathered by MobiTags field study in Chapter 5. Finally, I conclude with design and theoretical implications and future directions for the study of territoriality in online environments in Chapter 6.

CHAPTER 2

TERRITORIALITY AND ITS BOUNDARIES

2.1 Introduction

In writing this dissertation, I have spent time at a variety of coffee shops in different locations in the United States. Coffee shops possess a particular set of norms that are influenced by a variety of factors, from the physical architecture, the digital infrastructure of WiFi and power sources and the social actors who congregate in such spaces (Forlano, 2008). For example, the presence of books and papers or a jacket slung over a chair signifies that someone occupies the corner table, even if no one sits there at the moment. Those who become regulars at a particular place may accrue benefits such as occasional free drinks or special recognition from the barista (e.g. having one's usual drink waiting upon arrival). A regular may also begin to feel ownership towards one particular space within the café and claim a particular booth whenever he or she comes in for a coffee. For those who use their laptops at a coffee shop, the tables near the power outlets become highly valued, and fellow patrons utilize a variety of strategies to claim those spaces. These strategies can be self-centered (e.g. refusing to move even if the shop staff imposes a time limit) or they can be more cooperative in nature (e.g. bringing a power strip so that other users can share).

These behaviors and strategies are examples of territoriality as expressed within a shared social space. In this chapter, I discuss the different theoretical perspectives on territoriality and describe how this concept has been operationalized across different disciplines. The common thread in

across these various traditions characterizes territoriality as an expressive act that is meant to communicate ownership or control of a target to others. However, the differences in definitions center on issues of who the territorial party might be (e.g. individual or group), what the territory is, and what the benefits and motivations are for expressing territoriality. I draw from these definitions to assemble provide the working definition that I employ to extend this construct into online collaborative environments and then provide my motivation and justification for doing so.

Next, I unpack the concept of territory to better describe the characteristics of the targets towards which territoriality is expressed. I provide an overview of the prior research describing physical space as a territory and then move into a discussion of non-physical territories. These non-physical territories can be social in nature, such as individuals who feel that they are members of a group with boundaries that need to be controlled in some way (Goffman, 1971). Within these groups, individual members may perceive their position and status within a group as a territory to be maintained and defended.

Finally, I describe various factors that encourage territoriality and their possible effects, both beneficial and harmful, for collaborative activity. These vary from managing one's self-identity through membership in a successful group (Postmes, Tanis, & de Wit, 2001), clarifying task division in complex coordination (Crowston & Malone, 1994), and signaling expertise as a way to maintain one's status within a group (Thomas-Hunt, Ogden, & Neale, 2003). Less beneficial to collaboration are territorial expressions that exacerbate in-group and out-group divisions, particularly if the out-group consists of new well-intentioned contributors.

2.2 Territoriality as communicative action

From the perspective of socio-biology, anthropology and geography, territoriality is strategic and is defined as an individual or group's attempts to influence or control animals (including people), phenomena and relationships within a territory (Ardrey, 1968; Sack, 1986). Territoriality serves a spatial-organizational purpose, where different tribes or groups settle in a certain area to maximize the survival of those within the group with respect to the resources (e.g. food, water) available in a certain area (Dyson-Hudson & Smith, 1978). In this context, actors assert territoriality as a means of control and the maintenance of power by limiting access to a territory, particularly when it contains valuable resources (Taylor, 1988).

The sociological perspective describes territoriality as behaviors that individuals and groups express to govern membership in attempt to signal who belongs and who does not. For instance, Lyman and Scott (1967) propose that territoriality acts as a membrane that forms around groups at social gatherings, such that for the duration of the interaction there are rules to control whom can enter these social territories and engage in conversation (Goffman, 1971). The sociological approach analyzes the norms of access that are developed within groups but focuses instead on the effects of group membership on social order. One might maintain a certain position in a hierarchy by employing territorial behaviors to signal to others that one is a leader or holds a high status position. These signals can serve as an attempt to discourage lower status group members from attempting to ascend the hierarchy (Altman, 1975). As a result, territoriality helps to establish the status quo with respect to the power structure within a group.

In contrast to the geographic and sociological perspectives, the psychological approach to territoriality is conceptualized as a pattern of behaviors that communicate an individual's sense of ownership to others (Altman, 1975; Brown et al., 2005; Sommer, 1969). Psychological ownership is an internal state that an object or target is "mine", and can be characterized as a relationship that exists between an individual and a target, whether physical or immaterial (Pierce et al., 2003). Developing one's sense of ownership can be beneficial in that it establishes self-efficacy, builds one's self-identity and provides a sense of security (Pierce et al., 2003). To clarify, territoriality is the external expression of this sense of ownership. In the motivating example presented earlier in the chapter, a patron may feel ownership towards a certain table but behaviors such as leaving a jacket or book on the table are the expressions of territoriality.

From these conceptions of territoriality, I have assembled the working definition that I use within this dissertation. The current operationalization of this topic is an initial attempt to better categorize and systematically identify what may be characterized as territoriality in online collaborative environments. That is not to say that this current definition is all encompassing – in fact, I expect it to expand in the future as further research on this concept unfolds. To start, I draw from research defining collaboration as activity occurring between individuals who come together for a variety of motivations, such as feeling a sense of ownership towards a target (Pierce et al., 2003) and varying levels of commitment (Beenen et al., 2004). As a result, I am interested in how individuals manage these feelings and motivations as they negotiate interactions between other individuals who may be working towards the same goal (e.g. to complete a Wikipedia article or to produce a short film).

I currently define territoriality is a collection of strategies that individuals use to communicate and express ownership to others, consistent with Brown et. al. (2005). Because I focus on the individual's activities within a shared social space, a psychological approach would seem to support the proper level of analysis in describing how an individual perceives his or her actions within a community. Second, because I am also interested in how these behaviors and strategies influence collaborative activity, I examine how individuals employ territoriality to signal ownership and group boundaries to other social actors. This is consistent with the sociological perspectives on territoriality where one's position within a social structure influences the types of roles or strategies employed during interaction, where individuals attempt to maintaining their status within a group or control access to a valuable territory so that only members may enter.

2.3 Bounding Territory

The territory is the target towards which individuals and groups feel ownership and then express territoriality to communicate those feelings of possession and control to others (Altman, 1975; Brown et al., 2005; Sommer, 1969). The characteristics of the territory, or object of interest, may have a great influence on exactly how social actors express territoriality. The materiality of the territory may be one such factor. Territories may be a physical space, such as a home (Porteous, 1976) or an office (Wells, 2000). They may also be non-physical as well, such as a social group (Goffman, 1971) or ideas and knowledge (Altman, 1975).

Territories possess varying levels of access -- from extremely private to public places available to entry by all – that may be, in part, governed by social

and cultural norms (Hall, 1966). Altman (1975) describes three types of territories: primary, secondary and public. Primary territories are owned and controlled exclusively by certain individuals and groups, and others recognize their ownership. One example of a primary territory is one's home, as conceived in Western cultures, where owners consider access by an unwanted intruder to be a social affront (Porteous, 1976). Secondary territories are semi-public and individuals or a group have some control and ownership but not to the same extent as a primary territory (Altman, 1975). The café booth, favored by a regular patron, can be an example of a secondary territory where the patron can feel ownership yet others can sit in that spot if it is unoccupied. A public territory is one where anyone can have access and there is no recognized owner (e.g. a public park).

According to Altman (1975), territoriality would be more likely to be expressed regarding primary and secondary territories because there is some amount of ownership likely to develop. The intensity of the territorial behaviors and strategies may vary according to the length of time that one may control access to a territory so one might be more likely to more strongly defend a primary territory because of the degree of ownership held. In addition, one's level of emotional attachment to territory differs between the primary, secondary and public, with higher levels of territoriality likely to be expressed with higher levels of emotional attachment (Taylor, 1988). Under this continuum, one's home, for example, is a territory that will be most fiercely maintained as this space is central to one's well-being and its safety is a central concern (Newman, 1972).

Territorial strategies and expressions will differ depending on whether or not the territory is physical or virtual. At the broadest level, nation-states

are territories marked by geo-political boundaries and physical manifestations of these divisions, such as border guards and fortified walls (Sack, 1986; Taylor, 1988). Again, one's home is a physical territory that can be defended by locked doors or personalized with pictures of family and friends (Gosling, Ko, Mannarelli, & Morris, 2002; Porteous, 1976). Goffman (1971) suggests that the body is a territory, which is defended against unwanted intrusion by the maintenance of personal space (Hall, 1966).

Non-physical territories inspire territorial expressions that may be less immediately evident because of the lack of physical markers or signals. For example, the social territory created by the members of clique may mark its boundaries by using insider language or by speaking a foreign language that only those who belong can understand (Goffman, 1971; Taylor, 1988). Both Altman (1975) and Goffman (1971) suggest that one can develop and express ownership regarding ideas or thoughts. These intellectually created territories might be defended through patents in the case of intellectual property (Kobrin, 2001; Leong & Saw, 2007) while expertise may be formally signaled to others through markers of higher education (e.g. a doctoral degree), which can also be accomplished in physical space through personalization of workspace (Wells, 2000). Laib (1985) also suggests that marking intellectual territory can also be accomplished through rhetorical strategies, such as authorship claims (i.e. "this idea is mine") or downgrading intellectual contribution (e.g. "your ideas fit nicely into the wider theoretical context that I am proposing.")

The materiality of the territory does not necessarily determine whether or not the territorial behaviors take on a physical component, particularly in a physical space. For example, one could use a social signal of disapproval, such as verbal warning, to defend against intrusion at an already occupied

table (Goffman, 1971). The integration of technological systems within organizations may also provide another avenue for territorial expression for a physical space and mark it as occupied in an online scheduling system to signal to others that she perceives ownership of that space. In the case of expressing ownership towards online space, territoriality may indeed primarily emerge in the context of the online system, perhaps through appropriation of available design features to mark and personalize. This may be the case, particularly in online communities in which social interaction primarily occurs within distributed social networks where there is little chance for face-to-face interaction.

2.4 Expressions of Territoriality

In the previous sections, I have alluded to a general set of expressions that characterize territoriality and I now provide a more in-depth explanation to describe how these expressions can be categorized on the dimensions of motivation and intent. The first basic expression of territoriality is marking, the placement of an object or substance into a space to indicate ownership of one's territory (Bakker & Bakker-Rabdau, 1973; Brown, n.d). Markers can signal one's claim to a space and they can also delineate the boundary between one's territory and outside space (Goffman, 1971). Marking helps to socially construct an object of interest into a territory by communicating to other social actors that there is someone who has asserted ownership (Brown et al., 2005). Lastly, markers serve as preventative measures in that they are anticipatory strategies so that the public signaling of ownership will deter anyone from unwanted intrusion (Altman, 1975).

Marking can serve two purposes: 1) to communicate one's sense of identity (or personalization) and 2) to indicate control of a territory (Brown et al., 2005). Personalization occurs when someone marks a space with something reflective of one's identity (Sommer, 1969). Examples of personalization within personal spaces, such as dorm rooms and offices, include posting pictures of one's family, diplomas, and posters illustrating one's interests (Gosling et al., 2002). During holidays, homeowners personalize their residences with themed decorations to signal their attachment to their homes (Brown & Werner, 1985). Graffiti, tagged with each of the artists' names or gang affiliations, also serves to mark ownership of territory of public space within urban space (Ley & Cybriwsky, 1974). Marking for personalization and control is not mutually exclusive – personalization can serve a control-oriented purpose as well, as in the case of graffiti artists who use a signature tag that reflects their identity.

Personalization can be applied to technological systems as well. Blom and Monk (2003) extend this concept by defining it as the process by which a user adapts or a system is adapted to meet the personal needs of an individual. Underlying this extension is an assumption that a person exerts enough ownership to allow for this type of adaptation, whether through active means that suggests that a user has enough administrative control to do so. Mobile and pervasive systems can also be used to personalize a physical place by altering one's experience so that it is truly individualized, such as using a personal stereo device to provide a sonic bubble around oneself while moving through space (Bull, 2000). A second approach to mobile personalization is one that signals one's presence and contribution to others' experience of a space. In the case of bluejacking, the sending of short,

anonymous messages to others within a 10-meter radius using Bluetooth, bluejackers marked their presence by sending messages with consistent pseudonymous signatures to recipients in close proximity (Thom-Santelli, Ainslie, & Gay, 2007).

Control-oriented marking communicates the boundaries of a territory to others to discourage unwanted access and does not necessarily reflect aspects of the owner's identity (Altman, 1975; Goffman, 1971). Examples include a "No Trespassing" sign and territorial rhetoric, such as public announcements that demonstrate that an individual or group owns and controls access to a collaboratively maintained document (Laib, 1985). Control-oriented marking acts as the first anticipatory step in establishing group boundaries in signaling that a territory does exist and that someone has taken ownership of it. These expressions can be assertions of power that manifest through social signals, particularly if the territory is non-physical.

For example, in the creation of short films mediated by an online community of animators, the collaborative structure designates that the director is the leader of the project because either she has created the idea or has assembled the necessary crew (Luther & Bruckman, 2008). The title of director is a public signal that someone has assumed the main leadership role, which may pre-empt conflicts over control from inside and outside the group. Socially-based strategies may also be used to define the boundaries of a group and control its membership. Linguistic collusion, defined as the use of insider language, helps to affirm who belongs and determines who does not, depending on one's understanding of the jargon (Lyman & Scott, 1967). By employing secret passwords, members determine who has access to the

territory of the group and can attempt pre-emptively discourage unwanted entry in an indirect way.

The second basic expression of territoriality is defense, behaviors or strategies that arise from perceived and real infringements to one's territory (Brown et al., 2005; Goffman, 1971). Defense differs from control-oriented marking because it is a reactive response while the latter is a preventative measure. Note that other parties may not have truly invaded a territory but its owners' perceive it to be so and as a result, they react accordingly. One high-level example of territorial defense is the act of war between two nation-states where one country perceives an attack and defends through a counter invasion (Sack, 1986). Simple signals of presence may also serve as defense strategies as well, as in the case of players who touch arcade games more frequently if someone hovers nearby in wait (Werner, 1981). Social strategies of defense include yelling a warning to unwanted parties who enter a space, or e-mails chastising co-workers for parking in a restricted parking space. Defense tends to be directly confrontational in nature as owners of the territory hope that this communicative act will be strong enough to stop deter the current invasion and prevent any further violation. The strength of the defensive behaviors may also vary according to how offensive the invasion seems to the owner of the territory. Goffman (1971) characterizes violations, as unwanted entry into a territory, as much less severe than contaminations, which can befoul a territory so much as to make uninhabitable. Accordingly, the defensive reactions towards a contamination will be much robust than a mere violation.

2.5. Territoriality for the good of collaboration

Territoriality is likely to emerge in collaborative activities that occur in a shared social space, as issues of control and ownership develop when users work together towards a common goal. Whether or not the group activity occurs within a physical space or an online environment, there are social factors that help to encourage its development, and analyzing these factors in detail may shed light on why territoriality can be both helpful and harmful to the process of collaboration. On one hand, territoriality helps to structure interaction so that social order is maintained and coordination tasks are less ambiguous because a clearer social structure helps group members figure out their role quickly.

2.5.1 Providing clarity in the social landscape

First, territoriality helps to structure social interaction in reducing uncertainty by making one's ownership of a territory explicit (Sommer, 1969). For example, by placing a towel on a spot on the beach, potential conflict can be averted because the signal of ownership communicates to others that one occupies the space. Territoriality may particularly benefit newcomers and group members who have a lower tolerance for ambiguity, as social norms about the structure of the group become apparent (Sommer & Becker, 1969). A new employee can judge his or her colleagues' positions in the corporate hierarchy by observing what type of office space each of his or her co-workers possesses (Brown et al., 2005). As a result, a newcomer may be able to discern what types of social behaviors are appropriate with one co-worker (e.g. a peer) as opposed to another (e.g. a manager). This may also prove

helpful in volunteer communities where participants drop in and out, and membership is always in flux (Ren, Kraut, & Kiesler, 2007).

For groups working together on a temporary or ad-hoc basis, ambiguity regarding who has ownership over certain parts of a collaborative activity may be detrimental to one's experience in participation. When no one steps up to organize or assume responsibility for the work, it may be the case that social loafing will occur due to a lack of accountability and depending on the collaborative activity, the amount of free-riding may hinder a project's success (Beenen et al., 2004). On the other hand, complex collaborative activity may necessitate a hierarchical leadership structure at times. Explicit indication of the structure and hierarchy of a group can be crucial to success, particularly if the collaborative tasks at hand are complex and coordination costs are time-consuming and resource-intensive (Hinds & McGrath, 2006). In the open-source software community, development projects are often hierarchical because the leaders are instrumental in pushing changes through because they develop feelings of attachment towards the project and are invested in its outcome (Raymond, 2001). Without someone expressing and signaling ownership in some way, the projects may not be as successful in producing software.

2.5.2 Signaling status and expertise to others

Related to the structure of an organization is the importance of status and social role within the hierarchy of a group and the benefits that comes with a higher position. Status, in this context, can be defined as the amount of respect, influence and prominence that a member of the group has when

perceived by other group members (Anderson, John, Keltner, & Kring, 2001). Higher status members of an organization may own larger, more valuable territories (e.g. bigger offices, better projects), and territoriality may be expressed to signal one's position so that these valuable territories are maintained (Sommer, 1969). Because of the tangible resources and social benefits that accrue, such as deference from other group members, the status itself can be a possession that an individual needs to maintain and defend (Anderson et al., 2001). Territoriality expressed in the service of status signaling and maintenance may emerge in various forms, such as sitting at the head of the table at meetings (DeLong, 1973) or by consistently speaking first or interrupting during conversations (Conroy & Sundstrom, 1977).

One way in which an individual decides how he or she will behave in a certain setting is through the social role one adopts. A social role is a combination of behavioral, meaningful and structural attributes that describe how an individual acts in social order (Biddle, 2003; Welser et al., 2007). Status partially results from one's social role; for example, where someone who has a leadership role will have a higher status than someone who is lower in the hierarchy (Schein, 1992). There are other individual factors, however, that help to shape the more informal roles one may play within a group (Lin, 2003). For instance, within online communities, social roles are determined by the types of activities one engages in (e.g. lurkers (Nonnecke, Andrews, & Preece, 2006) or by their patterns of interactions with others in the group (Welser et al., 2007).

Expertise can also determine an individual's social role within an organization, whether formally through a titled position or informally (Thomas-Hunt et al., 2003). For the purposes of this thesis, I draw from Ackerman et.

al.'s (2002) working definition of expertise as relative knowledge, as compared to others, about a subject. In order for others to perceive that an individual has expertise, he or she must manage the impressions that others form about them and their relative level of knowledge through a number of communicative strategies (Goffman, 1971). Within mediated online environments, individuals can send signals of varying reliability that can indicate the likelihood that one possesses expertise in a certain domain (Donath, 2008). For example, profile elements in a social system or demonstrated participation in blogs or online forums, can communicate a willingness to share knowledge with expertise seekers (Shami, Ehrlich, Gay, & Hancock, 2009). Through these public efforts, others in the organization may perceive this person as an expert, which then reinforces one's self-identification as an expert. If an individual forms an attachment regarding his or her role, she or he may eventually express territoriality in defense of his or her position within the organization. Because this position becomes a target of expressed ownership, the owner of the social role may perceive it as a territory.

The expert can be a desirable social role because of the status and reputational benefits that accompanies it. When one gains a reputation as an expert, others in the organization may structure their interactions with the person accordingly by either recommending their work to others or treating them as a trusted collaborator (Friedman & Resnick, 2001). Because the possession of expertise by a group member can influence the performance of the group, those who play the social role of an expert are valuable resources (Wegner, 1987), who may have larger social networks with more social capital than those who are less expert (Lin, 2003). As another benefit, those who are

perceived as experts can gain power to make decisions and influence others because of the value of the knowledge they hold (French & Raven, 2001). In addition, experts are more likely to share their expertise with others if they are properly recognized, which may benefit the performance of the group as a whole (Stasser, Stewart, & Wittenbaum, 1995). With respect to territoriality, the willingness to broadcast one's expertise through marking behaviors may be motivated by a desire to gain this public recognition. Territoriality then serves as a benefit to the community by encouraging expertise sharing.

2.5.3 Maintaining one's sense of self through group affiliation

Territoriality may also be part of a greater strategy to maintain control over a target for reasons of impression management. To appear as an owner of a territory, it may be that territoriality is part of the strategy to assert and communicate to others that an individual controls a target of interest. A person with a lower tolerance for ambiguity may be more likely to want to express territoriality because those behaviors may make him or her feel more secure within a shared space (Brown, n.d.). This increased security may provide someone with the confidence to be a more inclusive discussion leader, when the interaction takes within one's territory (Conroy & Sundstrom, 1977). The impression that one maintains control of a territory allows that person to perceive that space to be more pleasant and private, and as a result, strive to create and preserve that atmosphere, making it more hospitable to all occupant (Edney, 1975; Edney & Buda, 1976).

The ability to express ownership may also have benefit for an individual's sense of identity, particularly if one wants to retain a specific place

within a social structure. Because territoriality is a communicative pattern of behaviors, its public nature may help to reinforce one's conception of the self; that is, if someone acts like a leader when interacting with other members of a group, he or she is more likely to see him/herself as a leader (Tice, 1992). Markers and defensive strategies can be part of the process in which someone asserts and maintains that leadership position because the process of expressing ownership helps to affirm to one's status as the territory's owner. For instance, if an activist wants to lead the organization of a collective action (e.g a boycott) and her position as the leader becomes an object of ownership, she could send signals marking her position through communicative means (e.g. e-mail signatures, repeated reference to past accomplishments, taking the lead during meetings).

The need to appear distinctive is another defining aspect of identity that may also be served through territorial expression, especially through personalization. Within large communities, groups or organizations, individuals may feel the need to stand out among the crowd because they define themselves by the qualities that make them different than others (McGuire & McGuire, 1981). By distinguishing oneself positively from others in a crowd, a person can maintain a higher level of self-esteem (Vignoles, Chryssochoou, & Breakwell, 2000). As a result, personalization (e.g. identity-oriented marking) can help individuals to actively distinguish themselves from others. In an office setting, again, this can mean pictures of one's family and tangible reminders of one's accomplishments (Wells, 2000). Students personalize their dorm rooms with artifacts illustrating their interests and preferences to broadcast certain facets of their personalities to others (Gosling et al., 2002). If appearing distinctive in a crowd has positive benefits to one self-esteem and

self-concept, territoriality can then help people feel more secure when they interact with others in a shared social space, which may facilitate more positive forms of interaction during collaboration.

At the same time, social identity theory suggests that group members want to belong groups that compare favorably with other groups and they desire distinctiveness, in that individuals want to belong to groups that are distinct from others (Tajfel & Turner, 2004). When a group's identity is unfamiliar to others in an environment, group members are likely to increase marking because it can serve as a mechanism for outgroup members to discover and learn about the in-group doing the marking – the owners of the territory (Caruso, Rogers, & Bazerman, n.d.).

A classic example of a territorial group is the urban gang, in which members of opposing groups fight each other for control of turf. Each group uses a set of strategies to express territoriality to preserve their identity by marking the boundaries of group access, such as wearing certain colors or employing insider language, or marking physical space with signature graffiti to signal ownership of one's turf (Ley & Cybriwsky, 1974; Venkatesh, 1997). These territorial strategies can be beneficial within the group, as they help to strengthen the group's identity to its members, which may result in greater commitment to the gang. While the urban street gang is an extreme case, collaborative groups use similar strategies to create a group identity, such as providing a password-protected group website or by referring to events that only insiders would know about in public communication (e.g. Facebook status updates).

Controlling access to resources can be another motivation for the expression of territoriality. Animals can more successfully survive if they band

together to defend themselves and forage for food as a group. However, if too many individuals want to join a group or too many groups claim ownership of the same territory, then resources will be stretched too thin among them. As a result, territoriality, through its acts of boundary maintenance, serves both an altruistic purpose, for those who belong to a group who controls some resource, and more competitive, for those outside that group (Gaston, 1978). For example, within an enterprise, a group member could ensure that her closest colleagues secure a plum work assignment, which benefits those particular individuals, but, at the same time, it shuts out those who may be equally well qualified (Lin, 2003). This type of preferential treatment works to make a group's identity more cohesive, consistent with the aspects of social identity theory that suggest that individuals want to belong to distinctive, favorably perceived, well-functioning groups (Tajfel & J. C. Turner, 2004).

Territoriality, in this type of control, again structures social interactions in that the definition of boundaries helps to keep the peace among competitive parties. Public marking serve as signals to others that there is someone who maintains a certain territory, which may make disruptive incursions less likely occur. Expressions of territoriality may also help reinforce the territory owner or owners' sense of control and security, particularly if the resources are central to one's livelihood. For example, the territories of lobster fisherman in Maine have been developed and maintained through natural geographic boundaries (e.g. cliffs, harbors) and socially constructed family traditions where certain spots are handed down from generation to generation (Acheson & Gardner, 2005). The fisherman employ physical markers, such as colored traps and distinctive buoys, to distinguish the boundaries of the territories and signal ownership by a certain group but equally important are the social norms

that develop between the families who work and live in close proximity to each other that keeps the territorial disputes at a relative minimum (Acheson & Gardner, 2005). The fisherman have to keep some kind of peace in their fishing territories in order to maintain positive social interactions between close families and friends off-boat and clearly defined boundaries marked through territoriality help to do so.

In the work of online knowledge production, the territories may not be as tangible as the fisheries but the ideas generated and expertise gained by an individual can be central to one's livelihood, particularly if it is a valuable resource in that it facilitates the success of collaborative activities (Wegner, 1987). Being known as an expert can be a distinguishing feature within a community that results in additional resources, such as a better job or higher status within the group, being granted to that particular individual (Lin, 2003; McGuire & McGuire, 1981). In addition, time can be a valuable resource to commit to the pursuit of generating ideas and gaining knowledge. As a result, the allotment of time and effort in collaborative activity is a dynamic process that can act as a drain on one's resources, assuming one's energy is a scarce resource (Marks, 1977). Territorial behaviors, such as broadcasting one's knowledge so that others will avoid claiming the expert position, might then be utilized in order to minimize the effort that one has to expend to maintain one's role.

In summary, territoriality benefits collaboration when its expression acts as signals to those engaged in collaboration within a shared space. These behaviors can provide collaborators with some indication of who has taken charge of a shared activity, which may clarify the uncertainty that occurs at the beginning of a project. Territorial expression can also signal who has expertise

on topics that may be vital to the collaborative process. Finally, these signals, as a whole, may indicate that an individual or a small group controls a specific territory. This control may elevate the status of the group, especially if others perceive it to be linked with the creation or maintenance of a valuable territory. As a result, one's sense of self may improve when he or she identifies with a group that completes collaborative endeavors successfully, and to maintain this higher self-worth, an individual may be motivated to contribute to the best of her or his abilities.

2.5 Complicating Territoriality

Whether territoriality is harmful or helpful in collaborative activity is a highly contextual matter, as the same motivating factors that make territoriality a benefit to cooperation may also be detrimental when improperly encouraged. While marking behaviors may help provide structure for social interaction when resources are limited or during ambiguous situations, the character of territorial behaviors may change when there is a threat of invasion and violation. In the case of the lobster fishing territories, dwindling resources (e.g. less lobster) can lead to trap cutting in order to drive fisherman from territories (Acheson & Gardner, 2005). When these attacks become too flagrant, the resulting disputes on land between the different families who have adjacent territories may become longer-lasting feuds that become disruptive to the community as a whole. Boundary confusion between private and public territories may also result in escalating conflict, in the context of aggressive driving behaviors and road rage (Szlemko, Benfield, Bell, Deffenbacher, & Troup, 2008). When drivers simultaneously occupy both a public territory (the road) and a primary territory (their cars), they may have a hard time making

the distinction between appropriate social norms of defense. Subsequently, they defend “their” territory from other drivers in an aggressive manner. In both of these examples, defensive expressions of territoriality can potentially manifest in antisocial ways that can be overly confrontational, particularly if the perceived interloper is not necessarily a true threat.

Territoriality can help to escalate conflict if the marking behaviors also suggest that an object is valuable to its owner, even if the territory seems innocuous. For instance, public pay phones users were observed to linger for a longer time if there was a person waiting on line to use the phone (Ruback, Pape, & Doriot, 1989) and similar behavior was observed in public parking lots in which cars took a longer time to leave a parking spot if the waiting car honked their horn (Ruback & Juieng, 1997). In the case of primary territories, such as one’s home, personalization that suggests affluence relative to its surroundings may make that particular territory more susceptible to theft (Newman, 1972). However, when such territories are intruded upon, defense can become confrontational and in the case of theft, perhaps, violent. On a broader level, Sack (1986) suggests that territorial disputes over valuable resources between countries can result in armed conflict and war, even when social conventions and physical markers are well in place for a long period of time.

The assertion of dominance within a group through the expression of territoriality can also negatively affect collaborative activity, in that dominant individuals may hijack the process so that their perspective is overly represented in discussions, resulting in less diverse outcomes (Janis, 1982). For instance, when opinions on a topic differ, those who own the space in which negotiations occur (e.g. one’s office) are more likely to dominate over

the visiting party because the visitors tend to concede their points more readily (Taylor & Lanni, 1981). In addition, when opinions between territory owners and visitors diverge, the territory owners spend more time speaking in defense of their perspective than the visiting party (Conroy & Sundstrom, 1977). In this example, the residents express ownership of their territory through linguistic markers of control; that is, they spend more time speaking and use more persuasive strategies to convince the visitor. As a result, this type of turf advantage can lead to situations where dominance can effectively shut out minority or newcomer perspective.

Building upon the possibility of exclusion, territoriality may exacerbate in-group and out-group tensions, particularly if resources and expertise are shared within an organization. Experts often have to serve as reluctant mentors to novices, despite limited resources and uncertain benefit, contributing to a sense that one has to protect and defend their time against outsiders. These behaviors can lead to negative consequences. For instance, Wikipedia has a policy called “Please Do Not Bite The Newcomers” that reminds experienced contributors that “nothing scares potentially valuable contributors away faster than hostility” (“Wikibooks:Please do not bite the newcomers - Wikibooks, collection of open-content textbooks,” n.d.). Presumably, this policy exists because some experienced users bite newcomers—employing territorial behaviors to defend against newcomers’ demands.

When individuals become overly territorial regarding their expertise, the resulting inability to share may lead to less successful expertise location, particularly in systems designed to afford such behaviors (Ackerman et al., 2002; McDonald & Ackerman, 1998; Shami et al., 2009). Expertise locators

typically help people find distributed individuals in a community or company who have needed expertise on specific topics, and may include information such as paths through a social network that might help justify contacting the recommended experts. Despite the technical feasibility of expertise recommender systems, the ability to locate experts assumes that these social actors will be pre-disposed to distribute their knowledge and abilities. Group members, however, will not always want to share their expertise, particularly when knowledge is power and status comes when that power is withheld from others (Pfeffer & Hinds, 2002). In addition, group members may begin to see themselves as the sole rightful performers of certain activities, and then hold themselves to those expectations by restricting their activities and information exchange to fellow in-group colleagues (Caruso et al., n.d.). As a result, territorial behaviors may act as a strategy for established experts to defend their privileged positions.

Overall, territoriality can be less helpful to collaboration when its expression becomes exclusionary in nature, particularly when well-meaning contributors want to participate. When territorial expression by individuals shut out others to the point that they become discouraged because their contributions seem marginalized, the collaborative process may suffer. First, a homogeneity of opinion may lead to less creative outcomes due to groupthink (McCauley, 1989). Second, the health of a collaborative community may suffer if newcomers are not sufficiently welcomed and encouraged to participate (Joyce & Kraut, 2006).

2.6. Summary

The main research questions that have been proposed earlier in Chapter 1 are as follows: 1) how can territoriality be expressed in online environments and 2) under what contexts can territoriality be beneficial to the collaborative process? The territories themselves also are non-physical (e.g ideas, knowledge, and expertise) and the territorial strategies used to control these territories can be socially and technologically supported. Territoriality may be likely to be expressed online through insider language and linguistic collusion, particularly if the environment is text-based. Online marking may also occur through personalization and through activities that define the boundaries of groups. Defensive expressions of territoriality may occur through linguistic means or other types of reactive responses to invasion, as supported by design features or social norms within online spaces. Marking is an anticipatory strategy, where the owner(s) of a territory communicate control in order to prevent intrusion. Defense is a reaction to an invasion, whether perceived or real, of one's territory that is meant to dislodge the intruder in order to re-assert control.

In response to the second research questions, the next chapters will cover 3 case studies in which I observe the emergence of territoriality in online environments and begin to describe the contexts in which territoriality can be beneficial to collaborative activity. To do this, I focus on the motivations for territoriality that I have described here: to clarify the structure of the group, to protect one's status within a group and of the group itself, to maintain one's position as an expert and to control access to scarce resources. Each system observed within the case studies supports indirect and direct forms of

interaction that potentially allow for both marking and defensive territorial behaviors while members engage in cooperative activity, related to knowledge production.

CHAPTER 3

TERRITORIALITY IN ONLINE COLLABORATIVE AUTHORING

3.1 Introduction

The journey of a big budget Hollywood movie, from script to screen, can be a circuitous one. For the screenwriter, the process in which movies get made can be especially arduous. After a producer purchases a screenplay, the writer receives feedback in the form of "notes" that are of varying quality in which he or she needs to incorporate into a number of revisions. If the final draft is deemed to be unsuitable, then other writers are brought on board to produce a new draft, which can be radically different than the original. In the case that a movie does finally make it into production, the issue of credit arises, which can be so contentious that the screenwriters' union, the Writers Guild of America, must arbitrate. From the perspective of the original screenwriter, this process can be difficult to bear, since the work of writing and authoring is intensely personal and is a product of intellectual work towards which one develops feelings of ownership. As a result, a writer may express territoriality towards the screenplay and the ideas behind it, in part because of the effort one puts into creating the work and also because of the potential reputational benefits that one may receive through credit.

This simplified description of screenwriting is an example of an individual writer may do almost all of the work of the initial writing while other stakeholders (e.g. producers, directors, actors, studio executives) give feedback, re-write and revise. In collaborative authoring, however, where

there are potentially multiple authors working together, territoriality may also emerge but in a more complex manner because of the shared social space in which the activity occurs. Collaborative authoring involves the production of a common document (e.g. books, computer code, reports) through a process involving the development of writing strategies to manage workflow and idea generation, document control to manage who has jurisdiction to make changes, and defined social roles to reduce ambiguity (P. B. Lowry, Curtis, & M. R. Lowry, 2004). Each of the collaborating authors may develop feelings of ownership because of the effort they expend and potentially express territoriality about their contributions, the ideas underlying them and the common document. In addition, because of the role negotiation and emergent control issues, the processes of collaborative authoring is an interesting site with which to study how territoriality can affect collaboration.

One factor that may influence the emergence of territoriality is that of recognition for one's work. Authors may write for intrinsic motivation and for the joy of creation, particularly if writing is a task that one loves (Csikszentmihalyi, 1991). At the same time, when the document creation becomes a required activity (e.g. part of one's job), authors also write due to external motivators, such as credit and recognition for their contributions. This recognition can come with reputational benefits, such as increased professional success and publicly visible leadership roles, such as the title of Benevolent Dictator in the case of open source software (Reagle, 2007). For example, in the open source software community, volunteer coders can land jobs as developers on the strength of their participation in certain projects (Lakhani & Wolf, 2005). As a result, if being known as a lead author making valuable contribution has tangible benefits, then figuring out how to signal that

to others may become important self-perceived success. In the case of scientific collaborations between particle physicists, up to 120 authors can be named alphabetically as authors in an academic publication so it can be difficult to figure out who may have been the study leader. As Birnholtz (Birnholtz, 2006) observes, there are informal mechanisms beyond publication, in which individuals can signal their centrality with respect to their contributions, such as presenting the work at talks. Because it is important for researchers' career success to become individually recognized even within large collaborations, such signals are important outlets for public communication of one's contribution to joint activity. When visible status as a lead contributor is threatened because their work is not properly recognized, it is possible that an individual may express territoriality to publicly maintain this position through markers as a preventative measure. If there arises a situation, where another author tries to assert leadership in some way, then territoriality may be expressed in a defensive way.

3.2 Wikipedia as a collaborative authoring environment

Over the years, collaborative authoring has emerged within different types of technologies that support brainstorming, outlining and document review as well as synchronous editing over local-area networks (Baecker, Nastos, Posner, & Mawby, 1993; Kraut, 1990). The reach of collaborative authoring, in terms of number of possible contributors as well as subject matter, has also increased as these activities migrate online. For example, wikis are collaboratively created websites in which users can author and edit content using a markup language. As a result, users work together in constructing text to create knowledge for various purposes, such as organizing

group work or for educational purposes (Forte & Bruckman, 2007). Wikipedia, a multi-lingual encyclopedia, is the largest and most well-known wiki, with over 13 million articles (2.9 million Engiish-language articles) ("Wikipedia - Wikipedia, the free encyclopedia," n.d.). Besides articles, Wikipedia has a number of coordination namespaces, such as Talk pages where discussion occurs (Viegas, Wattenberg, Kriss, & Van Ham, 2007) and User Pages, which act as editors' personal profile pages. In addition, there are policy forums in which Wikipedians propose and discuss governance issues (Kriplean et al., 2007). Each of these venues offers participants to collaboratively author and create content, both encyclopedic or discursive, with a number of fellow editors distributed among the globe.

Wikipedia provides an interesting case in which to study territoriality for the following reasons. First, from a design perspective, actions within Wikipedia are accessible to contributors, so that all authoring activity leaves a visible trace so that editors have an awareness of what others contribute (Hill, Hollan, Wroblewski, & McCandless, 1992). For instance, the changes made to any page, whether by human editor or by software agent, are publicly available. As a result, contributors can monitor their participation as well as the participation of others through watch lists and by tracking page histories. The talk pages also allow for direct conversation between users so that territoriality may emerge through explicit linguistic strategies and verbal confrontation. In addition, the open-source nature of the underlying Media Wiki software allows for potentially high levels of user customization so that markers to express territoriality might be created by those who develop ownership towards their contributions.

The complementary social aspects of Wikipedia may also encourage the emergence of territoriality. Because one user's edits are so easily reverted or changed by another, issues of ownership may emerge, particularly if a user perceives that he or she expended enough effort in making a worthwhile contribution (Viégas, Wattenberg, & Dave, 2004). The struggle between deleting and adding articles, in particular, has become a philosophical debate between two camps, the Deletionists and the Inclusionists, in the struggle to balance notable content and thorough coverage within the encyclopedia. Editors with different amounts of expertise and experience are also likely to contribute to Wikipedia in different ways, whether they create content or are more likely to delete it, such that conflicts may occur when a novice editor corrects content added by an expert editor (Kittur, Chi, Pendleton, Suh, & Mytkowicz, 2006). Lastly, coordination between editors is dynamic and roles are fluid, which may result in turf wars over whom does what when the activity structure is ambiguous (Stvilia, Twidale, Smith, & Gasser, 2008).

While anyone can edit Wikipedia, those who create user names can create User Pages that act as personal profile pages. As one becomes a more active and senior editor, reputational benefits increase as one learns how to take on more complex tasks (Bryant et al., 2005). For example, promotion to administrator status (e.g. editors who are granted certain powers to maintain quality standards) is linked to actions such as publicly thanking others, making edits transparent by summarizing and generally communicating their expertise as editors to others (Burke & Kraut, 2008). Barnstars are distributed to editors and posted on User Talk pages as a public signal that an editor has contributed in a variety of ways, such as giving social support or appreciation for work that is not necessarily recognized in other

official channels (Kriplean, Beschastnikh, & McDonald, 2008). Certain permissions, such as the ability to rollback edits, are given to editors only after they have completed a threshold level of participation, such as number of quality edits ("Wikipedia:Requests for permissions - Wikipedia, the free encyclopedia," n.d.). As editors become more visible within the Wikipedia community, these benefits, deriving from one's status as a valued contributor, may cause someone to feel possessive of that position and look for a way to mark and defend it through territoriality.

3.3 Ownership and Coordination in Wikipedia

The control of one's text is an issue that is central to the culture that has been established within Wikipedia. The prevailing mission espouses inclusion of authors; that is, theoretically anyone can edit Wikipedia at any time and on any subject, regardless of credentials or experience. This assertion has been supported by Jimbo Wales, one of the founders of Wikipedia and its the current head, since the encyclopedia's inception and continues to be held up as a core community value. Official policies discourage Wikipedia editors from feelings of ownership toward articles, in terms of the text and the ideas communicated ("Wikipedia:Ownership of articles - Wikipedia, the free encyclopedia," n.d.), and specifically point out that being a primary contributor is not grounds for asserting possession of an article.

Figure 1. The Maintained template as placed on Article Talk Pages. Note that the template explicitly indicates that it is not a marker of ownership.

Despite this, a group of Wikipedians have created the *Maintained* template (Figure 1), which allows editors to indicate active contributor status toward a given article. The stated guidelines, and the template itself, are careful to emphasize that article ownership is not expressed by the Maintained template (Figure 1). Maintainers are self-designated and ideally should have expertise on the subject matter as well as the structure of the article itself (e.g. style decisions, references) ("Template:Maintained - Wikipedia, the free encyclopedia," n.d.). As of the May 28th, 2008 database dump of Wikipedia, there were a total of 1172 articles that were designated as Maintained.

In this chapter, I present the results of a qualitative study exploring the expression of territoriality online, using Wikipedia as an example. I describe how a group of lead users express territoriality in this space by appropriating

existing functionality to exert control over artifacts. I also discuss how Maintainers' commitment and stewardship of articles may benefit the complex collaborative process that produces high quality articles.

3.4 Methods and Participants

I chose to observe Maintainers because, as lead users who have indicated that they have committed substantial time and resources to an article, we believe they might express territorial behavior toward the articles they maintain. Lead users, while not necessarily representative of more novice users, often have the expertise to customize the features of a system to mark and defend their territories (Hippel, 2005). In addition, while Maintainers may comprise a small number of editors with a particular set of practices, their underlying motivations for expressing territoriality may be applicable to other types of editors (Ljungblad & Holmquist, 2007).

We conducted in-depth semi-structured interviews with 15 Maintainers (12 phone, 3-mail) from March through June 2008. I chose to use a multi-medium methodology, similar to Luther and Bruckman (2008) to communicate with the widest spectrum of Maintainers possible. The telephone interviews lasted approximately 60 minutes and consisted of open-ended questions regarding their experiences as Wikipedia editors and their activities as Maintainers (Appendix A). The e-mail interviews consisted of similar questions with a period of IM follow-up for clarification and further information. Interviews began with a general inventory of editing demographics, such as length of time spent on Wikipedia, length of membership in the community, first edit. For the telephone interviews, participants were asked to be at a computer with an internet connection so that we could discuss specific pages.

In order to gain specific insight on the motivations for applying the Maintained template, I asked participants to visit 3 of their Maintained sites of their own choosing. The participants and I would refer to the article pages, page history and talk pages, as we spoke. To observe whether or not there was ownership emergent on Maintained pages, I asked open-ended questions to probe for their motivations for maintaining the pages. I did not use the word "ownership" or "territorial" in any of the interviews, as the cultural ideal as well as the template itself suggested that those terms would be too fraught with meaning, and it would be possible that participants would not express themselves fully because of prevailing community norms. To provide a specific referent for the participants, I asked them to refer to their last action on that page, which we both confirmed using the page history logs on Wikipedia. I would then request that the participants to describe the reasons why they made those changes and then recount any reaction from their fellow editors regarding those changes. I then asked the participants to recall and describe any changes they felt detracted from the page and provide their reasons for those sentiments.

Participants were recruited via e-mail, messages left via Wikipedia itself, and through snowball sampling. The participants (5 female, 10 male) are all native English speakers and have been active editors for an average of 3.2 years. The interviews were then first coded using a grounded-theory influenced analysis where emergent themes were iteratively refined over several rounds (Glaser & Strauss, 1967). I then compared these themes to existing research on territoriality as a way to further ground these initial explorations observing this phenomenon in online space.

3.5 Results

The interviews reveal a management style that relies on the application of territorial markers to communicate one's expertise and commitment to other community members as a way to both deter vandals and to welcome new editors—but only on the maintainer's terms. I observe defensive actions (e.g. monitoring article watch lists for changes and vetting unknown editors) that ensure there is active maintenance that protects article quality. However, these defensive behaviors may run the risk of deterring new community member participation.

3.5.1 The Maintained template as marker

Broadly, participants used the Maintained template as a signal to communicate their feelings of ownership towards an article in which they contributed to significantly. By indicating that they are the main contacts for anyone who might have questions regarding their respective Maintained articles, the template was employed to communicate their expertise and knowledge of the article's subject matter and its revision history to other members of the Wikipedia community.

The public expression of one's commitment and possessive feelings towards the article suggest that Maintainers do indeed employ this particular template as a marker of territoriality, despite the explicit warnings against ownership found within the template guidelines.

> *If you put that template up there and say, "I'm willing to answer questions about this article and put my name up here." It does in a*

> *sense say, I'm declaring myself an expert on this article. You know, and I'm going to take over for it.* (Maintainer for literature-related topics)

In addition, participants expressed some dismay whenever an unknown or new editor made substantive changes to the article, whether it was regarding content or citation choices, without any discussion on the article talk page.

> *I do feel that it* [the Maintained template] *usually signifies a particular editor as someone who has spent much time and effort on improving or writing a particular article…common courtesy would dictate that person should be contacted or at least notified if major changes are going to be made…*(P8)

I suggest Maintainers perceive the template as an explicit sign to new contributors to a given article that there is someone who acts as its guardian. Maintainers also seemed to carry an expectation that the role of the Maintainer held enough weight that he or she should be consulted if major changes to the article were to be made. At the same time, participants realized that the nature of Wikipedia as a community with a cultural norm discouraging ownership would make that unlikely much of the time. Further, the template is only visible on an article's discussion page, not the page for the actual article itself, making it even less likely that editors would notice (and heed) the template.

3.5.2 Defense through monitoring and cross talk

I observe the appropriation of wiki functionality, particularly the ability to easily change pages back to a previous version, for defensive means in response to changes made by other editors. All interviewed participants actively monitored their Maintained articles by watching page change updates to look for article vandalism and more substantially, to revert edits that they deem unsatisfactory due to quality issues such as incorrect information or assertions made without proper citations. They then used their perceptions of the quality of the edits to make judgments regarding the quality of the editors, particularly if they are unknown, much like (Viégas et al., 2004)'s observations regarding page watchers who look out for unfamiliar IP addresses or first-time contributors.

> *Because people will say "I'm improving the grammar here" but really t hey have no idea what they're doing. And, there has to be someone vigilantly watching all the time.* (Maintainer, military history topics)

However, if the changes were minor in nature (e.g. formatting) and left the major structural form intact, participants would be more likely to view the new edits as acceptable and would not revert them.

> *Most of what was changed by other people was formatting issues, which don't really matter to me as long as it reads fine. I don't really care what period goes where.* (Maintainer 4, music topics)

A more explicit but less common form of defense, again through appropriation of existing wiki functionality, is through direct contact between editors. This happened both on articles' discussion pages, and through direct user-to-user communication on User Pages, which are analogous to profile pages. Five participants reported incidents where a new editor would repeatedly try to edit an article even though the maintainer would revert their edits after finding them unsatisfactory. In response, participants would then apply a stronger defensive action by objecting through discussion, as opposed to simple reverts of edits. From the perspective of the new editor, however, these territorial responses may prove discouraging enough to deter further contributions.

> *And you'll say [via Talk pages], no, you have bad ideas. You should leave the article alone because you don't know what you're talking about…You're protecting the article because you do feel it's yours…But it IS my article. It is my baby.* (Maintainer 3, arts and literature topics)

I suggest that the defensive strategies of monitoring and confronting unwanted activity combined with our previous description of marking is indicative of a pattern of collaboration that is more hierarchical than is suggested by the anti-ownership policy ("Wikipedia:Ownership of articles - Wikipedia, the free encyclopedia," n.d.). Maintainers exert some managerial power over a selection of pages that they maintain but will allow smaller tasks (e.g. copy edits) to be completed by newer editors.

3.5.3 Control through primary contribution

Consistent with the emergence of public statements of ownership and a hierarchical model of collaboration, I also observed that each of the Maintainers interviewed had a particular editing style, consistent with primary editorship, again despite explicit policies warning against such behavior. To confirm these observations, we used WikiDashboard (Suh, Chi, Kittur, & Pendleton, 2008), a visualization of edit activity on Wikipedia pages, and found that the articles maintained by our participants were indeed the primary editors, in terms of number and size of edits.

Each characterized their involvement as that of a managing contributor; that is, he or she decided to improve or significantly revamp the article with minimal assistance unless he or she specifically requested it from other editors with whom they were familiar. In one case, however, one participant went so far as to take his activities offline so that he retained complete jurisdiction over his articles as he embarked on major editing.

> *I've found that creating the desired article (or major re-write) offline in Word first allows me to take days to weeks to develop, source and write an article…. Once I am satisfied, I either create the new article or replace the existing article completely with the re-written…It is essentially a "fait accompli" style of editing.* (Maintainer, military history topics)

Generally, participants perceived their editing style to be more holistic in nature, where drafting complete articles is the goal rather than incremental improvements.

> *I would rather contribute, you know, finished, more finished product than the smaller bits of information…And, a lot of people just like to contribute a paragraph here, a citation there.* (Maintainer, arts and literature topics)

As an expression of territoriality, I propose that the Maintainers' editing style is part of a strategy to maintain control of the content and structure of an article and to reinforce to observers that they hold some leadership position in the construction of the article, despite the explicit policies against ownership. From our analysis, it seems that this control is especially apparent in the early stages of the creation of an article, whether it is a substantial rewrite or starting from scratch.

Maintainers may be adopting this editing strategy because they are committed to producing quality articles, particularly ones that will stand up to heavy critique from equally dedicated editors. This particular collaborative pattern may also be a result of existing policy, at the time of data collection in the Spring of 2008, with respect to the Featured Article nomination process, which consists of a series of rigorous peer reviews with votes taken until consensus is reached to grant or deny status. The Featured Article designation is a prestigious descriptor of quality; only a small percentage of articles become Featured.[1] Eight of the participants reported that they were heavily involved in the Featured Article process, as both article nominators and peer reviewers.

This leadership model has now been codified within the Feature Article nomination process; nominated articles must have a primary editor who gives

[1] 2214 of the 2,539,000 articles, as of August 2008 ("Wikipedia:Featured article statistics - Wikipedia, the free encyclopedia," n.d.).

his or her blessing for the nomination and takes responsibility for addressing in a timely manner the actionable objections that arise during the peer review process.

> *We* [the committee] *have started demanding that the nominator of the article either be one of the primary contributors...Because we were having a lot of people nominate articles, saying, "Wow, this is cool. I read this and it's awesome." But they have no concept of whether the article is complete...* (Maintainer, news and current events topics)

This model of primary ownership, with the territorial expressions that accompany it, can have benefits. Since the Featured Article process is a lengthy and rigorous one, a successful nomination may more likely occur if there is a primary contributor willing to expend a large amount of time and resources needed to usher an article through peer review. Having a primary contributor who is intimately familiar with the history of an article may also have value in explaining why an article is the way it is, to help newcomers understand the article's structure or to resolve disputes.

3.6 Where we stand

This data reveals that territoriality does emerge within online space—and that when a hierarchical style of collaboration is crucial to success, territorial behavior may be valuable. However, it can also have a negative effect by deterring new member participation. Instead of negotiating with a Maintainer who reverts their contributions, new editors of an article might just give up on the article, or the community as a whole. To maintain the health of

a collaborative social system, encouraging a diverse pool of participants to help maintain documents may help slow the decay of artifact quality. We found that Maintainers were amenable to small formatting changes made by other editors but less encouraging of more substantive changes to content and structure.

More broadly, the theoretical implications of this study are as follows. First, territoriality may be communicated using virtual markers that can be constructed through familiarity with the system. Maintainers applied user-generated templates to signal feelings of ownership and communicate commitment to other editors. Second, maintainers signal their expertise through this template and feelings of ownership may develop around this expertise, particularly if expertise comes with benefits. In this case, successful peer review of articles and involvement with the prestigious Featured Articles process designates an editor as someone who cares about Wikipedia's quality.

Next, despite warnings against ownership, when a Maintainer's territory has been invaded, he or she will apply defensive techniques in response, ranging from indirect actions (e.g. reverting edits) to direct confrontation (e.g. approaching someone on a talk page). These actions may be territorial in nature because they are linked to expressed ownership that has been communicated by the author of the article. That is, the author, as the self-designated owner of the page, commits herself or himself to making the page as high quality as possible. Finally, territoriality may be part of a larger strategy of control. By taking leadership roles and editing and authoring large portions of articles, Maintainers signal to others that they control the territory. As a result, they use territorial markers and defense to retain this position.

To summarize, this case study reveals that users of collaborative authoring systems may develop feelings of ownership about the content that they produce, even if the cultural norm of the community warns against it. These feelings of ownership are expressed through anticipatory marking, such as customizable user templates, to let others know that there is an owner of the article. When unwanted changes were made to an article, participants employed different communicative strategies to defend their territories in response. The stronger response is direct communication through online discussion, which is currently supported by Wikipedia. Another form of response consists of indirect strategies, also supported by the system, in which users changed edits back to an earlier version of the page.

In the next two chapters, I move my focus to social tagging systems as shared online spaces where territoriality may emerge regarding one's expertise and one's status within an organization or a group. What makes social tagging systems different, however, is the lack of direct online interaction between the social actors in the space, which may affect the character of the emergent territorial strategies. This lack of interaction, however, offers a different test for whether or not territoriality might occur in an online collaborative environment by observing whether these behaviors occur without the threat of direct invasion (e.g. when changes cannot made by others) as well as an activity that is less dependent on joint collaborative action for success.

CHAPTER 4

SIGNALING TERRITORIALITY IN AN ORGANIZATION THROUGH TAGGING

4.1 Introduction

Collaborative tagging is the process by which many users add short keywords, or tags, that describe shared online content. Popular examples of this include sites like flickr.com, in which photos are tagged, and delicious.com, in which links to web pages are tagged. These tags then serve as metadata that are attached to the content, which is viewed as the main resource within these systems. Because the process of tagging is relatively low effort, many users can apply tags to many resources, creating a large corpus of labeled resources with a relatively low amount of individual effort. However, there are a few factors that influence the character of individual participation within collaborative tagging systems.

The design of collaborative tagging systems affects the user experience by establishing the technical mechanisms that support collaboration. Visibility and ownership of resources and tags are at the heart of four basic design dimensions of collaborative tagging systems: tag sharing, tag selection, item ownership and tag scope (Sen et al., 2006). First, tag sharing refers to the visibility of the tagged resources to others within the space, such as the ability for a flickr user to choose settings that only allow certain contacts to view his or her photos. Second, tag selection describes visualization features, such as tag clouds or “most popular tag” filtering, in which the general body of tags is distilled into a more manageable form. Third, item ownership answers the following question: who owns the content tagged by the user? In photo

tagging sites such as flickr, it is the user, but that is not necessarily the case in social bookmarking sites, such as delicio.us. In constrast, tag scope characterizes the management of the tag application. Any number of individuals, as is the case in delicio.us, applies a set of personal tags to a broad set of items while in a community-owned tagging application, the group maintains a common set of tags on individual items, owned by the sharer (e.g. photos on Flickr).

The social aspects of collaborative tagging systems, as structured by these design dimensions, play an equally important role in their user experience. Users can maintain completely private repositories such that the tags chosen need only to be understandable to one person, the tagger. On the other hand, users who want to reach out to a broad audience may need to select tags using very different criteria. In particular, tag ownership and tag scope raise important questions with respect to territoriality. For instance, does tag ownership increase the perception of threat if users, besides the owner, are able to tag a public resource? Alternatively, can a community develop feelings of ownership regarding a shared repository of tags, if encouraged within an organizational content?

In this chapter, I attempt to answer those broad questions by using the theoretical framework of territoriality. First, I outline the individual-level and group-level motivations for participation in collaborative tagging systems. I then describe the additional incentives to contribute when organizations deploy such systems, focusing on the possible benefits derived by individuals when they are members of the organization, and propose that territoriality may be more likely to emerge within organizational social software. Lastly, I

describe a qualitative study that observes how users employ tags as territorial markers to signal their expertise and to define the boundaries of their group.

4.2 .Choosing Tags for Oneself and for Others

In organizing information, collaborative tagging systems have both a benefit for an individual user as well as groups of users by classifying resources under a set of unifying descriptors. On an individual level, tags can encourage recall for the person who originally applied the tags and organize one's personal collection of content (Wash & Rader, 2007). On a group level, collaborative tagging systems afford social information seeking by allowing users to search for resources via community browsing, such as looking for bookmarks according to popularity or those created by specific taggers (Lee, 2006; Millen, Yang, Whittaker, & Feinberg, 2007). As metadata, tags are also important to the information retrieval process by providing information scent to users who are browsing by tags topically (Chi & Mytkowicz, 2008). In addition, collaborative tagging systems can especially useful in encouraging the labeling of non-textual content (e.g. pictures or music) for subsequent text-based search by other users (Ames & Naaman, 2007).

Since tags have become so useful in the process of information retrieval, the body of tags, or the tag vocabulary, is also an important characteristic of collaborative tagging systems. Tags are collectively contributed by a large group of users with no imposed or official categorization scheme. Each user is free to choose and label resources using whatever criteria he or she sees fit, and there is no pre-determined hierarchical structure, as is the case in a card catalog. While this may, in theory, support participation in the system by a large amount of users, the diversity of tags

also poses a challenge for successful information retrieval, as is the case when users do not choose the same tags for the same resources (Furnas, Landauer, Gomez & Dumais, 1987). In tag-based search, polysemy -- words that have many related but not identical meanings -- can return results that are related but not appropriate while synonymy – multiple words with identical meanings—contributes to inconsistency in that all relevant resources will not be found if labeled with an infinite amount of variation (Golder & Huberman, 2006). Because of these challenges, the underlying motivations for tag choice and contributing to tag systems are important to understand.

One likely reason for variable motivations for choice and contribution are the different social characteristics of the tagged resources (Marlow et al., 2006). In the case of delicio.us and other social bookmarking tools, users are likely to bookmark web pages for personal refindability (Wash & Rader, 2007). As a result, delicio.us users perceive their efforts as an individual benefit and therefore, are more likely to choose tags to spur recall (Rader & Wash, 2008). However, resources like photos and blog posts are perhaps more likely to be shared with others. Ames and Naaman (2007) observe that taggers within a photo-sharing application were likely to select tags that have meaning for those who share common ground and social context and in some instances, go as far as to target these parties by using tags who might only be known by certain readers. This suggests that there are users who employ tags as a signal to speak to intended parties, such as family members or friends, so that they draw attention to certain photos.

The between-resource distinction is not an entirely clean one, as taggers themselves play multiple roles within a system and the tags they choose to apply as well as their motivations for tag contribution change

depending on the context. Hammond et. al. (2005) describe user roles within these systems as 'tag user' (e.g. the reader of the tag) or 'content creator' (e.g. the person applying the tags). Ames and Naaman (2007) observe that users in a photo tagging system contribute tags for both personal and social benefit as both readers and writers, so that they can organize their own personal collections as well as share this content with others. Again, depending on the audience for the tags, the motivations with respect to tag choice may differ if one is tagging for himself or herself (e.g. tagging for personal refindability) or to communicate to another user (Marlow et al., 2006).

Lastly, the design of the tagging systems can influence user tag choice and contribution. On an individual level, one's own tags can be recommended back to a user, so that a consistent personal vocabulary may emerge, as habit and investment partially influence tagging behaviors (Sen et al., 2006). By making others' tags visible through tag clouds or through the post form, however, users can be influenced to choose tags for social reasons such as popularity (Golder & Huberman, 2006; Millen et al., 2007). Sen et. al. (2006) observe that factual tags used by community members, upon recommendation to users are more likely to be reused, potentially leading to vocabulary convergence. Whether or not a tagger is influenced by his or her own tags or ones chosen by other tags, popular tags, if displayed, are more likely to be re-used.

To summarize, collaborative tagging systems offer both individual and group benefits and the salience of each category depends on several factors. First, users may be more likely to share certain resources (e.g photos) with others (e.g. photo or bookmark) so the chosen tags may be more communicative in nature. Second, the design of the collaborative tagging

system may influence how users choose tags, such as through social imitation or by keeping one's tags internally consistent (e.g. applying the same tags as one has previously). With respect to territoriality, I propose that ownership may develop around the shared resource so that users may develop strategies to limit access and these strategies may revolve around tag choice.

4.3 Organizational motivations for collaborative tagging

Systems like Flickr.com and delicio.us support awareness of known members of a network (e.g. collaborators, friends and family) and emergent groups with common interests (Marlow et al., 2006). They are, however, open and available to the public, and users may participate for reasons of utility and communicating to smaller, personally known groups (Ames & Naaman, 2007). As organizations deploy collaborative tagging systems, the social context changes and users may be motivated to contribute for additional reasons.

First, organizational social software, used within enterprises, makes user identity especially salient by tying one's name to contribution. The social software deployed within IBM (e.g. social bookmarking, blogs) require login and authentication with an employee ID so that anonymous or pseudonymous contributions are impossible, in contrast with other public systems where there is often no strong link between real world and online identities (Millen, Feinberg, & Kerr, 2006; Muller, 2007). When one's non-virtual identity is so visible to fellow co-workers, motivations for contribution and participation are likely to change, particularly as one becomes part of a professional community. Because user identity is so visible, taggers who contribute to organizational social systems may be more likely to employ tags as a communicative device because these actors may have working relationships

with one another and exchanges and social interactions occur within a bounded organizational context. In effect, participation and contribution may have a real effect on one's standing within the organization. For example, very few resources are designated as private within dogear, an enterprise social bookmarking site, suggesting that users are either more comfortable sharing with their co-workers or that they only bookmark and tag resources that they perceive as appropriate for their co-workers (Millen et al., 2006). This careful self-presentation may stem from the realization that inappropriate sharing may lead to a sullied work reputation, since future co-workers and managers are the audience for their contributions.

One's commitment to an organization may encourage participation in a social software system as a way to improve the community in some way. As someone more highly identifies with a group, he or she is less likely to leave the community and is more likely to express a higher level of commitment (Ellemers, Spears, & Doosje, 1997). This commitment may lead to participation in collaborative activities for the benefit of a group. For instance, if someone believes that creating a repository of media resources will improve the status of that group as experts on a subject, he or she may encourage fellow members to tag these resources so that others can find them and perceive that group as more knowledgeable. This person may also participate because he or she believes that helping others find information will better the organization as a whole (Hogg & Terry, 2000). At the same time, he or she learns to associate and identify with that group for individual benefit in order to bolster self-esteem by perceiving one's in-group as distinct and better than others (Tajfel & Turner, 2004). A member of an organization may be more likely to contribute to a collaborative social system if an individual perceives

benefits for him/herself (Beenen et al., 2004) *and* benefits for the group as well (Hogg & Terry, 2000).

As members of an organization become more highly committed to the group, they may also feel a sense of attachment to the community, which may also lead group members to participate in shared social activities, especially if they are thought to benefit the organization in some way (Ren et al., 2007). These feelings of attachment may lead to psychological ownership, the sense that one owns something (Dyne & Pierce, 2004). Again, higher levels of ownership may lead to greater contribution to collaborative systems if a member of an organization feels that he or she has a direct stake in its success, particularly if the individual participation aligns with the success of the organization. For instance, self-categorization theory predicts that users may be more likely to participate in a collaborative activity if they feel that that activity may lead to success because it is important to one's identity to be associated with successful groups (Ellemers et al., 1997). In addition, large organizations have a variety of subgroups with their own cultures and norms that often compete for a limited pool of resources (Hofstede, 1998). As a result, user participation in these systems may also be motivated by the desire to make one's subgroup more successful than the others within the larger organization.

In summary, members of an organization have various motivations for participating in collaborative social software. First, participation can raise one's visibility within a large group, which can have positive consequences within a professional context. Second, if one expresses higher levels of commitment to the organization, one may be more likely to participate in collaborative activity that helps that organization succeed. In large

organizations, however, individuals may participate in collaborative systems on behalf of their own subgroups, motivated by a desire to be associated with a successful group. If, however, a potential mismatch between individual benefit and benefit for the entire organization as a whole arises, less helpful expressions of territoriality may arise if individuals feel that contribution to the system may affect their status or reputation (Pfeffer & Hinds, 2002). For example, an individual may decide not to share and tag resources that would be valuable to the rest of the organization because he or she feels retaining control of this knowledge may be of higher individual benefit. On the other hand, feelings of ownership regarding the organization or group membership might be useful to encourage so that territoriality can be expressed in such a way to incent participation in a social software system.

4.4 Territoriality and Collaborative Tagging in an Organizational Context

The previous sections attempted to describe the motivations for participation and contribution within collaborative tagging systems more generally and within an organizational context. As mentioned previously, users may have prior contact or knowledge with each other and may eventually collaborate with each other in future interactions through continued membership within the organization. Because of this situated context, territoriality may emerge around a number of objects and resources and these expressions may be communicated through the social systems that organizational members have at their disposal. In addition, continued use of a social software system may lead group members to eventually feel ownership towards shared resources because they are products of some type of collaborative activity.

Within the particular organization observed in this case study, tagging various internal resources has been promoted as an act of cooperation so that shared content may be labeled for the improvement of the information seeking and search within the corporate intranet (Dugan et al., 2007). However, continued participation through tagging may not occur if users perceive that they should are not responsible to tag because they believe that the content "belongs" to another. For example, in the case of collaborative repositories, renaming files that are essentially identical does not occur not because it is technically impossible but instead, there are social norms in place that make users less likely to do so because of the perception that another user has created the content (Rader, 2009). Because of these factors, the reluctance to alter "other's" content contributes to the goal of a less efficient information-seeking environment, particularly if there are duplicate or out of date files. I propose that territoriality, as an incentive to motivate participation, may help to empower users to collaborate if users are encouraged to develop and express feelings of ownership when appropriate.

Members of an organization may use these collaborative social systems to communicate the boundaries of the subgroups formed within the community. Territorial behaviors may emerge as a defensive response to a perceived invasion by an outsider or as a preventative measure to broadcast to others who belongs to a group (Goffman, 1971). In physical spaces, territoriality may manifest through measures such as a locked door or through social means, such as secret handshakes or dress codes. While there might be fewer opportunities for interaction between users through direct conversation in collaborative tagging systems, territorial expression in this context may emerge in less explicit ways. For example, insider language may

be employed in order to signal to others who belong and who does not where only those who understand may be granted access (Lyman & Scott, 1967). A possible motivation for people to be territorial about subgroup membership relates to social identity theory, where one's perception of his or her in-group as attractive to others helps one feel better about him/herself (Tajfel & Turner, 2004). At the same time, subgroups within a larger organization may also be fighting for scarce resources, such as money or larger offices or better projects, so members may be territorial about group membership in order to control who may have access.

To better understand the potentially emergent territorial behaviors as expressed through the appropriation of social software, I conducted a series of exploratory interviews with users within a large enterprise organization to answer the following research questions:

- How does one's status within an organization influence the expression of territoriality?
- How might territoriality be expressed through collaborative tagging systems that are deployed within the context of an organization?

With respect to high-level research questions of the thesis, this particular study also attempts to observe how territoriality emerges when there is little opportunity for direct interaction within the collaborative tagging systems. In addition, I build upon the findings from the study on Maintainers to observe whether signals of expertise can serve as a marker of territoriality within social tagging systems.

4.5 Study Methodology

Semi-structured interviews were conducted with a sample of 33 employees of IBM, a global corporation with over 300K employees that provides a broad range of IT services (e.g., software, hardware and consulting). This firm has a long history of innovation and internal experimentation with new technology, including emerging forms of organizational social software (e.g., blogs, wikis and social bookmarking). During the data collection occurring from June 2007 to August 2007, the Chief Information Officer (CIO) had organized an enterprise tagging service project in which users of these enterprise systems were encouraged to tag as many resources as possible in all of the systems within IBM that employed collaborative tagging. The metadata from these tagged resources would be then aggregated in an attempt to improve search and retrieval within the corporate intranet (Muller, 2007). As a result, the CIO's office hoped to frame collaborative tagging as a shared activity that was important to the organization and therefore ideally completed cooperatively by as many users as possible.

The collaborative tagging systems under study consisted of a blogging tool (Figure 2), a social bookmarking website (Figure 2), an enhanced contact directory (Figure 3), and a podcast repository (Figure 3). Each application supported the ability to collaboratively tag resources for subsequent use, which were determined primarily by the type of system (e.g. blog posts for the blogging tool, profile pages for the contact directory, URLs for the bookmarking site, and podcasts and multimedia presentations for the podcast repository). The blogging tool and the podcast repository provide an avenue for direct within-system interaction through commenting features so that viewers can

discuss the tagged content. The contact directory and the social bookmarking site did not support for direct conversation between users.

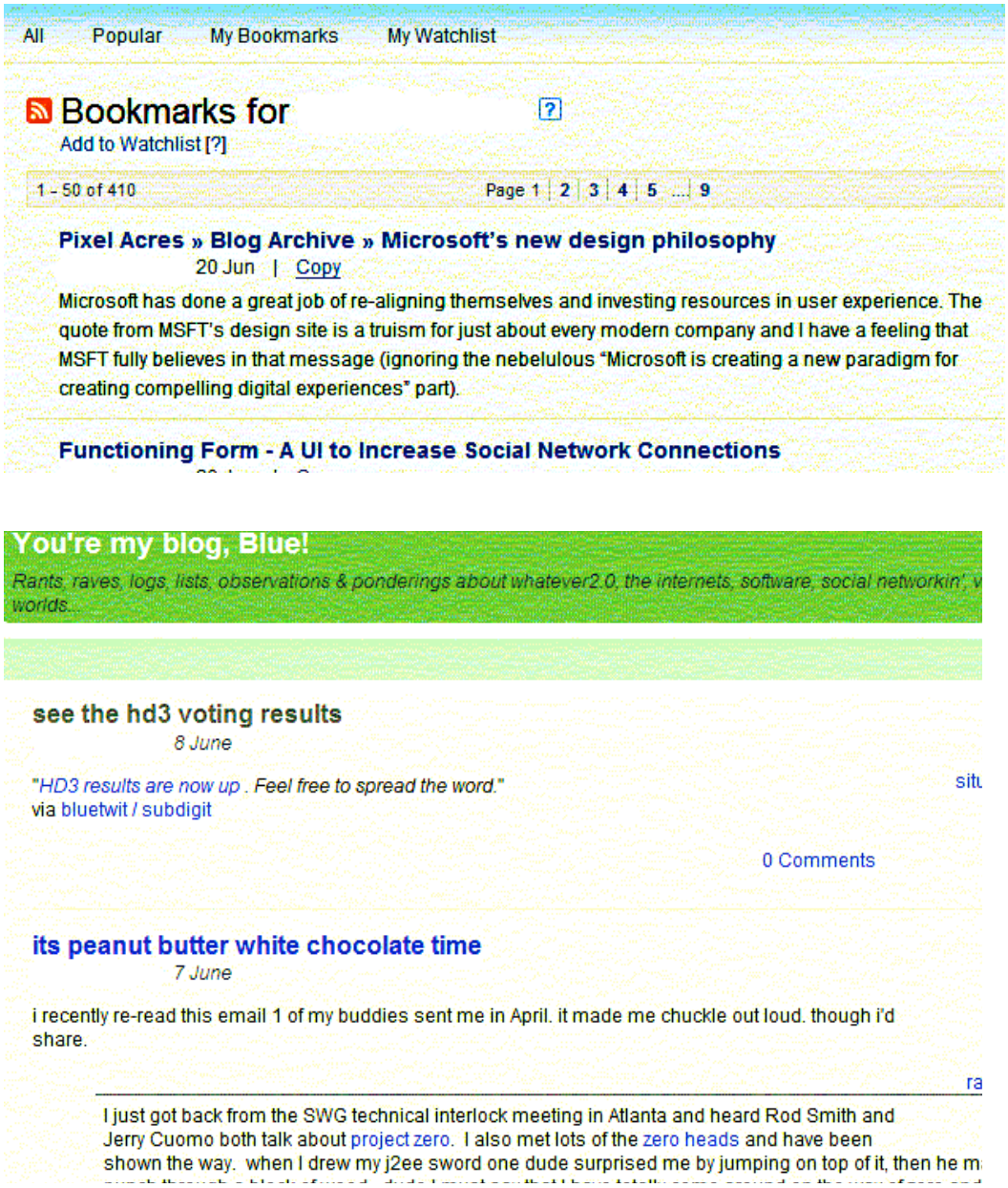

Figure 2. Blogging system (top), social bookmarking system (bottom)

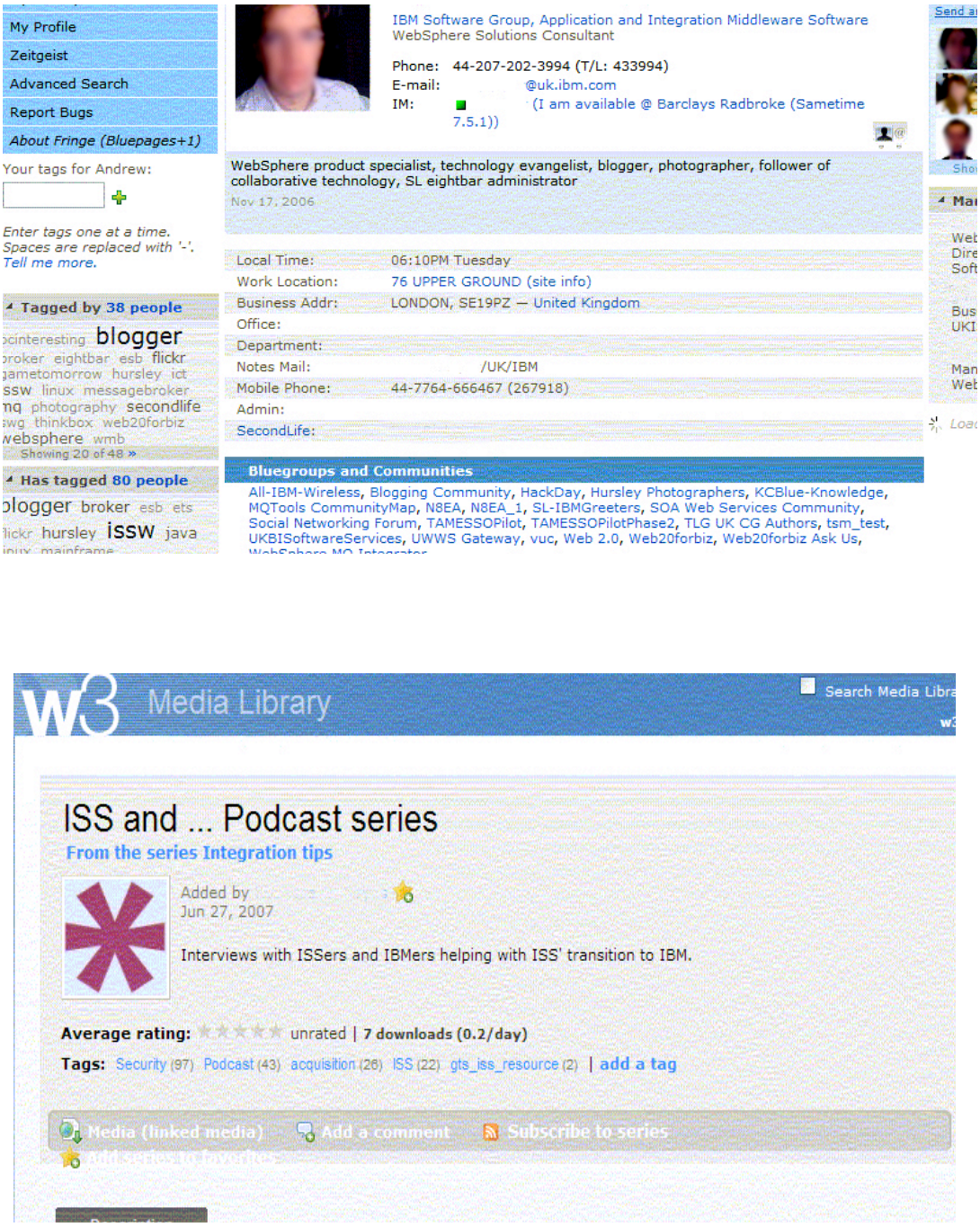

Figure 3. Contact directory (top), Media Library (bottom)

The 33 informants stratified by their tagging activities across these systems, in that we looked for participants that were active taggers (>20 tags applied) in at least one of these systems. They were distributed across 6 countries, and 12 of the informants were female. Informants' job roles included project managers, designers, software engineers, and consultants. Interviews consisted of a series of open-ended questions regarding the informants' functions within the organization, the communities with which they identified and general discussion regarding their tagging activities. Finally, there were a series of specific probes asking informants to discuss specific tags that they had created in the different tagging systems (Appendix B). I requested permission to employ screensharing through instant messaging so that the participants and I could refer to specific tags and resources more easily. For each of the systems that the participants reported using, I focused on the last 3 resources that were tagged and I asked open—ended questions regarding their motivation for choosing the tags and what they believed was the tags' intended uses.

The transcribed interviews were then coded in a manner influenced by grounded theory (Glaser & Strauss, 1967) in which emergent themes were generated from the collected data. There were three rounds of coding with three coders in which themes were refined and the coders discussed critical incidents to reach consensus about their importance and meaning with respect to motivations for social tagging within the organization. Following these initial rounds of coding, two coders re-analyzed the data in a similar manner to build upon the prior analysis to draw out themes related to ownership and territoriality.

4.6 Emergent Roles

My collaborators and I identified five major social roles – community-seeker, publisher, community-builder, evangelist, small-team leader -- around the organizational use of tags emerged from our interviews. During the process of coding, I decided to employ the concept of social roles as an analytic framework to systematically observe and categorize the evolving strategies and motivations employed by taggers depending on whom they perceive their targets to be. As mentioned previously, social role can also help to determine what status one holds within an organization.

In general, like Marlow et. al. (2006) and Ames and Naaman (2007), we observed that individual motivations, such as creating a personal repository or re-finding one's own resources, remained important. At the same time, however, we observed that the informants who fall within these audience-facing roles place equal or higher importance on tagging for others, suggesting that tags serve a communicative purpose within the organization. In addition, I did observe, across the roles, that participants did see contribution to the tagging systems within IBM as a cooperative activity to label all of the resources within the organization so others could find them. This motivation was especially apparent because of the perceived shortcomings of w3, the internal search engine.

> Yeah, definitely. Because I feel like Dogear [the social bookmarking site] and..uh, tagging is more about helping people find the right link, where w3 search [internal IBM search engine] is not that great. And it's so much easier if people go through here and pick out the pages that you're really going to need. So I did spend more time thinking about

> what are the tags to apply to those links so that local team here can find the pages that they need. (*M*, project manager)

Five of the 33 participants were explicitly aware of the larger CIO-sponsored effort to encourage people to collaboratively tag the various pieces of information. This suggests that users wanted to contribute even without explicit direction from the higher levels of the organization.

I describe all five of these roles in a previous publication (Thom-Santelli et al., 2008) but for the purposes of employing tags as a territorial strategy, I focus on the community-builder, evangelist and small-team leader roles and provide brief descriptions below.

4.6.1 Community-builder

If a community of shared interests did not exist, some informants would appropriate the tagging features of the system as a way to create one. The intended readers for the tags created by the community-builder role are current and potential members of the community. The community-builder tailored their tag choice appropriately so that the intended recipients can more easily find available resources. Specific topical tags are then chosen so that a community will rally around the described interest:

> I'm happy to accept [a tag that] someone else has used because that makes me more useful to me and the other person. (*E,* software developer)

The community builder is highly aware of how other members of the group view their tags, especially when they are so explicitly linked to his/her professional identity.

> Ok, because someone went out on the internet and typed out a search, this tells me that **project-management**… [is] the highest percent of [search] terms…This is how people are finding me…*(J*, project manager*)*

This behavior is consistent with Bogdan's (2003) assertion that visibility is part of active membership within a community and is a critical aspect of career self-management within a community of practice (Wenger, 1998).

4.6.2 Evangelist

I observed several instances of community builders who developed increasingly complex strategies and motivations. Using the language of this corporation, I term this role as an *evangelist*, who can be described as a core connector between those with similar interests within the organization. The evangelist not only uses the different systems to broadcast his/her message but also serves the community by finding related information to facilitate sensemaking for fellow members of the group because he or she knows so much about a certain subject. Here an evangelist, who was "able to build a community of people around [my] blog," describes a tagging strategy:

> When you go into [the social bookmarking site] and look at those people, you see that they match, they use the same criteria as myself and the tagging convention. It helps because it provides a unifying

> message…that whatever they see in other systems is what they'll see…*(L)*

The evangelist tags within different systems to draw attention to his or her resources and content, which are usually byproducts of their expertise. It is important to note that the audience consists of known members of the community, with known information-seeking strategies:

> I know that several people subscribe[2] to me on **attention**. I know that several people look up my bookmarks on **attention**. For a while, I used to use **attention-management** but now I make sure to use **attention** now because I know how they find me. *(S, referring to the social bookmarking site)*

The evangelist is often concerned with raising the profile of her/his community and his/her expertise within the community and uses tagging as part of a strategy to enhance the reputation of the group. For example, in the following quotation, the informant keeps track of his community's visibility in the organization by increased usage of tags within the social tagging system.

> I want to see **project-management** move up that cloud. I want to tap into it. It requires a lot more than me doing it. My whole community of project managers would have to get involved. *(J, referring to the blogging tool)*

[2] This respondent refers to a feature that provides RSS feeds based on tagger, tag, or the intersection of tagger and tag in the social bookmarking site. The list of subscribers is visible to the tagger.

4.6.3 Small Team Leader

The small team leader employs tags as a signaling device by employing terminology that is understood primarily by in-group members. In our interviews, I observed that six of our informants identified with this role. While the community builder/seeker, evangelist and publisher were active taggers across systems, the small team leader's tagging was more variable. There were a few reasons expressed for their lower frequency of tagging, most often that other members of the team did not write tags within the systems.

> It's kind of like going to a party. It's going to be fine if a lot of people go, but there isn't really the mass that we need to make it part of the mainstream. If that mass evolves, then I'll gravitate. *(J, referring to the social bookmarking site)*

When the small team leader is a more active tagger, he or she may attempt to use the systems as a way to share resources with the team as the intended target. The tags chosen are ones that have meaning to only those within the team (e.g. project names). In the following quotation, the informant describes a tag that consists of an acronym for a project (EGL) combined with one standing for user architecture (UA).

> That **EGL_UA** tag is one that I specifically picked … as something my team… would use on [the social bookmarking site]. I remember sending out an e-mail that said, "I'm going to start using this to record links to these pages we keep having trouble finding. And I'm going to apply this **EGL_UA** tag to it so if you find links, you can do the same." *(K)*

In these cases, the small team leader has tried to establish team-specific tags but the rest of the group does not respond (e.g., **EGL_UA** was intended for team use, but was in fact written by only one member of the team). I speculate that small teams may not employ tagging as frequently because of the smaller number of group members and the higher levels of existing common ground among them.

I also observed, in two instances, that the small team leader employs these social systems in an effort to bring visibility to his or her team. To do this, these participants posted and tagged web resources on certain topics to try to attract attention to their new interests or projects. However, they both expressed that they wanted to balance how much they were willing to share online with the possibility of other groups competing with them to complete similar projects. As a result, these users expressed their feelings of ownership regarding their expertise by keeping some resources marked as private so that they were not accessible by others or by not bookmarking them at all.

> I, uh, want people to know about what's happening, especially how we…might be involved..as leaders. Because some of this [work] is exciting. But…if too many people start in on the same thing, maybe it gets crowded…or sort of, uh, noisy. So, I'm trying to figure it out. *(M, project manager, referring to social bookmarking site)*

When probed about this issue, these participants wanted their teams to achieve a higher level of success by being the first to bring the organization's attention to an issue or by gaining the reputation as an expert in the subject.

From these three social roles that emerged from the data in our interviews, I observed two main expressions of territoriality communicated through the use of the collaborative tagging. First, participants contribute to these systems in order to broadcast their expertise to raise their reputation in the organization. In effect, their status as an expert is the territory and public signals of their expertise are the markets are the territorial expressions. Second, participants use specific terminology in their tag choices to delineate boundaries of subgroups within a larger community. Within the systems observed here, these choices are not necessarily defensive expressions of territoriality; that is, they are not responses to perceived invasion into an established group. Instead, participants use certain tags as a marker to communicate to others that they feel ownership towards this subgroup and serve as maintainers of a community of interest.

4.7 Using Expertise as a Marker

One's reputation as an expert on a subject affords himself or herself higher status, particularly in an organization that prides itself on knowledge production. Simply knowing that one is an expert is not enough – others have to aware of your expertise in order to obtain reputational benefits. As a result, being visible as an expert can be an important motivation to contribute to collaborative tagging systems, and tagging then becomes a strategy to attract an audience of readers.

> It's selfish in that I tag so that other people will look at my content. I want other people to look at the podcasts and blogs. (G, consultant)

> Beyond page views, community-builders and evangelists, in particular, I want those in the organization to know that they are extremely interested in specific topics so as a result they choose certain tags to match up with those content areas.
>
> My audience is people, people who are interested in the different topics that I blog about, bookmark…I have a passion for things regarding knowledge management, knowledge sharing, collaboration…community building, learning, social networking. The communities that I work in on a regular basis, these are the things that, the product I work with, a lot of these tags on this topic on Blog Central are probably mine. I'm one of the major people contributing to this subject. (R, software developer)

In another example, as mentioned previously, one participant changed her tag choices from *attention-management* to *attention* so that the audience, who subscribed to her bookmarks and tagged resources via RSS feeds, could more easily recognize her contributions within her area of expertise.

As part of their professional identity, participants who assumed the role of community-builder and evangelist derive satisfaction from the recognition they receive for their expertise and actively seek it out through participation in various collaborative social software systems. In an enterprise organization, this recognition has professional benefits, as well as the intrinsic ones of higher self-esteem detailed by Tafjel and Tafjel (2004), as the title of "evangelist" is can be incorporated into one's official job description.

It is important to note that this type of broadcasting is not just the desire to manage one's impression (Goffman, 1971) but that there is also some aspect of perceived ownership of a resource or an object, which is a central requirement for the expression of territoriality. In this case study, I propose that the act of applying certain tags to draw attention to one's expertise is a territorial marker. Recall that marking describes the behaviors that construct and communicate ownership of some object (Brown et al., 2005). According to this working definition, the status that results from one's reputation as an expert is the territory and the tags serve as a marker to tell others that you possess some expertise about the subject and therefore occupy a higher status position within the organization. Because this status may be valuable in that it yields career and professional benefits, it may be a desirable territory that must marked and defended.

When asked whether or not they felt that there were other fellow experts in their area of knowledge, participants who identified with the community-builder and evangelist roles acknowledged that there were others who contributed to these systems who had similar kinds of expertise. However, they were careful to qualify their responses to say that they knew of only a relative few who were publishing or tagging as much as they were about their expertise. While I did not observe any overtly exclusionary behavior, the evangelists, in particular, were aware of a status hierarchy where they were the producers of knowledge by tagging resources for their reading audience.

When probed on whether or not they hoped that more people would evangelize on their topic of expertise, these participants replied positively but would then re-emphasize that other members of the organization perceived

them as one of the first experts in a certain space. One participant viewed his participation in the different collaborative tagging systems within IBM as a way to share his expertise selectively in that he retained some ownership of his knowledge.

> I was a very active contributor [to the Project Manager Knowledge Base]. I published lots of reports. Over the last year or so though, everything is copyright under [informant's name]. I don't post it there anymore because they [IBM] require that you give up your intellectual capital. (*J*, project manager)

Furthermore, their status as a widely read contributor to social software systems motivated them to continue to be active taggers, employing their signature tags, so that they retained readership and maintained their position as a known expert on project management or attention or any number of topics.

4.8 Marking Group Boundaries through Insider Language

While we described the role of the small team leader as one that employs insider language, we also observed that other roles employed other specialized tags to define the boundaries of a community of interest. As a result, these tags served as secret passwords to highlight resources of interest to those who understand the terminology.

> **gts_iss_resource** is the private tag I told you about before that we're going to assign to our resources. Anything with this tag will be

> automatically integrated into our content...It's kind of cryptic. I wouldn't expect too many people to go "Oh! That's such a meaningful tag" but we're using it for our purposes. (*R*, intranet editor)

> It's (**web20forbiz**) like a special tag. It's a generic tag. It's a special kind of secret tag, if you'd like. If you use that community, it's likely to show up in aggregators that the community set up...It's like a special password. (*A*, consultant)

Participants expressed that these specific terms helped to bring together a certain group of people by providing a signal that only they would know. The members of these subgroups assume that their shared common ground will help fellow members interpret what these specialized tags mean (Clark & Brennan, 1991).

In this case study, I observed that participants did not necessarily feel like there was a threat to the boundaries of their communities of interest so the application of these tags was not a defensive territorial strategy. Instead, I propose that the specialized terminology served as a marker to signal that there were active members who exerted effort in maintaining the community and perhaps developed a sense of ownership because of their participation in the subgroup's activities. Like our observations regarding the use of tags to mark expertise, these participants were not actively excluding people from joining their community of interest but assumed that others were not interested or that these resources would be irrelevant to others. However, by using tags that not everyone could understand, these subgroup members drew

boundaries to indicate who belonged as an insider and who did not have access.

4.9 Where we stand

The qualitative interviews in this case revealed that the professional visibility that accompanies the participation in an organizational collaborative tagging system motivates contribution to some extent, particularly for participants who identified with certain social roles (e.g. evangelist, community-builder and small-team leader) within the organization. Participants also tailored their tag choice for two purposes with respect to territoriality. First, evangelists and community builders choose specific tags as markers in order to signal their expertise to others within an organization because they feel territorial about the status they gain as an expert. Second, we also observed that a number of participants -- across roles -- used specialized jargon to mark and construct the boundaries of subgroups to allow access to the insiders who knew the meaning of these terms.

Like the Maintainers in the Wikipedia case study, the evangelists and small team leaders are concerned with their position as expert in a social hierarchy. In fact, a reputation as an expert in an enterprise organization may have tangible professional benefits that may not necessarily be present through voluntary participation in Wikipedia. If these benefits are perceived to be scarce, this may encourage territorial behaviors that are less collaborative in nature, as is the case with the small team leaders who struggle with sharing resources completely. In this case, these participants seem to feel ownership regarding their individual expertise but less so for the health of the organization as a whole.

When compared to a wiki, the social tagging systems in this case do not necessarily provide direct interaction through direct conversation. In addition, they do not allow for alteration of the contributions of other participants, as is the case in a wiki, where text can be easily changed. As a result, defensive territorial strategies were less likely to occur through direct confrontation within the system, as was sometimes the case in the WIkipedia study. Instead, the interviews suggest that, in this case, designating something as private, using insider language or simply not sharing a resource were the actions that may have been partially motivated by territoriality. These strategies may possibly be more passive than direct confrontation between collaborators and offer some kind of face saving, particularly in an enterprise environment when users' actions are linked to their real-world identity.

In the next chapter, I describe a field study observing how users with expertise about art might express territoriality in MobiTags, a mobile social tagging system deployed in a museum. Unlike the currently described social tagging systems, users are anonymous but social presence is conveyed through indicators of past activity. Like Wikipedia, MobiTags allows for some rating of contributions through voting on the quality of tags; however, the system is not designed for direct conversation or interaction, much like the organizational social tagging systems. Drawing from the findings from the previous two case studies, I hope to more systematically test whether or not expertise does influence how territoriality might be expressed when newcomers appear to contribute to a system.

CHAPTER 5

TERRITORIALITY AND EXPERTISE WITHIN THE MUSEUM ENVIRONMENT

5.1 Introduction

In Chapter 4, I observe that members of an organization marked their territory as experts in a subject area through participation in collaborative tagging systems. The users signaled their expertise by choosing tags to reflect their knowledge and defined boundaries of the organizational subgroups by choosing tags that were understandable to its members. These strategies to communicate ownership fell into the category of marking behaviors, as they were not in response to an invasion to one's territory. I propose this perceived lack of threat is related to participants' view that collaborative tagging in this context is a broadcast medium, where they are the producers and their audience consumes the tagged resources as readers. As a result, their place in the hierarchy, as the known experts, seems secure.

The data from Chapter 3 also suggests that one's position as a self-designated lead author in an online collaborative writing environment can be perceived as a territory that can be both marked and defended. In this case, the Maintainers placed visible templates broadcasting their expertise about an article to attempt to communicate their sense of ownership to other potential contributors who may be thinking about making changes to their Maintained pages. When unwanted changes were made to an article, the Maintainers reacted in a defensive manner by reverting the content in the article back to its original state or by confronting editors directly through online discussion

threads, especially if the changes reflected some questioning of the author's expertise with respect to writing a quality article for Wikipedia. In both of these reactions, the Maintainers are somewhat aware of the invaders' identity, either pseudonymously or through an IP address.

In this chapter, I approach the issue of perceived threat to one's position as an expert when the system does not allow for direct interaction and when the threats are largely anonymous. When one's collaborators are unknown to others, will experts still express ownership even if the presence of other collaborators are implied but not directly observed? I also begin to further investigate how an expert might react when position is threatened, particularly when newcomers join an existing collaborative group. Expressions of territoriality may be especially sensitive in cases where experts and novices work together, especially if there exist social and technical structures that make it appear that these two groups are to work together as peers. While recruiting novices is important for a community's health (Ren et. al., 2007), novices impose costs on experts' time and pose potential threats to experts' work (through mistakes) and position in the community.

I describe the results of a field study of a mobile social tagging system deployed within a museum environment to users with a wide range of expertise, in order to explore how more expert users manifest territorial behavior and attitudes when employed in collaborative activity alongside novices. I observe that self-identified experts feel more of a sense of ownership than non-experts about both their expertise and the community of art lovers, participate more The findings suggest that such appropriations may benefit contribution to a user-generated content system if increasing

expert participation is the goal but can also discourage novices from becoming more active community members.

5.2 Ownership & Participation in Collaborative Activity

Again, my current definition of territoriality is the public expression of ownership -- the individual's internal sense that he or she possesses something (Pierce et al., 2003). This target of ownership can be tangible (i.e. real estate) or intangible (i.e. ideas) in nature (Goffman, 1971). One can also have a sense of ownership towards a group or organization to which an individual belongs (Dyne & Pierce, 2004). Ownership can have a number of positive social benefits that may help the collaborative process. It can strengthen self-identity in that one defines oneself, in part, by the possessions he or she controls (Belk, 1988). This may contribute to a stronger sense of security in one's self-worth, which in turn may lead to more confidence in one's social interactions with others (Pierce et al., 2003). Feelings of ownership can influence individuals to remain as members of an organization and vice versa, where increased tenure and commitment may increase an individual's sense of ownership (Pierce & Rodgers, 2004). Thus, ownership may be a possible factor in encouraging commitment and continued participation in a collaborative activity.

When members of an organization feel ownership regarding the group, they are more likely to view it in a beneficial light. For example, an individual's sense of ownership encourages higher valuations of owned targets (Strahilevitz & Loewenstein, 1998), suggesting that ownership influences these judgments positively (Beggan, 1992). If the organization decides to deploy a new process, those who feel a higher level of ownership may be

more likely to accept the introduction of a new technological system that may benefit the group (Paré, Sicotte, & Jacques, 2006). As a result, I suggest that ownership can help motivate participation in collaborative activity, especially if a sense of ownership helps to encourage commitment and acceptance of new processes and systems. However, if psychological ownership is largely an internal state, observing its outward expression may be accomplished largely through territoriality with higher levels of ownership possibly resulting in stronger examples of marking and defensive behaviors.

5.3 Considering the Expertise of Museum Visitors

The traditional social structure of the museum suggests that professional curatorial staff members are the most expert of the community by virtue of professionalized training and education while the museum visitor might be considered the least expert (Falk & Dierking, 2000). However, the museum visitor population can be incredibly diverse and identification as an expert does not lie solely within the domain of the professional staff of a museum (DiMaggio, 1996). For example, residing in the hierarchy between museum professional and naïve visitor are docents, highly motivated volunteers who are trained to give tours and participate in education activities. In addition, there are museum visitors who are practicing artists, artists-in-training or serious connoisseurs or collectors who have demonstrated significant commitment to the arts.

The desired experience of the museum visitor depends on the type of motivations one has when entering such a space. Bell (2002) describes three key components of the museum ecology from the visitor's point of view: liminality, sociality and engagement. Liminality characterizes the museum visit

as transformative, spiritual and reflective. At the same time, visitors seek out social and educational experiences while in the museum. The introduction of technology to support these three components has taken on a variety of formats. Boehner, Sengers, Medyinkskiy and Gay (2005) characterize these differences as technology applied as tool or as art. The tool approach treats the introduction of technology as a one-way information transfer process, where curators pass their knowledge to the visitor who plays a passive role as receiver. For example, handheld guides that act primarily as a tour guide deliver content that has been professionally curated, where visitors can participate primarily through commenting on this content (Fleck et al., 2002). On the other end of the continuum, the art approach treats technology as an installation and as another artifact to be interpreted, much like paintings or sculpture. Boehner et. al. (2005) propose, however, that a hybrid approach may be more fruitful, so that visitors may play more of an active role in creating and personalizing their museum experience.

For instance, systems such as Imprints (Boehner et al., 2005) allow visitors to personalize their visit and connect with other visitors through creating and viewing signature markers attached to individual exhibits. In another example, ArtLinks supports meditative signs of social presence through a collectively created visualization, which augmented visitor interpretation of a physical artifact (Cosley et al., 2008). Alternatively, (Benford, Giannachi, Koleva, & Rodden, 2009) design immersive mixed-reality experiences to encourage the performative quality of the museum visit, such that visitors are characters that actively create the narrative. All of these examples allow the museum visitor to reflect on their experience and allow for

flexibility in interpretation, so that meaning can be co-created as opposed to transmitted in one direction (Sengers, Boehner, David, & Kaye, 2005).

More recently, museums have implemented social tagging systems in order to address the gap between how curators and the general museum audience interpret artifacts, as well as to encourage visitors to contribute to the experience. Steve.museum (Trant & Wyman, 2006), for example, is an online collaborative system in which distributed users tag items in a multi-institutional museum catalog in order to generate a more diverse vocabulary for describing art objects in a way that is accessible to those who have less expertise. There is little barrier to entry with respect to contribution in steve.museum -- all that is required is registration.

At first glance, this kind of social tagging system may not fully support explicit means for museum visitors to communicate their expertise to others. Thom-Santelli et. al. (2008) however, suggest that members of an enterprise organization choose tags accordingly in order to appear as experts to their audience, while Ames and Naaman (2007) observe that tags can be socially communicative in nature. Because of their commitment to the arts and the museum, we hypothesize that these "unofficial" experts will exhibit territorial behaviors, particularly if they feel a sense of ownership towards the museum. Further, we expect that they will use features of the cooperative system to express these behaviors.

5.4 Study Description

To study whether this is in fact the case, we conducted a field study in which experts and novices used MobiTags, a collaborative tagging system in a museum, and observed their behaviors using the system and their attitudes

toward it. MobiTags is a prototype system that allows users to vote on and contribute to the body of tags that describe objects in a small open storage collection at a university art museum located in the Northeast United States (Cosley et al., 2009). MobiTags has a number of features; the current study focuses on the tagging features, shown in Figure 4.

Each object displays the tags previous visitors have associated with the object, as well as how many people agree that the tag is appropriate for the object. Users can vote up or down on a tag to express their own agreement or disagreement. Visitors can also add new tags by using a text box; MobiTags provides an auto-complete feature that takes advantage of tags already existing within the system. Since encouraging contributions from experts and novices was a primary design goal for MobiTags, social tagging was chosen as a low effort way for users to provide their opinions. This lowered barrier encourages museum visitors to participate despite what fears they may have due to a lack of expertise about art or the museum (Gay & Hembrooke, 2004).

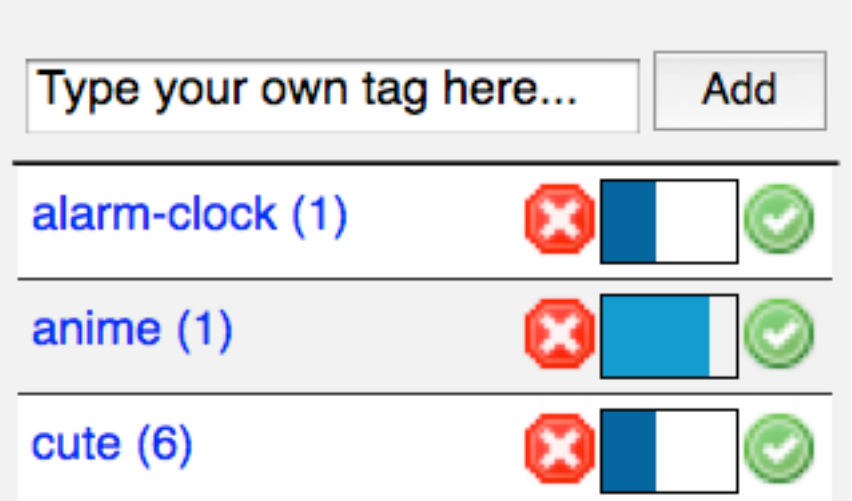

Figure 4. MobiTag Voting Interface. Users click on the green button to vote a tag up while selecting the red button registers as a down vote.

5.4.1 Methodology

I repurposed MobiTags to conduct a study of how expertise can manifest as territorial behaviors in collaborative content creation systems by asking experts and novices to vote on a pre-existing collection of tags[3]. We explicitly primed visitors both to highlight the cooperative nature of the system, and the potential for conflict. In order to emphasize the cooperative nature of the system, and to encourage contributions, we informed participants that we were hoping to obtain the highest quality tags possible and asked them to contribute as best as they could. To make the possibility of conflict and the threat to one's contributions more salient, we made two characteristics of the system explicit in our instructions, as follows.

[3] This collection is the same collection used by the original MobiTags system; these tags were primarily generated by the research team, all self-admitted art novices.

What we are trying to do is create a collaboratively generated group of tags that will help other museum visitors have a great educational experience while navigating the space *so we've asked people who are knowledgeable about art, such as those who study art, as well as museum visitors who don't have any formal training to help contribute tags of their own, which are displayed here.*

However there is limited space in the tour interface, so we will be choosing the best 5 tags created by users to be displayed permanently alongside the object in the tour. We plan on making this decision in the next week of or so your input is especially important at this time. As I mentioned before, one special thing about the MobiTags is the ability to create tags and view tags chosen by others. So, if you are unsatisfied with the tags left by others, then you can vote them down. If you are pleased with the other tags, you can vote them up as well. If you want to add more tags, please feel free to do that as well. We are interested describing the objects as well as possible. Keep in mind that other visitors will be able to vote your tags down as well.

The study script reminded participants that others of varying expertise would also be completing this task and that they would be able to vote their tags up or down. It also emphasized that the interface highlighted only the most popular tags on the initial page describing the object (Figure 5).

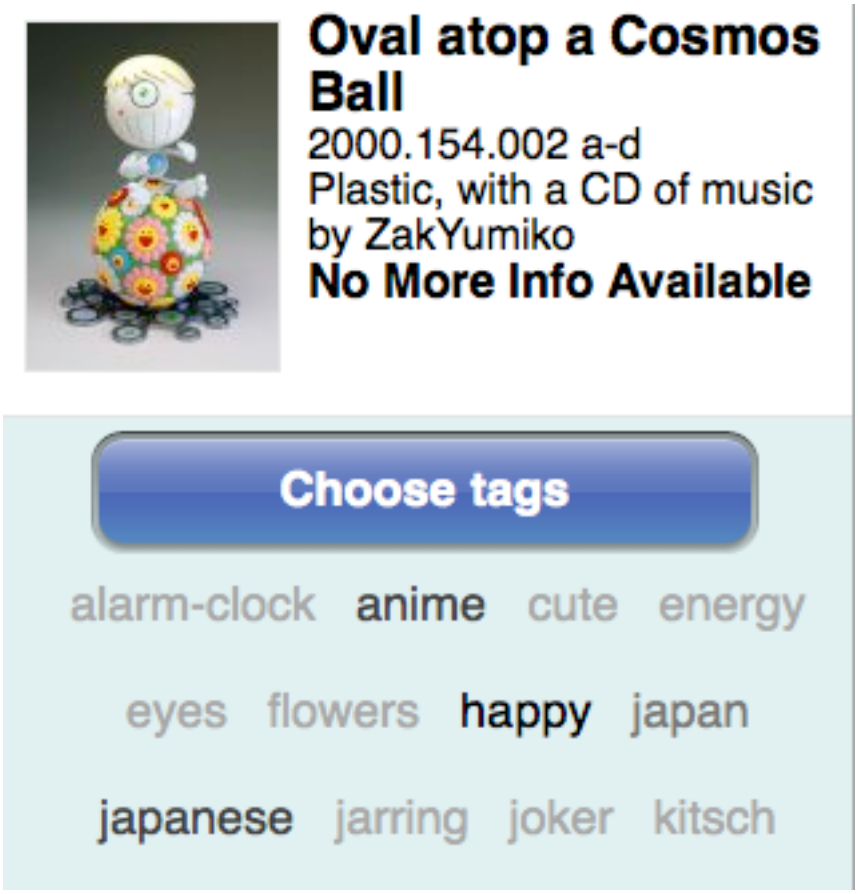

Figure 5. The most popular tags associated with the object. The number of up votes and manual tag addition determine popularity. The tags in black are the most popular.

I recruited 15 novice participants, self-described as having little or no experience with art or this specific museum, from a university-wide database of psychology experiment volunteers. I also recruited 15 more expert participants, consisting of 7 docents, 1 museum intern and 7 members of the Museum Club, a group of undergraduate students interested in art and the museum. The mean age of the experts was 30.45 (SD = 18.24) while the mean age of the novices was 19.6 years (SD = .99). All participants were female with the exception of 5 participants in the novice condition. This gender

balance is consistent with research suggesting that the ratio of men to women art museum volunteers is 25:75 (Howlett, Machin, & Malmersjo, 2005).

Upon arrival at the museum, participants filled out a short questionnaire to confirm their level of expertise with art and the university art museum under study. We then briefly instructed them on how to use MobiTags, and asked them to use the tag voting features of the system for 30 minutes. To accomplish this task, each participant spent time in the gallery space, looking at the objects within the open storage cases in order to evaluate tags for voting purposes. After using MobiTags for the specified amount of time, participants filled out another short questionnaire regarding ownership behaviors and experiences with the system and then completed a semi-structured interview. At the start of the interview, a researcher would ask the participant to choose an object that he or she particularly enjoyed viewing via MobiTags. To provide the participant with a problem, the researcher would then navigate to that particular object and ask the participant to indicate the tags that he/she voted up or down. The participant would then be asked to share their motivations for their votes on these specific tags (Appendix D). Upon completion of the interview, all participants received $10 in compensation for their time.

5.4.2 Specific Case Study Research Questions

Overall, I am interested in observing how individuals express territoriality in online collaborative environments through specific characteristic behaviors, specifically when they appropriate specific features of the system. In this case, this would be the tag voting capabilities of MobiTag. Additionally,

to build upon work from the last two case studies that I described, I am interested in discovering how exactly expertise may influence the types of emergent territorial expression. As a result, I focus on whether or not expert users feel ownership towards art and the museum more strongly and how they may interact with MobiTags, when compared with novices.

The study investigates the following specific questions that inform the higher-level research questions of this dissertation.

1. *Do experts feel more ownership than novices toward the museum?* Building expertise about art and the museum gallery requires commitment, particularly if an individual is a docent. The docent positions requires regular training in order to develop knowledge about the art on display as well as museum procedure ("Get Involved at the Museum," n.d.). Because Pierce and Dyne (2001) observe that ownership may increase when individuals commit themselves to an organization, we propose that the experts in the user study will be more likely to exhibit a sense of ownership to the museum.

2. *Do experts prefer objective terms to describe the artwork?* (Leder, Belke, Oeberst, & Augustin, 2004) observed that those with training in art and aesthetics are more likely to use objective words (e.g. metal, wood, Renaissance) as opposed to terms evocative of one's feelings about the piece (e.g. fierce, crazy). Further, analysis of steve.museum reveals that there is little overlap between the descriptive words that appear in traditional museum catalogs and the tags people choose (Trant & Wyman, 2006). We hypothesize that experts will prefer tags that are objective in nature, and that

preference will influence their perception of the novice participants with respect to their knowledge of art.

3. *Will experts be more likely to contribute to MobiTags by down voting tags*? Based on Pare et. al. (2006), I propose that higher levels of ownership will lead to acceptance of the system and as a result, experts may be more willing to fully participate than novices in MobiTags by voting on tags more frequently in comparison to the novices Furthermore, I hypothesize that experts will vote the novice-generated tags down more frequently, in part, to help ensure success of the system by sharing their expertise to create a high quality set of tags.

4. *Do experts use jargon to describe the objects?* (Lyman & Scott, 1967) and (Thom-Santelli et al., 2008) propose that insider terminology can be employed as territorial strategy by individuals to indicate to others that they can claim the position of expert within a collaborative group. Given the priming employed in the procedure to emphasize the presence of novice contributors, the use of jargon may be employed as a marker that communicates an individual's ownership of that position to others.

5.5 Results

Log data indicates that participants did complete the task as requested, and spent an average of 29.27 minutes (SD = 3.37). Like previous studies of tagging systems, including the initial user evaluation of MobiTags (Cosley et al., 2009), tag popularity roughly followed a power law distribution (of 466

distinct tags, 87 were applied once). Table 1 presents a summary of tag voting behavior.

Table 1. Breakdown of upward and downward votes on tags

	Experts	Novices	Total
Up votes	2435	1538	3973
Down votes	2178	868	3046
Total	4613	2406	7019

I now answer the four research questions posed, using the quantitative and qualitative data gathered.

Q1: Do experts feel more ownership than novices towards the museum?

We wanted to confirm the presence of ownership since it is central to our definition of territoriality. To measure the construct of ownership, we included an adapted version of (Pierce et al., 2003)'s 7-point scale on psychological ownership (e.g. the feeling that one owns something) on our post-task questionnaire. On average, experts (M=2.87, SD=1.72) were more likely than novices (M=4.53, SD=1.64) to agree with the statement indicating "a very high degree of personal ownership" towards the museum $t(28)=-2.7$, $p<0.01$. In comparison with the novices (M=3.40, SD=1.45), the experts (M=2.33, SD=1.29), on average, were also more likely to agree that they felt "the tags chosen were mine", $t(28)=-1.06$, $p<0.04$.

Consistent with the latter indicator of ownership with respect to the tags themselves, six of the expert participants and two of the novices expressed

that they would be disappointed if subsequent visitors would vote down their tags.

> *I guess I would feel hey...this is what I do* (R is an art history professor and cataloguer)*. Why are you voting down my tag? This tag makes sense. Why would you vote it down?* (R, docent, expert)

> *Well, I feel…like I worked kind of hard to do this…to vote on all of the tags…to…like, contribute. So, yeah, I would be a little bummed, sure.* (T, novice)

These quotes illustrate a key difference we observed with respect to ownership between the expert and the novice participants. The novice participants were more concerned with the amount of effort they used in order to complete the task. In the case of the expert, the down vote appears more like a negative judgment of one's expertise and knowledge. However, all of the participants, including the ones who expressed mild dismay, noted that they were accepting of the possible down votes on their tags since they were not likely to reuse the MobiTags system. This is in contrast to other user-generated content systems, such as Wikipedia, that are more dependent upon repeat participation for continued health and success.

I also observed that some of the expert participants, who were less pleased with the quality of the tags, were also grudgingly hopeful that systems that support user-generated content would draw new visitors to the museum.

> *Um, so but, maybe by using these kinds of terms that maybe somebody that's not in museums...or with an art or art history background...would allow more people to find objects that they were interested in…and maybe then…they'd come to the museum more often.* (R, docent, expert participant)

> *This, uh,* [system]*, isn't…something that I would choose to do but I can see how other people.…maybe who don't come to the* [museum name] *might learn something. I think it would be great to get…uh, more visitors so I like seeing, um, these new technology* [sic]*. Maybe get them more involved too, later.* (B, docent, expert participant)

Despite their preferences for a different type of visitor experience or different tag choices, these expert participants ultimately wanted the museum to thrive and attract newcomers. The docents, in particular, viewed their commitment to self-education about art, as part of the effort to make the museum successful.

> *The* [museum name]*, um, is a special place for me…so I spend time here more, now I volunteer. Now I make more of an effort. I want things to turn out well here so I study...before* [she gives] *tours. So, people might like them and come back more often? I want them to like what they see.* (C, docent, expert participant)]

The interviews suggest that expert participants were more likely to feel like their contributions and their participation as volunteers helped to improve the

museum visitor experience overall. Combined with the questionnaire data, I propose that the experts were motivated to participate, in part, by feelings of attachment.

Table 2. Results of Logistic General Estimating Equation.

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	.365	.1862	.000	.730	3.842	1	*0.050
Expert	-1.263	.1215	-1.501	-1.025	108.129	1	*0.00
Objective Subjective	-.195	.0935	-.379	-.012	4.368	1	*0.037
Expert* Objective Subjective	1.484	.1165	1.255	1.712	162.141	1	*0.00
ownership	.052	.0307	-.009	.112	2.830	1	.093
age	.004	.0035	-.002	.011	1.563	1	.211

Q2: Will experts be more likely to contribute to MobiTags by voting tags down?

The activity logs recorded a total of 7019 tag votes. From Table 1, experts voted on a total of 4,613 tags: 2,435 up (52.8%) and 2,178 down (47.2%), while novices voted on a total of 2,406 tags: 1,538 up (63.9%) and 979 down (36.1%). However, even among novices, subjects in this study voted tags down more frequently than users in the initial MobiTags evaluation (Cosley et al., 2009), who voted tags up 197 times (81.1%) and down 46 times (18.9%). There may be a few reasons for this difference. In the current study, the participants used MobiTags for a longer period of time, and the script, in this case, emphasized a goal of collecting tags that best described an object. The initial Cosley et. al. (2009) study focused on the user experience of the

design of the system itself. This suggests that emphasizing quality of the tags as a goal may have influenced how participants rated the tags.

Using SPSS, I conducted a logistic general estimating equation to observe the likelihood of tag votes according to the variables of interested specified by the research questions. Both the predictor variables of *expert*, indicating participant expertise, and *ObjectiveSubjective* for evaluating RQ2*,* indicating tag type, are coded as dummy variables. The predictor variable of *Ownership* reflects the participants' score on the ownership item in the post-task questionnaire. Because there was a significant difference in age between the novices and experts, age was entered as a control variable. Table 2 presents the results of the logistic regression.

From the analysis described in Table 2, experts were 1.263 times more likely than novices to vote tags down ($p<0.00$). Further, the interview data suggests the priming made the presence of novices more salient to our expert participants, even though there was no indication of expertise or experience of fellow users in the design of the MobiTags interface. Six of seven docent and four of seven museum club members expressed some dissatisfaction about the quality of some of the tags in that they seemed to be chosen by art neophytes.

> *Oh, I, uh, voted them [tags] down a lot. They just seemed wrong to me. Like added by people didn't know what they were seeing, like they didn't know about art.* (E, museum club member, expert)

> *…like [the tag] 'starwars. ' And, uh, I just didn't know what people were thinking when they chose that. So, it didn't…really seem like they had*

any idea about art. I didn't think those, uh, kind…[of] tags were useful or…good. (S, docent, expert)

These observations, combined with the higher frequency of tag down votes, suggest that our expert participants appropriated the voting feature in an attempt to prevent the tags they felt were of lower quality from becoming more popular. In addition, these participants assumed that these tags were also added or voted up by people who had less knowledge about art and that the experts did not see much value in their contributions.

It is fair to ask whether these are expressions of territorial behavior or just experts correcting errors. Theoretically, our findings are consistent with prior observations of the threat of competition as encouragement for territorial behaviors. Socio-biological models of territoriality [see (Sack, 1986) for a review] suggest that the perception of limited resources would incent actors to mark and defend their territories. If valuable resources are scarce, actors may even be motivated to attempt aggressive actions to gain a larger territory through invasive means (e.g. starting a war). Four of the expert participants expressed some awareness of novice participation and its perceived effect on the visibility of the expert contributions.

Well..yes, probably I might find this more useful, uh, if I was able to see more from…people who knew more about the museum…You know, the art…It could be, well, I would add tags about the stuff I know about but…who knows who else could see it? Maybe….um…that's why I voted those [tags] down….so maybe I could see stuff from those people [other experts]. (B, docent, expert)

Granted, the resources associated with the social space of the museum are not as vital to survival as food and water. Time, however, is valuable, and the docents had spent an average of seven years volunteering at the museum. These participants also expended effort in keeping up with the changing collections through regular training sessions and attendance at museum events and lectures. Because of their sustained involvement, we suggest that the docents also derive satisfaction not only from their enjoyment of these activities but also from their status as liminal professionals. Liminal, in this usage, is descriptive of betweenness: these participants are not professionally-trained curators but they do hold a certain level of expertise that does hold currency in the museum ecology (V. Turner, 1964).

As a result, these highly committed community members may be inclined to publicly signal their expertise so that others might appreciate their hard-won knowledge. When asked to participate in this particular collaborative activity, the experts may have felt threatened by the novices, in that their contributions would be given equal weight in the interface as their more educated choices. Consequently, expert participants respond to this perceived threat to their territory by voting tags down to lessen the impact of the tags that they assumed were created by those who were less knowledgeable about art than they were.

Q3: Do experts prefer objective terms to describe the artwork?

Two raters coded the 7019 tag votes into the categories of objective and evocative ($\kappa=.78$, $p < 0.01$). To obtain inter-rater agreement, the raters

first coded a sample of 50 tags to reach consensus on how the tags should be categorized. Examples of objective tags included “african”, “wood”, “and “ceramic”, while sample subjective tags included “dreamy”, “strange”, and “evil.” Of the 7019 tags, 4285 were coded into the objective category and 2734 were categorized as subjective. The data from the logistic regression reveals that both objective tags were 0.195 less likely to be voted down than subjective tags by participants ($p<0.037$) but that experts were also 1.484 times likely to vote objective tags up ($p<0.00$). This suggests that experts preferred the more objective tags, consistent with the proposed hypothesis.

The interviews reveal that the experts and novices have differing preferences for objective and evocative tags because each group had a distinct conception of the overall purpose of the system’s tagging features. I observed that the expert participants characterized MobiTags as a navigational device, akin to a more traditional handheld tour. As such, experts believed tags should be used to search for objects of interest, and deemed the subjective tags unsuitable for searching.

> *For this* [statue]… *Bodhissava...Guanyin and Buddhism. So, those are categories to search for. These* [other tags] *are descriptions...that it's “strange”? Who's going to search for that?* (B, docent, expert)

> *I didn’t understand some of the tags. I probably won’t…uh…look for something “dreamy” or “alien.” Not sure what that would tell you. I don’t think…um…people…or I would learn anything from that.* (M, docent, expert)

In contrast, questionnaire data revealed that novice participants, on average (M=1.20, SD=.414), had less experience than the expert participants (M = 1.93, SD =1.01) with other museum mobile tours $t(28)=4.05$, $p<0.022$. This relative lack of familiarity may have contributed to receptiveness to the subjective tags and their affective nature—that is, tags are just as much a tool for expression and reflection as they are for categorization (which was also a finding in (Cosley et al., 2009)). Compare the reactions of two participants, one novice and one expert, in describing the tags associated with the same Tiffany glass vase.

> *I chose tags because of the way the object made me feel. So, this one* [the Tiffany vase] *was my favorite…because it was so feminine…I used the word "delicate" because of how it made me feel.* (G, novice)

> *To me, that* [Tiffany] *vase is nothing about dreaming and when I look at a vase, I usually think of glass or pottery. Just dreaming? I don't think I ever think of vases and dreams.* (M, museum club member, expert)

These distinct conceptions, grouped by expertise, of what tags are satisfactory may contribute to the perception of an in-group and out-group, in which experts devalue the contributions of other participants who are more open to subjective tags. In the current study, the expert participants are more likely to vote down the subjective tags that have been created by novices, and the interview data suggests that they may view the subjective tags as too descriptive to be educational or useful for searching. As a result, based on their preference for the objective tags for the purposes of information seeking,

we observe that the expert participants more highly value the engagement and education component of Bell's (2002) museum ecology. On the other hand, the novices may be more open to systems that better support the components of liminality and sociality. If experts are less willing to accept tags that they do not value, it may be less likely that a diverse collection of tags may be developed to describe resources, which is the goal of user-generated content systems, such as steve.museum (Trant & Wyman, 2006)

Q4: Do experts use jargon to describe the objects?

To determine what tags could be considered jargon, two raters (a curator/PhD candidate in Art History and a practicing artist with a MFA) viewed the list of objects featured in MobiTags and then selected terms of a specialized nature. Because novices generated the initial seed list of tags, the number of tags was relatively small. The raters selected these tags as specialized: "cubist", "gold-filigree", "Kawaii", "monochrome", "Murakami", "pastiche", "symmetrical", and "totem." These tags received relatively few votes—together, they received 46 up votes and 17 down votes from experts, and 18 up votes and down votes from novices. We speculate that the relative unpopularity of these specialized tags in voting was primarily due to a "rich get richer" phenomenon where more popular tags received more attention, especially if users were navigating the system via the initial tag list interface.

Our qualitative data did suggest that there were experts who did attempt to find and vote up more specialized tags. Six of the expert participants revealed in their interviews that they were attracted to tags that were similar to ones that they used in art history coursework, and they expressed some surprise that these terms were not more frequently used, especially they were

aware that other expert participants were also evaluating the tags in the system.

> *I was surprised that Murakami was not one of the tag names. It's become almost like a household word because Murakami has a distinct style and I follow his work closely so I added the tag…I thought other people who would know about it might vote it up later.* (L, museum club member, expert)

Rather than actively creating a barrier between novices and participants, these expert participants hoped that the usage of the specialized tags would speak to others who may have a similar background. While the intention may be to create community among peers, novices may be excluded from evaluating these contributions because they may not have the specific content knowledge to do so. Three expert participants suggested that novices might not be able to connect with insider jargon. For example, we observed that novices were more likely to vote up the tag "pastiche." According to our trained raters, this tag was incorrectly applied to certain objects, which may explain the higher frequency of down-voting by experts.

> *You can, uh, start using words like Impressionistic or semi-Impressionistic or abstract but, um…I don't think people really need words like that...the general mainstream doesn't need all of those words.* (V, museum club, expert)

We suggest that depending on one's goals (e.g. helping experts find

other experts or affording collaborative expressions by novices), the use of insider jargon as a defensive territorial strategy should be carefully managed in a collaborative system.

> *I spend a lot of time here, learning about the art. So it's nice to be able to share what I know. But, it's hard to pick…just a few words, especially since other people are picking too* [laughing]. *And, you don't know, uh, what they might know.* (M, docent, expert participant)

5.6 Discussion of Case Study Results

In summary, expert participants expressed territoriality defensively through the down-voting of tags as a way to protect perceived threats to their expertise and their level of status within the social space. While the higher frequency of expert down-voting may be, in part, motivated by the correction of inaccuracies, the presence of increased ownership towards their tags and the museum, combined with the commitment expressed by the experts, suggests that error correction is not the only motivating factor in rating tags negatively. Instead, experts expressed their attachment to the space by contributing to the best of their abilities by explicitly sharing their expertise with others and defending their position within it. I now describe the novel contribution of this research.

First, I propose that experts apply defensive territorial strategies when they perceive a threat to their status as experts. Because higher status members of a social group may reap benefits (e.g. increased visibility, the power to accept changes in open source software, the ability to block users in

Wikipedia), they may be more likely to express territoriality in a defensive manner in order to maintain their possession of that standing. The data revealed that expert participants were more likely to engage in defensive territorial behaviors (e.g. down voting tags assumed to be created by novices), particularly when the presence of newcomers was highlighted. I suggest that territoriality becomes a defensive response to a perceived threat because one's identity within the group may be structured around his or her self-concept as an expert (Tice, 1992).

However, I do not claim that all defensive behaviors are harmful. For example, vigilant responses to vandalism help to improve the quality of Wikipedia articles (Viégas et al., 2004). When longtime community members admonish trolls, groups can be come more civil and welcoming (Preece, 2000). One could imagine appealing to the experts to be valuable gatekeepers against the truly malicious behaviors that threaten the community. This might encourage experts to aim defensive territorial strategies towards those who may actually do harm to the social space, as opposed to good-intentioned novices who have an interest in contributing in a positive way.

Second, we see that experts and novices can define and perceive a territory differently. It is important to remember that status is also fluid. Novices do not necessarily remain novices forever. As novices acquire the knowledge to become experts, tensions between the aspiring experts and the existing ones can emerge. If improperly managed, a community can break apart, such as in the case of Citizendium, a wiki-based encyclopedia started in part due the conflicts arising on Wikipedia in which official markers of expertise (e.g. PhDs) were considered irrelevant.

In the current study, I observed that the two roles of expert and novice differed on their conception of what the ultimate goal of the MobiTags system should be. Furthermore, people are willing to defend their vision, much like the debate between deletionists (e.g. articles should be especially noteworthy) and inclusionists (e.g. encyclopedia should be comprehensive) in Wikipedia. The expert participants viewed the system as a navigational device while the novices were open to the social and affective possibilities of the design. Four of the novice participants were also first-time visitors to this particular museum, and they indicated that they particularly enjoyed the informality of these contributions.

This observation has several implications, especially in systems were collaboration is repeated and ongoing. It is indicative of the different set of needs held by stakeholders in cooperative work. One approach in managing these distinct sets of needs is to separate into different systems, by either having experts break off (e.g. Citizendium) or to set novices up in a playground-type area until they get their feet wet (e.g. World of Warcraft, Second Life).

Without continued exposure to experts, however, novices may not gain the tacit knowledge needed to become valued participants (Wenger, 1998). Thus, we propose that experts should be encouraged to express ownership (e.g. territoriality) about the community as a whole by participating in policy-making decisions where tenure is a benefit, as opposed to defending low-level territories such as their day-to-day contributions (e.g. tags or article edits). By encouraging a more global application of territoriality, experts may become more aware of a community's health on the whole and engage in the type of leadership and coordination tasks that only experienced members can

successfully tackle. Instead of emphasizing the threat of competition, an emphasis on the benefits of inclusion may minimize the threat of competition from novices by demonstrating that there is more to gain from newcomer participation.

5.7 Where we stand

In the MobiTags field study, I observe how defensive territorial strategies emerge when one perceives a threat towards his or her status within a group. These behaviors can strengthen one's identity -- in this case, as an expert -- and signal feelings of ownership about contribution as well as a collaborative space as a whole, much like the signaling attempted by the Wikipedia Maintainers in which the template serves as public communication of one's ownership of an article. While this case and the organizational social tagging chapter focus on similar systems in a technical sense in which resources are tagged, the social processes underlying the collaborative activities are somewhat different. The enterprise framed social tagging as an endeavor that would benefit the organizational as a whole while the activity in the MobiTags study primed users to focus on competition. This distinction is not entirely clean; in the case of organizational social tagging, perceived competition emerged for parties who felt resources were scarce. With MobiTags, experts expressed some desire for the system to succeed in order to benefit the museum, even if the system would then include tags that they thought were not adequately descriptive of art objects.

In relation to the prior case studies, the research in this chapter also offers a description of territoriality as expressed by experts when the identity of the other collaborators are largely unknown but are perceived to be novices.

This is in contrast to Wikipedia, in which the users are pseudonymous, and the organizational social tagging system, in which users' identities are linked to the names, job titles and other identifying characteristics such as professional reputation. Despite a less obviously identifiable threat to the system, MobiTags users with art expertise still attempted to protect the territory from unwanted contributions, much like the Maintainers within Wikipedia, by voting tags down. This type of defensive maneuver is similar in nature to the reversion of edits on Wikipedia, in which a low-effort gesture serves as a reaction to the perceived incursion to the territory (e.g. MobiTags or a Maintained article).

CHAPTER 6

TOWARDS A THEORY OF ONLINE TERRITORIALITY

6.1 Introduction

As stated at the outset, the contribution of this dissertation is two-fold. From the observations drawn from the three studies, this chapter will offer a set of design strategies to encourage the expression of territoriality when it might benefit collaborative activity, particularly when participation by experts are central. However, it is important to also ensure that novice contributors do not feel marginalized or excluded because of the territorial expressions from expert collaborators. As a result, these strategies attempt to answer the challenge in managing the inevitable points of tension that will arise when a novice asserts his or her particular perspective and the expert feels threatened by the different approach. The second contribution is the development of a theoretical framework that proposes several emergent socio-technical factors that influence the strength and type expression of territoriality. These factors include characteristics of the social system that influence the development of ownership (e.g. authorship) and characteristics of the collaborative process, (e.g. coordination needs during group activity).

In this chapter, I first integrate the findings of the three case studies and then describe more specific design goals drawn from these observations. Next, I present the separate factors of the theoretical framework and then discuss future directions and the contribution of the thesis.

6.2 What has been observed in the case studies?

Territoriality can emerge in online collaborative environments, as observed in the three case studies described in this thesis. The participants in each case study outwardly expressed internal feelings of ownership to others within a social space, consistent with the proposed working definition. I also build upon Altman's (1975) and Goffman's (1971) observations that territories can not only be physical but that users can feel ownership towards their activities within an online environment. In addition, users can also appropriate the features of these online environments to express territoriality. Despite a cultural norm against ownership within Wikipedia, Maintainers perceived themselves to be the overseers of a page and responsible for its comments and used the template as a marker to signal that ownership to others. In the case of organizational social tagging, participants expressed ownership of the groups that they belong to by employing specialized terms that are known only to its members. In the example of social tagging within the museum, expert participants indicate higher ownership of the museum and communicate their commitment to the organization by helping to improve the quality of a social system for all visitors.

In physical space, people can create socially meaningful markers by altering the features of the environment in which the territory resides, such as putting up a fence to publicly mark a boundary. In online space, users might use a similar approach to construct territorial markers that signal ownership to others. The small group of lead users observed in the Wikipedia case study designed and modified an existing template to signal one's status as a Maintainer on an article talk page. In the examples of social tagging within an organization, markers emerged linguistically through tag choice, where users

employed specific words and jargon to communicate to others that they own a certain position within the enterprise (e.g. a leader or an expert). Within the enterprise organization, the participants who considered themselves thought leaders or evangelists chose tags describing their topic of expertise to broadcast their standing to their audience. By aggregating a large number of resources tagged with these terms, these participants believed that others within the organization would then recognize them for their expertise, which would then lead to reputational benefits with respect to their careers.

While in physical space, the markers that are employed to communicate territoriality may be non-verbal in nature, such as a jacket placed over a chair or photos posted on a cubicle wall. In online spaces (i.e. Wikipedia or social tagging) where the main mode of interaction may be verbal, linguistic strategies emerged as the main format of territorial expression, particularly as a way to define group boundaries. The use of insider tags in the case of organizational social tagging acts as a call-out to others who belong in the group, consistent with (Lyman & Scott, 1967) definition of linguistic collusion. However, when less confrontational and indirect options are available, territoriality with respect to group boundaries may also be expressed in this manner, as in the case of Maintainers reverting changes by unknown editors while soliciting edits from familiar collaborators.

The case studies also reveal several different types of social territories, or targets around which individuals and groups express territoriality. Most broadly, people can develop feelings of ownership regarding the organizations in which they claim membership. In the interviews conducted for each of the case studies, participants expressed ownership towards an enterprise organization, an art museum and Wikipedia. While the enterprise organization

and the art museum had physical space components (e.g. offices and a museum building, respectively), the data from the case studies suggest that the abstract idea of the organization was just as salient in the current research. For example, in the MobiTags study, the expert participants hoped that the application would succeed so that more visitors would be attracted to the museum, which would be an overall benefit to the organization, not necessarily the physical space itself. The Maintainers worked to improve the quality of articles, in part to strengthen Wikipedia's value to the world as an accurate source of encyclopedic information. In both of these examples, the good of the organization motivates participation.

Subgroups within these larger organizations can also become social territories that can be marked and defended by its members. These sub-groups can be formally established (e.g. small work teams within an enterprise) or self-organized (e.g. Wikipedia editors with a common interest). While the data from the current research does not directly observe this, prior research suggests that people improve the standing of their subgroups in order to derive self-importance by being publicly identified with a successful group (Tajfel & Turner, 2004). Territoriality may be part of the strategy to accomplish this bolstering of a group reputation's by deterring inexperienced parties from joining, at the risk of lowering the group performance. For example, with both the Maintainers and the expert users of MobiTags, undoing activity, either through reversion or down-voting, may help to weed out noise so that the quality of information presented meets the standards of the territory's owner. The contribution of the unknown parties were deemed to be less satisfactory, in part because the group members were not sure of the

qualifications of the unknown participants. As a result, territorial behaviors would be directed at non-members to deter unsuitable contributions.

The data is consistent with the argument that one's position within the hierarchy of a group can be perceived as a territory, especially when an individual may perceive himself or herself to be higher status. In particular, the higher status gained by an expert in a group may emerge as an object to claim and defend. This may explain why individuals strove to make themselves distinctive as experts through markers that communicated to others about their knowledge. Public recognition as an expert helps an individual maintain her or his position, and markers can be a way to broadcast to others how much one knows. Again, in the case of the Maintainers within Wikipedia, the Maintained template served as a marker to communicate to others that someone has claimed knowledge and expertise regarding the content and the structure of a particular article. In response to perceived and real invasions into this territory, individuals may then apply defensive strategies, such as voting down tags in the case of MobiTags.

Social tagging and collaborative authoring support different patterns of cooperative activity, which may have contributed to the varying intensity and expressions of territoriality that were observed in the case studies. When one applies a tag to describe an object, an individual can complete the task but the repository of aggregated tags are collaboratively created. An individual, however, may still derive benefit from his or her own tags if they are used for re-finding personal resources. Additionally, organizational affiliation may possibly increase the likelihood that individual taggers will think of others while choosing tags, as observed in the interview data describing organizational social tagging, so that taggers may be targeting an in-group in particular. In

the case of Wikipedia, an individual or a small group of editors can attempt to author an article solely by contributing a large portion of it, but other editors within the community can alter the collaboratively created artifact. The tension between individual and group contributions, in both cases, makes it difficult to pinpoint when exactly territoriality can benefit collaboration. I do suggest, however, that activities that require higher levels of coordination may be a fruitful place to encourage such behaviors, based on the observations gathered from the Wikipedia Maintainers. Higher levels of coordination suggest that there are more interdependencies between different resources, social actors and tasks (Crowston & Malone, 1994). These interdependencies may contribute to social ambiguity, in which different individuals may be unsure about how best to participate.

In the case of Wikipedia, the process of creating and ushering an article towards promotion to Featured Article status requires much coordination. First, editors must structure, write and revise an article, according the accepted indicators of quality set out by other community members. The article then undergoes a process of critique through peer review, in which editors must continue revising an article in order to gain favorable ratings. After the article reaches a certain level of acceptance, editors may nominate it for Featured Article status, which then begins another round of peer review where editors must answer and address as many substantive comments in order to obtain status as a Featured Article. This is a time-consuming process, which requires high levels of expertise regarding an article's content as well as its structure. Like prior quantitative analysis of articles receiving the Good designation (Kittur, Lee, & Kraut, 2009), I observe through qualitative methods that the authoring of quality articles requires high levels of coordination.

I also extend upon this more recent work revealing that smaller numbers of collaborating editors are more likely to result in higher quality articles by then proposing that motivated editors express territoriality as a result of their commitment to manage interdependencies. If an editor develops feelings of ownership towards an article, allowing her or him to communicate that state through territoriality may then signal to others who may be interested in contribution that there is a leader willing to manage the time-consuming aspects of coordination. The Maintainer interviews revealed that participants viewed the user-generated Maintained template as a public expression of the work that he or she put into an article and hoped that others would recognize that effort. This recognition may consist of designation as a Featured Article or it may be courtesy notification of major changes by other editors who wish to edit in the Maintainer's territory. If this recognition carries enough benefit for each individual, it may be possible to motivate increased participation, consistent with the notion that acknowledgement by others provides external motivation (Ren et al., 2007). This external motivation may stem from a desire to be recognized as a territory's owner because he or she is insecure in his position in the hierarchy. Alternatively, users may be motivated to participate if they are held publically accountable as the maintainers or lead contributors of a collectively created artifact.

On the other hand, the data from the MobiTags user study and Maintainer interviews suggest that self-perceived experts employ defensive territorial behaviors in response to contributions made by newcomers. Because the overall goal of the thesis was to observe and categorize how individuals express territoriality, I did not focus on the perception of these behaviors by the other non-experts inhabitants of the social space, beyond

observing that non-expert MobiTags users held lower levels of ownership towards the museum. In the case of the Maintained Wikipedia articles, participants indicated that they would not accept substantive changes made to their articles made by unknown editors, particularly if they were less experienced. Expert users, in the MobiTags study, were more likely to vote tags down and suggested during interviews that they voted tags down if the tags did not seem to be contributed by individuals with art experience. These defensive responses may contribute to a group dynamic within the system in which the known experts are valued participants while discouraging newcomers from collaborating. Past research indicates that the formation of in-groups can result in exclusionary behaviors (Tajfel & Turner, 2004), which can have a detrimental effect towards collaboration (Caruso et al., n.d.). I suggest that these excessively defensive expressions towards newcomers who want to contribute in a productive manner may discourage participation, which in turn may contribute to Beenen et. al.'s (2004) observations that a lack of positive feedback from group members may ultimately harm the health of a community.

In summary, the data from the case studies suggest that territoriality can be expressed towards non-physical territories (e.g. online environments, social groups). Individuals appropriate features of a system to create markers and employ defensive strategies to express territoriality regarding the system itself, the activities supported by the system, one's status as an expert within a hierarchy, and group boundaries. Lastly, as a next step in extending this research, I propose that territoriality can benefit collaboration when activities require a higher level of coordination. On the other hand, territoriality can be detrimental if experts employ defensive strategies to exclude newcomers with

good intentions. In the following section, I suggest a number of design strategies based upon these findings.

6.3 Design Implications for Social Systems

As I suggested earlier, social systems that support collaborative activities requiring high levels of coordination are potentially productive sites for encouraging territoriality. In situations where hierarchy and status facilitate cooperative activity, strategies that make those qualities visible and maintainable, such as territoriality, may support collaboration. For example, I previously noted the hierarchical structure of animation film production teams (Luther & Bruckman, 2008) and certain open-source software communities in which the "Benevolent Dictator" provides overall guidance on the direction of each project (Raymond, 2001). In each of these cases, the successful completion of each project is more likely when group members are aware of their role within the group's structure. A collaborator on an animated short has an expectation that the director will assign him/her tasks, as the leader of the production. If a number of the collaborators attempt to question the director's decisions, the director may feel the need to assert her/his role by using territorial expressions as a signal that he or she possesses a certain status as the leader. Territoriality helps to clarify the social structure of the group activity in these cases by providing a road map of expected behaviors for collaborators.

In a hierarchical collaboration, success may be influenced by the identification of willing leaders, or at the very least, individuals who are willing to manage and assume responsibility for coordination (Reagle, 2007). To help potential lead contributors develop feelings of ownership towards the content

they author, designers could encourage marking as a signal of leadership. This could be accomplished by building upon Cosley et. al.'s (2006) SuggestBot, in that that visible markers can be intelligently routed to users who display a pattern of leadership behaviors consistent with those observed in the case studies. The outward expression of ownership may encourage community attachment and member retention so that longtime contributors have a more systematically recognized outlet to demonstrate commitment to other participants. For example, in the case of social tagging, a system may recognize that an individual has begun to tag a concentration of resources on the subject of pizza and then recommend to that person that he or she may indicate on a linked profile that he or she is an expert on pizza and is willing to be contacted on the subject. This could be integrated with an expertise location system, so that users may receive public recognition on their knowledge of a topic. If the recognition is coupled with some reward or benefit, whether intrinsic or extrinsic, individuals may be encouraged to express ownership on a variety of topics. For systems where the goal is to encourage continued participation, providing public markers may be a component of a strategy to motivate individuals through recognition.

These public signals may also help to provide a feedback loop, in which recognition of one's territoriality may prevent individuals from employing exclusionary defensive tactics. Maintainers perceive the existence of an audience of other editors and provide a signal through the Maintained template that they are the ones who have expended resources in working on an article. However, beyond looking at editing history and contact from other editors through User Talk pages or direct message, Maintainers cannot be sure if their editors interpret the template as marker in that way. With respect to

organizational social tagging, there is little support, besides referral tools or lists of subscribers, to help evangelists to gauge their success in drawing attention to the resources indicative of their area of expertise. Both examples suggest that a territory's owner may possibly feel more secure about his/her position if he or she had a better indication of whether or not the editors interpreted the expressions of territoriality as a signal of ownership. If territory owners might gain a measure of awareness regarding others' perception of their position, this added feeling of security could deter them from exclusionary behavior. For example, this may be a visualization of aggregated viewing behaviors, available only to page owners, much like the tool access granted to Wikipedia editors with a certain level of access.

On the other hand, if the quality of collaboration and coordination is dependent on a more deliberative process, then perhaps territoriality should be minimized. In deliberative environments where territorial expressions may hinder discussion, it may be more important to lessen the impact of these behaviors. For example, in democratic-style policy discussions, the perceived quality of the deliberations increases when there are heterogenous perspectives expressed (Ryfe, 2005). If there is a participant who expresses territoriality regarding his or her position through exclusionary behaviors (e.g. marking one's position as an important insider or intimidating or aggressive linguistic strategies), other contributors may be discouraged from voicing their opinions. Another example might be found in articles, labeled as controversial on Wikipedia. If the goal of each article is to produce one that is of a neutral point of view, the editors who are territorial about their beliefs may denigrate others' contributions by reverting edits or changing text so that the article remains consistent with their opinions.

Additionally, overly aggressive marking and defense can also have a negative effect by deterring new member participation. Instead of negotiating with a Maintainer who reverts their contributions, new editors of an article might just give up on the article, or the community as a whole. To maintain the health of a collaborative social system, encouraging a diverse pool of participants to help maintain documents may help slow the decay of artifact quality. The interviews reveal that Maintainers were amenable to small formatting changes made by other editors. Again, a collaborative authoring system might support this kind of collaboration with an expertise locator that allows lead contributors to more easily choose collaborators with desired skills, especially ones that do this kind of minor work. This type of system may also have an educational benefit by helping newer members who are learn community norms through incremental participation (Bryant et al., 2005). For a social tagging system, the visualization of viewing patterns may reveal that fellow members of one's clique are the sole readers of their tags. While this is not necessarily exclusionary, if one wants to reach a wider audience, this may help spur more inclusive language choices, so that the tags are legible to a broader population.

Another possible way to recognize expertise while minimizing exclusionary behavior could include providing mentorship opportunities for longtime community members**.** This could be as simple as a formalized volunteer buddy program, where novices sign up for mentoring and experts can choose their level of participation. These opportunities should be relatively low-cost, low-effort and voluntary so that participants do not feel that their resources (e.g time and effort) are unfairly taxed. For example, in a massively multiplayer online role-playing game (MMORPG), one could imagine a

shopping trip where a newbie accompanies a high-level player on a shopping trip in-world to buy supplies. Alternatively, in Wikipedia, members can volunteer to be part of the welcoming committee, to answer newcomer questions. It is worth nothing that only 1047 editors (as of September 2009) have signed up to do so, illustrating the need to make the benefits of participation explicit to a wide variety of potential mentors. On a macro level, this could be some reminder that the community, as a whole, flourishes if enough people volunteer. Less altruistically, experts could be reminded that helping novices get up to speed may decrease the amount of "newbie" naïveté and expand the pool of qualified members so that the burden of community maintenance is spread among many. To further incent participation, providing immediate individual benefits (e.g. extra game currency, better access to in-game worlds) may make advantages to participation by experts more tangible. Furthermore, participation in such mentorship programs could provide an immediate reputational boost so that experienced community members might be incented to participate fully. Taking this full circle, the mentorship community may develop into a territory towards which members feel ownership and feel responsible for its well-being.

Just as Bell, Blythe, and Sengers (2005) suggest that designers defamiliarize themselves to become receptive to new experiences, we propose that experts could benefit from such an activity in a collaborative community. Instead of recommending similar tasks (Cosley, Frankowski, Terveen, & Riedl, 2007), longtime Wikipedians, who have become specialized in their activities, might be routed toward activities that push them into unfamiliar territory (e.g. editing articles in a new content area, becoming involved with policy decisions). It is important, however that these

recommendations are not completely out of one's expertise, but just enough that the user can be challenged by tasks that provide scaffolding (Leont'ev & M. J. Hall, 1978). Pushing expert users out of their comfort zone may help the community in a few ways. First, experts may better develop empathy for the novice experience so that they will be less likely to act in an unwelcoming way. Second, a more competent pool of members only strengthens the health of the group (Preece, 2000). Again, encouraging expert members to participate in such an activity may necessitate a change in a group's culture to make this type of scaffolding a benefit to one's reputation in the group or the health of the community.

I also suggest that exclusionary defensive behaviors can be re-directed away from well-intentioned newbies and instead be targeted towards other more pressing threats to the community by appealing to a global sense of territoriality regarding a community. Some collaborative systems already leverage these feelings of ownership. Wikipedians have created automated processes to find and revert vandalism quickly. In Slashdot, experienced moderators help to evaluate comments to increase their quality and eliminate trolls and spam (Lampe & Johnston, 2005). Encouraging expert participants to try new activities through scaffolding and to actively mentor newcomers are other attempts to make the link between helping newcomers acclimate and the development of a strong community explicit.

Besides these external dangers, I propose that inattention is another threat to a collaborative system that can be defended against by encouraging territoriality, if sufficient levels of ownership exist. Thus, designers should consider encouraging the development of ownership behaviors so that territorial markers would be applied in a way that helps maintain the

functioning of a collaborative system. For example, Rader (2009) observed that shared file repositories become unwieldy as users do not express ownership of the shared space and irrelevant files pile up. System designers can call attention to the inefficiencies of a bloated system (e.g. time to complete a search query) and appeal to an expert's sense of ownership through explicit reminders of their particular knowledge (e.g. time spent working on a project) to then try to motivate action (e.g. deleting old files, re-naming directories).

I do want to emphasize the dangers of applying such strategies without fully considering the context in which social activity occurs. Each of these design implications, when applied inappropriately or without monitoring, may result in territorial behaviors that can permanently fracture a community or group. As a result, it is also important to consider the theoretical implications of the expression of territoriality within online environments, so that designers and researchers may be better able to create ways for users to discern when things are going well or when things are going less well. One way in which to assist in these judgments would be to provide lightweight visualizations for users themselves to reflect on their language use if territorial expressions became overly exclusionary, similar to how GroupMeter provides collaborators with visualizations to reflect on teamwork practices (Leshed et al., 2009). A possible metric to illustrate would be domination of conversation (DiMicco, Hollenbach, & Bender, 2006), or perhaps showing that others' participation diminishes as a certain user takes control of the conversation. Conversely, such visualizations can show users how territoriality and ownership improves the health of the community. This can be accomplished by surfacing measures of success, such as pages created or vandals thwarted, and linking

them to specific markers (e.g. templates, patterns of linguistic response) that helped to meet these goals.

6.4 Creating a Theoretical Framework

As stated in the introduction, the contribution of this dissertation is also theoretical in nature. Based on the collected data and the prior literature on the topic of territoriality, I begin to propose a descriptive theoretical framework for the factors influencing the expression of territoriality in online environments. The framework is socio-technical in nature and serves to organize, categorize and understand the context in which territoriality develops and emerges. By doing this, I attempt to better observe how existing social behaviors may simultaneously altered and reproduced by the design and appropriation of social systems.

6.4.1 Degree of Authorship

Authorship describes the process of writing and creating a text by an author (e.g. the creator). It is also the mechanism by which authors potentially receive credit for their contributions and accept reputational benefits from the recognition from peers and members of the audience (Birnholtz, 2006). As a result, authorship can be a valuable commodity in a collaborative context because of the increased standing within the community that one might accrue. Territorial strategies, such as marking and defense, may arise so that authors can establish, maintain and defend their positions as recognized creators.

The level of authorship supported by the system may also influence the type and intensity of each territorial expression. For example, in the case of

social bookmarking sites, where the large majority of bookmarks are created for web pages created by third parties (Thom-Santelli et al., 2008). In the middle of this continuum might be threaded discussions found within online communities where users contribute posts on various topics of personal interest or on areas of expertise. Finally, a system such as Wikipedia or blogs in which users write and edit documents (e.g. articles or blog posts) would represent a higher level of authorship than those environments where the content is created by a third party.

I propose that authorship may contribute to the expression of territoriality because the creation of intellectual territory or the germination of ideas or inventions takes effort. This effort might manifest in time spent ruminating upon and creating the product of those ideas (e.g. articles, blog posts, short films). As more effort is expended, feelings of ownership may develop towards the territory, which may then manifest in expressions of territoriality. Likewise, existing feelings of ownership may also influence how much effort an individual expends towards maintaining a territory because those feelings act as motivation for participants to continue contributions. For example, the Wikipedia Maintainers devote time to shepherding their articles by controlling who contributes through defensive measures, such as reverting edits, because they are loath to let the quality slide after the time and effort that have committed to improving these territories.

6.4.2 Degree of Visible Identity

If one receives a boost to one's reputation through recognition by fellow community members and an audience of readers, it is possible that authors may partially construct their identity around their position as a valuable

contributor. Because the created product can be a tangible indicator of one's expertise or a mechanism for building one's reputation within a community, social systems that encourage higher levels of authorship may increase feelings of ownership that may be expressed towards the authored content. Academics build their reputation as experts through the authorship credit they receive through article, book or monograph publications (Birnholtz, 2006). In Wikipedia, editors receive credit for being using a pseudonym with which their contributions are linked. As mentioned previously, editors in this community distribute barnstars on fellow editors' personal talk pages as recognition for their work (T. Kriplean et al., 2008). In order to gain visibility for their work, book authors and musical artists provide false reviews on Amazon.com or trade reviews with each other so that they can build their reputation (David & Pinch, 2005). Because territoriality expressions are communicative in nature, marking and defense can allow users to protect the territories that facilitate the development of one's reputation.

I speculate that when users' reputation are highly linked to visible contribution, they may be more likely to be protective of the content they produce. For example, in the case of Wikipedia, the editors who may define themselves as producers, either by authoring content as sole authors, may be more territorial about their contributions than those editors who are either less active or less concerned about integrating into the community as a visible Wikipedian (Thom-Santelli et al., 2009). In addition, if a user's identity is more visible through participation in the social system, she or he may feel ownership towards the content that represents himself or herself as a contributor and therefore express territoriality towards the artifacts he or she creates. In the case of the social software within IBM, real names are associated with

contributions within the system, so that any negative interpretation of content posted would have a direct impact on a user's professional reputation (Millen et al., 2006). As a result, the users may be more likely to defend their contributions from attack from other members of the community, lest their value and status as participants is diminished.

6.4.3 Degree of Direct Interaction

Finally, circling back to the technical design of the system supporting the collaborative activity, the ways in which users interact around the authored content influence how territoriality may be expressed. For example, defensive behaviors can potentially be confrontational in nature if direct interaction is supported. In the case of MobiTags, users were able to vote tags -- a relatively low authorship contribution – down in a relatively, indirect non-confrontational way. However, if deleting tags or others' contributions were supported by the system, would users have then expressed territoriality more aggressively for a low authorship territory? Designers may influence the types of territorial expressions through interaction and interface choices regarding not only the type of authoring supported but also by the social activities and practices surrounding the authoring.

The notion of degree may also not be binary, where more direct interaction opportunities would mean that those territorial expressions are more noticeable. Indirect actions, such as voting, may also have a real effect on the composition of an online community. For instance, Lampe and Resnick (2004) observe that down voting contributions on Slashdot can contribute to a less diverse set of content available to readers, if good comments are hidden

because of incorrect ratings not given according to community standards. In systems where there is direct interaction (e.g. threaded conversation with known identity), territorial expressions in this context might occur, when the owner feels that the territory has been violated or attacked. For social systems deployed in an organizational context, such as those in IBM, implementing direct feedback may lead to less overly exclusive expressions of territoriality because one's real identity is linked to a professional reputation, and contributions could be potentially be viewed by peers and co-workers. In this case, accountability, as related to the last point on the degree of identity, may help users reflect on their behavior and think twice about being exclusionary.

6.4.4 Coordination Management

Networking technology, such as the Internet, has fostered the development of distributed collaborative systems that allow social actors to cooperate in order to accomplish tasks, often without traditional economic incentives such as payment or the top-down structure of a firm or corporation (Benkler, 2007). Instead, community members work as peers to complete ambitious projects, mostly motivated by passion and interest. However, Benkler's (2007) usage of the word "peer" is more descriptive of one who volunteers as opposed to a vacuum of leadership within the actual work of coordination. Even within the collaborative process of commons-based peer production, distinctive styles of leadership and management style emerge depending on variety of factors, such as the type of task and the characteristics of the social actors involved. With respect to the type of tasks, collaborative activity may be complex where a variety of individuals need to

complete a number of interdependent tasks or it may be simpler, where a number of individuals perform discrete or repetitive tasks to collaborate, such as small copy edits made on Wikipedia pages. In the former situation, it may be that territoriality may be expressed when a lead contributor begins to manage the process of coordination, where there is a coordinator who delegates tasks to a subordinate group of collaborators.

Territoriality in these different contexts may have a different effect on the success of collaborative activity. In collaborative activities that require a more hierarchical style of coordination, the expression of ownership may help to clarify the task structure and the process. The data from the Wikipedia Maintainers case study provides some initial support for the former proposition. Their feelings of ownership regarding these articles manifest through a desire to control access to the territory of the article, where Maintainers allow only trusted editors to make major changes to a page. However, the Maintainers felt that this pattern of control was necessary to meet standards of quality necessary to shepherd articles through peer review and provide leadership in the writing process.

On the other hand, in a de-centralized process, it is less clear, at this point, whether territoriality may benefit the collaborative activity. In the case of MobiTags, however, the task of describing objects was de-centralized, much like in social bookmarking systems. Expert users were more likely to contribute at a higher rate by voting on tags more frequently, so it may be possible that encouraging ownership may result in continued participation in collaborative activity. However, the results also suggest that expert users were more likely to vote tags down that they perceived as contributed by novices. Territoriality -- when applied towards the less expert users -- may

become perceived as exclusionary if novices become discouraged from participation if they feel that their contributions are not valued. Further study is needed to clarify whether or not territoriality can encourage participation and if so, whether or not these contributions are helpful to collaborative activity.

6.4.5 Building one's identity around a social role

One's position within a shared social space can determine how territoriality is expressed when collaboration and coordination are necessary. Social roles can be defined as a pattern of expected behaviors of individuals occupying a particular position (Giddens & Merton, 1987). For example, social roles that have emerged from online communities range from answer person (Welser et al., 2007); trolls, local experts, conversationalists (S. A. Golder & Donath, 2004; Haythornthwaite, 2007); experts, members, and novices (Bogdan, 2003); and "lurkers" (whose indirect contributions to the community have been highlighted in the concept of non-public participants (Nonnecke et al., 2006). The design of a social system can also influence the types of roles that develop. For example, commenters can play a different role in a blogging environment than that of the author of the blog post. On the other hand, as I have mentioned earlier, social roles can also be emergent, as observed by those that emerged within organizational social tagging systems.

In the context of an online community, I observed that members with higher status roles are likely to use marking and defensive behaviors to reinforce their positions within the organizational hierarchy. For instance, the Maintainers applied templates as a marker to signal one's position as the de facto lead editor of an article. Higher status members of an online community

may also develop a holistic sense of ownership in that they may be more likely to express territoriality regarding the entire community, as opposed to specific components. I observe examples of these behaviors from the sense of ownership regarding the museum as the territory, which was expressed by docents in higher levels than the novice visitors in the MobiTags study.

From data collected from the case studies on organizational social tagging, MobiTags and Wikipedia, I also propose that the social role of an expert can influence how individuals express territoriality. Experts communicate their position by applying markers that signal expertise within a collaborative space. Within an organizational tagging system, experts in subject areas, such as project management, manage their brand and reputation by selecting tags that broadcast their knowledge to others within the enterprise. I suggest that the tags serve as markers because experts may apply them, in part, to protect their status and reputation within the group, particularly if there are benefits to be gained from their position (e.g. career promotions, better projects). The Wikipedia Maintainers also applied the Maintained template to communicate to other editors regarding their position as lead editor and expert on the aspects of a particular article. The template serves as a marker because it is a preventative attempt to express to others that there are individuals who have expressed a sense of ownership towards an article.

6.5 Future Work

The case studies are descriptive and exploratory in nature, as this thesis is a first step in developing a theoretical framework for the expression of territoriality in online environments. The socio-technical contexts studied (e.g.

social tagging and wikis) were chosen because they differed on two aspects of the proposed theoretical framework (e.g. authorship and coordination) but they cannot provide broadly generalizable results regarding specific collaborative activities across a wide range of systems. My goal is to raise more questions regarding how territoriality can be studied in the future and by that metric, this dissertation is successful. In this next section, I describe a number of the gaps that provide opportunities for further study.

6.5.1 Individual characteristics

While I propose that the structure of a group (e.g. its leadership style) or the social roles are factors that help determine how territoriality is expressed in a collaborative context, it is also important to recognize that each individual member affects the dynamic of a group as well. Drawing from social psychology, I also suggest that individual characteristics may be one such differentiating factor that may affect the likelihood and the intensity of emerging territorial behaviors.

An individual's need to be dominant may be linked to territoriality as the expression of ownership behaviors may be a strategy for attaining a position of influence over more submissive group members. It is important to note that from a socio-biological perspective, dominance helps to establish a group's pecking order (Lyman & Scott, 1967), such that territorial markers cements one's place in the hierarchy or that invasive territorial behaviors may represent an attempt for lower status social actors to raise their standing. For example, dominant individuals may also be more likely to control access by others to territories while retaining relatively unrestricted movement and activity, due to

their established position within the social structure (Goffman, 1971). In collaborative activities, dominant individuals may be more likely to defend their position within a group through various means, such as dictating flow of conversation (Conroy & Sundstrom, 1977) or by controlling decision-making processes (Taylor & Lanni, 1981). This may manifest in conversation patterns, such as having the last word in a thread, or being the first to object to long-standing changes in process.

Since territoriality can play a regulating function in social situations by making social structure and hierarchy more explicit, whether or not someone is tolerant of ambiguity may have an effect on the expression of ownership within a collaborative task (Brown, n.d.). If a social actor has a higher tolerance of ambiguity, he or she may be less likely to express territoriality in shared social space. However, if one's tolerance of ambiguity is lower, strategies such as marking and defense may be applied in order to control the situation and reduce the amount of uncertainty. In a high coordination environment, such as Wikipedia or open source software, it may be helpful to encourage territoriality with this particular type of user, if the collaborative activity requires someone to take ownership of the process. When combined with the type of collaborative activity (i.e. low coordination or high coordination), an individual's level of discomfort with ambiguity may hasten his or her move into a leadership role, by moving into a position where one can assign tasks and clarify the process for others.

In order to observe these characteristics in a systematic way, a more controlled experiment in a collaborative system with individuals using psychological measurement scales can be designed to evaluate these propositions. Ideally, such self-report would be combined with a previously

validated proxy for a low tolerance of ambiguity or dominance, such as monitoring language use to determine whether these individual characteristics might manifest linguistically.

6.5.2 Reactions to territoriality

I have proposed that territoriality might be harmful when its expression creates in-group and out-group divisions, particularly when well-intentioned newcomers might be discouraged from participation. In the current research, I draw from actions taken by participants, such as reverting article edits in Wikipedia or voting tags down in MobiTags, to make such a claim that newcomers might be barred from contributions by longtime community members. However, I primarily focused on those who transmit the territorial expressions, as opposed to those who are the intended recipients. As a result, it is difficult for me to draw conclusions regarding whether the recipients interpret markers or defensive actions as territorial and furthermore, whether the territorial expressions are exclusionary.

One possible outcome from closer observation of recipients may be that newcomers do feel excluded and discouraged from contribution by those who apply territorial expressions. In the case of Wikipedia, the maturation of newcomers is not necessarily such a simple process, where other editors scare off newer collaborators. New power users may not even perceive markers as exclusionary and jump in right away on editing a variety of articles (Panciera, Halfaker, & Terveen, 2009), or they might make small edits and progress to larger-scale contributions (Bryant et al., 2005). Based on this prior research, I suggest that, despite possible exclusionary tactics from oldtimers,

a segment of newcomers may not be overly discouraged that other contributors express ownership regarding their work.

It is less clear, however, what level of territoriality may permanently discourage new users from becoming participating members of a community. As a result, further research on how territoriality is interpreted should be conducted to better determine what type and intensity of territorial expression might be interpreted as exclusionary. In addition, how recipients respond to these signals is also of interest, whether the audience members stop contributing or if they then respond by invading territory in some way. These responses to territorial expressions could be observed in a naturalistic way within an existing system, whether through ethnographic means or through log analysis.

6.5.3 The environment

Another fruitful area for further research lies in expanding the research to other sites and contexts in order to evaluate and refine the exploratory framework that I have laid out. I envision two approaches to this next line of research. First, I can observe the expression of online territoriality in other systems to better validate or expand specific aspects of the framework. For instance, open source software development is a possible next case because it is a high-coordination process that requires an individual to contribute relatively large amounts of expertise under one's name or identifiable pseudonym. Like Wikipedia, the open source community expects that the code produced is public and should be shared with others, and there are communication channels (e.g. discussion threads) that may support the

expression of territoriality by the collaborators. As Raymond (2001) and Reagle (2007) observe, the social structure of open source development can be hierarchical in nature, where there is a leader assigning tasks to subordinates. In addition, successful open-source developers often gain reputational benefit for their contributions and expertise, which can lead to job offers or acclaim within the community. These factors may contribute to the expression of territoriality in a manner somewhat similar to those within Wikipedia.

An alternative approach in validating this framework would also involve observing on a larger scale, through more quantitative means, how territoriality might be expressed. In the case of Wikipedia, one could take a theoretically informed sample of article talk history (i.e. Featured Articles, articles on a certain content area, WikiProjects) and compare it with a relatively random set of article talk history through an analysis of linguistic markers of territoriality. These linguistic markers would be pre-determined either through interviewing, participant observation, or theoretically justified (i.e. insider language and jargon), where one could attempt to observe correlations between these markers and the outcome of the articles on a variety of measures such as quality or level of satisfaction by the editors on the finished product. Similarly, this type of analysis could be conducted on a number of online collaborative systems that involves direct social interaction through conversation, such as massively multiplayer online role-playing games with components of physical-space like interactions or creative communities such as Newgrounds or Transom.org.

As initially explored within the tagging case studies and now more recently proposed, language use may emerge as one of the more easily

observable markers of online territoriality because it can be recorded through text files and then coded for ownership expression. In addition, online interaction can be analyzed paralinguistically through such methods as turntaking (Hancock & Dunham, 2001) or the amount of time needed to respond to an online message (Walther, 1996). Further exploratory observations will need to be conducted to determine whether or not traditional paralinguistic cues, such as turntaking or chronemics, may express ownership in some way.

6.5.4 Becoming territorial

This line of future work would attempt to better understand how individuals or groups become territorial about entities, such as expertise or status, and how territoriality towards these objects would then be expressed to others. Perhaps ownership, the basis of my current working definition for motivating the expression of territoriality, may just be one component when the territory is one's ideas. For instance, the desire for public acknowledgement of one's contribution or expertise may be more influential in the development of one's sense of territoriality. In the case of Wikipedia, perhaps public recognition by others of one's editing activities on a page can spur territorial behavior, where that editor might be more likely to become protective of the article.

On a broad scale, legal structures, such as copyright or the patent system, are an attempt to allow idea creators to publicly express ownership (Altman, 1975). Another form of attribution might be through one's reputation within a group, as described in previous examples of collaborative authoring, such as academic publishing or in film production. As a result, reputation

management may have a territorial component that has been left largely unexplored in detail, where specific strategies to control one's reputation may be related to marking and defense. To further study such issues, it may be worthwhile to observe credit negotiations in a variety of collaborative contexts in more detail. Collaboratories, whether scientific, humanistic or artistic, may be one such opportunity where one's ideas or intellectual work is jointly shared but credit has to be negotiated through a variety of social and structural means, such as funding, publishing, or reputation in the field.

Lastly, the idea as territory highlights the different possible definitions of non-physical targets of territoriality. In this research, I focused on the content created by users of collaborative systems and also suggest that one's expertise may be territories that are marked and defended. However, there are other likely targets, such as the community or the organization as a whole to which one belongs. For instance, the expert users in MobiTags expressed ownership towards the museum and perhaps this ownership may result in a variety of territorial behaviors, outside of the context of the mobile tagging system. In the case of organizational social tagging, a subset of users may feel invested in the success of their enterprise or their employer and develop feelings of ownership towards that entity, which may influence higher levels of participation or different expressions of ownership, again outside the context of the social tagging system.

Finally, consistent with Goffman (1971), one's social group may also be a territory. In the current research, I observed that social taggers within an organization use insider language to define the boundaries of subgroups while in another example, I propose that Maintainers within Wikipedia delineate the borders of acceptable editors by reverting changes made by unknown

contributors. These initial findings suggest the possibility that online groups are territories that are marked and defended through features of the interface supporting social interaction. The focus, however, is primarily on individuals, which requires that future work should further investigate how joint owners of territories might express territoriality between themselves and outsiders as well as between themselves. Of particular interest is the process by which group members establish how the boundaries might be marked and defended. For instance, if insider jargon is one method to mark territory, how are terms that signal belonging negotiated and decided upon, particularly when group members are distributed? Again, this line of inquiry relates to the audience or reader perception of territorial expressions; that is, experts or other types of group members also acknowledging the existence of other experts.

6.5.5 Territoriality as an incentive to participate

As noted previously, territoriality is an attempt by an individual or a group to communicate to others that there is an owner of a shared space. Whether or not the intended recipients of these expressions interpret them as signals of ownership is an open question, as I mention previously, but another future line of research may focus again on the actions of the perceived owner of the territory. The observations from the Wikipedia case study suggests that despite not knowing with certainty whether territoriality successfully communicates ownership, the Maintainers continued to apply markers or defensive strategies, alongside their upkeep of their maintained articles. By providing support of these behaviors through design, I suggest that these

territorial actions in this context can be leveraged as motivators so that users will remain committed to participating in collaborative social systems.

The immediate goal of this line of research would explore how territoriality might be employed as a behavioral nudge, where encouraging its expression would incent people to take action of some kind to solve a pressing complex problem in which many individuals need to collaborate in order to succeed (Thaler & Sunstein, 2008). The case studies described in this thesis focus on territoriality as an outcome of one's feelings of ownership. However, in this context, providing users with a mechanism to express territoriality in a productive way might also act as a feedback loop to stimulate and increase ownership by participants so that these users can have a socially acceptable way to receive credit and acknowledgement for their contributions. For example, in an online citizen science application where the objective is to collect data about invasive vegetation in a certain area, users might be able to mark their contributions in some way (e.g. through a signature or icon) so that it is clear to the other participants that they are the ones that have added it. If someone uses their data and builds upon it, some indication of the work done by the original contributor should remain, whether through a named credit or by one's signature icon. By incorporating such signals of ownership, contributors may also feel less apprehensive about sharing their data with others because they are aware that it is possible that they will receive external validation or credit for their participation.

On a higher level, leveraging territoriality as a motivator for collective action serves another goal in extending the research from this thesis. The interviews from the Wikipedia case study portray, for the most part, the Maintainers' expressions of territoriality towards their specific articles and

one's individual reputation, as in the case of the editors who were heavily involved in submitting articles for peer review. To extend upon this work, I propose, in addition to individual contributions, that the targets of territoriality might move up a level to larger entities, such as the community of people who wish to solve the hypothetical complex problem proposed a few paragraphs earlier. In the online citizen science example described, longtime contributors may be encouraged to express territoriality about the community as a whole through incentives that help encourage ownership of the community as a whole, such as public recognition as an expert or an invitation to join a prestigious steering committee. Note that there is still an element of individual benefit – the trick in this line of research will be figuring out what the optimal balance between individual-level reputational and linking that external recognition to the realization that one's individual actions will benefit the community as well as one's self.

6.5 Contribution and Conclusion

In summary, I believe this dissertation accomplishes the following. First, I demonstrate that territoriality can be expressed in virtual space regarding non-physical objects, such as collaboratively created content. Second, I observe that users who hold expertise may be territorial about their knowledge and signal their position through expressions of ownership. Third, I uncover initial results that suggest that territoriality may help to individuals to navigate collaborations where coordination needs are high and tasks are complex. Using these findings, I propose a number of design strategies and then outline an initial theoretical framework describing motivating characteristics of online territoriality.

Territoriality is an emergent pattern of behaviors and attitudes that can arise when individuals of varying expertise come together for a cooperative goal. These behaviors can help to define the boundaries of a social group, manage complex coordination by reducing ambiguity, strengthen one's identity as an expert and signal feelings of ownership about contribution as well as a collaborative space as a whole. However, it is important to also ensure that novice contributors do not feel marginalized or excluded because of the territorial expressions from expert collaborators. I view the research challenges facing the study of online territoriality are opportunities in developing broadly applicable social science theory that helps designers and researchers develop better ways for users become more aware of their actions in collaborative activity. The challenge for designers lies in managing the inevitable points of tension that will arise when members of different groups assert their particular perspectives and others, in turn, feel threatened by the different approach. Successful collaborative groups will need to strike this balance in order to remain healthy and vital.

APPENDIX A

Wikipedia Interview Script

Intro spiel

Today, I'd like to talk to you about how you participate in Wikipedia. I'll ask a few questions to get started but after a little while, it should be more of a conversation and less like an interview.

I'd also like to record this conversation. This would be for transcription purposes. We hope to use the information from these interviews in research papers and presentations. Any quotes would be anonymized so that you wouldn't be immediately identifiable. Are you comfortable with me recording you? If not, you can still participate in this interview – I just won't audiorecord you.

Warmup Questions/General Questions about Wikipedia

What is your UserName? How do you decide on what name to choose?

How long have you been participating in Wikipedia?

What activities do you participate in within Wikipedia?

Are there any Wikipedia groups/projects that you belong to? What are they? (For each activity, get an idea of frequency.)

More Directed Questions – Screen Sharing
Here, we look at three different activities chosen from Wikipedia pages, with at least one of them being Template: Maintained Pages.

The First Edit/Activity to be discussed
Can you show me the last edit you made? What exactly did you do? How did you decide what to change? Why did you make this change?

Did you participate in the talk page for this (action)? Why? Why not?

How did you feel that your change/edit was received by your fellow editors? [Probe with the different usernames on the page, if needed.]

Was this specific edit changed by someone afterwards? Why do you think the change was made? (Ask them to point out any discussion in the talk page, if applicable). What was your reaction to the change?

Are you watching this page still? (On the watchlist?) Why?

(If referring to Maintained pages)
Why did you choose to maintain this page?

Are you maintaining other pages?

How did you find out about this Template?

Have people contacted you as the Maintainer?

The Second Edit/Activity to be discussed

Can you show me the last edit you made? What exactly did you do? How did you decide what to change? Why did you make this change?

Did you participate in the talk page for this article? Why? Why not?

How did you feel that your change/edit was received by your fellow editors? [Probe with the different usernames on the page, if needed.]

Was this specific edit changed by another editor afterwards? Why do you think the change was made? (Ask them to point out any discussion in the talk page, if applicable). What was your reaction to the change?

Are you watching this page still? (On the watchlist?) Why?

(If referring to Maintained pages)
Why did you choose to maintain this page?

Are you maintaining other pages?

How did you find out about this Template?

Have people contacted you as the Maintainer?

The Third Edit/Activity to be discussed

Can you show me the last edit you made? What exactly did you do? How did you decide what to change? Why did you make this change?

Did you participate in the talk page for this article? Why? Why not?

How did you feel that your change/edit was received by your fellow editors? [Probe with the different usernames on the page, if needed.]

Was this specific edit changed by someone afterwards? Why do you think the change was made? (Ask them to point out any discussion in the talk page, if applicable). What was your reaction to the change?

Are you watching this page still? (On the watchlist?) Why?

(If referring to Maintained pages)
Why did you choose to maintain this page?

Are you maintaining other pages?

How did you find out about this Template?

Have people contacted you as the Maintainer?

APPENDIX B

Organizational Tagging Interview Script

Today, I'd like to talk to you about how you use some of the different systems at IBM that involve tagging. I'll ask a few questions to get started but after a little while, it should be more of a conversation and less like an interview.

(Also, mention screensharing with either NetMeeting or SameTime 7.5.1 and audiorecording ahead of time.)

I'd also like to record this conversation. This would be for transcription purposes. We hope to use the information from these interviews in research papers and presentations. Any quotes would be anonymized so that you wouldn't be immediately identifiable. Are you comfortable with me recording you? If not, you can still participate in this interview – I just won't audiorecord you.

<u>Warmup Questions</u>
What is your role at IBM? Your job title?

How long have you been at IBM?

What are your duties in your position?

What teams do you belong to?

General Questions about Tagging

What systems do you tag in? [If more than one, make sure to ask about both internal and external systems. Make sure to ask about external blogs. Find out what they are about. If not familiar with them, see how they fall on the content creation continuum (tagging others' content, tagging my content, hybrid.)]

If they don't say it spontaneously, ask about use (writer or reader) of specific systems:

	Writer	Reader
Dogear		
BlogCentral		
Media Library		

More Directed Questions – Screen Sharing
Here, we look at three different tags chosen from the systems named by the informants.

The First Inscribed Tag(s) to be discussed

Can you show me the last tag you created? Why did you choose these tags? How did you decide on the ones you selected?

Who do you think are looking at these tags? How do you think they are using these tags? [Probe with different groups, like members of your team, managers, IBM-ers in general.]

Let's talk a little more about the (content that has been tagged). Who do you think will be looking at this? Who might be interested in this content? [Is it the same type of person who will be looking at the tags?]

[If a blog or podcast] Do you know who reads your blog (or podcast)? Who are your posts(podcasts) written for (perhaps differentiating between different types of posts)?

Is there any information that you don't want to share with these audiences (in this context)?

(If you can tag other people's content, do you do so? Why or why not?)

The Second Inscribed Tag(s) to be discussed
[[If the first system happened to be Dogear, then choose a different second system.]]

Can you show me the last tag you created? Why did you choose these tags? How did you decide on the ones you selected?

Who do you think are looking at these tags? How do you think they are using these tags? [Probe with different groups, like members of your team, managers, IBM-ers in general.]

Let's talk a little more about the (content that has been tagged). Who do you think will be looking at this? Who might be interested in this content? [Is it the same type of person who will be looking at the tags?]

[If a blog or podcast] Do you know who reads your blog (or podcast)? Who are your posts(podcasts) written for (perhaps differentiating between different types of posts)?

Is there any information that you don't want to share with these audiences (in this context)?

(If you can tag other people's content, do you do so? Why or why not?)

The Third Tag to be Discussed

Can you show me the last tag you created? Why did you choose these tags? How did you decide on the ones you selected?

Who do you think are looking at these tags? How do you think they are using these tags? [Probe with different groups, like members of your team, managers, IBM-ers in general.]

Let's talk a little more about the (content that has been tagged). Who do you think will be looking at this? Who might be interested in this content? [Is it the same type of person who will be looking at the tags?]

[If a blog or podcast] Do you know who reads your blog (or podcast)? Who are your posts(podcasts) written for (perhaps differentiating between different types of posts)?

Is there any information that you don't want to share with these audiences (in this context)?

(If you can tag other people's content, do you do so? Why or why not?)

Writing Tags vs. Searching with Tags
Up until now, we've been talking about how you write tags. Now I'd like to shift the topic to how you search in tag-based systems. Do you search for tags, specifically? Do you do a general text search? How do you choose the tags you use for search? Do you click a displayed tag, or do you type one in? How often do you use more than one tag in a search?

The First Searched Tag

Can you tell me about the last tag-based search you conducted? [Let the user pick the system.] So, tell me about this tag. [Possible prompts: Why did you choose these words/terms? Why did you create this tag? Do you know if anyone else is using this tag? Who and how do they use it?]

Is there a tag that you search with particularly often [Let the user pick the system.] So, tell me about this tag, too. [Possible prompts: Why did you choose these words/terms? Do you know if anyone else is using this tag? Who and how do they use it?]

The Second Searched Tag
[[As above, if the first system happened to be Dogear, then chose a different second system. If the first system happened not to be Dogear, then chose Dogear as the second system.]]

Can you tell me about the last tag-based search you conducted? [Let the user pick the system.] So, tell me about this tag. [Possible prompts: Why did you choose these words/terms? Why did you create this tag? Do you know if anyone else is using this tag? Who and how do they use it?]

Is there a tag that you search with particularly often [Let the user pick the system.] So, tell me about this tag, too. [Possible prompts: Why did you choose these words/terms? Do you know if anyone else is using this tag? Who and how do they use it?]

APPENDIX C

Museum Participant Script

Both experts and non-experts will be given cover stories to prime for cooperation and competition.
[**Bring participant to workshop table.]**

Script for experimenter:
Before we begin, please look over the consent form. If you have any concerns, please let me know. If you do not choose to participate, we want to emphasize that this will not affect your relationship with Cornell or the Johnson Museum in any way.

Thanks. Now I'm going to ask you to fill out these forms so we can get some information about you. Please remember that there are no right or wrong answers and your input will be very helpful to us.

[Give the participant the questionnaires to fill out. When the participant is done with the questionnaires, collect them and write participant # on them.]

Experimenter script:

Now, we're going to ask you to use this iPodTouch tour of the gallery space for the next 20-30 minutes or so.

Have you ever used an iPod Touch before? You scroll by moving your finger up and down on the screen, and click by touching a button or link. Do you know what tags are? They are one-word keywords that other visitors like you have used to label certain objects. This is a list of the top 20 tags. The numbers next to the tags are how many objects were labeled using that tag. To see all of the tags available, click on the button at the bottom of the page. You can also search through all the tags and objects available by typing in the box using the keyboard. To speed up the process, you can click on a word while you're typing and it'll finish the word for you. If you click on a tag, you'll see all the objects that were labeled by other people using that tag.
The name of each object will be a certain color based on what area it's in. That area is the African Corner, those objects are the Lobby, and that is the Workshop Room.

When you click on an object, you can click "More Info" to see more information if it's available. You can also see the tags that other visitors used to label the object. Darker tags are more popular. If you click "Choose Tags", you can vote on tags that you like or don't like, or add you own tags. If you like a tag, click on the green check mark and it'll make the tag more popular - if you don't like it, click on the red x mark and it'll make it less popular. Click it again to undo. You'll see the meter get more or less full as you vote. You can also click on tags here to see all of the objects that were labeled using this tag. If you want to add your own unique tag, click in this box and type your tag using the keyboard, then press “add”. Again, while you type you can click on a word and it'll finish it for you. **If you have any trouble entering tags on the keyboard, you will have a chance to tell us later.**

At any time, rotate the iPod to see a map of where you are. You can click on a room to see all of the objects in that room. *TODAY WE ARE FOCUSING ON THE OBJECTS IN THE LOBBY CASE AND AFRICAN ART.* If there are numbers next to the name of a room, that's how many objects are in that room that have the tag that you're looking at. If an object is highlighted in gold, that's an object that has the tag that you're looking at. You can click on an object, and then rotate the iPod back to see its information. Lastly, you can click the "zoom out" button to see a view of all the rooms.
What we are trying to do is create a collaboratively generated group of tags that will help other museum visitors have a great educational experience while navigating the space so *we’ve asked people who are knowledgeable about art, such as those who study art, as well as museum visitors who don’t have any formal training to help contribute tags of their own, which are displayed here.*

However there is limited space in the tour interface, so we will be choosing the best 5 tags created by users to be displayed permanently alongside the object in the tour. We plan on making this decision in the next week of or so your input is especially important at this time. As I mentioned before, one special thing about the MobiTags is the ability to create tags and view tags chosen by others. So, if you are unsatisfied with the tags left by others, then you can vote them down. If you are pleased with the other tags, you can vote them up as well. If you want to add more tags, please feel free to do that as well. We are interested describing the objects as well as possible. **Keep in mind that other visitors will be able to vote your tags down as well.**

[Participant takes the tour.]
Experimenter script: Thanks again for your cooperation. Did you want to add tags but weren’t able to with the interface?
[IF YES]

To make sure we get the best set of tags possible, I'm going to ask you to look again at the objects on paper to add any additional tags that you may have not been able to contribute.

[Hand participant forms. Give them 10 minutes or so to complete.]

I'm going to you a few questions about your experience with the tour. There are no right or wrong answers – your feedback is extremely valuable for helping us improve the system.

[Give participant the questionnaire. Then conduct the following interview.]

What did you think of the tags that were initially displayed when you first started the tour?

Would you mind going to your favorite object that you saw on the tour? How did you choose the tags for (this object)? What were your criteria for the tags that you chose?

Did you vote on any tags? If so, can you show me an example? Why did you vote the tag (up or down)?

How did you feel about other people being able to vote your tags up or down? How did that change the way that you tagged?

Debrief script:
Thanks again for participating in our study. We are interested in how people express ownership during cooperative tasks. To study that more closely, we asked you to contribute to a database of social tags describing these objects. These tags were collected for the purpose of the experiment and will not be used, unless you specifically request them to be incorporated. In addition, we are not choosing three tags as the sole descriptors of the objects, as we had stated during the experiment. We had described this scenario as a way to make this task feel more meaningful to you as a participant.
[Give participant the $10 compensation. Ask them to sign the attestation form.]

Do you have any questions for me? Please feel free to contact me or Professor Geri Gay, the faculty member supervising this research if you have any concerns. I can be reached at jt17@cornell. edu and Prof. Gay can be contacted at gkg1@cornell.edu.

APPENDIX D

Museum Questionnaires

What is your age?

What is your gender?

How would you describe your knowledge of art? Please circle all that apply.

a. Little to no knowledge
b. Passing knowledge
c. Knowledgeable
d. Very knowledgeable

Have you had formal schooling in art or art-related topics?

a. No, I have not had formal schooling in art.
b. Introductory-level college coursework in art or art history or art-related topics
c. Major in art or art history or art-related topics
d. Graduate degree in art-related topic
e. Other _____

How often do you visit the Johnson Museum?

a. This is my first visit.
b. Rarely (1-3 times/a year)
c. Occasionally (4-6 times/a year)
d. Regularly (1-2 times/**a month**)
e. Often (3 or more times/**a month**)

How familiar are you with social tagging?

a. Not familiar at all
b. Somewhat familiar
c. Familiar
d. Very familiar
e. Extremely familiar

Are you a user of social tagging sites? If so, please circle all that apply.

a. delicio.us
b. Flickr
c. Facebook
d. steve.museum
e. citeulike
f. Other _____

How familiar are you with using mobile tours in the museum?

a. Not familiar at all
b. Somewhat familiar
c. Familiar
d. Very familiar
e. Extremely familiar

For the following questions, please indicate whether you agree or disagree with the statement by circling the appropriate number.

(strongly agree) (agree) (neutral) (disagree)(strongly disagree)

1. I enjoyed my experience with the iPod Touch today.

1 2 3 4 5

2. I felt like I learned a lot during my experience with the iPod today.

1 2 3 4 5

3. I would recommend this iPod Touch guide to other visitors.

1 2 3 4 5

4. I was comfortable with my ability to use the iPod. (I had no trouble using the iPod.)

1 2 3 4 5

5. I was comfortable with my knowledge of tags before today.

1 2 3 4 5

6. I felt that in general the tags were appropriate for the object that they were linked to.

1 2 3 4 5

7. I saw a connection between objects with the same tag.

1 2 3 4 5

8. I thought about the other people who contributed tags while I took the tour.

1 2 3 4 5

Please answer the following questions by circling the best response.

I feel a very high degree of personal ownership towards the tags I have chosen for the tour.

Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7

I sense that these tags chosen for the tour are mine.

Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7

When I collaborate with others, I seek an active role in the leadership of a group.

Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7

When working with others, I avoid trying to influence those around me to see things my way.

Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7

I find myself organizing and directing the activities of others.

Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7

I strive to gain more control over the events around me.

Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7

I strive to be “In command” when I am working in a group.

Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7

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