

Coordinating the Commons: Diversity & Dynamics in Open Collaborations

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A dissertation submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

University of Washington

2013

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Program Authorized to Offer Degree:

Department of Human Centered Design & Engineering

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Abstract

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The success of Wikipedia demonstrates that open collaboration can be an effective model for organizing geographically-distributed volunteers to perform complex, sustained work at a massive scale. However, Wikipedia's history also demonstrates some of the challenges that large, long-term open collaborations face: the core community of Wikipedia editors—the volunteers who contribute most of the encyclopedia's content and ensure that articles are correct and consistent—has been gradually shrinking since 2007, in part because Wikipedia's social climate has become increasingly inhospitable for newcomers, female editors, and editors from other underrepresented demographics. Previous research studies of change over time within other work contexts, such as corporations, suggests that incremental processes such as bureaucratic formalization can make organizations more rule-bound and less adaptable—in effect, less open—as they grow and age. There has been little research on how open collaborations like Wikipedia change over time, and on the impact of those changes on the social dynamics of the collaborating community and the way community members prioritize and perform work. Learning from Wikipedia's successes and failures can help researchers and designers understand how to support open collaborations in other domains—such as Free/Libre Open Source Software, Citizen Science, and Citizen Journalism. In this dissertation, I examine the role of openness, and the potential antecedents and consequences of formalization, within Wikipedia through an analysis of three distinct but interrelated social structures: community-created rules within the Wikipedia policy environment, coordination work and group dynamics within self-organized open teams called WikiProjects, and the socialization mechanisms that Wikipedia editors use to teach new community members how to participate. To inquire further, I have designed a new editor peer support space, the Wikipedia Teahouse, based on the findings from my empirical studies. The Teahouse is a volunteer-driven project that provides a welcoming and engaging environment in which new editors can learn how to be productive members of the Wikipedia community, with the goal of increasing the number and diversity of newcomers who go on to make substantial contributions to Wikipedia.

For Davis E. Keeler

As conditions are equalized in a people, individuals appear smaller and society seems greater, or rather, each citizen, having become like all the others, is lost in the crowd, and one no longer perceives anything but the vast and magnificent image of the people itself.

Alexis de Tocqueville

Democracy in America, Volume II, Part II:

On the Influence the Democratic Ideas and Sentiments Exert on Political Society

Even though you try to put people under control, it is impossible. You cannot do it. The best way to control people is to encourage them to be mischievous. Then they will be in control in a wider sense. To give your sheep or cow a large spacious meadow is the way to control him. So it is with people: first let them do what they want, and watch them. This is the best policy. To ignore them is not good. That is the worst policy. The second worst is trying to control them. The best one is to watch them, just to watch them, without trying to control them.

Shunryu Suzuki

Zen Mind, Beginner's Mind

Acknowledgements

This work would not have been possible without the support of many individuals and several organizations. I have been fortunate in my academic career so far; I have had a number of excellent mentors. First, I would like to thank my advisor, Mark Zachry, not only for teaching me how to be a better researcher, but also for serving as a Socrates to my Meno—patiently shepherding my vague, sometimes disjointed notions into research questions and helping me reign in my rambling manuscripts (to some extent anyway). I would also like to thank all members of my dissertation committee, past and present: Cecilia Aragon, Robert Mason, David McDonald, Adam Moore, Karine Nahon, and Judy Ramey. And I would also like to express my gratitude to Dan Cosley, Andrea Forte, Sean Goggins, Travis Kriplean, Cliff Lampe, Katie Panciera, and John Riedl, who provided feedback, intellectual guidance, and inspiration on this and other research projects.

All of the research that contributed to and culminated in this dissertation was collaborative in nature. I couldn't have accomplished any of it without the dedication and intellectual contributions of numerous collaborators. I would first like to thank my collaborators from the University of Washington: Emily Bender, Lance Bennett, Alan Borning, Deen Freelon, Michael Gilbert, Jeff Hemsley, Mari Ostendorf, Meghan Oxley, Behzod Sirjani, Stephanie Steinhardt, and many others with whom I've worked, learned, and schemed along the way. A great deal of the research in this dissertation was performed with collaborators outside of UW as well. I thank my colleagues at the Wikimedia Foundation, especially the Teahouse team—Siko Bouterse, Sarah Stierch, and Heather Walls—and everyone who participated in the 2011 Wikimedia Summer of Research, especially Stuart Geiger, Aaron Halfaker, Melanie Kill, and Maryana Pinchuk. I would also like to thank the Foundation itself for providing me with countless opportunities to translate my geeky academic interests into real world impact. And of course, I offer my sincere gratitude to the Wikipedians I have known and worked with—I look forward to continuing our important work together.

The entire faculty and staff of the UW Department of Human Centered Design & Engineering have made my graduate school experience easier and more engaging in countless ways. I would like to thank them all for supporting me in my transformation from a clueless n00b to a bona fide HCI researcher. I also wish to acknowledge several other institutional sources of support. Thanks to the University of Washington College of Engineering for providing me with early support through a 2008 Clairmont L. Egtvedt Fellowship, and to IARPA and the National Science Foundation (Grants #IIS-0811210 and #IIS-1162114) for funding that supported my research.

Finally, I thank my family and friends, especially my mother and father, Diane Lantz and Barry Morgan, for encouraging me from an early age to look, learn, and ask questions. Thanks to my first mentor, Davis Keeler, for showing me how I might think, write, and live. Thanks to Alena Benson, Doug Divine, Toni Ferro, Karl Frantz, Elly Searle and all my other HCDE peeps, whose friendship has kept me relatively sane over the past five years. And finally my deepest thanks to Allison Kilgore for her patience, companionship, intellectual curiosity, and sharp editor's eye.

Table of contents

ACKNOWLEDGEMENTS	7
TABLE OF CONTENTS	8
LIST OF TABLES	12
LIST OF FIGURES	13
CHAPTER 1	14
INTRODUCTION	14
SITUATING OPEN COLLABORATION	15
<i>Defining open collaboration</i>	16
<i>Designing for openness</i>	17
RELATED WORK.....	18
<i>Pitfalls and Unintended Consequences</i>	21
RESEARCH GOALS	24
<i>Structure of the dissertation</i>	25
<i>Authorial voice and attribution</i>	26
CHAPTER 2	28
BACKGROUND AND RELATED RESEARCH	28
A BRIEF HISTORY OF WIKIPEDIA.....	28
<i>Mechanisms for coordinating growth: 2001 - 2007</i>	30
<i>The Wikipedia Policy Environment: Formalized community norms</i>	32
<i>WikiProjects: Open teams for coordinating work</i>	33
<i>The new user experience and the editor decline: 2008-2013</i>	35
PUTTING THE EDITOR DECLINE IN CONTEXT	36
<i>Calcification of the policy environment</i>	37
<i>WikiProject work in the decline era</i>	37
<i>New user experience in the decline era</i>	38
CONCLUSION	39
CHAPTER 3	40
THEORY AND METHODOLOGY	40
ECOLOGICAL RESEARCH APPROACH.....	40
<i>Tracing ecological relationships in heterogeneous networks</i>	41
<i>Ecological relationships in complex systems</i>	43
RESEARCH METHODS	45
<i>Comparative case studies</i>	46
<i>Edit log analysis</i>	47
<i>Content analysis</i>	47
<i>Interviews</i>	49
<i>Surveys</i>	50
CHAPTER 4	51
FORMALIZATION IN WIKIPEDIA'S POLICY ENVIRONMENT	51
THE WIKIPEDIA POLICY ENVIRONMENT	52

STUDIES OF WIKIPEDIA'S POLICY ENVIRONMENT.....	54
<i>Study 1: Wikipedia's policy environment as genre ecology</i>	54
<i>Study 2: Calcification of Norms Against Newcomers</i>	55
METHOD	56
<i>Study 1: The ecological role of essays</i>	56
<i>Study 2: Policy growth and calcification.</i>	56
FINDINGS	57
DISCUSSION	60
CONCLUSION	61
<i>Chapter summary</i>	61
CHAPTER 5.....	63
COORDINATION WORK AND GROUP MEMBERSHIP IN WIKIPROJECTS	63
INTRODUCTION	63
RELATED WORK.....	65
<i>Joining a project: Declared vs. participatory members</i>	66
<i>WikiProject work: Content production vs. coordination</i>	67
<i>Hypotheses: Membership status and coordination work</i>	68
METHODS.....	69
<i>Codebook development</i>	69
<i>Data annotation</i>	70
FINDINGS	71
<i>Types of coordination work</i>	71
<i>Non-member participation</i>	73
DISCUSSION	75
<i>WikiProjects as groups</i>	76
<i>WikiProjects and FLOSS projects</i>	76
CONCLUSION	77
<i>Chapter summary</i>	78
CHAPTER 6.....	79
DYNAMICS & DIVERSITY IN WIKIPROJECTS	79
INTRODUCTION	79
RELATED WORK.....	80
<i>Current study</i>	82
METHOD	83
<i>Identifying Active WikiProjects</i>	84
<i>Identifying Alternative WikiProjects</i>	84
<i>Classifying Alternative WikiProjects</i>	85
<i>Characterizing participation in Alternative WikiProjects</i>	86
FINDINGS	87
<i>Range of work activities in alternative WikiProjects</i>	88
<i>Editing Work</i>	88
<i>Meta-Content Work</i>	90
<i>Social and Community Support Actions</i>	91
<i>Collaborative Actions and Disposition</i>	92
<i>Border Patrol</i>	93
<i>Administrative Actions</i>	94
DISCUSSION	94
<i>Implications for Design</i>	96
CONCLUSION	97

<i>Chapter summary</i>	97
CHAPTER 7	99
DESIGNING OF TEAHOUSE	99
WIKIPEDIA TODAY: A NEW EDITOR'S PERSPECTIVE	100
TEAHOUSE: A PLACE FOR NEW EDITORS	101
<i>System overview</i>	101
<i>Origins of the Teahouse</i>	103
<i>Design goals</i>	106
DESIGN PROCESS	106
<i>Research sprints</i>	107
<i>User scenarios</i>	107
<i>Wireframes</i>	108
TEAHOUSE FEATURES	108
<i>Invitations</i>	108
<i>Social Q&A</i>	110
<i>Host and guest profiles</i>	111
<i>Embedded social norms</i>	113
<i>HostBot</i>	117
CONCLUSION	119
<i>Chapter Summary</i>	120
CHAPTER 8	121
EVALUATING THE EXPERIENCE AND IMPACT OF THE TEAHOUSE	121
METHODS	121
<i>In-project activity</i>	121
<i>Invitations</i>	122
<i>Surveys</i>	122
<i>Dynamics of Teahouse Q&A board vs. Wikipedia Help Desk</i>	123
<i>Retention of Teahouse visitors vs. non-visitors</i>	123
FINDINGS	123
<i>Activity and participation</i>	123
<i>Invitations</i>	126
<i>Editor satisfaction</i>	127
<i>Participation by female editors</i>	128
<i>Impact of social Q&A</i>	129
<i>Impact of participation</i>	130
DISCUSSION	131
CONCLUSION	131
<i>Future work</i>	131
<i>Chapter summary</i>	133
CHAPTER 9	134
CONCLUSION AND FUTURE WORK	134
<i>Contributions</i>	135
<i>Current and future work</i>	138
CONCLUSION	142
REFERENCES	144
VITA	155

APPENDICES 156

APPENDIX A: WIKIPEDIA POLICY ENVIRONMENT CODEBOOK156

APPENDIX B: WIKIPROJECT TALK PAGE CODEBOOK.....157

APPENDIX C: WIKIPROJECT INTERVIEW PROTOCOLS159

First round of interviews (July – September 2011)159

Second Round: November 2012 – May 2013.....159

APPENDIX D: TEAHOUSE RESEARCH SPRINTS162

Sprint #1: Newbie teaching strategy trends.....162

Sprint #2: Alternative Lifecycles of new users.....162

Sprints #3-4: New user help requests and participation in help spaces.....163

Sprint #5: WikiProject Participation and mentorship.....163

Sprints #6: Visualizing WikiProject Activity.....164

APPENDIX E: TEAHOUSE USER SCENARIOS166

Requesting Technical Help.....166

Negotiating People, Policy or Process.....167

Finding Collaborators or Ways to Contribute.....168

APPENDIX F: TEAHOUSE SURVEYS169

Phase 1 Guest survey.....169

Phase 1 Host and Wikipedian survey.....172

APPENDIX G: TEAHOUSE DESIGN ARTIFACTS175

Teahouse Invitations.....175

Workflow diagram for inviting promising newcomers to the Teahouse during Pilot Phase 1.....176

List of tables

Table 1. Timeline of research activities	21
Table 2. The coefficients of a logistic regression over the contributions of registered editors to norm pages predicting <i>success</i> (i.e. not reverted) are presented.	53
Table 3. Coding categories for WikiProject talk page messages, showing messages coded per category.	64
Table 4. Work activities of alternative WikiProjects, classified according to valued work codes from Kriplean et al. 2008... 79	
Table 5. Top 20 WikiProjects by annual edits to project pages in 2007 and 2012. Alternative project names are highlighted and italicized. An asterisk indicates a project that was not among the top 20 in 2007.	82
Table 6. Average Teahouse guest satisfaction by gender. Differences marked with an asterisk are marginally significant... 121	
Table 7. Interactivity of Teahouse Q&A board vs. Wikipedia Help Desk. Significant differences are marked with an asterisk.	122

List of figures

Figure 1. The Wikipedia editor decline. The number of active editors (≥ 5 edits/month) plotted over time.	29
Figure 2. (left) Wikipedia's Editing Policy page.	32
Figure 3. (right) WikiProject Feminism main page.	32
Figure 4. Wikipedia essay No Angry Mastodons.	52
Figure 5. The policy, guideline and essay templates.	52
Figure 6. Number of documents in each policy genre that cover different regulatory topics.	57
Figure 7. Norm growth over time. The change in the sizes of three genres of formal norms are plotted by year.	59
Figure 8. Main pages for two WikiProjects.	64
Figure 9. Talk page for WikiProject Good Articles (left). Member list for WikiProject Ireland (right)	66
Figure 10. Proportion of message types by project members (black) and non-members (grey).	72
Figure 11. WikiProject page template (left). Stated goals of the WikiProject Council (right).	84
Figure 12. Number of edits to WikiProject pages (left) and registered editors participating in WikiProjects over 10 years. Alternative WikiProject activity (red dotted line) is lower but more stable than in conventional WikiProjects (green dashed line).	88
Figure 13. Landing page of the Wikipedia Teahouse, showing rotating galleries of recent questions, featured hosts, and featured guests.	102
Figure 14. Teahouse Guests page, with recently created profiles.	103
Figure 15. Teahouse hosts page and profiles.	104
Figure 16. Teahouse Q&A board (top). Clicking "Ask a question" causes the Teahouse Gadget as a JavaScript webform to appear (middle). During Phase 2, Teahouse hosts expanded the functionality with a "Join this discussion" button (bottom).	105
Figure 17. Teahouse guest profile creation workflow with step-by-step editing instructions.	113
Figure 18. Wikipedia Help Desk page header (top), and a typical Help Desk response to a newcomer's question (bottom).	115
Figure 19. Host expectations document (top), and pledge to abide by those expectations during the host profile creation workflow (bottom).	116
Figure 20. Monthly question metrics from Teahouse metrics report. Metrics that have improved from the previous month are highlighted in green.	119
Figure 21. Activity during the Teahouse pilot. The interregnum and Phase 2 periods are represented by grey and gold bars, respectively.	124
Figure 22. The landing page of the Wikimedia IdeaLab, a cross-project idea incubator, with featured content galleries.	139
Figure 23. Overview of Percolate activity surfacing patterns showing preliminary typology of profiles and guides.	140
Figure 24. The IdeaLab Ideas page, which features idea profiles in a gallery pattern (left) and a feed pattern (right).	141
Figure 25. New editors and Wikipedians joining WikiProjects, by year, 2004 - 2011. Source: http://commons.wikimedia.org/wiki/File:Editors_joining_wikiprojects.png	165

Chapter 1

Introduction

As human beings, one of our defining features is our ability to join together to satisfy our individual needs and pursue common goals. Throughout history, many groups, communities and whole societies have emerged organically without duress or coercion. Since classical times, philosophers and scientists have been interested in how these groups work: why they form, how they govern themselves, and how they balance the needs of the individual and the group. Since the European Enlightenment, scholars have used the scientific tools of social theory and empirical observation to begin to understand the social institutions that enable these voluntary associations: social mores and social contracts, common bonds and cooperative arrangements, market economies and bureaucracies. The work of these scholars has revealed both the power and the perils of these associations. At their best, these social institutions help us achieve ends collectively beyond what we could accomplish individually. But they are also vulnerable to corruption, disruption and dissolution.

The Internet has made new forms of collective action and voluntary association possible. Geographical location, physical appearance, socioeconomic status, native language and many of the other aspects of our offline identities constrain our actions less when we are online. At their best, the systems we build to allow people to communicate and collaborate over the Internet leverage this new freedom much like our best democratic political institutions. They allow large numbers of people with a variety of motivations, abilities and levels of interest to participate—synchronously and asynchronously, independently and collaboratively—in the creation of communities, the fulfillment of common needs, and the pursuit of common goals. Open collaboration systems—online technology platforms that present low barriers to participation and support the development of sophisticated social institutions—have received increasing attention over the past decade because they allow loosely-affiliated, self-organized volunteer groups to create certain kinds of common goods such as software and encyclopedias that were formerly the sole domain of traditional organizations.

The evolving laws, governance structures, and ideals of democratic states reflect our various attempts to negotiate a balance between our values and our needs as conditions change in our societies and in the world around us. In this dissertation, I explore a similar dynamic tension in open collaboration systems: how these systems instantiate openness in their technologies and social institutions and how they maintain and transform themselves in response to changing needs, shifting priorities, and the consequences of external events.

Species often become extinct because they fail to adapt to changes in their environment. Nations decline and fall when their institutions stagnate, or become intractable and unmanageable. Large open collaborations like Wikipedia resemble offline communities, even whole societies, in their scale and complexity. But open online collaboration is a relatively recent phenomenon, and we know very little about what makes these systems succeed or fail, or how they change over time: how are open collaborations affected by unexpected growth or decline in participation? How does the design of their software and social structures impact their ability to remain inclusive and flexible? How do they maintain productivity, quality and continuity as new members join and veterans leave? How do they continue to meet the needs of their members as community goals, attitudes, or the nature of the collaborative project itself change?

In order to support open collaborations that make valuable contributions to human society, to design new open collaboration systems that will stand the test of time, and to develop effective models of open collaboration for new domains of work, we

must understand what sets open collaborations apart, and what makes them effective. Before discussing my specific research activities, I will motivate my investigation by reviewing previous empirical and theoretical work on open collaboration: how it differs from other modes of collaborative work, the role of openness in the design of open collaboration systems, the benefits and challenges of these systems, and the work domains in which open collaboration has been most broadly adopted.

SITUATING OPEN COLLABORATION

The phenomenon of online mass collaboration has changed how we as a global society consume, produce and exchange information. Mass collaboration systems are networked technologies and web-based platforms that allow large numbers of people to work together towards a common goal or that aggregate their individual contributions (Richardson & Domingos, 2003). These systems are so ubiquitous in our daily lives that we often take them and the services they provide for granted: user-generated recommendations on sites such as Amazon.com and Yelp give consumers the confidence to buy everything from books to boats that they have only seen pictures of and to sit down at a new restaurant in a foreign city and expect a delicious meal.

Mass collaboration has also significantly altered the way we work: crowdsourcing platforms and online job marketplaces such as Amazon Mechanical Turk and oDesk are two examples of many new tools of the internet economy that provide geographically distributed individuals and businesses with greater flexibility in how, when, and where they work, and what they work on.

Mass collaboration has also changed the way we conceptualize work. Some mass collaboration systems, like Google, leverage implicit work: analyzing the searching and web browsing behaviors of millions of people every day in order to deliver the most relevant results (and advertisements) for every query. Other systems elicit volunteer work by creating game-like experiences. NASA's clickworkers project uses game mechanics to get thousands of individuals to annotate images of astronomical objects, simple and engaging tasks that can be completed independently and then aggregated by computers to create rich scientific datasets. Fold.it presents volunteers with an even richer game-like environment complete with leaderboards and levels in the service of solving protein-folding problems that are too complex to model computationally.

Analyzing Internet users' digital traces and aggregating user-generated content are productive (and often profitable) ways of leveraging mass collaboration to create valuable products and provide useful services. Mass collaborations like Fold.it and Amazon Mechanical Turk, which rely on centralized mechanisms to aggregate independent work, are commonly referred to as crowdsourcing systems. Crowdsourcing relies on "the wisdom of crowds"—a term that describes the emergent phenomenon of individuals acting in predictably similar ways without interacting or otherwise consciously influencing each others' behavior (Surowiecki 2004).

A crowdsourcing model for collaboration can be highly effective for completing modular, well-scoped tasks that can be performed independently and aggregated after the fact. However complex, sustained collaborative work such as developing computer programs and creating and curating large information repositories generally requires deeper domain expertise and intentional coordination among workers. Traditional organizations like libraries and software companies coordinate the creation of sophisticated material and virtual artifacts by investing in massive, centrally-controlled infrastructures that consist of employees, workspaces, tools and materials, and formal rules, roles and procedures.

The past 15 years have seen a revolutionary new approach to coordinating complex work at massive scale: a type of mass

collaboration called open collaboration. Open collaborations share features of both traditional organizations and other online mass collaborations. Like other mass collaborations, open collaborations involve the collaborative production of (generally virtual) artifacts by distributed individuals mediated by a shared technological platform. Like traditional organizations they also provide infrastructures that allows communities of practice to develop complex artifacts that require sustained, coordinated effort to create and maintain. Forte & Lampe (Forte & Lampe, 2013) distinguish open collaborations from other mass collaborations in two ways. Open collaborations:

- *present low barriers to entry and exit, and*
- *support the development of persistent, malleable social structures among their participants*

Other features commonly, but not universally, associated with open collaborations include voluntary (uncompensated) participation and a reduced dependence on hierarchical organization (Benkler, 2002).

The goal of this dissertation is to understand how to support this powerful emerging form of collaborative work by examining a system in which open collaboration has proven effective for over a decade: Wikipedia. In the following chapters I investigate two mechanisms for collaboration that have been instrumental in Wikipedia's success—community-created policy documents and self-organized work teams called WikiProjects. I analyze the evolution of these mechanisms over 11 years of Wikipedia's history in order to understand both how they have shaped collaborative work and how they have been shaped by the internal and external changes that Wikipedia has undergone during that time. I describe the impact of the formalization of Wikipedia's policy environment on participation in community governance over the past six years (Chapter 4). I describe the way Wikipedia editors use WikiProjects to coordinate their work (Chapter 5), the diversity of work activities these projects mediate, and how participation in Wikiprojects reflect the shifting concerns of the community and the changing nature of work on Wikipedia (Chapter 6). Finally, I describe the design and deployment of the Teahouse, a Wikipedia project that leverages the findings from the previous chapters and related research on new user socialization in online communities in order to address an important new form of work—recruiting and retaining more new Wikipedia editors (Chapters 7 - 8).

Defining open collaboration

Defining terms is important when performing research on new domains of scholarship, where a lack of consistent terminology can lead to fundamental confusion over the nature and the significance of the research project. In this dissertation I build on Forte & Lampe's definition of open collaboration. I explore the boundaries of their model through a discussion of related theoretical constructs, and evaluate its utility as a theory by applying it in empirical analysis of phenomena from a prototypical instance of the model—Wikipedia. To facilitate this evaluation, I operationalize their two necessary criteria for openness, low barriers to entry and malleable social structures, as *inclusivity* and *flexibility*. I refer to both the technical features and social institutions that support or impede inclusivity and flexibility as mechanisms, adopting Hollan & Stornetta's (Hollan & Stornetta, 1992) definition of mechanism as “ways to meet informal communication needs that are enabled by a medium.” Using the same term to describe both technical and social features emphasizes both their functional similarity and their inter-relatedness. Although it may be more common to conceptualize technical features (e.g. forums, listservs and “edit” buttons) as communication mechanisms, social structures in open collaborations such as rules, informal norms, groups are also used to meet communication needs. Furthermore, in open collaborations these social mechanisms are inextricably bound to the technical capabilities of the underlying platform, because all interaction with and through these systems are technologically-

mediated. Mechanisms can be simple (e.g. “like” buttons, project member lists) or complex (e.g. version controlled code repositories and project planning documents). Mechanisms can also be nested within other mechanisms (e.g. a hashtag in a tweet or an informal poll taken during a deliberative discussion in a forum).

I expand Forte & Lampe’s criteria for openness to highlight the importance of these mechanisms and to illuminate the relationship between the degree of inclusivity or flexibility afforded by specific mechanisms and the overall openness of the system. I define inclusivity and flexibility as:

- *Inclusivity*: The inclusivity of an open collaboration system is the degree to which its mechanisms support diverse types of contributors and contributions.
- *Flexibility*: An open collaboration system’s flexibility is the degree to which its mechanisms can be reconfigured to address changing needs and new conditions.

In the next section I provide a rationale for this expanded definition of open collaboration through examples that show how specific mechanisms can support or impede inclusivity and flexibility. I show how examining the inclusivity and flexibility afforded by the technical features of open collaboration systems and the social structures enabled by those features can be a productive approach to understanding how the way a system is initially designed and the way it is used jointly effect the project’s productivity and longevity.

Designing for openness

A system promotes inclusivity by creating low barriers to participation. In many cases, any mechanism that makes it easy for anyone to make a contribution can be thought of as promoting inclusivity. An equally relevant aspect of inclusivity is allowing different kinds and degrees of contribution. Allowing new users to make small, meaningful contributions at first provides them with a means of legitimate peripheral participation (Wenger, 2000), helps them understand community rules and norms, teaches them the ropes, and can make them want to contribute in more sophisticated ways. Preece and Shneiderman’s “Reader to Leader” framework (Preece & Shneiderman, 2009) describes a process by which online collaborations sustain themselves by providing tiered contribution mechanisms that allow new users to become gradually more involved.

Although allowing anyone to make a contribution is one mechanism for openness, even systems that provide open access may present barriers to participation in other ways. Some open access systems, such as open source software projects, require significant domain expertise to even participate peripherally. A seemingly simple task like filling out a bug report can be still be complex and confusing, especially when documentation is poor or nonexistent. The social norms of the project community can also constitute barriers to participation. Free/Libre Open Source Software (FLOSS) culture has been criticized for being hostile to women (Rustad, 2011) and the norms of the Wikipedia community can discourage participation by editors with different sociocultural backgrounds (Morgan, Mason, & Nahon, 2011). In recent years, the Wikipedia community has shown an increasing tendency towards excluding contributions from newcomers and outsiders in general (Halfaker, Geiger, Morgan, & Riedl, 2013).

Providing a mix of inclusivity mechanisms can also support quality control, a critical challenge for open collaborations (Forte & Lampe, 2013). Systems that only provide inclusivity in terms of ease of access, without providing multiple mechanisms for contribution, may suffer from poor quality control. For example, President Barak Obama’s Open Government Dialogue pro-

ject¹—which invited United States citizens to collectively brainstorm public policy issues—provided open access, but only two mechanisms for contribution: submitting a new policy proposal or rating an existing one. The website WorldNetDaily.com took advantage of these mechanisms by asking its readers to flood the site with strategically-motivated proposals calling for the president to release his birth certificate (FCW, 2009) and then to rate those proposals highly so that legitimate policy proposals were buried underneath. This kind of appropriation may have been prevented if the system had provided alternative mechanisms for contribution, such as the ability to flag redundant or inappropriate proposals, re-write or combine proposals into coherent policy statements, or required participants to sign their proposals with a persistent identity. Simple mechanisms like these can reduce the amount of noise in a system and the risk of strategic appropriation without imposing restrictions on who can contribute or what can be contributed.

Another option for the Open Government Dialogue project would have been to create or cultivate mechanisms that enhanced the project's flexibility. Flexibility is enabled by technical mechanisms that allow participants to change the system dynamically to suit their needs and facilitate direct communication and sustained interaction. Creating group communication channels, configurable group workspaces, usernames and profiles, and persistent, public records of past activities allows participants to develop relationships and reputations that make them feel more invested in the community and accountable for their actions. Providing user communities with flexible mechanisms that allow them to define and enforce community norms of behavior and quality standards can also make the system more robust to appropriation and more consistently productive.

Wikipedia provides an instructive example of how a mix of mutually reinforcing mechanisms can make an open collaboration resilient to appropriation and help it maintain quality. Wiki website technology allows Wikipedia users to participate in many different ways, such as by improving existing articles or tagging them for peer review, creating new articles, and engaging in group decision making. Self-organized teams called WikiProjects use shared workspaces to collaboratively structure their work around tasks and topics that interest them and benefit the encyclopedia. Community-created policies such as No Original Research and Verifiability and community-designated administrators entrusted with special technical powers allow Wikipedia to regulate the content of the encyclopedia and the behavior of its contributors in a consistent, transparent and decentralized way.

Wikipedia presents an exceptional case of open collaboration in that it has been intentionally designed to be both very inclusive and very flexible. The degree to which any particular collaboration system will benefit from such a degree of openness, and the mix of mechanisms necessary to make it so, depends on the goals of the collaboration: what it is designed to achieve and how it meant to achieve that goal. Theories of voluntary group collaboration developed in different work domains and areas of scholarship help to flesh out the dimensions of open collaboration and illustrate some of the requirements of different open collaboration systems.

RELATED WORK

Like the systems it encompasses, the term open collaboration is inclusive, flexible, and of relatively recent origin. While Forte & Lampe's definition has the advantage of being current, nuanced and succinct, previous conceptualizations of open collaboration are essential for understanding the dimensions of the model. In particular, Budhathoki & Haythornthwaite's (Budhathoki & Haythornthwaite, 2012) framework for organizing crowds and communities, Ostrom's (Ostrom, 1990) re-

¹ <http://opengov.ideascale.com/>

search on common-pool resource communities (CPRs), Benkler's (Benkler, 2002) commons-based peer production model, and Riehle's (Riehle, Ellenberger, Menahem, Mikhailovski, Natchetoi, Naveh, Odenwald, 2009) definition of open collaboration in Free/Libre Open Source Software (FLOSS) all elucidate important aspects of the central concept.

Budhathoki & Haythornthwaite (Budhathoki & Haythornthwaite, 2012) employ a graduated classification framework for describing the features of open collaborations that is similar to my own definition of inclusive and flexible mechanisms. They classify mass collaborations in terms of lightweight-to-heavyweight ways of organizing. A lightweight approach to organizing is supported by mechanisms that allow independent contribution of simple, modular content. Heavyweight organizing is supported by mechanisms that enable direct interaction, persistent conversation, and the formation of norms and social identities. Crowdsourcing systems primarily support lightweight organizing, but some also provide heavyweight mechanisms such as "boasting forums" where participants can advertise their individual achievements in public. Open collaborations such as Citizendium², which requires participants to register under their real names and submit their contributions for expert review prior to publication, reflect a more generally heavyweight approach.

Most open collaborations employ mechanisms that support a more balanced mixture of lightweight and heavyweight mechanisms because they need to support both crowds and communities. Budhathoki & Haythornthwaite's distinction between crowds and communities underscores a fundamental property that open collaborations share with many other mass collaborations, which is that participation generally follows a rough power-law distribution, with a small group of highly active core participants and a long tail of less active peripheral participants (Wilkinson, 2008). The peripheral participants (the crowd) generally perform well-scoped or simple tasks such as fixing typos, rating movies, filing bug reports or identifying lunar craters, while the core participants (the community) perform more complex tasks such as integrating patches, writing reviews, maintaining to-do lists, and moderating forums. The crowd/community distinction provided by the lightweight-to-heavyweight framework is useful for a high level understanding of user requirements for open collaborations. I find that adapting Forte & Lampe's definition provides better granularity for examining the specific mechanisms of collaboration and also makes it easier to distinguish open collaborations from other forms of mass collaboration, such as crowdsourcing.

Ostrom's (Ostrom, 1990) research on common pool resource communities (CPRs) provides a description of offline groups that share many similarities with open collaborations. CPRs are self-governing communities of different sizes that successfully manage shared consumable resources—such as coastal French villages managing local fisheries or cities in California's San Fernando valley that cooperatively manage the use of a shared aquifer. This groundbreaking work, which won Ostrom the Nobel Prize in Economics, presents CPRs as an instructive exception to the tragedy of the commons (Hardin, 1968) and other game-theoretic models of economic exchange that posit that equitable management of shared group resources is not possible without oversight by an external authority vested with power to enforce rules of production and consumption. Benkler's (Benkler, 2002) commons-based peer production model extends Ostrom's work to describe how mass collaborations like open source software projects and Wikipedia produce free, high quality open online resources outside the influence of capital markets or managerial commands.

Both of these theories elucidate critical economic and social antecedents and consequences of open collaboration. Ostrom in particular sets out a set of design principles for successful CPRs that highlight the importance of malleable social structures

² A wiki-based encyclopedia similar to Wikipedia

such as contextually sensitive rules, graduated sanctions for rule-breakers, and collective-choice arrangements for decision-making. Benkler articulates several core principles of peer production enterprises—modularity, granularity and integration—that allow these systems to create high quality goods efficiently while maintaining low barriers to entry. However, both Benkler and Ostrom focus on economic and legal conditions beyond the features of collaborative arrangements themselves that may not be applicable to all open collaborations (Forte & Lampe, 2013). For instance, Ostrom posits that successful CPRs must have clearly defined boundaries to succeed, but most articles and discussion forums on Wikipedia are technically open to anyone. Furthermore, the Internet itself makes it easy to hide your identity or inhabit multiple identities and the widely variable nature of participation in mass collaborations means that it is difficult to say where the boundaries of a particular collaborating community lie and how many members there at any given point. Benkler argues that the absence of managerial control and market-based motivations are necessary components of successful commons-based peer productions. While decentralized governance and non-market incentives have proven to be important principles for many open collaboration systems, they are not universally applied even in the domains Benkler focuses on: many mature open source projects such as MySQL receive substantial support from paid software developers working in traditional organizations, and the Wikimedia Foundation exercises explicit managerial control over the content of Wikipedia in certain cases because of legal considerations.

The model of open collaboration presented by Riehle (Riehle, Ellenberger, Menahem, Mikhailovski, Natchetoi, Naveh, Odenwald, 2009) focuses on principles of egalitarianism and meritocracy, which are central to the ethos of the open source software movement. FLOSS projects are an important subset of open collaborations, but egalitarianism and meritocracy implicate particular social mechanisms for decision-making (e.g. accepting or rejecting a patch based solely on its own presently-understood merits) and technical mechanisms of interfaces (e.g. all actions within the system are open and visible) that are not universal among open collaborations. Furthermore, while many FLOSS projects (and again, Wikipedia) hew close to these principles, they are antithetical to the goals and practices of other collaborative systems that are included under Forte & Lampe's definition of open collaboration. As Luther (Luther, Fiesler, & Bruckman, 2013) points out, an open commons is antithetical to the values of some creative production communities, where individual collaborators often feel a strong sense of ownership of their work. Framing open collaborations in terms of absolute principles also doesn't take into account how these systems change over time. Individual collaborations may operate in a less meritocratic fashion at various points for particular purposes, or evolve gradually towards a greater or lesser degree of egalitarianism.

Although I have unpacked the distinctions between these related theories in detail here, I do not believe that any of this previous work is fundamentally incompatible with a definition of open collaborations that focuses on their nature as systems that afford a high degree of inclusivity and flexibility. I draw on the work of Benkler and Ostrom (particularly Ostrom's CPR design principles) in my analysis of Wikipedia's policy environment (Chapter 4) and WikiProjects (Chapters 5 and 6). I also refer to the principles, practices and coordination mechanisms of other wikis and open source software projects as they are described by Riehle, Ward Cunningham (Leuf & Cunningham, 2001), Eric Raymond (Raymond, 2001) and other researchers and practitioners of open source in my analysis of WikiProject coordination (Chapters 5 and 6) and new user socialization in Wikipedia (Chapters 7 and 8). Forte & Lampe's definition of openness is a better fit for my empirical work because it can be operationalized as a property of systems that can be realized through various mechanisms and to various degrees. This allows me to comparatively evaluate different mechanisms that serve related purposes within the same collaboration (e.g. the Civili-

ty policy and No Angry Mastodons essay in Chapter 4) and also between different systems (e.g. open source projects on SourceForge and WikiProjects in Chapter 5). Examining openness as contingent and complex also facilitates multi-level analysis of change over time, allowing me to pose questions such as: *In what ways has Wikipedia become more or less inclusive since 2007?* and *How have coordination mechanisms like policies and WikiProjects become more or less flexible?* Finally, Forte & Lampe's definition also makes it possible to negatively bound my investigation by defining collaborative work arrangements that are not open collaboration systems, such as:

- offline collaborations (e.g. face-to-face group work)
- online collaboration that does not seek to create new artifacts (e.g. World of Warcraft raiding groups)
- mass collaborations that are not directly interactive (e.g. crowdsourcing systems)
- online collaborations for which affiliation with a traditional organization is necessary for participation (e.g. virtual teams in corporations)

All of these phenomena are fascinating and worthy of study but fall outside the bounds of this research project. I draw on theory and research from these domains to understand the dynamics of collaboration on Wikipedia, especially previous research on group dynamics in co-located teams, the coordinating role of artifacts in cooperative work, and groupware systems in enterprise collaborations. These comparisons allow me to understand the way open collaborations resemble other forms of organization and also how they differ, and to identify the unique challenges open collaborations face and how these challenges may be addressed.

Pitfalls and Unintended Consequences

I approach the task of understanding open collaboration as a design problem. All forms of human organization have strengths and weaknesses. The job of a design researcher is to understand, for any given system, the approach that will best leverage the strengths and mitigate the weaknesses. Many of the strengths of open collaboration have been discussed above. In this section I briefly describe a growing body of research on open collaboration and related domains of cooperative work that illustrates some of the common pitfalls and tradeoffs in the design of open collaboration systems.

Software can be designed to support openness in two basic ways: by offering specific mechanisms that afford particular kinds of inclusivity and flexibility, or by making the system architecture reconfigurable and extensible so that user-designers can customize it to suit their specific needs. The first approach could involve building in features such as “like” buttons, voting mechanisms, Q&A forums, and structured user profiles. The second approach involves providing the building blocks that allow contributors to create useful features. Wikipedia's software architecture again provides a radical example of the second approach to openness. The MediaWiki platform supports templating and markup languages that can be used for tagging articles that need citations and also for creating Barnstars (Kriplean, Beschastnikh, & McDonald, 2008) to acknowledge quality work. On Wikipedia, the same basic wiki page structure is used for developing content (articles, policies, help documents, WikiProject workspaces) and for engaging in asynchronous discussion (taking polls, making decisions by consensus, proposing collective action or asking and answering questions). Users can also write personal JavaScript extensions called userscripts and develop automated bots that allow them to customize their individual and group workflows and automate repetitive tasks.

While every computer-mediated environment enforces certain inflexible constraints on how it can be used (Lessig, 2006), many open collaboration systems are deliberately underspecified in order to facilitate the creation of the social structures that help maintain community, a design approach that Garud (Garud, Jain, & Tuertscher, 2008) refers to as *designing for incompleteness*. A design for incompleteness approach helps address a problem of computer-supported cooperative work systems that Ackerman (Ackerman, 2000) refers to as the *sociotechnical gap*, the disconnect between the social interactions that are necessary in complex collaborative work and the technical capabilities of the system that mediates that work. Early work in CSCW by Grudin (Grudin, 1994) showed that workplace collaboration technologies often failed because they did not support the existing social institutions—communication practices, roles, workflows, and social norms—of the groups that were made to use them. Orlikowski (Orlikowski, Galegher, Halperin, & Malone, 1992) showed that when organizations insisted that employees use systems that failed to meet their work needs, the users developed workarounds that re-appropriated elements of the systems or circumvented it entirely.

Because open collaborations lack the centralized control of traditional organizations—volunteer participants cannot be forced to participate—open collaborations with a wide sociotechnical gap may never get off the ground, and changes to an existing open collaboration system that disrupt established social structures can trigger a mass exodus. However, changing the technical features of the system is often desirable and sometimes necessary for maintaining the health of the system. In the case of AnswerBag.com, studied by Gazan (Gazan, 2011), a website redesign that triggered an exodus of angry community members was initiated with a goal to make the site more engaging to newcomers by changing the parameters of the reputation algorithm, which was biased towards established members. There is no guarantee that the social institutions that emerge within any human system—whether it is a society or an online community—will be beneficial to the system’s sustainability or productivity in the long term. For example, gatekeeping practices that evolved on Wikipedia to help maintain the encyclopedia’s quality have resulted in more and more good faith newcomers having their contributions deleted, which is one of the primary drivers of Wikipedia’s recent decline in new editor retention (Halfaker, Geiger, Morgan, & Riedl, 2013).

Researchers are just beginning to understand the long-term unintended consequences of particular social structures and technical features in open collaboration systems. As these systems grow and change, mechanisms that initially enabled flexibility and inclusivity can begin to make the system more exclusive and less adaptable. In Chapter 7, I show that new Wikipedia editors in 2013 face a confusing, seemingly disorganized mass of rules, jargon, help documentation, and half-completed tasks which may make it more difficult to for them find engaging work to do and figure out how to do that work correctly. The technical complexity of the wikitext markup language, decentralized and often ad hoc information architecture, and proliferation of procedures and policies that helped make Wikipedia an inclusive, flexible and successful open collaboration have in recent years created increasingly steep barriers to participation and make it difficult to deploy new tools and techniques to combat the editor decline.

In Wikipedia’s case, the increasingly high barriers that new contributors face are due in part to an ongoing process of formalization of sociotechnical structures. The process of formalization has been studied by scholars since Max Weber’s initial description of organizational bureaucracies (Weber, 2009). Organization scientists study formalization both as a measure of difference between organizations and a measure of change over time within organizations. According to Pugh (Pugh, Hickson, Hinings, & Turner, 1968), an organization’s degree of formalization is the extent to which rules, procedures and instructions are documented. According to Hage (Hage & Aiken, 1967; Hage, 1965), the definition also includes both the

proportion of codified roles, and the range of allowable variation from that formal standard. Since everything on Wikipedia is in a sense documented, and in open collaboration systems rules can be codified in multiple ways (e.g. established as binding community policies, or literally coded into the software itself) I define formalization in open collaborations as:

...the process by which rules, roles and work activities are codified into either binding community policies or the mediating technology, and the range of allowable variation from the formal standard.

Formalization has consequences for how work is coordinated, performed, and acknowledged in organizations, and potentially also for their long-term success. When informal workflows are formalized into organizational process the artifacts to which the work has been delegated are abstracted and decontextualized, but durable (Latour, 1987). Formalizations also encode the biases of their creators and the immediate concerns they were created to address, and so may not be as effective when applied in even slightly different situations leading to breakdowns and inequalities. Coordinating artifacts such as process diagrams and written rules do not provide all the information necessary to apply those rules in a given context; the relevant contextual information must be supplied by the individual applying the rule or following the diagram (Star, 1995). When workers use formalizations to perform complex tasks, they often draw on subject matter experts (wizards), informal documents (Spinuzzi, 2004) and their own tacit knowledge to re-contextualize the work. If the articulation work (Suchman, 1996) of re-adapting a formalization to a given context cannot be integrated into the formalization or represented within its own formal structure, that work is rendered invisible within the organization (Ribes, Jackson, Geiger, Burton, & Finholt, 2013). As a result both the important translation work and the people who perform it are not acknowledged and the organization as a whole may become less effective at adapting and learning.

Organizations often become more formal as they grow. Organizational growth often creates the need to decentralize authority, and formalization allows decentralization through bureaucratization. Organizations often also become more formal as they age, irrespective of their growth—as new rules are created to deal with internal and external environmental changes or to revise or adapt existing rules (March, Schulz, & Zhou, 2000). Although by the standards of traditional organizations Wikipedia is relatively young, it has experienced growth and change on a scale that most organizations never achieve. Over the course of six years, the community grew from hundreds of members to tens of thousands. It became the largest encyclopedia in history, and a top 10 website that millions of people throughout the world increasingly turned to as their first choice for information. Wikipedia also became the focus of intense media scrutiny, broad professional mistrust, and the subject of major controversies. As more people began to read and edit Wikipedia, the core community dedicated a tremendous amount of creative energy towards formalizing a set of decentralized quality control mechanisms. In this dissertation I argue that many of these mechanisms have helped Wikipedia maintain quality at the expense of openness. In 2013 Wikipedia is less open, both technically and socially, than it was in 2004. Wikipedia has begun to lose the substantial core volunteer community that allowed it to create and maintain its high quality public information resources. Many community processes and technical mechanisms have become too formal to be re-adapted or reformed, a state I refer to as *calcification* in order to signify that, in such situations, the formalization process has progressed to such a degree that methods originally put in place to amend or adapt the mechanism are no longer effective.

Forte (Forte, Larco, & Bruckman, 2009) showed how mechanisms such as the policy environment and WikiProjects helped Wikipedia maintain its openness during its growth period. The central question posed by the current decline of participation in Wikipedia is whether these or any of Wikipedia's other native mechanisms for promoting inclusivity and flexibility can

help the site maintain a core community that is large and dedicated enough to allow Wikipedia to both maintain the quality of its existing content and continue building the encyclopedia over the coming decades, during which time the Internet and the world will certainly continue to change in dramatic and unpredictable ways.

RESEARCH GOALS

In the context of the immense internal and external shifts that Wikipedia has undergone in its 12-year history, a bit of calcification is to be expected. Systems and societies often become a little less open minded, and a little less flexible, as they age. But the closing of Wikipedia is not complete, and I believe that the decline is not irreversible. Thousands of people still manage to make valuable contributions to Wikipedia every day. There is no indication that the rate of the decline is increasing, or that the overall quality of Wikipedia content is decreasing. Although some people write Wikipedia off as a fluke, and others predict that a continuing decline in active editors is inevitable, I take a more optimistic view: I believe that by understanding the mechanisms that help make Wikipedia inclusive and flexible, and particularly those that have resisted calcification, can not only help reverse the Wikipedia editor decline but also provide generalizable findings about open collaboration and implications for the design of other open collaborations in exciting new domains. In this dissertation, I take the stance that openness was an essential factor in Wikipedia's growth, and that maintaining a high degree of openness is equally essential to both Wikipedia's ability to sustain itself as a productive collaborative system and its ability to further its mission of engaging a diverse set of volunteers in task of producing a comprehensive and freely-available information resource that meets the needs of a global audience.

A research agenda broader than any one dissertation would be required for understanding why Wikipedia is so successful, how that success has shaped and been shaped by all of its social structures and technical features, and whether these mechanisms might be implemented successfully in other domains and systems. In my research work, I decided to examine two mechanisms of Wikipedia—community-created policy documents and self-organized workgroups called WikiProjects—which have been shown to be instrumental in maintaining Wikipedia's openness during its epic rise but which have not been studied in the context of the current editor decline. Policies and WikiProjects are productive structures for analyzing the impact of formalization on Wikipedia because they are themselves specialized, locally-made formalizations for regulating and coordinating decentralized volunteer work. Previous research provides evidence for how and why WikiProjects and policies evolved prior to 2007. However the long-term impacts of the policy environment, WikiProjects, and other mechanisms that were developed and deployed during Wikipedia's growth period have not been extensively studied on Wikipedia or on other open collaborations. One other area where studying the impact of formalization on Wikipedia may provide generalizable insights for other maturing open collaborations is the way the community socializes new members. All open collaboration systems require a pool of volunteer contributors to function. Since all participants in such systems will eventually stop contributing, a steady stream of newcomers must join the community in order to maintain productivity. In recent years, Wikipedia has become less successful at recruiting, retaining, and socializing new editors and this has contributed to an overall decline in participation.

If any of Wikipedia's native mechanisms for regulation and coordination still possess a degree of openness and flexibility, it may be possible to learn from or adapt these mechanisms to improve the new user experience of Wikipedia, increase the retention of new editors, and ameliorate the editor decline. This may in turn provide a roadmap for other open collaborations that must also balance requirements for openness and sustainability. The research questions that motivate the empirical inves-

tigations and design interventions presented in this dissertation are focused on understanding the extent to which Wikipedia's native coordination mechanisms are still highly inclusive and flexible and whether these open mechanisms can be leveraged to address other causes and symptoms of the current editor decline.

Research questions

- **RQ1:** How has the increasing formalization of norms in the Wikipedia policy environment affected participation in community self-governance?
- **RQ2:** How do Wikipedians coordinate work through the self-organized, open teams known as WikiProjects?
- **RQ3:** How can formal norms and open teams be adapted to provide opportunities for new user socialization and help Wikipedia recruit and retain a larger and more diverse set of new contributors?

Structure of the dissertation

Most previous studies of Wikipedia have focused on its exponential growth phase, the period between 2002 and 2007 when the site experienced the highest rates of content creation and participation. In this dissertation, I focus on five years that followed Wikipedia's activity peak, 2008 through 2012. I examine how WikiProjects and Wikipedia's policy environment reflect inclusivity and flexibility, and how these mechanisms have changed since 2007. Many previous studies of WikiProjects and policies have focused on prototypical examples: large topic-focused projects and official rules. I approach these same phenomena ecologically. Instead of generalizing from prototypical cases I attend to the diversity and commonality of various kinds of project and policy, describe their internal structures and external relationships, and analyze how they have adapted to environmental changes. A timeline of the research activities presented in this dissertation is provided in **Table 1**.

In Chapter 2, I provide a summary of previous research on Wikipedia, focusing on the policy environment, WikiProjects, and the impacts of growth and decline on new editors. In Chapter 3, I describe my methodological approach to researching Wikipedia. I describe how ecological and systems theories inform my research, and describe two frameworks I use to analyze the dynamics of document genres and team projects ecologically: genre ecologies (Spinuzzi & Zachry, 2000) and small groups as complex systems (Arrow, McGrath, & Berdahl, 2000). I go on to describe the research methods I used to sample and analyze data: content analyses of on-wiki artifacts and discussions, interviews and surveys of Wikipedia editors, and quantitative analyses of users' behavioral traces in the form of the edits they make to the wiki.

Chapter 4 addresses Research Question 1. I reports on my empirical work on how editors participate in community governance. I describe the three subtypes of Wikipedia policy—policies, guidelines and essays—as different genres of regulation that have been formalized to different degrees and address distinct community concerns. I also find that contribution to Wikipedia's official norms has slowed overall during the decline period and that the community is increasingly resistant to policy contributions by newer editors. However, unofficial norms—essays—continue to provide a valid informal mechanism for contribution to community governance for these editors.

In Chapter 5, I pursue Research Question 2. I examine the group structure of WikiProjects by analyzing the role that project membership and group discussion forums called project talk pages play in coordinating work. I find that WikiProjects follow a similar model of collaboration as FLOSS projects. WikiProjects are often weakly tied groups, they exhibit a pronounced core/periphery structure and the most common method of identifying and completing tasks is self-assignment. In Chapter 6 I take a deeper look at the role of WikiProjects in coordinating valued work on Wikipedia by investigating alternative Wik-

iProjects: projects whose goals and work activities do not fit the prototypical mold. This investigation shows that the WikiProject structure, originally developed to coordinate editing of articles within well-defined domains of encyclopedic knowledge, have been adapted to coordinate a variety of work activities beyond content production. I suggest that these alternative projects may be especially important in the decline era and highlights several challenges that impede work within WikiProjects.

Chapters 7 and 8 address Research Question 3. I describe the design and deployment of Teahouse, a WikiProject-style collaboration that offers peer-support for new editors. I provide a detailed design rationale for the Teahouse, focusing on coordination mechanisms that I developed to provide scalable, effective support for new editors in a welcoming community setting. In Chapter 8, I analyze the impact of Teahouse on editor engagement and new editor retention. I find that the Teahouse has been successful at creating positive and productive interactions among new and experienced editors and that newcomers who participate in the Teahouse are more active for longer than other new editors.

In Chapter 9, I conclude by returning to my three research questions, summarizing the major contributions of the dissertation, and proposing areas for future work in open collaboration based on my findings.

Authorial voice and attribution

Many of the research and design activities presented in this dissertation were conducted in collaboration with other researchers. Although I took the lead role in the research and writing of all of the research studies I present here, many of these studies would not have been possible without the vital contribution of other researchers at the University of Washington, the Wikimedia Foundation, the University of Minnesota and the University of California, Berkeley. In differentiating between solo and collaborative efforts, I will generally use the “we” voice to refer to collective efforts within unpublished and previously published research that include contributions from co-authors, and the “I” pronoun for solitary research efforts and in the discussions of framing and synthesis that provide transitions between chapters and constitute Chapters 1-3, and 9 in their entirety. The timeline of research activities presented in **Table 1** further clarifies my role and that of my esteemed collaborators in the research activities addressed directly within this dissertation.

Table 1. Timeline of research activities

	Research activity	Research question	Manuscript section	Description	Collaborators	Related publications
Summer 2009 – Spring 2010	Wikipedia policy environment study I	<i>RQ1</i>	Chapter 4: Formalization in Wikipedia's Policy Environment; Appendix A	Genre analysis content analysis of Wikipedia's policies, guidelines and essays.	Mark Zachry; Tomas Sadilek	Morgan, J. T., & Zachry, M. (2010). Negotiating with angry mastodons. <i>GROUP</i> 2010
Summer 2011	Analysis of the new user experience of Wikipedia	<i>RQ3</i>	Chapter 7: Designing the Teahouse; Chapter 8: Evaluating the Teahouse; Appendix D	Exploratory analysis of new user participation patterns and messages left on new user talk pages	R. Stuart Geiger; Melanie Kill; Maryana Pinchuk	Morgan, J. T., Bouterse, S., Stierch, S., & Walls, H. (2013). Tea & Sympathy: Crafting Positive New Editor Experiences on Wikipedia. <i>CSCW 2012</i>
Summer 2011	Initial WikiProject analysis and first round of interviews with WikiProject members	<i>RQ2</i>	Chapter 6: Diversity & Dynamics in WikiProjects; Appendix C	Initial quantitative and qualitative analysis of WikiProjects; Interviews with 9 WikiProject members	Shawn Walker	Morgan, J. T., Gilbert, M., McDonald, D. W., & Zachry, M. (2013). Diversity & Dynamics in Open Collaborations WikiProjects. <i>CSCW 2014</i> (Under second round review)
Fall 2011 – Fall 2012	Design and evaluation of Wikipedia Teahouse	<i>RQ3</i>	Chapter 7; Chapter 8			Morgan, J. T., Bouterse, S., Stierch, S., & Walls, H. (2013). Tea & Sympathy: Crafting Positive New Editor Experiences on Wikipedia. <i>CSCW 2012</i>
Summer - Winter 2012	Wikipedia policy environment study II	<i>RQ1</i>	Chapter 4: Formalization in Wikipedia's Policy Environment	Analysis of policy, guideline and essay contributions by new and established editors over time	Aaron Halfaker; John Riedl; R. Stuart Geiger	Halfaker, A., Geiger, R. S., Morgan, J. T., & Riedl, J. (2013). The Rise and Decline of an Open Collaboration System: How Wikipedia's reaction to sudden popularity is causing its decline. <i>American Behavioral Scientist</i> , 57(5), 664–688
Summer 2012 – Spring 2013	Second round of interviews with WikiProject members	<i>RQ2</i>	Chapter 6: Diversity & Dynamics in WikiProjects; Appendix C	Interview 9 current and former WikiProject participants about the nature of their participation and the structure of WikiProject collaboration	Mark Zachry; David W. McDonald; Michael Gilbert	Morgan, J. T., Gilbert, M., McDonald, D. W., & Zachry, M. (2013). Diversity & Dynamics in Open Collaborations WikiProjects. <i>CSCW 2014</i> (Under second round review)
Fall 2012 – Spring 2013	Analysis of WikiProject talk pages	<i>RQ2</i>	Chapter 5: Coordination work and group membership in WikiProjects; Appendix B	Analyzed the way WikiProject members coordinate on project talk pages; analyzed the goals and scope of active WikiProjects	Mark Zachry David W. McDonald; Michael Gilbert	Morgan, J. T., Gilbert, M., McDonald, D. W., & Zachry, M. (2013). Project talk: Coordination work and group membership in WikiProjects. <i>WikiSym + OpenSym 2013</i>

Chapter 2

Background and Related Research

In this chapter, I introduce Wikipedia, the open collaboration system that is the focus of the research and design activities presented in this dissertation. I define key terms and present previous research on several of the social and technical mechanisms that were important to the rapid rise in Wikipedia's popularity between 2001 and 2007. I summarize the particular collaborative mechanisms that are the focus of my empirical studies: the Wikipedia policy environment and WikiProjects. I trace the evolution of the Wikipedia policy environment and describe how the formalization of community norms into official rules helped the maintain quality and productivity during the exponential growth period. I introduce WikiProjects and describe the characteristics that define a WikiProject and distinguish them from other teams, group workspaces, and other collaboration mechanisms on and off Wikipedia. I discuss findings from previous studies that show how WikiProjects facilitated collaborative work during Wikipedia's growth period.

Finally I examine the nature of the decline in participation that began in 2007. I present an overview of previous research and evaluate several decline theories. Then I motivate the research activities reported in this dissertation by examining the relationship between the editor decline and a) the formalization of community norms in the policy environment, b) work coordination in WikiProjects, and c) the socialization of new Wikipedia editors.

A BRIEF HISTORY OF WIKIPEDIA

Wikipedia was founded on January 15th, 2001 by Jimmy Wales and Larry Sanger. It was originally set up as a sister site to Nupedia, another online encyclopedia they had launched the previous year. Nupedia was designed to allow scholars to contribute to free, online encyclopedia articles. All new articles on Nupedia were subject to a seven-step peer review process before being published on the web. Nupedia initially floundered, with only 21 articles approved in its first year. To encourage faster growth, Wikipedia was designed differently from Nupedia in several ways: Wikipedia explicitly welcomed contributions from anyone, not just experts; it eschewed Nupedia's formal peer-review requirement entirely; and it was built on a wiki content management system that allowed live, in-place editing of articles.

On wikis like Wikipedia, users do not have to sign up or log in to contribute, and changes they make appear publicly as soon as they are submitted. A single edit to a page can range in size from a single typo fix to the creation of a full page of content, allowing users to easily make contributions of different sizes and types. Most pages are not hierarchically organized, but connected to other pages through internal hyperlinks called wikilinks. Users can even create wikilinks to pages that do not exist, providing a social signal to others that an article should be created on that topic because it is relevant to the current entry (Leuf & Cunningham, 2001). In Benkler's terms, wikis' open access, ease of editing and flexible information architecture increase the modularity and granularity (Yochai Benkler, 2002) of contribution. This increases users' incentive to contribute by allowing them to make independent contributions of various sizes and types.

Wikipedia quickly outpaced Nupedia in content, with over 1,000 articles created in its first month, and 20,000 in its first year. By the beginning of 2004, the English Wikipedia alone had nearly 200,000 articles with contributions by over 4,000 registered contributors and thousands more individuals who contributed anonymously³.

³ <http://stats.wikimedia.org/>

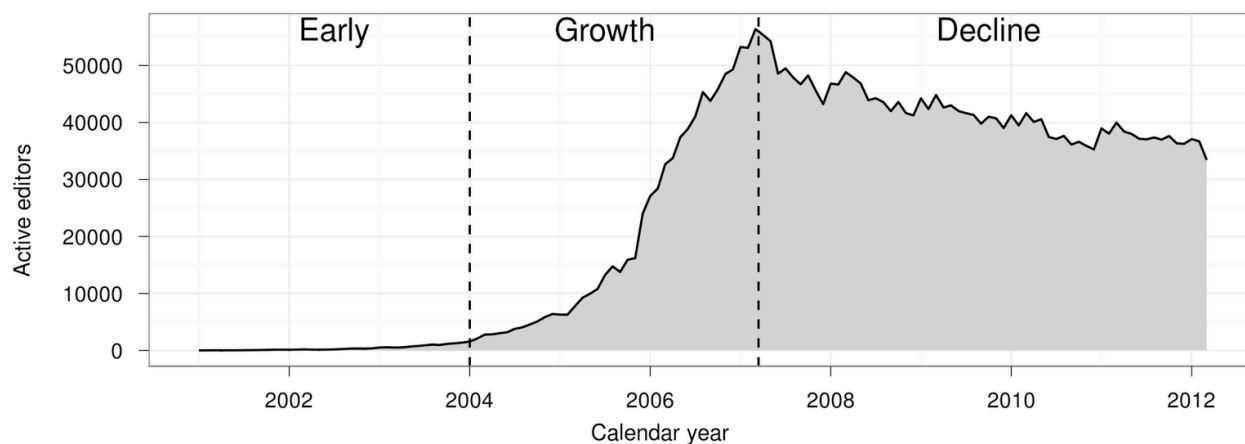


Figure 1. The Wikipedia editor decline. The number of active editors (≥ 5 edits/month) plotted over time.

Wikipedia became an increasingly popular online information resource. In 2005, with over 500,000 articles, Wikipedia became the most trafficked reference website in the world according to HitWise.com. By 2007, the Wikipedia.org domain, which includes all language editions, became one of the top 10 most popular web domains according to Alexa.com. As of August 1st 2013, Alexa lists Wikipedia.org as the world's seventh most popular web domain.

Although there was initially distrust of the quality of Wikipedia, several key studies have shown that the site's content is in general of a high quality. An expert review study by Giles (Giles, 2005) found that the accuracy and completeness of Wikipedia's coverage of several major academic subjects was equivalent to that of the Encyclopedia Britannica. Emigh and Herring (Emigh & Herring, 2005) also showed that the tone and formal structure of Wikipedia entries was comparable to Britannica. While several high profile incidents brought the quality of Wikipedia into question (such as the Seigenthaler libel incident in 2005⁴), such incidents were rare as most vandalism was generally quickly reverted (Suh, Chi, Pendleton, & Kittur, 2007).

Wikipedia continued to grow massively in new articles, contributions to existing articles, and total monthly contributors from 2004 through 2006. The peak of activity for all three measures came in early 2007. In March 2007 approximately 150,000 registered editors made at least one edit and more than 1500 new articles were created. However, after this point activity began to decline according to all three measures. The decline in activity, while gradual, has proven to be inexorable. In March 2013, only 114,000 editors made at least 1 edit and 856 articles were created.

March 2007 was also the high water mark for editing activity within the core Wikipedia community. During that month, 51,400 registered users made five or more edits. Although other divisions of editor activity have been used (Suh, Convertino, Chi, & Pirolli, 2009), the threshold of five or more edits per month is used within the Wikimedia Foundation (Wikimedia Foundation, 2011) and has been by other researchers to demarcate the lower bound of the community of Wikipedia editors as opposed to the crowd of peripheral contributors described in Budhathoki & Haythornthwaite's open collaboration model (Budhathoki & Haythornthwaite, 2012). I will maintain this distinction hereafter by referring to this class of editors as Wikipedians.

Wikipedians are more likely to be involved in editing on a persistent basis, have a basic familiarity with community norms and tech-

⁴ http://en.wikipedia.org/wiki/Wikipedia_biography_controversy

nical tools, and perform more complex editing tasks (Bryant, Forte, & Bruckman, 2005; Krieger, Stark, & Klemmer, 2009; Panciera, Halfaker, & Terveen, 2009). Because a strong community is necessary to integrate the continual stream of contributions from the crowd, the decline in active Wikipedians is a telling indicator of the overall health of Wikipedia as an open collaboration system. This editor decline has been steeper than the overall decline in contributions and contributors: Only 33,276 Wikipedians contributed during March 2013, a decline of 36% from the 2007 peak.

Mechanisms for coordinating growth: 2001 - 2007

In order to understand causes and consequences of the editor decline it is first necessary to understand how Wikipedia managed to become so big and so good in the first place. How was Wikipedia able to integrate the contributions of so many people into a coherent, high-quality resource? How was it able to maintain itself as a community with thousands of new members joining every day?

By early 2007, around 50,000 people were editing Wikipedia at least 5 times per month. Beyond the standard wiki features described above, the MediaWiki platform that Wikipedia has run on since 2002 provides a variety of mechanisms to help these editors coordinate with one another. Watchlists and publicly-available edit histories provide a degree of social translucence (Erickson & Kellogg, 2000): they allow editors to be mutually aware of each others' activities, provide contextually salient cues to the nature of those activities, and make editors accountable for their actions. Birnholtz (Birnholtz & Ibara, 2012) showed that Wikipedia editors are cognizant that their edits will be viewed and evaluated by other editors, and craft their edit comments carefully to provide a clear rationale for the changes they make and to avoid conflict.

Talk pages, wiki pages associated with every content page (such as an article), are conventionally used to conduct threaded, asynchronous discussions. The close link between content and discussion spaces allows work around each article to be coordinated locally and asynchronously. Editors use talk pages to ask questions, propose or explain changes and resolve disputes related to the proximate article on the talk page (Schneider, Passant, & Breslin, 2011; Viegas, Wattenberg, Kriss, & van Ham, 2007). For articles that are under active development, total talk page activity and the number of participants on the talk page is positively correlated with the quality of the article (Kittur & Kraut, 2008).

Technical mechanisms such as talk pages and edit histories provide all editors with a common lightweight toolkit for coordinating their daily editing activities. To ensure the quality of the encyclopedia as a whole and maintain a productive, congenial work environment for its editors Wikipedia developed social structures for making and enforcing decisions locally. One such social structure is the adoption of a consensus as the default model for group decision-making (Forte & Bruckman, 2008). Another is the designation of the role of administrator, a user who has been entrusted with the power to enforce consensus-based decisions and perform other important tasks that do not involve writing articles but that keep the community running and assure overall quality contributions (Burke & Kraut, 2008).

Because the openness of Wikipedia allows editors to easily undo each others' work, making major changes without consulting with the other editors who are currently working on or monitoring an article is unproductive. Editors attempt to achieve consensus by posting a rationale for their edit on the article's talk page and engaging the respondents in discussion. If an editor does not post a rationale, or if the editors present on a talk page cannot achieve a consensus or adopt an acceptable compromise, what sometimes results is a phenomenon called an edit war: a kind of war of attrition or crude majority rule in which editors revert each other back and forth until one side gives up. As these conflicts are harmful to both the quality of the article (Kittur, Suh, Pendleton, & Chi, 2007), Wikipedia maintains a small volunteer police force to resolve and reduce the incidences of edit wars. These administrators possess technical per-

missions beyond those of regular editors, such as the ability to lock specific pages from editing and in exceptional cases permanently delete contributions from the article's edit history, that allow them to more effectively mediate disputes and enforce decisions.

The administrator role is an example of a persistent social structure that facilitates local coordination at the level of individual articles and also helps coordinate collaborative work at the global level. In addition to resolving disputes, administrators can also block or ban editors who make malicious contributions (known as vandals) (Geiger & Ribes, 2010) or editors repeatedly disrupt collaboration by picking fights with other editors or repeatedly defying consensus (Morgan, Mason, & Nahon, 2012). Administrators also perform mundane janitorial tasks such as deleting or moving pages that were created by mistake (Burke & Kraut, 2008).

In addition to their quality control function, persistent social structures can help contributors develop the strong social ties that are necessary to sustain a core volunteer community (Bruckman & Jensen, 2002). Wikipedia editing follows a power law distribution similar to that of other mass collaborations (Wilkinson, 2008), with a small number of highly active core participants and a much larger periphery of occasional contributors. Although the crowd plays a critical role in content creation on Wikipedia, the core community members participate disproportionately in both content creation and quality assurance. Suh found (Suh, Convertino, Chi, & Pirolli, 2009) that historically about 1% of all Wikipedia editors had contributed 55% of the encyclopedia's content. A study by Priedhorsky (Priedhorsky, Chen, Lam, Panciera, Terveen, & Riedl, 2007) found that the top 0.1% of Wikipedia editors (around 4,200 people) had contributed nearly half of the value of the encyclopedia in terms of content that was viewed most and persisted the longest.

Wikipedia contains a variety of spaces where these core community members can meet and interact outside of article talk pages such as the Village Pump, a set of community noticeboards, and The Signpost, a monthly online newspaper created by Wikipedians to report on news and current issues. User pages provide each user with a customizable space where they can craft meaningful and nuanced identities for themselves (Le, Beschastnikh, & McDonald, 2010), as well as a personal talk page where others can contact them. User pages provide a forum for advertising personal achievements or ongoing activities, and for acknowledging valued work. Barnstars, for example, are a common sight on the user pages of veteran Wikipedians. Barnstars are community-created awards that editors give to one another to acknowledge valuable contributions—such as vandal fighting, copyediting or dispute resolution—or demonstrations of outstanding personal qualities such as the ability to keep a cool head in heated disputes (Kriplean, Beschastnikh, & McDonald, 2008).

Two other persistent social structures that serve as both global quality control and community maintenance mechanisms are the community rules and norms documented in the Wikipedia policy environment and persistent, interest-based workgroups called WikiProjects. The policy environment and WikiProjects are among the oldest and most novel social structures on Wikipedia and their importance is reflected in their complexity—the nested structures they contain and the diverse purposes they serve—as well as the evolution they have undergone over the course of Wikipedia's history.



Figure 2. (left) Wikipedia's Editing Policy page.

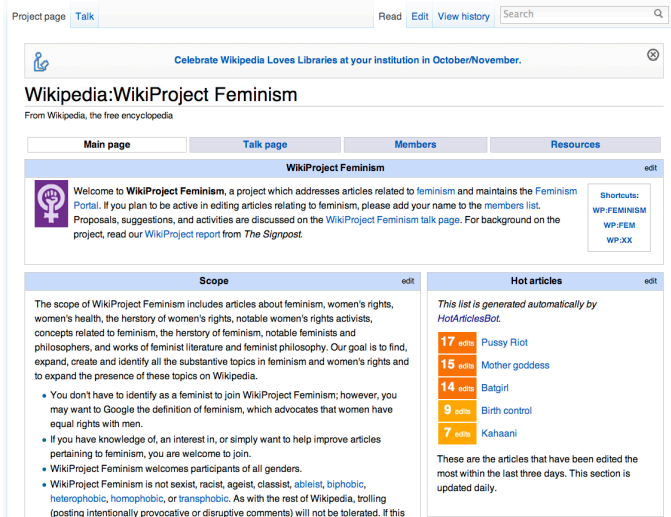


Figure 3. (right) WikiProject Feminism main page.

The Wikipedia Policy Environment: Formalized community norms

Conflicts often occur between editors working on the same article, and Wikipedia articles are vulnerable to vandalism (Viégas, Wattenberg, & Dave, 2004) by outsiders. But there are only about 1,000 administrators active on Wikipedia at any point, far too few to meet the daily needs for guidance, mediation and regulation in a project with tens of thousands of participants per day. These administrators also need to be held to standards to assure that they are fair and consistent in the use of their powers. Furthermore, while article talk pages can provide an effective mechanism for ensuring quality at the level of a single article, they are not designed to assure consistent quality across articles. To provide common standards for article content and user behavior, Wikipedians have formalized many of their community norms into a set of written regulations. These regulations are inscribed in class of content pages in the Project namespace of Wikipedia, an area of the website which is separated from the encyclopedia articles themselves and less visible to casual readers. In this dissertation, I will refer to this set of wiki pages collectively as the Wikipedia policy environment.

Pages in the policy environment (Figure 2) address a wide range of regulatory topics that are important to editors' work: from official rules for article creation and user behavior to technical how-to's, editing tips, philosophical principles, best practices, and heuristics for contributing to the encyclopedia and interacting with fellow editors. By 2005, the pages in the policy environment had come to be organized into three distinct, roughly hierarchical genres—policies, guidelines, and essays. More formal regulations (policies and guidelines) reflect community consensus and can be enforced: for example, an editor who repeatedly violates the Three Revert Rule, part of the Edit Warring policy, can have their account temporarily blocked by an administrator. Blocks are usually between 24 and 72 hours, but complete bans are possible for persistent offenders. The pages that represent the third regulatory genre, essays, are not enforceable rules per se and need not reflect consensus but often reflect community concerns. The essay Bold, Revert, Discuss Cycle outlines an informal process for resolving local editing conflicts without recourse to edit wars or external intervention (Halfaker, Geiger, Morgan, & Riedl, 2013).

The first Wikipedia policy to be created, *Neutral Point of View*, was created to establish general guidelines for writing an article in an encyclopedic fashion: if the subject of an article affords multiple conflicting interpretations, the article should be written so that it does

not appear to favor any one interpretation over another. Over time, this policy was collaboratively refined and expanded and also supplemented and contextualized with the creation of additional policies such as *No Original Research*, *Verifiability* and the *Copyright Policy*, which outlines the circumstances under which copyrighted material from other sources can be included in Wikipedia articles. Policies such as *Civility* and *No Personal Attacks* present general guidance on how editors should behave towards one another and specific proscriptions against certain types of disruptive behavior

The pages in the policy environment serve as boundary objects (Star & Griesemer, 1989) that help the large, distributed Wikipedia community apply consistent standards to diverse work contexts. As wiki pages, they are inspectable and reviseable by the community of users, making them flexible enough to be shaped and negotiated over by different stakeholders, yet stable enough to persist as visible and coherent articulations of community rules and practices. The policy environment functions as both a shared repository for Wikipedia's rules and regulations, and a tool for regulating content and behavior on a day to day basis. Wikipedia editors frequently create hyperlinked citations to these documents in talk page discussions to lend weight to their words as they attempt to educate new users, socialize deviant participants and persuade others about the shape the article should take (Morgan, 2012; Viegas, Wattenberg, Kriss, & van Ham, 2007).

Formalization of policy

The formalization of norms into policies and the use of these policies for decentralized articulation and enforcement of quality and behavior standards was a natural and effective responses to the massive growth that the Wikipedia community underwent between 2001 and 2007 (Forte, Larco, & Bruckman, 2009). Formally documenting community practices allowed formerly implicit norms and conventions to be disseminated widely in the expanding community. The formalization of implicit norms into rules and the embedding of these rules in technologies, such as pages, bots and templates, facilitated distributed peer processes that functioned efficiently at scale (Viégas, Wattenberg, & McKeon, 2007). Although the process of formalization often leads to rules that are decontextualized and simplified (Star, 1995), Wikipedia's policy environment contains several checks to this tendency. Policies themselves may be edited by anyone, and new policies may be created to address emergent needs. Policy talk pages provide a forum for collaborative sensemaking (Nagar, 2012) in which participants reflect on the alignment between existing regulation and current community needs and discuss different interpretations and possible changes. One of the core policies of Wikipedia, *Ignore All Rules* (IAR) is often invoked in talk page discussions and is treated as a legitimate basis for questioning the authority or applicability of other policies. Joyce (Joyce, Pike, & Butler, 2012) examined article deletion discussions and found a positive correlation between the citation of IAR and decisions to retain the article that had been proposed for deletion, suggesting that this policy is used to call the suitability of formal procedures into question.

The Wikipedia policy environment provides an instructive example of the power of community-created social structures to guide collaboration in a decentralized fashion. However the policy environment is largely concerned with how to work; it does not provide a way for editors to find work to do, or facilitate sustained coordinated activity among editors. And as policies are often referred to in a argumentative context, they may not be the best tools for cementing positive, lasting personal ties among community members. WikiProjects step in to fill this gap by providing opportunities for editors with similar interests to share resources, define common goals, and work together.

WikiProjects: Open teams for coordinating work

Much of the work on Wikipedia is coordinated in spaces outside of the articles talk pages—user talk pages, policy pages and talk pages, community noticeboards like the Village Pump, and persistent group workspaces such as WikiProjects. As wiki

pages, these spaces are technologically equivalent; as distinct locales (Giddens, 1984) they are specialized mechanisms for satisfying specific communication needs and performing certain kinds of coordination—a distinction that Harrison & Dourish refer to as space versus place (Harrison & Dourish, 1996).

Sustaining a community in open collaborations can be challenging. In order to succeed, open collaboration systems must provide mechanisms for helping potential contributors find productive and engaging ways to get involved, ensure productivity and project maintenance despite lower levels of member commitment and higher levels of member turnover relative to compensated and co-located collaborations. Many of these challenges may be effectively ameliorated when participants work together in persistent subgroups, or teams. Teams help match volunteer contributors' interests and expertise with tasks that need to be accomplished (McGrath, 1984) and can also reduce coordination costs by allowing a relatively small number of core participants to organize the activities of a much larger halo of transient, low-volume contributors (Raymond, 2001). And group collaboration can help motivate volunteers to keep contributing by making the work experience itself more socially engaging and pleasant (Nov, 2007).

If article and user talk pages provide sites for local coordination, and the Village Pump and the policy environment are used to coordinate work across the entire community, WikiProjects function as spaces for coordination at the level of the team. WikiProjects are collections of pages that enable persistent group collaboration around particular article topics (such as articles about women scientists) or specific work activities (such as categorizing stub articles) (**Figure 3**).

WikiProjects are complex coordination structures that enable discussion, acknowledgement, guidance and a variety of other mechanisms that promote collaborative work. Like policies, WikiProjects help structure editors' work and promote prosocial behaviors (Kittur, Pendleton, & Kraut, 2009); like Barnstars, they incentivize participation by providing opportunities for positive social interaction (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012) and new editor socialization (Choi, Alexander, Kraut, & Levine, 2010). WikiProjects also create and maintain task lists (Krieger, Stark, & Klemmer, 2009), group awareness tools (Gilbert, Morgan, McDonald, & Zachry, 2013), and editing guidelines (Forte, Larco, & Bruckman, 2009), and serve as hubs for discussion and coordination across multiple articles. In this respect WikiProjects fill similar roles to work groups, teams and task forces in other settings, from World of Warcraft guilds (Nardi & Harris, 2006) and Open Source software development projects (Ducheneaut, 2005) to offline groups (McGrath, 1984).

Since the first WikiProjects were created in 2002, thousands of projects have been founded and tens of thousands of Wikipedia editors have signed up as project members. There are over 2,000 WikiProjects on the English edition of Wikipedia. Like Wikipedia as a whole, WikiProjects present few barriers to participation. Editors are free to add their name to a project member list, but declared membership is not required in order to contribute to articles within the project's scope, edit project pages, or participate in project discussions.

The openness of WikiProjects renders them distinct from many other types of teams. Unlike teams in traditional workplaces, WikiProjects do not necessarily delineate formal roles; enforce role-based behaviors, rights or privileges; or possess clear team boundaries. Because anyone can participate in a WikiProject without officially joining or asking permission, the term "wikiproject" can be used to describe both a workspace designated for coordinating a specific editing activity and the collection of people who use that workspace or self-identify as project members. In this dissertation, I conceptualize WikiProjects as *open teams* to differentiate them from other teams (such as project teams and virtual teams in organizations, as well as sports teams) that maintain more formal roles and bounda-

ries. This distinction also separates WikiProjects from other teams on Wikipedia as well such as the Featured Article Committee, Arbitration Committee, and Bot Approval Group to which members are elected or appointed and imbued with social responsibilities and/or technical privileges.

The new user experience and the editor decline: 2008-2013

In this section, I examine the drop in monthly participation by Wikipedians since 2007 and the accompanying changes to the social structures that facilitate collaborative editing work. I discuss several possible reasons why the core community has started to shrink and the ramifications of the editor decline for Wikipedia's ability to maintain itself as an open collaboration.

When discussing the editor decline, it is important to note that English Wikipedia is still a large, thriving open collaboration that has continued to grow in many respects since 2007. The total content of Wikipedia has continued to grow to over 4 million articles in mid-2013, and the readership has also expanded, with 7.9 million pageviews in June 2013⁵. Furthermore, the core community of Wikipedians is still far larger than that of most open collaborations, and it will likely continue to be for many years to come even if the editor decline trend is not reversed.

Suh (Suh, Convertino, Chi, & Pirolli, 2009) were the first to publish a detailed and thorough overview of the decline in activity that began in 2007. Their study of editing trends from 2001 to 2008 highlights several other disturbing trends beyond the decline in several high-level activity metrics such as new article creation and the total number of editors. They found a steady increase in both the rate at which article edits were reverted and new articles were deleted, and that occasional contributors were more likely to have their contributions reverted or deleted. Their study also showed that the decline was largely confined to the middle class of Wikipedians: editors who made between 10 and 1,000 edits per month. In effect, this meant that the average Wikipedian in 2008 was editing much less frequently than the average Wikipedian in 2005.

Suh propose several hypotheses to explain these findings. They posit that as Wikipedia has become increasingly full of content, new editors find fewer places to contribute, potentially reducing their incentive to continue editing. Drawing an analogy from population biology, they suggest that as the resource of editing work becomes scarce, competition and conflict will increase and members of the population who have competitive dominance (in this case, established Wikipedians) will have a competitive advantage over less experienced editors.

The increasing saturation of articles on major topics may contribute to the editor decline to some degree. An editor who joins Wikipedia with the intent of writing the article on Paris, France will likely find it difficult to make a substantial contribution to that mature article. However, there are still substantial contributions to be made across Wikipedia: Most of Wikipedia's "Core 1,000," articles are still of poor quality, and across the encyclopedia, only 18,000 of Wikipedia's over four million articles are rated "good" quality by the Wikipedia community as of August 2013⁶. Furthermore, hundreds of thousands of Wikipedia articles are still listed as stubs, short incomplete articles that the community has indicated require substantial contributions⁷.

Another possible reason for the decline that is suggested by the population analogy is that the editing community is right-sizing: shrinking to an appropriate and sustainable size now that the main work of creating the encyclopedia is done. Two pieces of data argue against this theory. First, as noted above, the vast majority of articles in Wikipedia are still below community standards for good arti-

⁵ <http://stats.wikimedia.org/EN/TablesPageViewsMonthly.htm>

⁶ <http://enwp.org/WP:GAS>

⁷ http://en.wikipedia.org/wiki/Category:Stub_categories

cles, indicating no shortage of work. Second, the Wikipedia editor community does not reflect the diversity of its readership, resulting in substantial gaps in the topical coverage of the encyclopedia. While Wikipedia's audience is global, the majority of Wikipedia editors are young, male and located in North America or Western Europe (Wikimedia Foundation, 2011). Members of currently underrepresented groups find it challenging to join: one study found that only 9% of edits are made by female editors and that articles of particular interest to women are shorter than articles of interest to men (Lam, Uduwage, Dong, Sen, Musicant, Terveen, & Riedl, 2011). This gender gap is just one of many potential gaps in the demographics of Wikipedia that have ramifications for content: as of July 2013, only three of the 14 current justices on South Korea's Supreme Court have their own English Wikipedia articles, whereas all 9 current United States Supreme Court Justices (and 45 current and former Supreme Court Law Clerks) have dedicated articles. Despite the fact that the English Wikipedia is much larger than other language editors, there is a strong geographic bias in its topical coverage (Hecht & Gergle, 2009). Until editors are representative of the population of potential contributors, it is difficult to argue that a shrinking community will ever be able to accomplish the task of documenting the sum of all encyclopedic human knowledge.

Analysis performed by Halfaker in a series of studies on reverting behavior on Wikipedia shows that occasional contributors are not the only editors who face an increased likelihood of reversion: newer Wikipedians are also more likely to see their work deleted, generally by more senior editors, and these actions have a negative impact on their likelihood of continuing to participate (Halfaker, Geiger, Morgan, & Riedl, 2013; Halfaker, Kittur, & Riedl, 2011). The resistance to contribution by peripheral participants, and the related decline in newcomer retention have serious ramifications for the future of Wikipedia. Open collaborations must constantly bring in new contributors to sustain themselves as existing community members become less active or leave entirely. The frequency with which new and occasional contributors' work is deleted means that these users have fewer opportunities to engage in legitimate peripheral participation which for some editors can serve as the first step in a process of becoming Wikipedian: beginning to perform valuable community functions such as quality control, governance, and integrating the contributions of the crowd (Bryant, Forte, & Bruckman, 2005).

The continued steady growth in the number of articles on Wikipedia combined with a steadily shrinking community also means that there are progressively fewer editors monitoring existing articles for vandalism or self-interested contributions. Wikipedia can afford to be inclusive and accept edits from anonymous contributors without formal review in part because there are enough editors keeping their eye on articles that mistakes and vandalism can be quickly corrected. Eric Raymond summed up this same distributed, self-organized approach to quality control in FLOSS projects in a rule he called Linus' Law, after LINUX creator Linus Torvalds: "Given enough eyeballs, all bugs are shallow".⁸ Assuming that there will always be plenty of eyeballs is one of the chief advantages of maintaining a high degree of inclusivity in open collaborations.

PUTTING THE EDITOR DECLINE IN CONTEXT

While there has been research on how mechanisms like talk pages, policies and WikiProjects helped Wikipedia evolve from a successful small project in 2001 to an even more successful large project in 2007, there has been very little work on the role these mechanisms have played over the past six years of the editor decline: fully half of Wikipedia's history to date. Suh's and Halfaker's findings indicate that there have been massive changes in both the work environment of Wikipedia and in patterns of editor behavior, but their work focuses on site-wide participation trends. My work examines the impact of the decline through a different lens. I examine the relationship between the editor decline and three important social structures of Wikipedia: participation in community governance through contributions to the policy environment, coordination work in WikiProjects, and the mechanisms the community uses to so-

⁸ <http://www.catb.org/esr/writings/homesteading/cathedral-bazaar/ar01s04.html>

cializes new members.

Calcification of the policy environment

Research conducted during Wikipedia's growth period has drawn links between Wikipedia's success and editors' ability to participate in the creation, modification, and enforcement of the rules that govern editing. However, no systematic analysis has been performed to track the continuation of these trends, or their impacts, into the decline period.

In fact, Wikipedia's policy environment is not always as flexible in practice as in theory. As Star notes (Star, 1995), formal representations encode the biases of their creators. In a previous study of a heated debate that focused on the choice between displaying images of Muhammad in the article *Jyllands-Posten Muhammad Cartoon Controversy*, I showed how veteran Wikipedia editors enforced their interpretations of Wikipedia's Consensus and Censorship policies to artificially close deliberation and silence minority viewpoints (Morgan, Mason, & Nahon, 2012). Other research has also shown that senior editors tend to have greater "power of interpretation" over policy (Kriplean, Beschastnikh, McDonald, & Golder, 2007) as well as greater control of formal community processes (Keegan & Gergle, 2010) than newer editors. Furthermore, more recent analysis shows a gradual decline in participation by newer editors in the areas of Wikipedia dedicated to drafting and discussing policy, indicating that senior Wikipedians may now be more responsible for curating and interpreting community policy than ever before (Kaelin & van Liere, 2011).

In Chapter 4 I argue that by the beginning of the decline era, policies may have begun to undergo a process I will refer to as *calcification*, effectively an advanced state of formalization in which Wikipedia's natural mechanisms for adjusting rules to suit local needs have failed and policies are no longer living documents. I posit that although policies were originally created to maintain a balance between flexibility and stability in the face of a massive growth, policies may have calcified in the decline era: they may no longer open to renegotiation either within the policy environment itself or in the context where policies are enacted in talk page discussions. If decentralization in governance and dynamic norm formalization were key to Wikipedia's successful socialization of new members during the growth period, I suspect that policy calcification and increasing centralization of policy interpretation may negatively affect the retention rate of desirable newcomers and contribute to the decline.

Furthermore, previous studies have analyzed only the two most formal genres of regulating document contained in the policy environment—policies and guidelines—which are binding rules and subject to peer review process. In the context of slowing growth and possible calcification among these genres, it is important to examine the features of the third and least formal of the primary policy genres, essays, and determine whether this genre has also been subject to slowing growth and calcification.

WikiProject work in the decline era

Historically, Wikipedia has succeeded because it has managed to maintain a high degree of openness even as it developed new formal mechanisms that traded degree of openness for more effective governance and more systematic quality control. However, there are still many mechanisms that have remained essentially open to this day. The majority of articles and non-article content pages (as well as all talk pages) are still open to editing by unregistered users, and registered users still maintain control over the presentation of content within their own user pages and talk pages.

Among Wikipedia's complex social structures developed during the growth period, WikiProjects appear to have resisted formalization to a greater degree than policies. WikiProjects have no official control over the articles they focus on than they did when Forte analyzed them, anyone can create a new WikiProject, and others can participate in whatever way they choose. WikiProjects remain rela-

tively autonomous and informal entities: although a WikiProject Council⁹ was set up in 2006, it is itself a WikiProject and has no official control over any other project. There are no official rules on the proper internal organization of projects or on the way project members coordinate their work.

However, the overall editor decline may have an impact on WikiProjects as well, although hundreds of projects are still active in 2013, hundreds more have been minimally active or entirely inactive over the past year¹⁰. Since most WikiProjects focus on particular topics, such as medicine, rugby and U.S. roads, perhaps WikiProjects have seen a decline in participation because these topics have become comparatively full.

Research that I conducted in the summer of 2011 (see **Appendix D**) suggests that this is not the whole story. This analysis shows that while the frequency with which editors join WikiProjects (by adding their names to the project member list) has declined at a greater rate than the overall editor decline, many projects have managed to add dozens or hundreds of new members in recent years, and even attract a substantial number of newcomers. Many of these thriving WikiProjects have a topic focus, suggesting that Wikipedians still find plenty of work to do in the article space and still find value in coordinating that work through WikiProjects. In fact, as it becomes more difficult for editors to find work to do in their area of interest, WikiProjects may become increasingly useful because they often record extensive, actionable lists of high-priority tasks that remain to be done (Krieger, Stark, & Klemmer, 2009).

Unfortunately, there are critical gaps in our understanding of WikiProjects that prevent us from fully understanding the impact of the editor decline on these social structures or the role that active projects play in coordinating work in a decline-era Wikipedia. All previous research on WikiProjects uses data gathered during Wikipedia's growth period and activity peak. Furthermore, no previous study has examined the full range of projects or project activities. Previous WikiProject studies examined the features of a few of the largest WikiProjects or presented aggregated findings on editor participation from across hundreds of topic-focused projects. No research has been done to examine WikiProjects that do not coordinate the creation and curation of articles within a particular topic area. Some of these *alternative WikiProjects*, like *WikiProject Spam*, are long established projects that perform valuable meta-work activities (in this case, providing a central workspace for coordinating the identification and removal of promotional content in articles). Other projects of more recent origin, like *WikiProject Editor Retention*, may reflect a growing awareness in the community of the need to take collective action to address the editor retention problem.

The inclusivity and flexibility of WikiProjects suggests that they can be used to coordinate a variety of other work activities beyond improving articles as well, a feature that may allow them to continue to play a valuable role as collaboration on Wikipedia shifts away from direct editing work and more towards curation and community support activities. To understand the past or the present role of WikiProjects, it is necessary to examine a greater variety of work activities across a greater variety of projects, and to develop a more inclusive understanding of project membership. In this dissertation, I examine coordination work in a large and diverse sample of currently active WikiProjects (Chapter 5) and investigate the way alternative WikiProjects allow the community to organize around important sets of activities that address issues that have emerged or become more important during the decline era (Chapter 6).

New user experience in the decline era

All of the theories posed for the editor decline point to difficulties for new users. The likelihood of rejection for new editors has increased as the encyclopedia has aged, a phenomenon that can have a powerful demotivating effect on newcomers: it leads them to edit

⁹ http://en.wikipedia.org/wiki/Wikipedia:WikiProject_Council

¹⁰ http://en.wikipedia.org/wiki/Wikipedia:Database_reports/WikiProjects_by_changes

less and stop contributing sooner. Suh's (Suh, Convertino, Chi, & Pirolli, 2009) resource competition model suggests that newcomers have both less incentive to contribute due to a (real or perceived) scarcity of engaging work and an increased likelihood of coming in to conflict with veteran editors. Halfaker's (Halfaker, Geiger, Morgan, & Riedl, 2013) findings suggest that while new editors in 2012 are no less capable of high quality contributions than previous generations of newcomers, the community appears to increasingly dismiss the efforts of good faith newcomers who would benefit the encyclopedia by continuing to contribute.

Evidence suggests that the socialization mechanisms of Wikipedia have not scaled as effectively as the regulatory mechanisms: there is no structured onboarding process on Wikipedia. Wikipedians have organized mentoring systems to support socialization, but they fail to serve most newcomers (Musicant, Ren, Johnson, & Riedl, 2011). As a result of the size and complexity of Wikipedia, it is difficult for newcomers to find work to do (Krieger, Stark, & Klemmer, 2009). WikiProjects could help new users find engaging tasks and even provide a degree of mentorship, but few new editors are aware that WikiProjects exist, and many formerly-active WikiProjects are inactive today.

Another probable factor contributing to editor decline is the encyclopedia's inability to recruit and retain editors from outside the traditional demographics. The 2011 editor survey reported that only 8.5% of active editors are women (Wikimedia Foundation, 2010). Another recent study calculated the proportion of female newcomers to be 16%, nearly double the site-wide average (Lam, Uduwage, Dong, Sen, Musicant, Terveen, & Riedl, 2011). This suggests that the attrition rate for female editors is even higher than for newcomers in general. The decline in the average tenure of new editors and the community's inability to retain female editors point to potential systemic flaws in the new user experience of Wikipedia, particularly the way the community socializes new contributors. Increasing the overall proportion of new editors who become Wikipedians, and boosting female participation in particular, requires new solutions. In this case, Wikipedia may suffer from a lack of formal mechanisms: a more systematic solution designed to identify and support promising new editors, especially those from underrepresented demographics, could help these editors make the transition from peripheral participants to core community members.

In Chapters 7 and 8, I describe the design and evaluation of a WikiProject-like space called the Teahouse: a scalable, sustainable support system for socializing new Wikipedia editors, and especially female newcomers, in a positive and engaging way. In Chapter 7 I describe the background research and design rationale for the Teahouse, and discuss specific project features I developed to allow the Teahouse to offer meaningful support to a large number of new editors on a long-term basis. In Chapter 8, I evaluate the effectiveness of those mechanisms and discuss the implications of the Teahouse for the new editor experience of Wikipedia and other open collaboration systems.

CONCLUSION

In the last two chapters, I have constructed a perspective to examine the evolution of Wikipedia leading up to and into the decline era. I have drawn on empirical findings and theoretical foundations from several academic fields. I have woven together theories and empirical research from open source software projects, bureaucratic organizations and online communities. I have surfaced relationships between formalization and growth and between community norms and technology in open collaborations. I have brought research findings from Wikipedia's first six years to bear on its most recent six. Chapters 1 and 2 integrate these threads into an agenda for investigating the diversity and dynamics of three sociotechnical structures—the policy environment, WikiProjects, and newcomer socialization—in the context of the editor decline. In Chapter 3, I will describe the theoretical and methodological frameworks that guide my investigations of these phenomena in Chapters 4 through 8.

Chapter 3

Theory and Methodology

In Chapters 1 and 2, I motivated my research by describing the domain of open collaboration and telling the story of Wikipedia's genesis and evolution. I presented a framework for understanding the mediating role of socio-technical mechanisms in open collaborations like Wikipedia, and described the process by which specific mechanisms may have afforded or constrained inclusivity and flexibility at various points in Wikipedia's history. In this chapter I explain the theoretical underpinnings of my approach to researching Wikipedia and the methods I adopted and adapted to examine the dynamics and diversity of the policy environment and WikiProjects, and the impact of Teahouse on new editor socialization and retention.

Early HCI research was primarily concerned with improving the usability of computer interfaces to increase the productivity of single, stationary workers engaged in largely solitary tasks (Chi, 2009). Many of the theories and methods used in the evaluation of these systems, such as Fitts' Law and the GOMS model (Card, Moran, & Newell, 1983), were drawn from the field of psychology and had been developed in line with theories of human cognition developed and tested in carefully controlled laboratory studies (Chi, 2009; Grudin, 2008).

Researcher Ed Chi argues that these theories and methods are poorly suited to the task of understanding distributed collaborative work in systems like Wikipedia and other social media, in which individuals interact through a common interface constituted of technical mechanisms, social structures, and other shared artifacts with a multitude of other individuals whose physical settings and motivations are often unknown. Furthermore, as Langdon Winner (Winner, 1980) and others have pointed out, these artifacts have politics: the digital artifacts and social structures that humans create and interact with in computer-mediated environments like Wikipedia are embedded with the values, meaning and intentions of their creators and users, giving them the ability to influence the behavior of humans and character of other artifacts without direct human intervention.

In contrast to controlled experiments and laboratory user studies, Chi advocates for ecological studies within living laboratories to provide better design requirements, evaluation criteria, and predictive models of these systems. This research approach involves observational studies and design interventions in naturalistic contexts like Wikipedia. The complex research task I have framed in this dissertation is an attempt to follow Chi's lead. My research requires theoretical and methodological tools that facilitate analysis of Wikipedia as an ecological system of interactions among a diverse set of human and non-human actors over time.

ECOLOGICAL RESEARCH APPROACH

Ecological research was pioneered in the natural sciences in studies of the complex web of relationships between organisms in natural environments. Examining the behavior of organisms outside of a controlled laboratory setting allows scientists to understand the processes that shape the physical characteristics and behaviors of organisms, such as camouflage and nocturnal foraging in prey species. An ecological approach can also be used to study broader emergent properties of the environment itself such as co-evolution and resource competition among species, the role of keystone species in ecosystem health, and the consequences of environmental change.

Psychologists James J. Gibson and Robert Barker pioneered the use of ecological methods in the social sciences. Rejecting the laboratory model of psychology research in vogue at the time, Gibson argued that the most effective way to understand human behavior was by examining it in its natural context. Barker, a student of Kurt Lewin—whose action research paradigm (Lewin, 1946) also reflects an ecological approach to research and design—set up the Midwest Psychology Field Station near the town of Oskaloosa Kansas as a base for performing a variety of empirical research activities on and with the town’s citizens (Barker, 1968). Gibson’s theory of affordances (Gibson, 1977) was developed to explain how an organism’s perception of its environment affords and constrains its behavior. Studying human behavior in artificial settings where the normal affordances are absent, Gibson argued, can lead to descriptions of behavior that don’t reflect how people actually act in their day to day lives. Gibson’s theory of affordances has been broadly adopted within the fields of human-computer interaction in the context of a user-centered design paradigm to explain how specific features of interfaces and other technological artifacts elicit predictable patterns of use (Norman, 1999).

Tracing ecological relationships in heterogeneous networks

The field of computer-supported cooperative work has long recognized the utility of an ecological approach to studying technologically-mediated human behavior in the workplace. Pioneering work by Grudin (Grudin, 1994), Orlikowski (Orlikowski, Galegher, Halperin, Malone, & 1992) and others (Dourish & Bellotti, 1992; Olson & Teasley, 1996) drew on observational methods to examine the way the features of work environments—physical spaces, physical and digital artifacts and organizational structures such as roles, hierarchies and work processes and practices—afford and constrain human action. This work was instrumental in the articulation of the central design challenges of CSCW, such as the “socio-technical gap” between technical capabilities and human needs and expectations (Ackerman, 2000). Many of these studies employed theoretical tools that allowed non-human environmental *factors* to be conceptualized as *actors* within the workplace system—in effect, as autonomous agents that perform work themselves and that both shape and are shaped by the actions of people.

In this work, I will discuss the evolution of artifacts, the work of groups, the influence of social norms, and role of other non-human actors within the sociotechnical environment of Wikipedia. Theories developed or adapted by CSCW researchers such as Actor-Network Theory (ANT), Rhetorical Genre theory, and Cultural-Historical Activity Theory (CHAT) can be used to follow the principles of Gibson’s ecological model within socio-technical settings. These theories help researchers attend to and describe characteristics of the physical and digital built environment that afford and constrain actions beyond humans’ direct perceptions. However, all of these theories ascribe agency to non-human environmental actors in subtly different ways, and suggest different modes and units of analysis. Below I characterize several differences in the way these three related theories deal with the agency of artifacts in order to elucidate my own approach to understanding the actions of technical mechanisms and social structures and how they shape and are shaped by Wikipedia editors.

CHAT, ANT and genre theory all fundamentally conceptualize human interaction as mediated and situated. All three of these theories are post-cognitivist in the sense that they reject the notion that any human action is fully determined by a single, predictable factor such as biological heredity or metaphysical concepts like free will. They are ecological in the sense that they focus on mediating role of the local environment in human (and to different degrees, nonhuman) action. CHAT views tools (often but not always material artifacts) as mediators between human needs and their objects (Kaptelinin & Nardi, 2006). ANT considers any node in an actor-network (whether human or artifact) that transforms meaning to be a mediator (Latour & Johnson, 1988). Rhetorical Genre theory, as articulated by Burke (Burke, 1973), focuses on the role of the rhetorical situa-

tion—a complex of persons, events, objects, and relations—in constructing “an exigency that can be allayed through the mediation of discourse” (Miller, 1984).

The focus on mediation in each of these theories is complemented by a focus on situation or *situatedness* (Suchman, 2006), the material and social circumstances in which the action takes place. Kaptelinin & Nardi describe the importance of situation thus: “human action can only be explained in terms of the specific conditions in which it takes place” (Kaptelinin & Nardi, 2006). Actor-network theory also advocates defining social interaction as a complex of contextually-specific mediations that can only be described through the tracing of associations between specific heterogeneous things: “social is not some glue... it is what is glued together by many other types of connectors” (Latour, 2005).

Genre theory presents a subtly distinct characterization of human and nonhuman agency that places special emphasis on the role of artifacts and social structures. Like ANT and CHAT, rhetorical theories generally focus on relations among actors and/or mediators. Like CHAT, genre theory views the relationship between people and artifacts as asymmetrical, and reserves critical qualities such as motives for human actors. However, like ANT, Genre theory focuses on the role and properties of socially-constructed communicative artifacts, which are considered as typified responses to recurrent situations (Miller, 1984). These artifacts may be material (Spinuzzi, 2003) or cognitive (Bakhtin, Holquist, & Emerson, 1986). Genres thus take on identities as assemblages (Latour, 1987) of social meanings that exist independently of their instantiations as mediators between the goals and objects of particular individuals, allowing them to be traced over time as dynamic agents that can shape and be shaped by human actions and local circumstances.

According to Spinuzzi (Spinuzzi, 2008) genre theory provides several advantages over CHAT and ANT for researching collaborative work contexts. He argues that although CHAT provides an excellent framework for tracing the development of individual motivations and competencies over time, it does not afford the same treatment for artifacts, which are an important component of workplace ecologies (Star & Griesemer, 1989). Spinuzzi elaborates that by tracing the interactions among genres researchers can uncover “how texts are historically developed and enacted in particular activities” (Spinuzzi, 2008). He also argues that while ANT offers a useful tool for tracing associations within heterogeneous networks, its goal of following the actors wherever they lead and identifying more and more mediators makes it difficult to prioritize which actors are the most central, making it difficult to draw conclusions or even know when to end an analysis—other than when, as Latour (Latour, 2005) suggests, the expected page count has been reached. Genre theory complements ANT, making it relatively easier to delineate particularly salient non-human actors/mediators for analysis by facilitating the identification and description of a discrete set of the most central genres in a particular work context. Genre theory allows a researcher to draw meaningful boundaries around their analysis while recognizing that those boundaries are contingent and dynamic.

In the studies I present in this work, I adopt the model of non-human agency described by genre theory. I study the mediating influence of socio-technical artifacts as actors and attend to the relationships among genres, but maintain a focus on humans—their motivations, intentions and needs. This allows me to clearly frame phenomena such as the writing and citing of Wikipedia policies in terms of editors’ motivations for participating in Wikipedia’s governance, and to explore what the names that appear on a WikiProject’s member list signal about the intentions of the editors who put them there.

Genres of communicative actions are realized in routine ways, often taking on similar generic structures, but it is their shared orientation to shaping beliefs and affording or constraining actions that make them particularly interesting focus of study in a

regulatory context. As explored in Schryer's work (Lingard, Schryer, Spafford, & Campbell, 2007), people "participat[e] in regularized practices mediated by genres that provide them with the constraints and resources they need to improvise their activities". Such genre-mediated regularized practices are thus similar to what are sometimes called conventions in studies of groupware systems. Gloria Mark (Mark, 1997), for example, uses conventions to refer to "rules and arrangements established in the group, common and accessible to its members, that users need to cooperate effectively". In a genre theory analysis approach, the conventions that are focused on are those that are instantiated in recognizable types of communicative practices. (For a related discussion, see also (Antunes, Costa, & Pino, 2006))

Genres can be simultaneously viewed as complete structures as well as sub-structures that are nested within and contingent upon equally coherent and distinct genres (Spinuzzi & Zachry, 2000). This *genre ecology model* has proven to be a powerful analytical concept for analyzing regularity in the communicative practices of organizations (Erickson, 2000; Orlikowski & Yates, 1998; Zachry, Spinuzzi, & Hart-Davidson, 2006). In this dissertation, genres are understood to be types of communicative actions that are recognized and enacted socially and locally and that exist in ecological relationships. In Chapter 4 I explore the Wikipedia policy environment as a genre ecology, and examine the relationships between its sub-genres and the way the distinct features of each genre affords different uses in different contexts.

Ecological relationships in complex systems

The genre ecology model's conceptualization of artifacts as distinct, interdependent and contingent agents that exist within dynamic relationships is based on an open systems theory (Suchan & Dulek, 1998; Von Bertalanffy, 1950). In an open system, each actor can potentially be viewed as a complex sub-system nested within the overall environment. The properties and behaviors of these sub-systems are shaped by a combination of interactions among its internal components, interactions with other actors within the global system, or by the features of the global system itself.

Untangling the complex web of relationships between actors in a nested system like Wikipedia requires the ability to examine phenomena at multiple levels of analysis. An open systems approach facilitates examination of heterogeneous actors at multiple levels of analysis and helps unpack the cause and effect relationships between local actions and system-wide events. It allows researchers to ask questions that would be difficult to address if constrained to a single level or unit of analysis, such as *How has the evolution of the policy environment affected the behavior of individual editors at different points in time?* and *What is the relationship between the overall size of the encyclopedia and the work activities of individual WikiProjects?*

As I discussed in Chapter 2, WikiProjects are complex socio-technical mechanisms used by loosely bounded, self-organized open teams to coordinate a wide variety of work activities. Overcoming the research challenge posed by the nested complexities of WikiProjects requires both theoretical and empirical tools that facilitate analysis at the level of a group's constituents (e.g. people, their beliefs and attitudes, and the digital artifacts they create and use), as well as the emergent properties of the group itself and the dynamics of the group's interactions with its embedded context—the system as a whole and other system agents.

One particular open system approach, Small Groups as Complex Adaptive Systems theory (SGCAS) (Arrow, McGrath, & Berdahl, 2000) provides a particularly productive and appropriate framework for studying the dynamics of open teams like WikiProjects. SGCAS is a theoretical framework that synthesizes existing empirical and theoretical work on the formation, coordination and adaption of small groups from the field of social psychology. Like other ecological approaches to social

psychological research, SGCAS advocates a departure from the practice of studying these phenomena in controlled settings in favor of natural settings. SGCAS also borrows concepts from complex systems theories pioneered in the field of theoretical physics. See (Holland, 1992) for an overview. Complex systems theory—and the related theories dynamic system theory and adaptive systems theory—has been applied across a variety of physical and social scientific fields to explain non-linear and emergent phenomena in complex systems. Complex systems theory has been used to model and predict phenomena that emerge from the interaction among multiple variables over time such as punctuated equilibrium, saddle points, and adaptation, and to explain and model the dynamics of systems as disparate as stock markets, ant colonies, cities and subatomic structures.

In qualitative and mixed-methods research, systems theories can be used to identify recurring patterns of behavior or stable, dynamic configurations within systems that contain both known and unknown variables. These features provide an explanatory power for identification of system-level features of configurations of variables that often give rise to particular observed properties of interest. Most importantly, systems theories can be used to identify particular kinds of emergent behavior across disparate systems with vastly different components and which exist at very different scales. As such, systems theories can be powerful tool for both action researchers who seek to facilitate particular outcomes *within* a system and design researchers who seek to develop design requirements that may be transferrable *across* systems and domains of work.

The central contribution of complex systems theory to SGCAS is the postulate that human groups exhibit behaviors that are not directly determined by specific behaviors of their individual members or their external environment, but rather emerge as properties of the relationships between multiple factors and actors. These emergent behaviors make the group itself an actor in the system and an important unit of analysis, along with micro- and macro-level phenomena such as the motivations of individuals or the structure of the software platform which influences the group's dynamics. Complex systems theory also provides specific concepts that are useful for identifying and characterizing group behaviors, such as attractors—group states that are robust enough to persist despite disruptions or destabilizing pressures—and resonance—the ability of small inputs to amplify existing group properties.

SGCAS provides three broad levels of analysis for examining the behavior of groups over time: local dynamics, global dynamics and contextual dynamics. Local dynamics include intra-group factors such as the motivations of individual members, the features of particular group coordination mechanisms, and the interactions among members, tasks and tools; global dynamics are characterized by emergent group-level features or behavior patterns that change over time such as group norms, shared goals, productivity and persistence; contextual dynamics are environmental factors such as external events or relationships with other groups that affect the group at the local or global levels.

My approach to examining the evolution of Wikipedia is guided by an open system framework. Wikipedia is an open system. Individual contributors join and leave, and their activities on the site are influenced by external events, such as natural disasters (Keegan & Gergle, 2010) and international controversies (Morgan, Mason, & Nahon, 2011). Although Wikipedia editors do interact outside of Wikipedia—at local meetup events, on Internet Relay Chat channels, and at the annual Wikimania conference—the MediaWiki platform captures a relatively comprehensive set of actions and interactions related to contribution, coordination and communication among Wikipedia editors. My investigation of WikiProjects is guided by the theory of Small Groups as Complex Systems. Most previous studies of WikiProjects have examined projects as groups of members; a SGCAS approach expands the focus of analysis to include group tasks and tools (such as the project workspace) as well as

the dynamic relationships between WikiProjects and between WikiProjects and Wikipedia. Researchers studying the effectiveness of virtual teams have proposed similar ecological frameworks to account for internal environment, external environment and boundary management (Shachaf & Hara, 2005).

Small Groups as Complex Systems also provides an important basis for my rationale in developing the Teahouse: by creating a local environment that affords a particular set of experiences and interactions between Wikipedia newcomers and veterans, I hope to have an impact on the way the Wikipedia community as a whole socializes new members. CSCW researchers have recognized the value of SGCAS for studying online groups (Goggins, Laffey, & Gallagher, 2011) and a handful have also used this framework to surface design requirements for small group systems (Aragon & Williams, 2011; Sutcliffe, 2008). However, no previous work has adopted a complex systems theory approach to *design intervention* within an established open collaboration on the scale of Wikipedia.

Challenges and limitations of an Ecological research approach

Carefully controlled studies are one of the central paradigms of the scientific method, and for good reason. Identifying causal links between phenomena is only possible if the influence of potentially confounding variables has been ruled out. Ecological research and other approaches that rely on naturalistic observation often avoid making claims about causality within specific instances because natural environments do not afford the researcher a sufficient level of control over potentially confounding variables.

Using a mix of different research methods can allow ecological researchers to make stronger claims about correlation, make generalizable inferences, and suggest causal relationships through the process of triangulation (Jick, 1979). Each of the studies in this dissertation uses a mix of qualitative and quantitative methods to identify correlations among different phenomena on Wikipedia. In each study, I provide a detailed rationale for my methodological choices and point out their potential drawbacks and limitations. For example, in my comparative analysis of the editing behaviors and retention rate of new editors who visit the Teahouse and other newcomers, I describe the process I used to define my experimental and control groups, and qualify my claims about the impact of Teahouse participation by discussing the limitations of implementing a quasi-experimental study design within a living laboratory, rather than a traditional laboratory.

Computational modeling, another technique for making causal claims about real world phenomena that is used in ecological and complex systems research, is beyond the scope of this dissertation. However the data gathered through my mixed-method studies could potentially be used to inform the development of algorithmic simulations of group dynamics and formalization processes in open collaborations. My use of comparative case studies is discussed in the Research Methods section below.

RESEARCH METHODS

In order to provide a rich description of several heterogeneous phenomena at multiple levels of analysis and over time, I use a mixture of quantitative and qualitative research methods in the studies presented in this dissertation. In this section I motivate my approach to examining the Wikipedia policy environment and WikiProjects with a discussion of the advantages of comparative case studies for open collaboration research. Then I briefly describe my data sources and my primary analytical methods: edit log analysis, content analysis, interviews and surveys. Specific details on how these methods were used in different studies are reserved for the research chapters themselves. Artifacts such as codebooks and interview and survey protocols are provided in the Appendices.

Comparative case studies

Comparing how different groups in similar circumstances address common problems is a useful way to develop theories of group dynamics and generalizable design principles for supporting group work. Ostrom's (Ostrom, 1990) design principles for common-pool resource communities were developed through longitudinal case studies of dozens of disparate self-organized offline communities that managed shared consumable resources. These guidelines have proven useful for understanding how online groups work as well (Forte, Larco, & Bruckman, 2009; Viégas, Wattenberg, & McKeon, 2007).

Over the past 10 years, researchers have studied distributed work groups across a variety of open collaboration systems with different features and focuses. Research in open-source software projects, creative multimedia collaboration among scientists and children, online role playing games, collaborative writing projects and many others have demonstrated the role of leadership styles (Luther & Bruckman, 2008), common bonds (Ren, Kraut, & Kiesler, 2007), group identity (Nardi & Harris, 2006), social creativity (Aragon, Poon, Monroy-Hernandez, & Aragon, 2009), and personal fulfillment (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012) on the ability of these groups to meet member needs and fulfill group goals.

However, relatively few studies have compared the strategies and structures of different groups within the same environment. Where such comparative studies have been conducted, the comparisons often involve concocted groups in artificial scenarios with carefully controlled variables, intended to validate a particular theoretical construct (Dabbish, Farzan, Kraut, & Postmes, 2012; Dabbish, Kraut, & Patton, 2012). While experimental research of this type is valuable, it cannot account for the full ecological complexity of group dynamics in natural settings. Online groups in the wild usually differ by more than one significant feature, and concocted groups may not persist long enough to exhibit the emergent goals, dynamics and repertoires of organic groups.

One practical reason for this gap in the literature on online collaboration may be the difficulty of finding a system that hosts a sufficient number of comparable groups. The dozens or hundreds of co-located software development teams at large organizations such as Microsoft and Google may provide enough overlap in goals, roles and tools for meaningful comparison. However, while a WikiProject and a World of Warcraft guild may have many similar qualities, the goals of these groups and the technical mechanisms that afford and constrain their actions are so different that comparison may be limited to a rather low degree of granularity. And the distributed group membership and use of multiple online media for communication may make it difficult to observe the full range of interactions among group members.

Ideally, comparative case study research on open collaborations should also examine groups over time in their natural environment so that the structures and strategies of different groups can be compared against group outcomes such as sustained productivity, member recruitment and retention, and longevity. The group system selected for study should also afford groups a high degree of flexibility in the structures they enact and the strategies they employ to facilitate the identification of a variety of combinations of success factors.

Wikipedia, by virtue of its openness, success and longevity, contains a large number of independent, comparable groups in the form of WikiProjects. Because Wikipedia's history is a publicly available dataset, it is possible to catalogue the differences among those groups' behavioral and system asset features and trajectories over time, and to try to spot the patterns that emerge.

Due to the mix of similarities and differences that WikiProjects exhibit, the large number of current and historical projects available for study, and the availability of longitudinal data, these groups would seem to be ideal candidates for comparable case studies. Because of Wikipedia's flexibility and inclusivity, each project has the opportunity to experiment with coordination strategies and shape its group workspace to meet its current needs. Yet WikiProjects, as a coherent genre of collaboration on Wikipedia, also exhibit a great degree of structural and functional similarity, facilitating direct comparison.

The investigation of the effects of formalization within the Wikipedia policy environment presented in Chapter 4 also employs a comparative case study approach to the formal rules and norms of Wikipedia. Previous work led by Beschastnikh (Beschastnikh, Kriplean, & McDonald, 2008) examined the rate of citation for policies and guidelines over time and provided evidence that writing and citing specific policies reflected current community concerns. However, this analysis did not investigate the role of genre differences between the policies and guidelines, such as their level of regulatory authority, citation and contribution patterns, and did not investigate the third major genre of regulating artifact, essays.

Edit log analysis

Data used in content analysis and statistical analysis performed in this dissertation was gathered from one of two live mirror databases of the English Language Wikipedia, either the Wikipedia Toolserver¹¹ or an internal research database made available in perpetuity to participants in the 2011 Wikimedia Summer of Research¹², of which I was one. These databases contain metadata about all edits to the English Wikipedia, with the exception of deleted revisions. Revisions are only deleted from Wikipedia in exceptional cases, such as in the case of potential slander or an inadvertent publication of sensitive personally identifiable information about an individual. The metadata about each revision made available through these databases include the editors' unique name and numeric id, the time and date of the revision, the size of the revision, the name and id of the edited page, and an optional user-generated edit comment. These databases did not contain web analytics style data such as unique pageviews, bounce rate, or clickthrough rates.

Wikipedia's community-created category and template structures were used to identify WikiProjects and regulating artifacts within the policy environment, and to track cohorts of new editors in the Teahouse evaluation. Wikipedia's revision dataset provides a wealth of metadata that can be mined and analyzed in different ways to understand user activity, as much of these data (such as categories) are user generated, they can be inconsistent and subject to change. Furthermore, edits on their own are an ambiguous and noisy signal of activity, since an edit can be a single word or 5,000, and because a comment on a talk page and a contribution to an article are equally counted as edits. In each chapter of the dissertation I provide a brief account of the sampling and analytical considerations that are pertinent to that study.

Content analysis

Content Analysis (CA) is a productive method for understanding the manifest and latent characteristics of texts that has been prominently featured in major studies of online behavior within HCI and CSCW (Burke, Joyce, Kim, Kraut, & Anand, 2007; Galegher, Sproull, & Kiesler, 1998; Herring & Nix, 1996; Kolko & Reid, 1998) and is well described in HCI method manuals (Preece, 2001). Researchers have used CA to analyze interactions in Instant Messages and IRC, Weblogs (Benkler & Shaw, 2010; Herring, Scheidt, Bonus, & Wright, 2004), Organizational Communication Practices (Orlikowski & Yates,

¹¹ <http://toolserver.org/>

¹² http://meta.wikimedia.org/wiki/Research:Wikimedia_Summer_of_Research_2011

1994), and a variety of online communities from USENET newsgroups (Kelly, Fisher, & Smith, 2006) to Wikipedia (Kriplean, Beschastnikh, & McDonald, 2008; Viegas, Wattenberg, Kriss, & van Ham, 2007).

Content analysis has been demonstrated to be an excellent tool for drawing inferences about user roles, goals and values from specific, quantifiable features of the texts that users leave behind when they comment, converse and collaborate online. These features (once divided into categories or codes) can then be used to identify how people are using the software itself, how well the social and technical infrastructure of the community is meeting their needs, and can generate a rich picture of their identities, needs and motivations. Content analysis is often deployed alongside other methods—both qualitative and quantitative—such as activity logs, interviews, contextual inquiries and surveys to triangulate behavioral observations and correlate different types of communicative acts with user roles, values and practices (Herring, 2008).

Although the term content analysis does not have a universally acknowledged definition, there have been attempts to come up with minimal definitions. Markoff and Shapiro (Shapiro & Markoff, 1997), in a literature review of content analytic scholarship, settle on the following as a minimal definition of content analysis:

...any systematic reduction of a flow of text (or other symbols) to a standard set of statistically manipulable symbols representing the presence, the intensity, or the frequency of some characteristics relevant to social science.

Susan Herring has proposed flexible and detailed methodological frameworks for deploying content analysis in computer-mediated contexts called Web Content Analysis (WebCA) (Herring, 2008). WebCA describes various approaches for capturing different kinds of text and other non-textual artifacts (such as images, multimedia content and entire websites), as well as for classifying text according to its manifest structural features or its symbolic meaning. For simplicity, I use the term content analysis to cover all of these approaches, and describe the details of individual analyses within each study.

Following Herring, I employ a coding and counting approach. First, I create a set of categories (codes) based on theory or observation, then I label all instances of those categories in a sample of data and perform quantitative analysis of the resulting frequencies, trends, co-occurrences and correlations among those categories and between the coded data and other related phenomena gathered through other methods.

There are many ways of assuring rigor and validity in content analysis. Where possible, I base my coding schemes on previous codebooks developed on similar data sources. Over the course of an iterative coding process, categories are refined or discarded based on how well they fit samples of new data, and new categories may be added to describe relevant phenomena not captured by the original codebook. The content analysis data presented in this work were adjudicated through group discussion among multiple coders in order to resolve inconsistencies and disagreements. Statistical methods of calculating inter-annotator reliability such as Cohen's Kappa and Krippendorff's Alpha (Krippendorff, 2004) can also be effective for categorizing manifest features of artifacts and for some latent phenomena such as affect and sentiment. I have used these methods to great effect in previous research studies (Kriplean, Toomim, Morgan, Borning, & Ko, 2012; Morgan, Mason, & Nahon, 2011). However the breadth and subjectivity of phenomena covered by the categories in the content analyses presented in this dissertation required a more iterative, collaborative approach to quality assurance, one that involved extensive negotiation and iterative assessment by multiple domain experts.

Interviews

Analyzing editing patterns can provide a basic understanding of the work editors do—the namespaces they edit most, the users they communicate with, and how active they are—but does not always provide a deep understanding of the reasons they perform that work, or a nuanced understanding of what kind of work is being performed in those edits. As Forte (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012) demonstrates, one effective way to understand the range of work activities that editors coordinate through WikiProjects is to ask the editors themselves. In Chapter 6 I draw on 18 interviews with Wikipedia editors that I conducted between 2011 and 2013. Eight interviews were conducted with members of *WikiProject Military History* during the summer of 2011, which I was a research fellow at the Wikimedia Foundation. These editors were participating in a project self-assessment organized by the Wikimedia Foundation, and I was put in touch with these editors by a Foundation employee who was facilitating that self-assessment. These interviews were conducted via Instant Message, Internet Relay Chat or, if necessary, email. A ninth, in-person interview was conducted with the facilitator herself, who was not a member of Military History but who was one of the most active Wikipedians at that time.

The second set of nine interviews was conducted with members of various WikiProjects between December 2012 and May 2013. We used a snowball sampling approach: I approached editors who were participants in the Wikipedia Teahouse on their user talk pages or over Internet Relay Chat and asked them if they were interested in being interviewed or to recommend friends. I also approached editors who participated in a Seattle Edit-a-thon that I helped organize. Interviews were conducted via Instant Message, Internet Relay Chat, Google Hangout, or in person. Participants in this set of interviews were compensated for their time with a \$30 Amazon.com gift card.

Participants were not required to reveal any demographic information about themselves beyond what was required for assuring a mechanism for off-wiki communication, although many did. An effort was made to recruit female Wikipedians for the interview study, but only one interview candidate identified as female. The interviewees as a set were highly diverse in their interests and level of experience, but all were current, highly active Wikipedia editors. All interviewees gave their permission to have their interviews transcribed or audio recorded and gave permission to be quoted in publications.

The interviews were focused on understanding each editor's history of involvement with WikiProjects, their motivation for participating in projects, and on identifying important technical and social factors that had impact the success of the project. Five of the initial nine interviews were conducted over email with a defined set of questions. The rest of the interviews were conducted in a semi-structured format over (in order of frequency) Internet Relay Chat/Instant Message, Video Chat, or in person. I maintained an anonymized record of all text-based interviews, and typed a transcript of all audio-recorded interviews. Although some interviewees gave consent to have their usernames included in these data, in the quotes used in this work all participants' names have been anonymized for consistency.

The protocols for the two sets of semi-structured interviews are presented in **Appendix C**. Each of these protocols was revised and expanded somewhat from its original form during the course of the interviews, as new themes arose or specific questions required clarification or suggested follow-up questions. Several interviewees also responded to follow-up questions I asked in the days, weeks or months after our interview. These data are also included in the interview dataset.

The overall goal of the interviews was to elicit information about individual editors' motivation for participating in WikiProjects, and the kinds of activities they performed. The initial interview protocol was designed with the additional goal of un-

derstanding the technical and social features of WikiProject work that could be better-supported with technology. The second interview protocol was based on the first, but revised after its first few uses in order to explore the emergent theme of alternative WikiProjects which is the focus of Chapter 6. After it became clear that alternative WikiProjects were a widespread and interesting phenomenon and I had devised a content analysis that allowed me to classify WikiProjects as either conventional or alternative, transcripts from all previous interviews were re-analyzed for descriptions of alternative WikiProjects and related themes.

The interview data were analyzed for themes (Aronson, 1994) related to participation in alternative WikiProjects by me and other members of a research team. We analyzed written interview transcripts and identified passages related to WikiProjects that had been identified as alternative according to our coding scheme, and discussed the work these projects performed.

The volume of interview data analyzed for this dissertation, and the specificity of the themes I explicitly analyze and discuss within those data, were small enough that I did not use a formal grounded theory approach to thematic analysis.

Surveys

Finally, during the pilot period of the Teahouse, between March and July 2012, online surveys were deployed to assess how useful and enjoyable editors found the Teahouse and several of its key features, to collect feedback for improvements, and to get a sense of participant demographics. These surveys were created using the Qualtrics online survey tool and invitations to fill out the survey were sent to the user talk pages of editors who participated in the Teahouse. New editors and veteran editors received different surveys, in order to reflect their different roles and elicit a wider variety of perspectives on different aspects of the experience. The survey texts are available in **Appendix F**.

Chapter 4

Formalization in Wikipedia's policy environment

Civility is part of Wikipedia's code of conduct and one of Wikipedia's five pillars. The civility policy is a standard of conduct that sets out how Wikipedia editors should interact. Stated simply, editors should always treat each other with consideration and respect. In order to keep the focus on improving the encyclopedia and to help maintain a pleasant editing environment, editors should behave politely, calmly and reasonably, even during heated debates.

This policy describes the standards expected of users when they interact, and appropriate ways of dealing with problems that may arise. It applies to **all** editors and all interaction on Wikipedia, including on user and article talk pages, in edit summaries, and in any other discussion with or about fellow Wikipedians... (WP:Civility¹³)

The fight-or-flight response developed by our pre-human ancestors may have helped them escape from **angry mastodons**, but it isn't constructive in an online encyclopedia. Wikipedia collaboration occurs between geographically isolated people in cyberspace. Nonetheless, sometimes editors get angry and feel a natural urge to fire off an immediate retort ("fight"). The urge is accompanied by a rapid heart rate, dilated pupils, and other physiological changes associated with the body's release of epinephrine. Or, they get scared or peeved or weary and just log off ("flight").

One of the best experiences at Wikipedia happens among editors with deep differences. People don't have to agree about a topic to collaborate on a great article. All it takes is *mutual respect* and *a willingness to abide by referenced sources and site policies*. If you think you're right, dig up the very best evidence you can find and put that in the article or add it to the discussion. Let the other side's best evidence be a challenge to raise your own standards and always bear the big picture in mind: we're here to provide information for non-specialists to teach them about the topic. There are several informal ways to de-escalate conflicts and defuse disputes... (WP:No_angry_mastodons¹⁴)

The two quotes above reflect very different approaches to communicating the same basic message, which could be summed up as: "it is important to treat your co-workers with respect, even when you disagree."

The first quote comes from the *Civility* policy, one of Wikipedia's Five Pillars, a set of documents that articulate the fundamental principles by which Wikipedia operates. The second quote comes from the essay *No Angry Mastodons* (**Figure 4**), a document that contains "the advice or opinions of one or more Wikipedia contributors on the Wikipedia:Civility policy". Both of these documents are formal norms of conduct that have been collaboratively developed by Wikipedia editors over time to help regulate behavior within their community.

Although Civility and No Angry Mastodons communicate a similar basic message, both the tone and the content of these two norms are very different. Civility is serious and formal—it lists behaviors that editors should not engage in, the potential con-

¹³ <https://en.wikipedia.org/wiki/Wikipedia:Civility>

¹⁴ https://en.wikipedia.org/wiki/Wikipedia:No_angry_mastodons

sequences of incivility (such as having your account blocked), and links to formal processes that editors can use to resolve disputes and noticeboards where they can report cases of uncivil behavior.

No Angry Mastodons, in contrast, has a more humorous and casual tone. In addition to providing cheeky advice such as “be cautious about editing after drinking,” it describes a series of informal, proactive approaches that editors can use to avoiding becoming uncivil in heated discussions or when dealing with incivility in others such as “look for an opposing truth,” “clarify humor,” and “be the voice of reason.”

In other words, these two documents provide useful and compatible normative guidance. But why have Wikipedians documented two separate formal norms to regulate the same behavior? Why is one called a policy and the other an essay? What do these different categories signify?

In this chapter, I present the results of two research studies in which I explore the role of different types of formal norm on Wikipedia, and examine their evolution over time. In the first study, I conceptualize policies and essays—along with a third category of regulating document, the guideline—as three inter-related genres that fill unique ecological niches within Wikipedia’s policy environment and that contribute to community regulation in distinct and complementary ways. Drawing from previous scholarship on the emergence of and interactions among document genres in traditional workplaces, I argue that both the hierarchical structure of the policy environment and characteristics of the three policy genres have emerged in response to editors’ needs for handling contingencies in the interpretation and enactment of regulation in the course of their work.

In the second study, I describe the increasing formalization of community norms into an enforceable code of conduct. I demonstrate the process of formalization and measure its impact through a longitudinal analysis of the creation and development of documents in these three genres. I show that as the policy environment became more formalized, fewer new official norms were created and existing ones became calcified—less open to reinterpretation and more resistant to change, especially changes proposed by newer editors. As the other genres in the policy environment calcified, essays proliferated because they remained unofficial and therefore open to a wider variety of contributions and contributors. I discuss the role of essays and the relationship between policy calcification and the Wikipedia editor decline, focusing on its impact on the ability of newer editors to shape the rules that govern their community in response to current concerns.

THE WIKIPEDIA POLICY ENVIRONMENT

In self-organized group collaborations, regulatory practices often evolve over time from informal social norms, rather than being fully defined and articulated up front (Ostrom, 2000). When work is conducted in virtual spaces through collaborative software tools such as wikis, contributors have the ability to inscribe these emerging norms, conventions and rules into the



Figure 4. Wikipedia essay No Angry Mastodons.

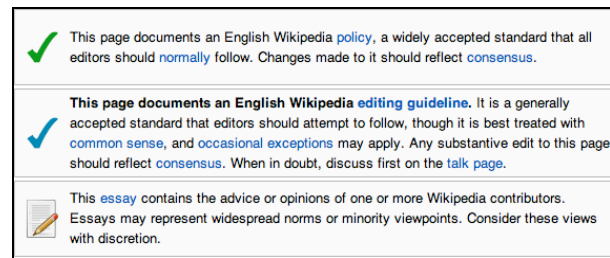


Figure 5. The policy, guideline and essay templates.

collaborative environment itself by encoding them into shared information assets (e.g., pages) within the environment. These formal norms are then experienced by the collaborators as regulatory documents. In open collaboration systems such regulatory documents can serve as boundary objects (Star & Griesemer, 1989). They are inspectable and reviseable by the community of users, making them flexible enough to be shaped and negotiated over by different stakeholders, yet stable enough to persist as visible and coherent articulations of community rules and practices.

Wikipedia editors have created a class of regulatory documents, the policy environment, that address a wide range of topics that are important to their work. These pages inscribe a variety of formal norms: from official rules for article creation and user behavior to technical how-to's, editing tips, philosophical principles, best practices, and heuristics for contributing to the encyclopedia and interacting with fellow editors. As the Wikipedia editor community grew, so did the policy environment. An increasing number of formerly implicit norms were formalized, resulting in a vast, complex, bureaucratic regulatory system (Butler, Joyce, & Pike, 2008). This extensive process of norm formalization was critical to maintaining common standards for content and behavior, and decentralize the enforcement of those standards (Beschastnikh, Kriplean, & McDonald, 2008; Forte, Larco, & Bruckman, 2009) in the rapidly growing community.

By 2005, three primary categories of formal norms had emerged within the policy environment: *policies*, *guidelines*, and *essays*. (**Figure 5**) Official norms (policies and guidelines) reflect community consensus and can be enforced. Unofficial norms (essays) are not enforceable rules per se and need not reflect consensus but do often reflect community concerns. Essays are by far the most prevalent of Wikipedia's formal norms: in 2008 there were 47 Wikipedia policies, 202 guidelines, but 404 essays.

Previous studies have demonstrated the important regulatory role that these formal norms play within Wikipedia. Policies are used tools for mediating conflict and promoting coordination (Viegas, Wattenberg, Kriss, & van Ham, 2007), and as sites for the articulation and negotiation of community concerns (Nagar, 2012). In addition to serving as a public repository for Wikipedia's rules and regulations, the policy environment also serves a more active role in the regulation of content and behavior on Wikipedia. In article talk page discussions, editors frequently employ hyperlinked citations of policy documents to lend weight to their words as they attempt to educate new users, socialize deviant participants and persuade others about the shape the article should take (Bender, Morgan, Oxley, Zachry, Hutchinson, & Ostendorf, 2011). Citing a policy, guideline or essay can also be a strategic move. Policies are invoked in the context of editorial power plays—attempts to sanction or discredit other contributors, or to bolster or legitimate one's own position (Kriplean, Beschastnikh, McDonald, & Golder, 2007; Morgan, Mason, & Nahon, 2012).

The formalization of implicit norms into rules and the embedding of these rules in technologies throughout Wikipedia, such as bots and templates, facilitated distributed “peer processes” that functioned efficiently at scale (Geiger & Ribes, 2010; Viégas, Wattenberg, & McKeon, 2007). Decentralized policy creation and enforcement allowed policies to reflect current community concerns as more editors—and, increasingly, newer editors—began to write and cite policies (Beschastnikh, Kriplean, & McDonald, 2008). These findings have led researchers (Forte, Larco, & Bruckman, 2009; Viégas, Wattenberg, & McKeon, 2007) to characterize growth-era Wikipedia as an example of successful commons-based governance (Ostrom, 1990) because policies reflect local circumstances, are flexible enough to change in response to emergent needs, and are open to revision and renegotiation by the individuals who are governed by them.

STUDIES OF WIKIPEDIA'S POLICY ENVIRONMENT

Study 1: Wikipedia's policy environment as genre ecology

Although the templates shown in **Figure 5** seem to be intended to advise editors to take genre distinctions into account when evaluating the guidance embedded within a particular regulating document—whether it be a policy, a guideline, or an essay—previous research studies on the role of the policy environment have examined Wikipedia's official norms as a single set (Beschastnikh, Kripean, & McDonald, 2008; Forte, Larco, & Bruckman, 2009). The potential distinctions between the regulatory role of the different document genres have not been examined. Furthermore, no previous study has examined the role of Wikipedia's unofficial, and largest, regulatory genre—the essay.

Exploring the differences among the regulatory guidance provided by these three genres, and in particular the role of essays, is critical to developing a systematic description of how regulation is enacted on Wikipedia. Previous research on the formation and characterization of genres that support work activities (Spinuzzi & Zachry, 2000) has shown that new genres often emerge to fill gaps left within work systems when individual users identify contingencies in their work practice that require existing genres to be supplemented, reinterpreted, and clarified. Spinuzzi and Zachry found that users of closed document systems often find it more expedient to create unofficial genres than to go through more formal channels for updating existing official ones. Sometimes these genres gain official recognition after being widely adopted, while at other times they remain in widespread use despite never achieving official recognition. In collaborative work that is complex and ongoing, then, official and unofficial genres co-exist. Official genres represent an organizationally sanctioned view of work processes and emergent, unofficial genres fill niches where the formal genres are inadequate or not well articulated to localized, context-specific needs. Together, the official and emergent genres make up a genre ecology. A genre ecology, in its totality, accounts for how work is mediated in regularized communicative practices.

In the Wikipedia policy environment, it is likely within the least official and authoritative genre—the essay—that contributors have the greatest opportunity for policy innovation. The form, content, and use of essays show many similarities to policies and guidelines: they are often collaboratively created, heavily edited, and cited in similar contexts. In a recent study (Halfaker, Geiger, Morgan, & Riedl, 2013), Geiger performed an analysis of citation practices around the essay *Bold Revert Discuss Cycle* (BRD)—which describes an informal workflow for resolving editing conflicts without escalating to an edit war or resorting to formal dispute resolution procedures. He found that citing this essay after reverting another editor's work resulted in a discussion between the two editors in over 50% of all cases, although this process was seldom effective for editors' who attempted to initiate the process with automated bots or with other editors who were using specialized editing interfaces optimized for efficient vandal fighting. Furthermore, although some essays do go on to become policies or guidelines the majority of them do not. This indicates that the essay genre itself is invested with a degree of authority despite its unofficial status, and that contributing to essays may represent an alternative way for editors to make meaningful contributions to community governance in an increasingly rule-bound Wikipedia.

The tone and content of essays like *No Angry Mastodons* and *Bold Revert Discuss Cycle* further suggest that the purpose of documents in this genre may be to describe approaches to regulating editor behavior in situations where official policies and guidelines do not provide flexible and appropriately localized guidance. If essays, policies and guidelines do in fact address unique configurations of regulatory concerns within the ecological space, we expect that these genre differences will be reflected in the content of the documents themselves.

Hypothesis 1: the ecological role of essays

Wikipedia's official and unofficial norms exhibit genre distinctions in the regulatory topics they address. As an examination of this hypothesis, I report new results that demonstrate the following:

- Policies, guidelines and essays focus on distinct areas of regulation.
- Essays focus primarily on topics related to editor behavior, while guidelines primarily address content standards. Policies address behavioral regulation but focus disproportionately on formal processes and legal issues.

Study 2: Calcification of Norms Against Newcomers

Research conducted during Wikipedia's growth period has drawn links between Wikipedia's success and editors' ability to participate in the creation, modification, and enforcement of the rules that regulate participation. The trends toward decentralization and norm formalization in Wikipedia governance may have been natural and healthy responses to community growth: formally documenting community practices facilitated wider dissemination in the expanding community, and new rules were created to meet emergent needs.

No systematic analysis has been performed to track the continuation of these trends, or their impacts, into the decline period. However, evidence suggests that both decentralization and norm formalization have slowed. For example, decentralization has its limits: Senior editors tend to have greater power of interpretation over policy (Kriplean, Beschastnikh, McDonald, & Golder, 2007; Morgan, Mason, & Nahon, 2012) and greater control of community processes (Keegan & Gergle, 2010) than newer editors. And the institution of an official peer review process for new policy proposals in 2005 may have slowed new policy creation (Forte, Larco, & Bruckman, 2009). Furthermore, some recent analysis shows a gradual decline in participation by newer editors in the areas of Wikipedia dedicated to drafting and discussing policy, indicating that senior Wikipedians may now be more responsible for curating and interpreting community policy than ever before (Kaelin & van Liere, 2011).

Although policies were originally created to maintain efficiency and stability in the face of a massive growth, decline-era newcomers may face entrenched social practices and technologically embedded processes that are no longer open to renegotiation. If decentralization in governance and dynamic norm formalization were key to Wikipedia's successful socialization of new members during the growth period, we suspect that policy calcification and increasing centralization of policy interpretation may negatively affect the retention rate of desirable newcomers.

Hypothesis 2: Norm formalization and calcification.

Formalization of norms has made it more difficult for newer generations of editors to shape the official rules of Wikipedia.

As an examination of this hypothesis, we report new results that demonstrate the following:

- With the introduction of a structured process for formalizing norms, the creation of new formal norms has begun to slow, and the rate of rejection of contributions to formal norms has increased significantly—especially for newer editors.
- As policy creation has slowed and the rejection rate has increased, editors have begun contributing more to nonbinding, informal norms (essays), whereby their contributions are significantly less likely to be rejected.

METHOD

Study 1: The ecological role of essays

For this study, I collected data from a January 2008 data dump of the English Wikipedia. I used the Wikipedia category hierarchy to identify the pages considered to be policies, guidelines, and essays. My population consisted of the 47 policies, 232 guidelines, and 404 essays within the *Wikipedia* namespace at the time the data were collected.

Community Investment Score

I chose to analyze all 47 Wikipedia policies but only those guidelines and essays that reflect the greatest degree of community investment. This sampling approach was used because previous research has shown that not all documents in the policy environment are equally used (Beschastnikh, Kriplean, & McDonald 2008), and because there are substantially fewer policies than guidelines or essays. I developed a simple balanced metric called Community Investment score (CI) a way of identifying a relevant sample of high value guidelines and essays based on the primary ways Wikipedians interact with these documents: by authoring them and citing them on article talk pages. For every regulating document, CI gives even weight to that document's value according how it ranks within its genre according to: a) the number of unique editors who had made a contribution to the document page, b) the number of unique editors who had cited that document on an article talk page, and c) the total number of citations that the document had received from article talk pages.

$$100 * \frac{3}{(r_citors + r_citations + r_contributors)} = \text{community investment score}$$

In order to facilitate direct comparison between the three genres, I collected the 47 top-scoring documents from the guideline and essay genres along with all 47 Wikipedia policies.

Content Analysis

I developed a set of coding categories to describe each document according to the type of regulation work and the community concerns it addressed. This coding scheme (**Appendix A**) was based on previous codebooks (Beschastnikh, Kriplean, & McDonald, 2008; Kriplean, Beschastnikh, & McDonald, 2008) developed to classify Wikipedia policies, guidelines, and barnstars. I adapted these categories to suit the aim and scope of the current analysis through an iterative process of policy examination, sample coding, and discussion with other members of the research team. My final classification scheme consists of five top-level regulatory categories (*Content, Behavior, Process, Legal, and Other*) and 16 sub-categories that describe fundamental areas of regulation on Wikipedia. The sub categories were used as exemplars to guide the coder in selecting an appropriate top-level category for each document.

Two researchers independently coded each document in our sample according to the types of regulatory concerns it addresses and then resolved any disagreements through discussion. Coding resulted in the identification and categorization of 246 instances where the regulatory categories were addressed in the policy documents. Many documents addressed multiple topics, with a mean of 1.74 topics per document.

Study 2: Policy growth and calcification.

For this study, I used a live mirror database of Wikipedia maintained by the Wikimedia Foundation that contained the full revision history between 2001 and mid-2012. As in Study 1, I used the Wikipedia category hierarchy to identify the pages considered to be policies, guidelines, and essays. To examine the activity surrounding norm formalization in Wikipedia, I defined a set of metrics to track growth and activity of pages in each of the three regulating genres over time.

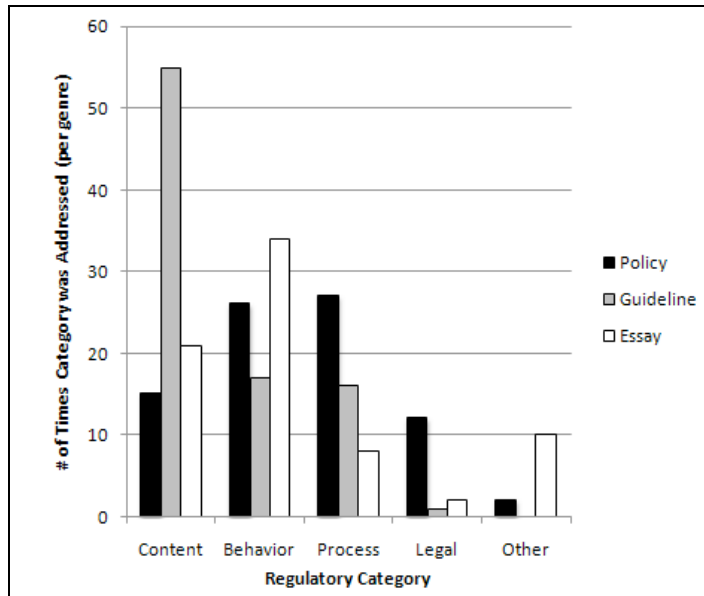


Figure 6. Number of documents in each policy genre that cover different regulatory topics.

- **Contributors:** The number of registered editors that contributed to norm pages.
- **Contributions:** The number of contributions to pages in a norm genre.
- **Length change:** The change to the overall length (in bytes) of pages in a norm genre.

To look for evidence of calcification, I defined a set of independent variables for a logistic regression over the Boolean outcome of whether a contribution to a norm page was reverted. Aaron Halfaker built and ran the regression model based on these parameters:

- **Editor tenure:** The age of an editor in years since account registration.
- **Year:** The time in years since Wikipedia’s inception (2001).
- **Essay:** (Boolean) Is the page an essay?

To identify policy proposals, I performed a text analysis on a diff data set published by the Wikimedia Foundation. Using the data set, I tracked additions and removals of the “`{{proposed}}`” template to determine when pages were nominated for the formalization process. I assumed that pages currently categorized as policies or guidelines were formalized whereas pages outside of those categories were not.

FINDINGS

Hypothesis 1: The ecological role of essays

A Chi Square Test for Independence demonstrated a significant relationship between genre of a norm document and the regulatory topics addressed by that document ($p < .001$). Some of the most notable differences within the Chi Square model are highlighted below for discussion.

- **Policies** tended to address Process (27 observed/17 expected) and Legal (10/4.2) issues more than expected by chance, and topics related to Content less than expected (15/29.5).

- **Guidelines** primarily address article Content (50/30) and contain relatively fewer references to Behavior (17/25) than expected by chance.
- **Essays** dealt with issues related to editor Behavior more than expected (30/21.5) and were less likely to address subjects relating to Content (20/25) or Process (8/14.6). Essays also contained the majority of the total topics that were not classifiable under my coding scheme (8/3).

The differences between the proportion of regulatory concerns addressed by policies, guidelines, and essays supports Hypothesis I, that these categories represent distinct document genres and are intended to support different aspects of regulation on Wikipedia, and that essays focus primarily on behavioral regulation. In the Discussion section I discuss the role of essays and suggest several possible reasons why this unofficial regulatory genre has emerged in response to editors' specific, localized needs.

Hypothesis 2: Norm Formalization and Calcification

To explore Hypothesis 2, I first looked for changes in the rate of new policy creation following the introduction of a structured proposal process in 2005.

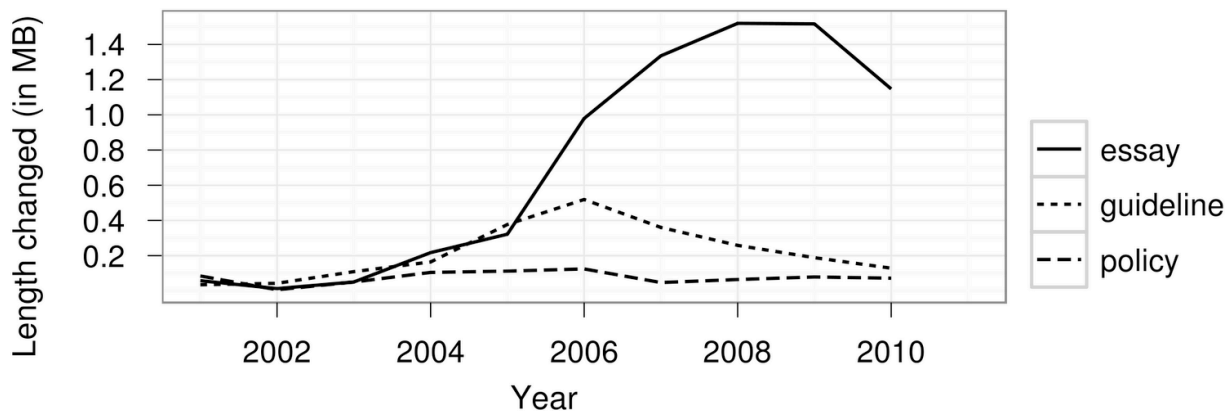


Figure 7. Norm growth over time. The change in the sizes of three genres of formal norms are plotted by year.

Table 2. The coefficients of a logistic regression over the contributions of registered editors to norm pages predicting *success* (i.e. not reverted) are presented.

(n = 120535, AIC = 16801)			
	Est.	StdErr	Pr(> z)
(Intercept)	-1.50	0.043	< 0.001
editor tenure	-0.29	0.006	< 0.001
year	0.12	0.006	< 0.001
essay	-0.38	0.135	0.005
editor tenure:essay	0.06	0.019	0.002
year:essay	-0.10	0.019	< 0.001

Figure 6 shows that growth of policies and guidelines began to slow in 2006, just as Forte (Forte, Larco, & Bruckman, 2009) reports. The results from our analysis of new policy and guideline proposals show that the number of new policy proposals accepted via this process peaked in 2005 at 27 out of 217 (12% acceptance). The year 2006 saw an even larger number of proposed policies but lower acceptance, with 24 out of 348 proposals accepted (7% acceptance). From 2007 forward, the rate at which policies are proposed decreases monotonically down to a mere 16 in 2011, whereas the acceptance rate stays steady at about 7.5%.

Existing formal norms continued to be revised and expanded through 2006, which closely correlates with the end of the community growth (see Figure 1). After that point, contribution to existing policies and guidelines begins to decline.

To look for effects of policy calcification on overall norm formalization, I compared the rate of creation and contribution to formal norms (policies and guidelines) and informal norms (essays). I find an increase in essay creation that corresponds to the decline in policy creation. Sixty-nine essays were written in 2005, 164 in 2006, and the rate does not fall below 185 per year thereafter. This initial growth in new essays appears to be attributable in part to the conversion of failed policy and

guideline proposals: In 2006, 22% of new essays began as failed policy proposals. However, the percentage of essays that started out as rejected policies or guidelines decreases sharply to 12% in 2007 and to 1% by 2011.

The growth of essays overtakes both policies and guidelines in 2006 and continues to rise to 1.52 MB of new content per year by 2008. From that point forward, the volume of content contributed to essays remains consistently above policies and guidelines. The number of distinct contributors to essays over time (not shown) follows a similar pattern, suggesting that the turn towards essay-writing was both widespread and collaborative.

To look for evidence of calcification of policies against contributions, we performed a logistic regression (described in the Method section) to predict the rejection of new contributions to all three types of formalized norm. **Table 2** shows a significant, positive effect for the year in which contributions were made, which suggests that over time, contributions to all types are more likely to be rejected independent of the tenure of the editor making the contribution.

However, the regression also reports a significant negative interaction between the year in which the contribution was made and the Boolean variable that codes for essays with a coefficient at a comparable scale (-0.12 vs. 0.10). This suggests that for essays, the increasing rate of rejection is almost entirely negated. The significant, negative effect reported for the editor's age (tenure) suggests that more-senior editors are less likely to have their contributions to norms rejected in general, but again, we see a reversed effect with the interaction with essay (-0.29 vs. 0.06). This suggests that newer editors are significantly more likely to be successful when contributing to essays.

DISCUSSION

Wikipedia editors write essays for a variety of reasons: to blow off steam, to share advice, to describe a particular instantiation or interpretation of an existing policy or to assert an ideological stance. Many essays are like *No Angry Mastodons* in that they use humor, hyperbole and anecdote to convey serious messages about proper editor behavior, high-level principles, and best practices for editing.

The number of essays that address editor behavior invites several interpretations of their regulatory role. In genre ecologies, users often create emergent genres to fill niches where available genres have proven insufficiently contextualized or otherwise unsuited to the work at hand. As in the case of *No Angry Mastodons*, essays sometimes address regulatory topics that are also covered by policies or guidelines. We suggest that essays like *No Angry Mastodons* may offer editors a softer mechanism for regulating behavior in situations where citing a policy (such as the *Civility* policy) would be too heavy-handed or insufficiently specific.

Because policies and guidelines are official rules, pointing out that another editor is violating one amounts to a serious criticism. Since violating policy can lead to being blocked from editing or even banned from Wikipedia, citing a policy in response to another editor's behavior carries an implied threat. In situations where an editor wants to persuade another editor to change their behavior, citing policies or guidelines might be seen as an act of intimidation. In such cases, citing a humorous, unofficial essay might help resolve a tense situation without escalating it into a full-blown edit war.

The results of Study 2 show that the documentation of new official norms has declined, and it has become more difficult over time for Wikipedia editors to contribute to existing policy—especially editors from more recent cohorts. I offer the rising rate of rejection as evidence of calcification and explain the slowing growth of official norms as the likely outcome of such a process.

One possible reason for the proliferation of essays involves the diminishing opportunities for editors to contribute to policy creation. As the process of policy creation becomes more formal and the process of adding to or amending existing policies has become more restricted, editors may see essays as a more accessible and desirable way to contribute to their own governance. Genre ecology research shows that such informal genres can become widely utilized organizational resources, despite never having been fully formalized or officially adopted.

I see at least two consequences of policy calcification that bear directly on newcomer socialization and retention. First, the calcification of policy is disproportionately felt by newer editors, who see their policy edits rejected at a higher rate. This suggests that under Wikipedia's current policy regime, rules are less open to revision by affected editors than they were during the growth period, decreasing the dynamic flexibility that was key to Wikipedia's adaptive success and increasing the power imbalance between newer and older editors. Second, although newer editors are contributing more to essays—where their contributions are less likely to be reverted—essays are not official, enforceable rules and are not as widely cited as policies or guidelines. Furthermore, as the BRD analysis described above (Halfaker, Geiger, Morgan, & Riedl, 2013) suggests, the unofficial norms documented in essays are trumped by official norms embedded in bots, human computation tools and other hard-coded regulatory mechanisms that are increasingly prevalent on Wikipedia (Geiger & Ribes, 2010; Halfaker, Geiger, Morgan, & Riedl, 2013; Suh, Convertino, Chi, & Pirotti, 2009).

While essay writing may not be an effective mechanism for social change, an increase in essay writing is an encouraging sign of newer editors' continued interest in participating in community governance: a signal that many newer editors desire to become part of the core community has not flagged even as the community has become more resistant to their participation.

CONCLUSION

This study contributes to a richer understanding of how regulation is enacted on Wikipedia by presenting the Wikipedia policy environment as an ecology of interrelated genres used to mediate the complex regulatory activities of Wikipedia users. My first study demonstrates that rather than being monolithic, the policy environment contains multiple genres of regulating documents that provide different styles of guidance and address different topic areas, and therefore may play distinct regulatory roles within Wikipedia. I also perform the first empirical analysis of the essay genre, and illustrate that the essays' topical emphasis on behavioral issues may reflect their primary use as soft regulatory mechanisms.

The second study fleshes out the distinctions between these genres, showing how the development of a formal centralized process dampened the decentralized proliferation of new norm formalization among the two official genres. Although Wikipedia successfully democratized policy creation and enforcement during the time of exponential growth, this study has shown that the community's artifacts of governance have calcified, making rules less adaptable and harder to contribute to, especially for newer editors. These editors increasingly appear to be moving to less formal spaces to construct and discuss ideas about Wikipedia's goals, processes, and organization. However, lacking the exposure and enforceability of policy, these contributions on their own are unlikely to gain wide currency within the community, shift community norms around interacting with newcomers, or help the community tackle issues related to the editor decline.

Chapter summary

The work presented in this chapter demonstrates that Wikipedia's increased resistance to contribution is not limited to casual contributors or brand new editors—all editors experience it to some degree, especially Wikipedians who have joined in the

years since the decline began. Even newcomers who make it through their initial contributions are encountering resistance while attempting to enter Wikipedia's inner circle by contributing to community governance. Wikipedia has changed from the encyclopedia that anyone can edit to the encyclopedia that anyone who understands the norms, socializes himself or herself, dodges the impersonal wall of semi-automated rejection, and still wants to voluntarily contribute his or her time and energy can edit. In other words, the decline directly affects the community, not just the crowd (Budhathoki & Haythornthwaite, 2012). It also demonstrates that despite the growing inflexibility of certain social structures, the dynamic flexibility and ecological diversity of Wikipedia as a whole has allowed users to make meaningful contributions through other structures that remain inclusive and flexible.

The growth of essays illustrates the adaptability of open collaborations. Even when certain mechanisms for contribution become less inclusive (in this case, through the exclusion of newcomer contributions to policies and guidelines) and less flexible (in this case, through the creation of a formal process for reviewing and approving new policies and guidelines), flexible social structures like the essay genre can be created or adapted to counteract these trends, helping to maintain the openness of the collaboration as a whole. Over the next two chapters, I explore another of Wikipedia's traditionally inclusive and flexible mechanisms for contribution, WikiProjects. In these chapters I expand my focus from community regulation to a wider range of work activities as they are practiced in decline era Wikipedia and examine how WikiProjects are used to coordinate and regulate that work.

Chapter 5

Coordination Work and Group Membership in WikiProjects

In this chapter, I shift my focus from formal mechanisms for regulation to those used for coordination. Like the policy environment, self-organized teams called WikiProjects have contributed to Wikipedia's success in important ways, yet the range of work that WikiProjects perform and the way they coordinate that work remains largely unexplored. In this study, we perform a content analysis of 788 work-related discussions from the talk pages of 138 WikiProjects in order to understand the role that WikiProjects play in collaborative work on Wikipedia. We find that the editors use WikiProjects to coordinate a wide variety of work activities beyond content production and that non-members play an active role in that work. Our research suggests that WikiProject collaboration is less structured and more open than that of many virtual teams and that WikiProjects may function more like FLOSS projects than traditional groups.

INTRODUCTION

New Wikipedia editor Endjinn109 has had a lifelong love of trains. He began editing because he noticed serious gaps in the encyclopedia's train-related coverage. As he begins to rectify this situation, he notices that many of the articles that he is interested in improving are tagged with links to other Wikipedia pages with funny titles like 'WikiProject Trains', and 'WikiProject Transport in Scotland'. From visiting these project pages, he figures out that these so-called WikiProjects have something to do with creating and improving train articles, and that there are many such projects on Wikipedia covering topics from Physics to Feminism. He also notices that each project has a list of members. He wonders whether he should join one of them—and if so which one? What does membership mean? Can only members edit certain articles? Can he request editing help from projects even if he doesn't join up? Will he be obliged to help others? Endjinn109 visits the talk page of WikiProject UK Railways and starts reading through some of the recent discussion threads, trying to figure out what this WikiProject actually does.

Groups emerge in online collaborations as individuals organize their productive activities around shared goals, interests, tasks and workspaces. These groups can provide important benefits for their members and perform valuable work for the community they belong to. Lave & Wenger (Lave & Wenger, 1991) assert that the most effective way to understand working groups like these is to examine the work activities their members engage in. But, as the scenario above illustrates, identifying the members of an online group and the work the group performs can be difficult for an outsider—whether they are a new user, a researcher or a system designer.

Research on the behavior of Wikipedia editors has informed our understanding of group work in open collaboration systems. Despite Wikipedia's reputation as an encyclopedia anyone can edit, participation patterns in Wikipedia are similar to those in other peer production systems in that the majority of the content on Wikipedia is written by a relatively small number of highly active contributors (Wilkinson, 2008). And although encyclopedia articles are the most visible product of Wikipedia editors' work, they spend a large proportion of their time on work activities that aren't directly related to expanding existing articles or writing new ones (Kittur, Suh, Pendleton, & Chi, 2007). This meta-work is important for supporting and regulating the editor community and maintaining the quality of the encyclopedia (Wilkinson & Huberman, 2007). Kriplean (Kriplean, Beschastnikh, & McDonald, 2008) identified many valuable meta-work activities by analyzing Barnstars—badges that Wikipedia editors

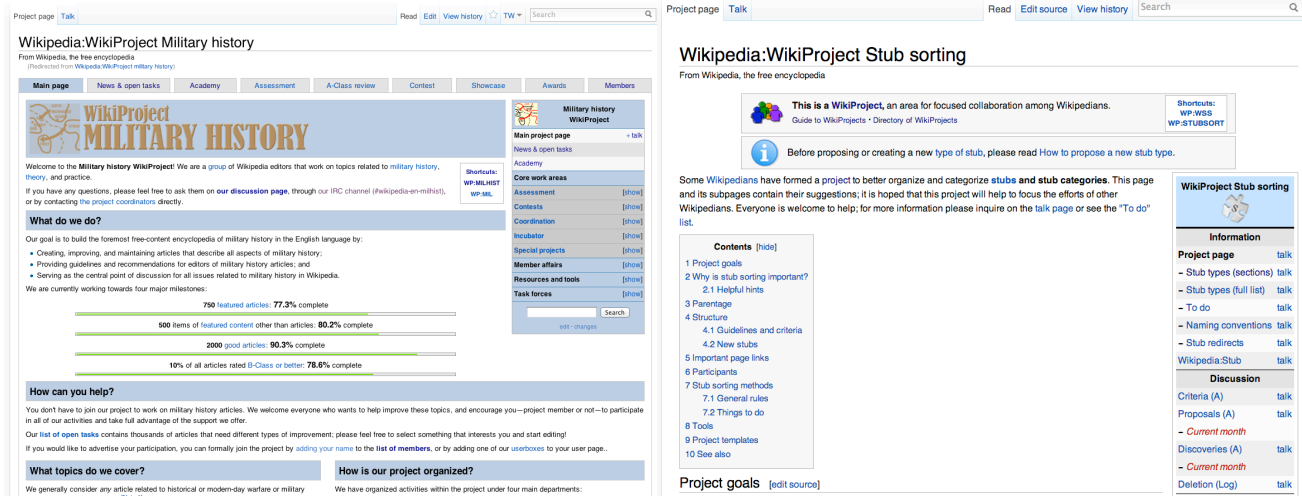


Figure 8. Main pages for two WikiProjects.

award to one another to acknowledge exceptionally valuable contributions. They found that the majority of Barnstars were awarded for work that was not directly related to writing articles but rather for community maintenance, administrative, and quality assurance activities such as providing mentorship, helping to resolve disputes, reverting vandalism, and welcoming newcomers.

Most of the work on Wikipedia, including meta-work, is coordinated in spaces outside of the articles themselves—on article talk pages, user talk pages, policy pages, and community noticeboards. One common class of group workspace is the WikiProject (Figure 8). WikiProjects are collections of pages that enable persistent group collaboration around particular subject matter domains (such as articles about women scientists) or editing tasks (from categorizing ‘stub’ articles to promoting editor retention). There are over 2,000 WikiProjects on the English edition of Wikipedia. By 2007, over 20,000 Wikipedia editors had participated in at least one WikiProject. WikiProjects also exist within editing communities of many of the hundreds of other Wikimedia wikis, such as the French Wikipedia (Ung & Dalle, 2010).

Previous research has shown that WikiProjects engage editors in productive editing work (Kittur, Pendleton, & Kraut, 2009), and that projects can also provide social support and coordinate meta-work activities. In our study we attempt to provide a more detailed description of the way editors coordinate these work activities through WikiProjects. We build on previous research through a systematic examination of work-related discussions on the talk pages of 138 WikiProjects that differ greatly in their size and scope. We analyze a sample of 788 talk page posts over a one-year period in 2011 and 2012 in order to understand how Wikipedia editors use group workspaces to propose, prioritize, and perform work. We present a typology of the article editing and meta-work activities that projects coordinate, and describe the important role that non-members play in WikiProjects. Our findings suggest that many WikiProjects are less formally organized than the projects examined by previous research studies, and that WikiProject work is in some ways less collaborative than previously thought. We discuss the ramifications of our findings for the nature of WikiProjects as groups and we discuss similarities between the group structure of WikiProjects and open source software projects. We close with set of questions for future research.

RELATED WORK

Voluntary online collaboration can be a powerful method for creating common goods with lasting value. However, creating and sustaining a successful online collaboration can be challenging. Platform designers and community members must provide mechanisms for helping potential contributors find productive and engaging ways to get involved, ensure productivity and project maintenance despite lower levels of member commitment and higher levels of member turnover relative to compensated and co-located teams. Many of these challenges may be effectively ameliorated when participants work together. Groups—large or small, formal or informal, pre-defined or emergent—help match volunteer contributors’ interests and expertise with tasks that need to be accomplished (Benkler, 2002). Well-organized groups can also reduce coordination costs by allowing a relatively small number of core participants to organize the activities of a much larger halo of transient, low-volume contributors (Raymond, 2001). And group collaboration can help motivate volunteers to keep contributing by making the work experience itself more socially engaging and pleasant (Nov, 2007).

Wikipedia is a prime example of a successful online collaboration where groups have proven effective in addressing many of these challenges. Groups on Wikipedia help resolve disputes (Kittur, Suh, Pendleton, & Chi, 2007), improve the quality of articles (Wilkinson & Huberman, 2007) and provide scalable, decentralized mechanisms for community governance (Forte, Larco, & Bruckman, 2009). WikiProjects in particular have been shown to shape editor participation in several ways that are beneficial to Wikipedia: editors who join WikiProjects edit more, communicate more with other editors, and are more likely to engage in “good citizenship behaviors” such as reverting vandalism (Kittur, Pendleton, & Kraut, 2009). Findings from previous research suggest that WikiProjects can also provide a variety of social support functions for their members (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012). Many previous studies have examined the role of WikiProjects in article production work—edits by project members to articles within the project’s area of focus. See for example (Kittur, Pendleton, & Kraut, 2009; Wang, Chen, Ren, & Riedl, 2012; Chen, Ren, & Riedl, 2010; Ung & Dalle, 2010). Other studies have examined coordination work and social support within large WikiProjects (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012; Zhu, Kraut, & Kittur, 2012). We complement these studies by analyzing how work is coordinated among both self-identified group members and non-members in the project workspaces of a large and diverse set of active WikiProjects.

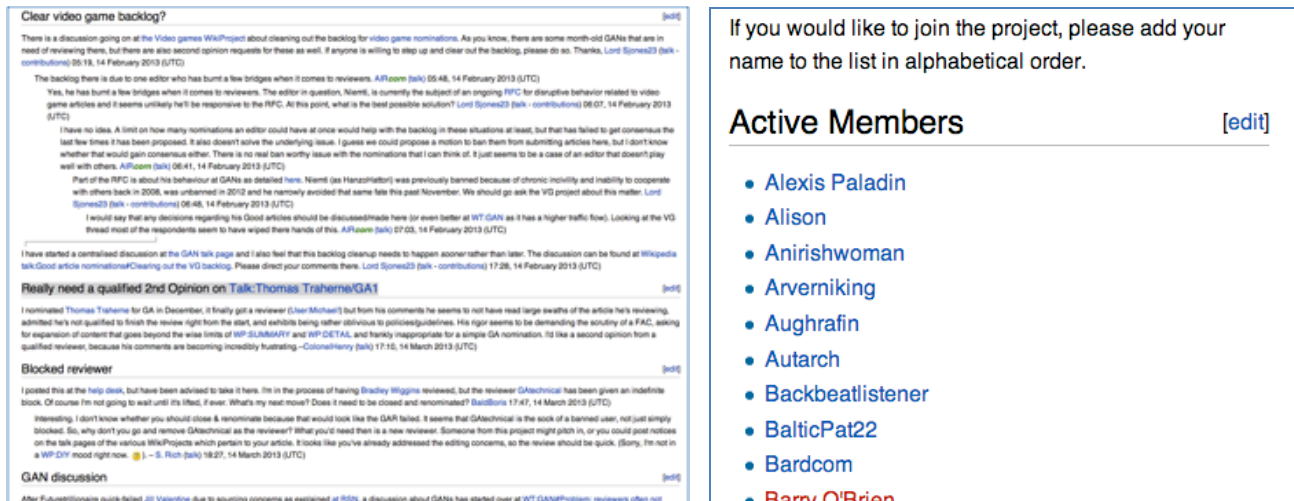


Figure 9. Talk page for WikiProject Good Articles (left). Member list for WikiProject Ireland (right)

Joining a project: Declared vs. participatory members

Unlike many groups on Wikipedia, such as the ad hoc groups that emerge in article talk page discussions (Morgan, Mason, & Nahon, 2011b), WikiProjects allow editors to explicitly declare themselves as project members by adding their name to a canonical member list located in the project space (Figure 9). Member lists are a ubiquitous feature of WikiProjects, and many projects list dozens or hundreds of editors as members.

Visible membership can be an important factor in the development of group dynamics: knowledge of who is a member of a group helps shape members' attitudes and behaviors towards each other, promotes interaction and defines group boundaries. Group members may exhibit in-group favoritism (Williams & O'Reilly, 1998), establish group norms and common repertoires (Lave & Wenger, 1991), share a strong sense of group identity (Ren, Kraut, & Kiesler, 2007), and develop common bonds as they work together on joint tasks towards common goals. The presence of an identifiable 'out group' can intensify these tendencies, influencing the behavior and interactions of both members and non-members.

Like Wikipedia as a whole, WikiProjects present few explicit barriers to participation. Declaring oneself a project member by adding one's name to the project member list is not required in order to contribute to articles within the project's scope, edit project pages, or participate in project discussions. Previous studies of group dynamics in WikiProjects have operationalized project membership in several ways. Wang (Wang, Chen, Ren, & Riedl, 2012) and Chen (Chen, Ren, & Riedl, 2010) limited their analysis of WikiProject participation to the editing activities of editors whose names appeared in the member rolls. Zhu (Zhu, Kraut, & Kittur, 2012) and Ung and Dalle (Ung & Dalle, 2010) counted editors as project members if they had previously made at least one edit to any project page. However, the degree to which a project's list of declared members reflects the actual number of project participants at a given point in time has not been determined. Kittur (Kittur, Pendleton, & Kraut, 2009) assert that non-members rarely edit project pages. However at least one highly active WikiProject Military History participant interviewed by Forte (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012) was not a declared member of that project.

The possibility of active participation by both declared members and non-members in WikiProjects suggests an opportunity to examine group dynamics related to interpersonal interaction, group identification and the formation of common bonds in

open collaborations. The setting for these interactions is the group workspace itself, where the distinction between declared members and participatory members is most salient and any in-group/out-group behaviors are most likely to be more pronounced. Chen notes (Chen, Ren, & Riedl, 2010) that many editor characteristics, such as their interests or their edit count, are not readily apparent to the other editors they interact with on a day-to-day basis. In most contexts on Wikipedia, an editor's membership status with a particular WikiProject is similarly difficult to ascertain unless the editor chooses to advertise it explicitly on their own user page. The visibility and ubiquity of project member list suggests that behaviors related to group identification such as in-group favoritism or behavioral similarity may be more evident in interactions on project pages. We leverage this observation in our investigation, which contributes to the existing body of research on group dynamics in WikiProjects and other open online teams in two ways: we analyze the degree to which membership status reflects real differences in how editors use project talk pages to coordinate work, and we analyze whether declared members display behaviors related to common bonds and common identity in their interactions with other members and non-members.

WikiProject work: Content production vs. coordination

Many WikiProjects have a topic focus, and several previous studies have operationalized the production work of WikiProjects by measuring edits by a project's members to articles within that project's scope (Wang, Chen, Ren, & Riedl, 2012; Chen, Ren, & Riedl, 2010; Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012). Several studies have shown a strong relationship between project membership and edits to project-related articles, and between the level of activity on project pages and article-editing activity (Kittur, Pendleton, & Kraut, 2009; Ung & Dalle, 2010). However, the work of WikiProjects that are organized around editing tasks that span topical boundaries, or activities that are not directly related to writing and editing articles, cannot be measured in this way. The work these projects perform, and the way they coordinate that work has not yet been examined. Furthermore, as Wang (Wang, Chen, Ren, & Riedl, 2012) notes, using member-edits to project-related articles as the sole criterion for project participation may limit the explanatory power of the analysis even for topic-focused projects because it does not capture other ways editors contribute to WikiProjects.

Several previous studies have presented evidence that coordinating the work of editing articles in topic-focused constitutes an important form of meta-work. Zhu (Zhu, Kraut, & Kittur, 2012) found that Collaborations of the Week (COTWs), a type of structured editing event organized on the project pages of some WikiProjects, were effective at getting project participants to edit articles. An in depth case study by Forte (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012) based on interviews with 15 members of WikiProject Military History identified a variety of social functions which that project performs for its members. Many of these social functions were performed within the group workspace, which was shown to provide opportunities for social interaction and networking, and served as a forum for editors to find help and collaborators. A separate research study based on these interviews (Forte, Larco, & Bruckman, 2009) described some of the sophisticated coordination tools that Military History had developed to improve and evaluate the quality of articles within the project's scope: project newsletters, topic-specific formatting guidelines, specialized task forces and article assessment noticeboards.

A project that can host weekly editing events, develop and maintain guidelines and publish regular newsletters reflects an exceptionally high level of investment for a voluntary collaboration. Many smaller WikiProjects may lack the critical mass of involved participants necessary to sustain structured collaboration mechanisms like these. Zhu (Zhu, Kraut, & Kittur, 2012) acknowledge that COTWs were only used consistently in 13 of the largest WikiProjects, and suggested that other projects may have stopped running COTWs or decided not to adopt them because of their high coordination cost. WikiProject Mili-

tary History is one of the largest, oldest and most organized projects on Wikipedia, with 1170 active members and 1000 monthly edits in 2007.

In order to examine how work is coordinated in both large and small projects, we focus our analysis on project talk pages, a feature that all WikiProjects share. Talk pages in other parts of Wikipedia have been shown to play an important role in collaboration and conflict resolution. Kittur & Kraut (Kittur & Kraut, 2008) demonstrated a link between a high level of talk page activity and article quality in the formative stages of article creation. Viegas (Viegas, Wattenberg, Kriss, & van Ham, 2007) and Schneider (Schneider, Passant, & Breslin, 2011) found article talk page discussions were primarily focused on coordinating editing activities around individual articles. WikiProject talk pages have not been systematically examined in this way, but findings from multiple studies suggest that editors use talk pages to coordinate a broader range of activities across many different articles: Choi (Choi, Alexander, Kraut, & Levine, 2010) found evidence that project members used talk pages to welcome new members, suggest tasks for them to perform and provide constructive criticism; and interview subjects in Forte (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012) listed project talk pages as places where members go for help with articles.

Following many previous researchers on Wikipedia (Viegas, Wattenberg, Kriss, & van Ham, 2007; Schneider, Passant, & Breslin, 2011; Kriplean, Beschastnikh, & McDonald, 2008), we use content analysis to characterize a class of communication activity within a particular interaction context. We categorize the coordination work implicated in messages that editors post to talk pages. This approach allows us to both *qualify* a broader range of work production and coordination activities and systematically *quantify* the prevalence of those activities across a diverse set of active projects and between declared members and non-member participants.

Hypotheses: Membership status and coordination work

The definition of WikiProjects provided by Wikipedia, “a group of editors that want to work together as a team to improve Wikipedia”¹⁵ suggests that WikiProjects are closely-knit groups of close collaborators, and findings from previous studies generally support this characterization of WikiProjects. However, substantial gaps in our knowledge about the role of non-members in WikiProjects and the way smaller projects coordinate work introduces a degree of uncertainty as to whether WikiProjects exhibit a degree of collaborative activity and group dynamics similar to teams in other settings—from bridge clubs and office workgroups to football teams and distributed work teams in organizations. Previous studies of WikiProjects have drawn on theories of group identification to explain the production work and social support mechanisms of WikiProjects. For our own investigation we draw on common bond theory and group identity theory to frame several hypotheses related to how work is coordinated among declared members and non-member participants in WikiProject talk page discussions.

H1: Members and non-members will post different kinds of messages on project talk pages

People who identify with a group are more likely to be influenced by the groups norms and values, and make decisions favorable to the group (Cheney, 1983). WikiProject members are more likely to engage in content production work relevant to the project than other Wikipedia editors (Kittur, Pendleton, & Kraut, 2009). We posit that the work activities that members coordinate on project talk pages will show similar regularities. To investigate this, we analyze the whether messages posted on talk pages by members reflect different kinds of content production and meta-work activities than messages posted by non-members.

¹⁵ <http://enwp.org/w/index.php?title=WP:WikiProject&oldid=545662745>

H2: Members will respond more to other members than to non-members

Group members often manifest a sense of common identity and purpose by helping to plan group activities and participating in group discussions with other members (Ren, Kraut, Kiesler, & Resnick, 2010). WikiProject members are likely to be aware of the member status of the editors they interact with on project talk pages. We investigate whether common identity influences member participation by analyzing the rate at which project members respond to members and non-members who ask questions or propose new collaborative activities on talk pages.

H3: Members will perform work activities requested by other members more often than activities requested by non-members

Group members may be motivated to provide individual support to other members because they develop common bonds through a shared history of interaction within the group context, increasing their likelihood of assisting each other and their willingness to work together (Ren, Kraut, & Kiesler, 2007). To investigate the influence of common bonds on project work, we compare the number of members who perform work requested by other members and non-members on project talk pages.

METHODS

We gathered our data from toolserver.org¹⁶, a public data repository hosted by the Wikimedia Foundation that maintains a nearly live slave database of many Wikipedia editions. We conducted queries against the Toolserver database parsing results to create our own metadata about WikiProjects and cached results to offload subsequent processing.

The first step in our analysis is to identify a large sample of active WikiProjects. Because WikiProjects may have functioned differently at different points in Wikipedia's history, we sampled WikiProjects that were most active during the one-year period: July 2011 to July 2012. To ensure that all the projects in our sample were active, all WikiProjects in our sample averaged at least 1 edit per day to its project pages (the main WikiProject page, the talk page and any project subpages), excluding edits by automated bot user accounts. This sampling resulted in a set of 138 WikiProjects with a median of 2.6 edits per project per day over the course of the year. For each of these projects, we gathered a random sample of 20 talk page posts that started a new discussion thread. 32 of the 138 projects (23%) sampled had fewer than 20 total thread-starting posts during the sample period. For these projects, we gathered all thread-starting posts. This sampling yielded 2,465 thread-starting messages.

To determine whether someone was a declared member of a WikiProject at the time they posted to the talk page, we first identified the member lists for each WikiProject by looking for sections of the main page and/or project subpages with titles like "Member" or "Participant." We then parsed the text of every revision to that page or section, capturing the date at which each editor added their username to the list. If an editor's username appeared on the member list before they posted to the talk page, we considered them a member at the time of that post. The median number of declared members in the projects we sampled was 111. WikiProject Military History was the most populous project in our sample, with 1,955 declared members as of July 2011.

Codebook development

We based our coding scheme on the codebook developed by Viegas (Viegas, Wattenberg, Kriss, & van Ham, 2007) and subsequently refined and expanded by Schneider (Schneider, Passant, & Breslin, 2011), and supplemented their categories with new codes based on work activity identified in previous studies of WikiProjects. The first author performed an initial open

¹⁶ <http://toolserver.org/>

coding of a sub-sample of our dataset—refining the definitions of existing categories to reflect their presentation in WikiProjects, dropping categories that were not attested in our data, and noting edge cases and unclassifiable posts for discussion with the research team. Our final codebook contained 12 post categories (**Table 3**). Because our focus is on coordination work, we follow Viegas and Schneider in discriminating between talk page posts that contain explicit directive cues such as *requests, suggestions or proposals* (hereafter, “requests”) and posts primarily intended to convey information that do not contain explicit requests for responses or follow-up actions (hereafter, “reports”). Eleven of our categories describe different types of request; one category, FYI, was assigned to all reports. Messages coded as FYI contained information relevant to editing Wikipedia, but no explicit request. Seven posts that were self-evidently off-topic or unclassifiable—obvious vandalism, nonsensical remarks or parser errors—were marked as INVALID. These posts were removed from our final dataset and not included in analysis.

Data annotation

We coded 788 posts randomly-selected from our initial dataset according to our coding scheme. Each post was categorized by two independent coders. All coding disagreements were adjudicated through discussion among two or more members of the research team in order to finalize our coded dataset. While the application of message-level categories involves a greater degree of subjective interpretation than would have been necessary for a content analyses of lower-level discursive phenomena (e.g. grammatical structure), we computed inter-coder agreement statistics (Krippendorff’s Alpha) on samples of data at various points during our coding process. This additional validation step proved useful for identifying and refining categories that were difficult to distinguish from one another, helped us train our individual mental classifiers, and functioned as a basic sanity check on the viability of our categories. Our average agreement *before* adjudication across all categories was $\alpha = 0.58$. This is well within the range (0.4 – 0.6) considered ‘moderate’ agreement by Landis & Koch (Landis & Koch, 1977).

We also gathered a set of 2,047 replies to the posts in our sample, which we used to analyze the subsequent activity within the coded threads thread.

Table 3. Coding categories for WikiProject talk page messages, showing messages coded per category.

Code	Definition	Example	# Messages	% Messages
REQ-OPINION	Requests advice, opinion or informal feedback, or attempts to gauge local consensus around an idea	<i>I would like articles like Solar eclipse of July 16, 2186 to have their own subcategory in the eclipse WikiProject. Is this possible? Am I duplicating a structure that already exists?</i>	303	38%
FYI	Post is only a statement or announcement - contains no requests or other directives	<i>The popular pages list has been updated for January. The only surprises are Jane Fonda and Yoko Ono shot into the top 10. Other than that, I didn't notice any major changes.</i>	141	18%
REQ-DISCUSSION	Requests or suggests that others join a discussion on another wiki page	<i>Greetings. A discussion related to this WikiProject has been opened at Wikipedia talk:Articles for deletion#Deletion sorting idea. Your thoughts are most welcome.</i>	130	16%
REQ-OTHER-PEOPLE	Request that other people perform edits to content pages, but does not offer to help out	<i>Hello there. If you look carefully at the info box for The Dungeonmaster, you'll see that it's a little screwed up. I'd like to fix it, but I don't know how. Help would be appreciated.</i>	60	8%
REQ-COORD-ART	Requests or proposes coordinated editing of articles	<i>Is everyone still happy to keep bashing away at episode articles for the time being, or should we maybe see about working towards something major together?</i>	30	4%
REQ-PEER-REVIEW	Requests that someone perform official peer review of encyclopedia content	<i>Please join the discussion on whether List of members of Stortinget 2005–2009 meets the featured list criteria. Articles are typically reviewed for two weeks; editors may declare to "Keep" or "Delist" the article's featured status.</i>	29	4%
REQ-INFO	Requests information that is not related to editing Wikipedia or being an editor	<i>I am trying to find out what happen to KRCR-TV anchor, Tim Mapes. How can I find out.</i>	28	4%
REQ-COORD-NONART	Requests or proposes coordinated editing of content pages that are not articles	<i>I have created this category and categorized it with a few articles. I bring attention it here for all interested and knowledge to add more.</i>	23	3%
INVITATION	Request to join another project, take part in a named initiative, or attend an event	<i>For anyone who is interested I will be giving a talk on my recently-published book "Jewry in Music: Entry to the Profession from the Enlightenment to Richard Wagner" at the Gustave Tuck Lecture Theatre on 22nd February.</i>	21	3%
REQ-MONITOR	Request to keep an eye on a page or user, or perform an administrator action	<i>Keeping an eye on Dream Chaser might be a good idea - a clearly COI/promotional account tried to turn it into a spammy puff piece. The account has now been blocked but they could always try again</i>	14	2%
REQ-OTHER	Post contains a request that does not fit into any of the request categories	<i>Hi everyone, I sadly had to change my status as a project mentor to "busy" because that is the state of my life right now. I would appreciate other members who would like to come forward to help out here.</i>	7	1%
REQ-TASKS	Requests that others suggest tasks for the poster to perform	<i>I am new to Wikipedia and new to this WikiProject, but I would like to help in other ways. Please let me know if there's anything I can do to help improve conservatism-related articles on Wikipedia!</i>	2	0%
Total			788	100%

FINDINGS

The distribution of coded messages in our dataset is presented in **Table 3**. Requests of all types comprise 82% of our data, with 18% of posts falling into our report category, FYI. A breakdown of posts by category between members and non-members is presented in **Figure 10**.

Types of coordination work

Most of the requests in our dataset were not directly related to collaborative editing of Wikipedia articles. Only 4% of messages contained explicit requests to edit specific articles together (REQ-COORD-ART). A similarly small proportion (3%) contained requests to collaboratively edit content on pages that are not articles such as templates, category pages, and task lists. Non-collaborative content editing requests (REQ-OTHER-PEOPLE) were more common than both of the collaborative editing categories combined.

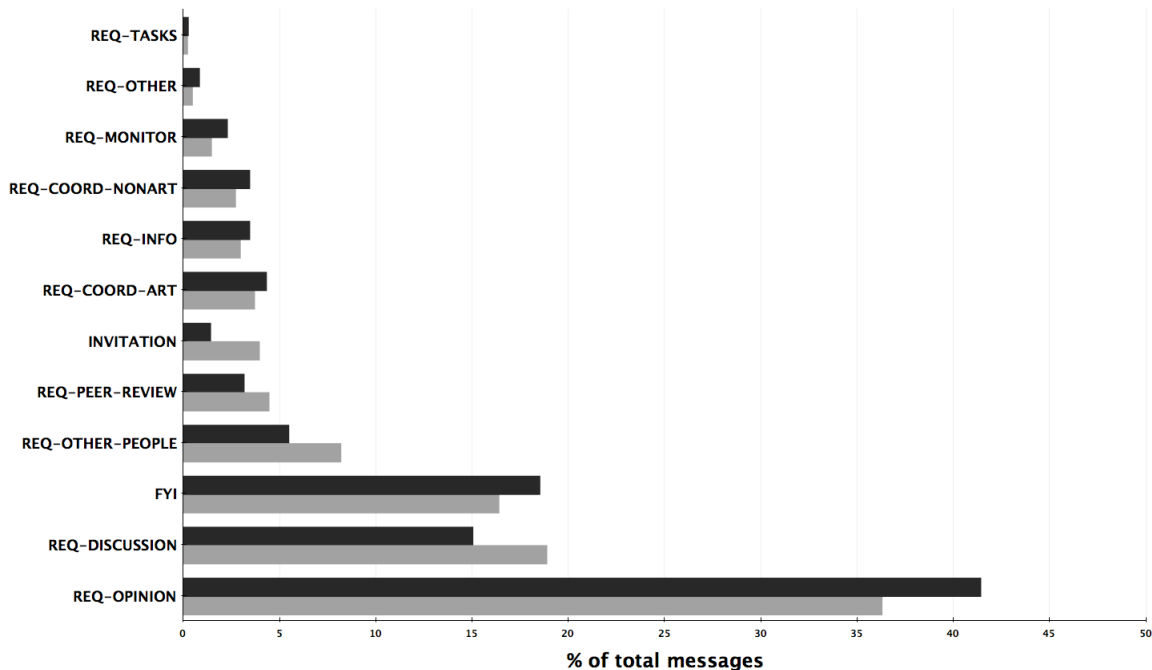


Figure 10. Proportion of message types by project members (black) and non-members (grey)

This result suggests that the way WikiProjects have been framed, as groups of editors who edit articles together, may be somewhat misleading. While project members may collaborate more directly in other forums on Wikipedia, such as user talk pages, our data suggest that the coordination of collaborative article editing organized at the project level is relatively rare. Instead, most requests reflect a more lightweight approach to collaboration. The largest request categories—REQ-OPINION and REQ-DISCUSSION, which do not contain explicit requests to edit content collaboratively—account for 54% of all messages in our dataset. Many REQ-OPINION messages, such as the example below, implicate collaborative activities of a short-term and transactional nature on the article talk page itself.

What are the opinions of those here on whether [The Formula 1 Blog](#) should be regarded as a reliable source for facts related to Formula One. It is a self-proclaimed blog site after all, and [WP:BLOGS](#) is fairly clear about the reliability of such self-published sources. Is there an overriding reason why this one should be exempt? (WikiProject Formula One)

The frequency of messages like this one in our data suggests that many editors work autonomously and only turn to the WikiProject when they get stuck, need advice, or just want to bounce some ideas off someone. REQ-DISCUSSION messages also reflect coordination of work that does not involve content production, as illustrated in the following example.

I have just proposed a merge from [The Schoolmaster's Progress](#) to [Caroline Kirkland](#), and I would be grateful if any of you could come and comment. The merge discussion can be found at [Talk:Caroline Kirkland#Merge proposal](#). (WikiProject Novels)

In this message, the requester is asking for others to add their voice to an ongoing discussion on another talk page. Anecdotally, we observed that many of these requests involved some sort of dispute resolution, with the requestor intent on recruiting allies to bolster their position. In other cases, requests for discussion seemed to serve a similar purpose to FYI messages: the requestor wanted to make the group aware of activities elsewhere that may be relevant to their interests or expertise, and

to which they could contribute if they saw fit. In the example below, an editor posts a notification of a potentially relevant discussion in progress on another talk page. A hyperlink to that talk page is counted as an unstated request to participate under our coding scheme.

A proposal to merge Scientific law into Laws of science is being discussed [here](#). (WikiProject Philosophy)

Simple reports of activity with no associated requests were also common. Our second largest category, FYI, was attested in 18% of all posts. The prevalence of reports on WikiProject talk pages shows that editors frequently use these forums in order to alert other editors of relevant goings on, rather than to elicit a direct response. This finding suggests that these forums function as mechanisms for group awareness in addition to group coordination, similarly to email lists in open source software projects (Gutwin, Penner, & Schneider, 2004). The following quote provides an example of an FYI post.

I made a new userbox, if anyone is interested in it. This one can be used by people who aren't a part of the WikiProject as well, just to show their support. (WikiProject Cooperation)

Although we designed our coding scheme to account for concrete types of work-related requests, rather than abstract types of collaboration, we see parallels between our codes and the three broad, roughly hierarchical types of collaborative activity—*coordination*, *cooperation* and *co-construction*—outlined by Kaptelinin & Nardi in (Kaptelinin & Nardi, 2006). In their typology, *coordination* “refers to cases in which people work towards a common goal, but carry out their activities basically independently.” Many of our FYI messages could fall into this category. *Cooperation* by their definition requires individuals to “relate their goals to the overall objective of a collective activity, be aware of the actions of other participating individuals, and adjust their actions to the actions of other people.” REQ-OPINION messages often fit this definition well. The third, and most direct, type of collaboration described by Kaptelinin & Nardi, *co-construction*, involves not only the collective pursuit of a common object, but the potential for collective redefinition “of the object—and the collective activity—itsself.” Both article editing collaboration requests and the deliberative discussions implicated in REQ-DISCUSSION messages reflect this type of intensive, open-ended coordination—involving multiple participants who weigh alternatives, experiment and debate with one another in order to achieve a resolution the shape of which is initially undetermined.

We believe that a natural extension of our study might be to attempt to categorize these data according to the *degree* of collaboration implicated in WikiProject discussions. Such an analysis could be instructive for understanding the way lean media, as well as differing community norms and work objectives, influence how people coordinate with one another in open collaborations.

Non-member participation

Non-members participated in WikiProjects at a much higher rate than we expected. Of 788 message threads in our sample, 403 (54%) were initiated by non-members and we captured 642 responses by non-members. Overall, non-members posted 37% of all messages in our dataset. Because we did not anticipate the high degree of non-member participation, we did not frame any hypotheses around the relative likelihood that members and non-members would start new threads vs. responding to them. However, a post-hoc Chi square test shows that the difference in thread-initiation vs. thread-response rates is significant ($\chi^2 = 115.5$, $df = 1$, $p < 0.01$). One consequence of the fact that non-members initiated roughly half of all talk page discussions is that declared members frequently participated in discussions started by non-members. This suggests that non-members may exercise a degree of control over what gets discussed on the project talk page, and by extension help set the agenda of the *de facto* group that uses the project space despite their lack of official member status or declared affiliation.

H1: member and non-member posting behavior

WikiProjects ostensibly exist to support collaboration, and messages that contain requests are more likely to reflect a desire to collaborate than those that do not. Since members are more invested in the project, more likely to edit project-related articles and more likely to have collaborated with other members in the past, we posited that members would be more likely to post request messages than non-members. To investigate whether members used the group workspace differently from non-members, we also analyzed whether members made different kinds of requests than non-members.

The hypothesis that members would post different kinds of messages was not supported. A Chi Square test for independence showed no significant difference between the proportion of requests and reports made by members and non-members ($\text{Chi}^2 = 0.4$, $\text{df} = 1$, $p = 0.52$). A second Chi Square test performed across all message categories with an expected count > 5 (excluding REQ-TASKS and REQ-OTHER) also showed no significant difference between the types of requests made by members and non-members ($\text{Chi}^2 = 11.03$, $\text{df} = 8$, $p = 0.19$).

Our findings indicate that project members are no more likely to request work from a WikiProject than report it, and that they do not tend to coordinate different types of work than non-members (**Figure 10**). We do note that non-members post certain types of requests—such as invitations to join other projects, requests for other people to perform edits for them and requests to participate in an external discussions—at a slightly higher rate than members do, behaviors that would be consistent with out-group status. However the lack of overall significance shows that even if these patterns are valid, they only reflect minor behavioral differences between in-group and out-group.

H2: member responses to requests

Previous research also suggests that members will reply more to other members than to non-members because they are more likely to recognize a shared history or a common bond. This hypothesis was supported by our data: 59% of posts by members (across all message types) received at least 1 reply from another project member, but only 45% of posts by non-members received a response from a member. To validate the difference in responding behavior, we performed two unpaired t-tests: one to measure the average number of member responses to member and non-member messages, and one measuring the average number of members who responded in the subsequent thread. In both cases, we excluded messages from the initial poster when they were a member. We found that posts by members received a significantly higher number of responses from other members than non-member posts did ($\text{mean}_{\text{mem}} = 2.09$, $\text{sd}_{\text{mem}} = 4.48$ vs. $\text{mean}_{\text{non}} = 1.53$, $\text{sd}_{\text{non}} = 3.08$; $t = 2.07$, $\text{df} = 788$, $p = 0.04$). We also found that more members responded to posts by other members than to posts by non-members ($\text{mean}_{\text{mem}} = 1.07$, $\text{sd}_{\text{mem}} = 1.21$ versus $\text{mean}_{\text{non}} = 0.86$, $\text{sd}_{\text{non}} = 1.29$; $t = 2.28$, $\text{df} = 788$, $p = 0.02$).

H3: member follow-up to editing requests

Studies of the editing and communication behavior of WikiProject members, as well as theories of group identification, suggest that a request to perform work from a fellow group member will be more likely to result in a follow-up action than a similar request from a non-member. To determine whether this finding held true for requests on WikiProject talk pages, we first identified a sub-set of coded messages that were likely to contain requests to perform editing work beyond the message thread: REQ-DISCUSSION, REQ-COORD-ART, REQ-COORD-NONART, REQ-OTHER-PEOPLE, REQ-PEER-REVIEW, and REQ-OTHER. We wrote a Python script that followed all wikilinks in the text of these requests that pointed to pages in Wikipedia's primary content namespaces (Article, Wikipedia, Template and Category) and their respective talk

namespaces. We then counted how many project members (besides the original requester, if they were a member) edited one of those pages within the next 30 days.

The hypothesis that members are more likely to perform work proposed by other members was not supported. The number of requests that resulted in at least one follow-up edit by a project member was roughly equivalent between the two groups (35%_{non}/36%_{mem}). Pages linked from non-member requests actually received slightly more member attention, on average, than pages linked from member requests (mean_{mem}=2.95, sd_{mem}=9.41 versus mean_{non}=3.64, sd_{non}=12.3), although this difference was not significant ($t=0.5$, $df=305$, $p=0.6$).

This result appears to be at odds with our finding from H2, which showed that members exhibited a bias towards responding to threads started by other members. Why would project members talk more with other members, but perform more work for non-members? We speculate that rather than reflecting a favorable bias towards other members, the higher response rate found in H2 may simply indicate that members were more likely on average to monitor the project talk page and therefore participate in discussions they initiated, offering other members more opportunities to respond.

To explore this new hypothesis, we performed a post-hoc t-test comparing the average number of times members and non-members posted replies in the threads they themselves started. We found that members did post more replies to their own initial posts on average (mean_{mem}=1.9, sd_{mem}=8.49 versus mean_{non}=0.83, sd_{non}=2.01; $t=2.56$, $df=788$, $p=0.01$). This result contextualizes our findings from H2: it suggests that one reason members respond to one another more often is that they are more actively engaged in the conversation. Over time, these member-to-member interactions may contribute to bond-based affinity or a sense of common identity. But our findings from H3 suggests that such affinity does not necessarily extend to all project members or result in collaboration outside the project workspace: it is based primarily on a history of interaction rather than social categorization based on explicit markers of group identity. Importantly, our findings suggest that such bonds may form through the performance of coordination work within the project workspace rather than in the context of collaborative content editing, even though facilitating content production is the ostensible purpose of many WikiProjects.

DISCUSSION

We set out to provide a more nuanced and comprehensive typology of the coordination work WikiProjects perform and the impact of group dynamics such as common identity, common bonds and explicit group membership on the performance of that work. Projects facilitate a wide range of work activities that extends beyond encouraging collaborative content production, but large-scale, highly structured and intensive editing collaborations are relatively infrequent in most WikiProjects. The majority of the collaborative activities implicated in our sample of talk page posts were short-term and lightweight: requests for informal feedback, for participation in a deliberative discussion (in the project workspace and elsewhere on Wikipedia), or for answers to work-related questions. Non-members are active participants in this coordination work, as both requesters and respondents, and they tend to use WikiProjects to coordinate the same kinds of work activities as declared project members. This suggests that project member lists are not a good proxy for *de facto* project membership. The purpose of these lists, and the reasons project members chose to add their names to a project's member list would be a productive topic for future research.

Our finding from H2 that members respond more to posts by other members suggests that they may exhibit some degree of in-group favoritism. However, post-hoc analysis suggests that this affinity may be due to the development of common bonds

through repeated interactions on the talk page, rather than a shared sense of identity as group members. The lack of significant difference between the rate at which members respond to editing requests by members and non-members (H3) suggests that correlations previously observed between project membership and article editing work (Kittur, Pendleton, & Kraut, 2009) are not necessarily reflected in coordination work: members do not exhibit a bias towards performing work requested by other members.

WikiProjects as groups

WikiProjects share some features of traditional groups, such as defined membership boundaries. Previous studies have considered the presence of these features as evidence of group identification and studied its impact on member behaviors such as the kind of content production work they chose to perform. Our findings indicate that the relationship between declared membership and one type of meta-work, coordination work, is equivocal. This suggests that in WikiProjects, coordination work and content production are loosely coupled: editors perform the majority of their work independently of one another. Loosely coupled work, which is common in computer-mediated groups, may not promote the strong group bonds found in traditional groups (Olson & Teasley, 1996). Further evidence that content production and coordination work in WikiProjects are loosely coupled is provided by Ung & Dalle (Ung & Dalle, 2010). They examined the relationship between discussion activity on the project talk page (coordination work) and editing activity on project-related articles (content production) among 644 French WikiProjects, and found that in most cases the most active discussion participants were not the most active editors of project-related articles. They inferred two distinct group structures among the WikiProjects they examined: some projects (a minority) function as closely-knit groups of editors who coordinate frequently, edit collaboratively and exhibit more traditional group dynamics; however in the majority of projects a small group of active discussion participants were instrumental in coordinating the work activities of a larger group of peripheral participants, but engaged in relatively less content production themselves. In these groups, the project pages may function as hubs maintained by a small group of (usually) project members who play the role akin to forum moderators or help desk personnel: answering questions, providing feedback and occasionally responding to work requests that come in. This may be the case in English WikiProjects as well. Larger projects such as Military History, which exhibit many group-like features, may use sophisticated coordination tools that allow them to orchestrate large-scale collaborative activity. Smaller projects, lacking the critical mass to maintain such infrastructure, may adapt their work practices to require less intense collaboration.

WikiProjects and FLOSS projects

While the loose coupling of work and the equivocal role of explicit group identification in WikiProjects sets them apart from many traditional groups, this model has many parallels in other peer production systems. One class of working group that often shares these characteristics is Free/Libre Open Source Software (FLOSS) projects. Like WikiProjects, many FLOSS projects are egalitarian groups in which both declared members and non-members participate and which exhibit porous group boundaries and possess few defined roles. In a study of message threads in open bug tracking systems of three successful FLOSS projects, Crowston (Crowston, Li, Wei, Eseryel, & Howison, 2007) observed group structures similar to those found in many WikiProjects: each project featured a large groups of peripheral users and small group of core developers. Yamauchi (Yamauchi, Yokozawa, Shinohara, & Ishida, 2000) also observed this strong core/periphery dynamic in two other FLOSS projects, with a small group of developers maintaining project resource pages, participating in coordination discussions in support of a larger group of peripheral participants. The project spaces examined both in Crowston's and Yamauchi's studies

also exhibited structural similarities to WikiProject pages: most had official developer lists (some of which were open, like WikiProject member lists), and each project provided centralized communication channels, documentation, and other relevant production resources. Furthermore, declared members (“developers”) and non-members (“users”) often behaved in ways that blurred this official distinction. In general, users tended to post more bug reports and ask questions and developers tended to reply more, but users also frequently responded directly to other users’ questions, and even submitted software patches in response to developers’ requests. Both studies also noted that core developers sometimes shifted their work activities from content production to coordination work, a similar pattern to the one observed by (Ung & Dalle, 2010) and suggested (but not investigated) by Wang (Wang, Chen, Ren, & Riedl, 2012) to explain their finding that long-term WikiProject members tended to edit articles at a lower rate.

While previous studies of WikiProjects have noted their similarity to FLOSS projects, we believe the parallels between these types of group are strong enough to warrant additional investigation. Designing tools to support technologically-mediated groups presents many challenges (Grudin, 1994) and doing so effectively requires a detailed understanding of the group’s structure and work activities. Designers and community managers who wish to support WikiProjects or foster similar self-organized volunteer projects in other open collaboration systems must provide mechanisms for coordination that not only work for large, well-organized, close-knit groups but also for groups that are smaller, more open, and less formal because many active and successful work groups may reflect one or more of those tendencies.

CONCLUSION

Previous research on WikiProjects has examined them primarily as groups, and drawn on group theories developed from empirical studies of offline groups to explain the behavior of project members and the way the projects themselves function. Both quantitative and qualitative findings from several of previous studies clearly indicate that the group lens is an appropriate one for analyzing some projects—particularly larger, more established projects—and some features of many smaller projects. However our findings suggest that the group lens may not be the most productive way of describing the work most WikiProjects perform, the role of declared members and non-members in the performance of that work, the way participants coordinate work, and the degree to which they collaborate.

Highly organized projects like WikiProject Military History may function as close-knit collaborating groups, at least for their most active and senior members. Highly active projects may be able to afford the heavy coordination cost of maintaining assessment departments, organizing weekly collaborations and distributing monthly newsletters. However our findings, drawn from a sample of discussion threads from the 138 most active projects on English Wikipedia in 2012, suggest that many WikiProjects are less formally structured. The typical WikiProject described by our findings contains a few participants (mostly, but not necessarily, declared members) monitoring and maintaining a project communication hub that supports a wide variety of work activities of a large number of peripheral participants (non-members, more often than not). The work requestors bring to the project to coordinate are largely self-assigned and pursued independently, or possibly a small piece of a more intensive collaboration organized through other channels. When members do engage in collaborative work requested through the talk page, their choice is not necessarily guided by considerations of group status or mutual obligation born out of common bonds or a shared group identity.

One productive area of future work involves characterizing the range of variation between WikiProjects. Most studies, including our own, have lumped dozens or hundreds of projects together and examined small numbers of common features and

functions across projects. But such averaging may mask critical variations in the way projects are structured (e.g. more group-like, more FLOSS-like, or an entirely different structure), the work they perform for Wikipedia and in what they provide for their members. Forte's case study (Forte, Larco, & Bruckman, 2009), Ung & Dalle's (Ung & Dalle, 2010) study and stray findings from other investigations hint at a world of variation hiding behind our averages and assumptions.

Comparative case studies of FLOSS teams like those performed by Crowston, Yamauchi, and by researchers of other online groups, and those described in Elinor Ostrom's (Ostrom, 2000) work on self-organized offline groups can be effective for identifying critical differences and common features associated with group outcomes which can be distilled into design principles and patterns to inform both technological development and group management strategies. Case studies of other open collaborations may also facilitate the identification of additional or more complex variables related to project structures and activities, allowing the temporal dynamics of WikiProjects—their formation, development and dissolution—and the role of ecological factors in project success to be modeled computationally.

Chapter summary

In this chapter, I showed how the inclusivity of open teams like WikiProjects and the flexibility of simple coordination mechanisms like project talk pages can contribute to the success of an open collaboration. WikiProject participants are able to focus on the work they find most engaging and select a collaboration style that is appropriate to the task at hand because the software and social structure of WikiProjects do not enforce strict roles and rules of who can participate in project work or how they should participate. I also highlighted structural and functional similarities between WikiProjects and FLOSS projects that suggest that open teams are an effective model for organizing work in open collaboration systems beyond Wikipedia. In the next chapter, I take a comparative case study approach to examining the focus of WikiProject work in alternative WikiProjects, and investigate the coordination mechanisms that these projects use to address a variety of important community concerns beyond editing articles.

Chapter 6

Dynamics & Diversity in WikiProjects

In this chapter, we report a comparative case study of Wikipedia in which we use a mixed-methods approach to understand how participation in specialized workgroups called WikiProjects has changed over the life of the encyclopedia. While previous work has analyzed the work of WikiProjects in supporting the development of articles within particular subject domains, the collaborative role of WikiProjects that do not fit this conventional mold has not been empirically examined. We combine content analysis, interviews and analysis of edit logs to identify and characterize these alternative WikiProjects and the work they do. Our findings suggest that WikiProject participation reflects community concerns and shifts in the community's conception of valued work over the past six years. We discuss implications for other open collaborations that need flexible, adaptable coordination mechanisms to support a range of content creation, curation and community maintenance tasks.

INTRODUCTION

The Internet has fostered many new ways for volunteers to organize around a common cause, but few of these initiatives have had the longevity or impact of Wikipedia. Wikipedia is one of the most visibly successful examples of large-scale, open collaboration. The English language edition has been a hive of activity for the past 10 years, with tens of thousands of regular contributors logging in each month to build and maintain the encyclopedia. The community around Wikipedia has certainly changed over that time. While Wikipedia's readership and article base has grown steadily, its active contributor base which grew exponentially until late 2007, has ebbed in recent years (Suh, Convertino, Chi, & Pirolli, 2009; Halfaker, Geiger, Morgan, & Riedl, 2013). Yet even with that ebb, tens of thousands of dedicated editors still contribute to Wikipedia, working together to coordinate their activities.

One key type of coordination is the WikiProject. A WikiProject is a collaborative effort organized around topic areas of interest or specific work activities. Previous research has shown that WikiProjects can play an important role in coordinating different tasks around editing Wikipedia articles. WikiProjects can also serve important social functions for those involved, who often become both more productive and more engaged in the editing community (Kittur, Pendleton, & Kraut, 2009; Forte, Larco, & Bruckman, 2009). In this respect WikiProjects fill similar roles to work groups, teams and task forces in other settings, from World of Warcraft guilds (Nardi & Harris, 2006) and Open Source software development projects (Ducheneaut, 2005) to offline groups (Arrow, McGrath, & Berdahl, 2000).

Previous studies of WikiProjects present a compelling but incomplete picture. They have tended to focus on projects that coordinate work around particular encyclopedia topics (like military history, medicine, or feminism), on the largest and most active projects, and on project activities during Wikipedia's growth years. However, research on other online collaborations (Heckman, Crowston, Eseryel, Howison, Allen, & Li, 2007; Luther, Fiesler, & Bruckman, 2013; Muller, Ehrlich, Matthews, Perer, Ronen, & Guy, 2012) suggest that teams within the same system vary greatly in the work they do and the ways they organize their work. Furthermore, both the teams themselves and the nature of the work they perform can change over time. The evolution of other coordinating structures on Wikipedia such as community policies (Beschastnikh, Kripean, & McDonald, 2008; Halfaker, Geiger, Morgan, & Riedl, 2013) suggest that WikiProjects likewise have the potential to adapt to environmental shifts. How the universe of WikiProjects has changed in response to the changing environment in Wikipedia has not been examined.

Investigating how WikiProjects have adapted to environmental change can inform our understanding of the specialized work activities necessary to maintain a mature peer production community, reveal patterns of participation that illustrate shifts in the community's priorities and work activities, and provide new insights into how open collaborations adapt and persist during periods of change. This could inform the design of tools to encourage participation in other open collaborations, and help designers and community managers address shifts in member activity and motivation (Rotman, Procita, Hansen, Sims Parr, & Preece, 2012).

In this chapter, we analyze 978 WikiProjects that have achieved sustained activity at some point in Wikipedia's history. Our investigation combines interviews with Wikipedia editors, content analysis of WikiProject pages, and quantitative analysis of edit logs between 2002 and 2012. To characterize the diversity of work activities coordinated through WikiProjects, we draw a distinction between *conventional* WikiProjects that are generally scoped around an encyclopedic topic and focus on coordinating article editing tasks, and *alternative* WikiProjects in which the project scope and/or primary tasks differ significantly from the conventional model. Our analysis unpacks key relationships between the creation of and participation in alternative WikiProjects, environmental changes within Wikipedia, and the editing community's perceptions of valued work. We close with a discussion of the current role of alternative WikiProjects in Wikipedia and present implications for supporting a wide range of specialized workgroups in other open collaborations.

RELATED WORK

Two key challenges for open collaborations are helping potential contributors find productive and engaging ways to get involved and ensuring sustained productivity and project maintenance despite low levels of member commitment and rapid member turnover (Forte & Lampe, 2013). Open collaboration systems address these challenges by keeping barriers to participation low and by supporting the development of persistent social structures. Low barriers to participation help assure that community members who leave are replaced by a steady stream of new contributors, and persistent social structures help organize and integrate contributions and maintain a sense of community and continuity.

One of the ways that Wikipedia keeps its barriers low is by allowing editors to decide for themselves where, when, how and how much they will edit. In order to ensure that these contributors and their contributions are successfully integrated, the Wikipedia community has developed a variety of social structures—such as community rules and awards—and embedded them into the website itself. Over time, these social structures have proliferated and developed complex internal structures and inter-relationships as community members adapt and refine them to better suit community needs or address new community concerns.

WikiProjects are another prime example of a persistent, community created social structure that addresses the challenges of open collaboration. Since the first WikiProjects were created in 2002, thousands of projects have been founded and tens of thousands of Wikipedia editors have participated. WikiProjects come in all sizes: some projects may host dozens or even hundreds of participants within a single month, while others only have a handful of members. Despite an overall decline in active editors on the English Wikipedia since 2007, hundreds of WikiProjects are still active in 2013.

One reason WikiProjects have flourished may be that they resemble Wikipedia as a whole in their openness and flexibility. Each project is a relatively autonomous and informal entity with no official control over the domain of wikiwork it focuses on (Forte, Larco, & Bruckman, 2009). Anyone can create a new WikiProject around any work activity they think is im-

portant, and others can participate in that project in whatever way they choose (Morgan, Gilbert, McDonald, & Zachry, 2013). Within these broad parameters, different WikiProjects are free to develop their own individualized strategies for motivating members and coordinating work.

A substantial portion of the useful work on Wikipedia does not involve writing encyclopedia articles. Kriplean (Kriplean, Beschastnikh, & McDonald, 2008) found that editors give one another specialized awards called Barnstars to recognize a variety of valuable contributions beyond editing articles: from meta-work such as developing specialized tools, to work that sustains the community such as conflict mediation. Barnstars are even awarded to recognize positive personal qualities like leadership or civility reflected in the performance of work. Given the broad leeway that WikiProjects have in the work they focus on and the way they organize, it is reasonable to expect that different projects also exhibit a degree of specialization and address valuable work beyond editing articles.

The work that is most valuable to Wikipedia may have changed over the course of its 12-year history. In particular, the decreasing rate of new article creation and article development over the past six years has potential ramifications for WikiProjects that focus on major topics, which may now direct more of their energy towards curating existing content than creating new content. Furthermore, the Wikipedia community's growing awareness of other emerging concerns seems to be reflected in the names of newer projects such as *WikiProject Editor Retention* and *WikiProject Cooperation*.

In order to understand the ways Wikiprojects may have adapted it is necessary to examine the diversity of projects and project work. Studies of FLOSS projects have shown that both the size of a project and the nature of its work are reflected in the structure and activities of the project (Heckman, Crowston, Eseryel, Howison, Allen, & Li, 2007; Yamauchi, Yokozawa, Shinohara, & Ishida, 2000). Previous research on WikiProjects has demonstrated that many large, topic-focused projects have developed diverse mechanisms to fulfill members' needs and coordinate editing work. We believe that smaller projects and projects that focus on alternative forms of work may exhibit even greater diversity.

Several previous studies have examined the work productivity of WikiProjects—operationalized as the number of edits made by project members to articles within the project's scope. Kittur (Kittur, Pendleton, & Kraut, 2009) examined the impact of project membership on users' editing behavior in a set of 73 topic-focused WikiProjects and found that editors who joined a project became more productive Wikipedians, communicated more with other editors, and engaged in more good citizenship activities like reverting vandalism to articles. A series of studies led by Chen (Chen, Ren, & Riedl, 2010) and Wang (Wang, Chen, Ren, & Riedl, 2012) that investigated the relationship between the group structure and work productivity in more than 300 topic-focused WikiProjects found that projects with a mix of veteran editors and relative newcomers made more edits to articles. However, the work productivity of veteran editors in these projects declined significantly more quickly than that of younger editors. The authors suggest that the decline in veteran productivity may be due to these editors taking on community maintenance and coordination roles within the project that were not counted as work in their model.

Several other studies have shown that such coordination work is important to a project's productivity. In a study of 310 topic-focused WikiProjects on the French Wikipedia, Ung & Dalle (Ung & Dalle, 2010) demonstrated a correlation between coordination activity on the project talk page and bursts of editing activity on project-related articles. Supporting Wang's post-hoc hypothesis, they also found that in the majority of cases there was little intersection between a project's most active content producers and its most active coordinators. A study by Zhu (Zhu, Kraut, & Kittur, 2012) found that Collaborations of the

Week (COTWs), a type of structured editing event organized on within the project workspaces of some WikiProjects, were effective at mobilizing project participants to edit articles together, and that participating in a COTW also boosted editors' subsequent productivity.

Other studies describe the project workspace as a site of both coordination work and group maintenance. Two studies led by Forte (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012; Forte, Larco, & Bruckman, 2009) based on interviews with 15 members of *WikiProject Military History* detail a variety of sophisticated coordination mechanisms that the project had developed such as a project newsletter, specialized task lists and task forces, and topic-specific article formatting guidelines and article assessment criteria. They also found that members appreciated *Military History* for its social functions: participating provided opportunities to find new collaborators, get expert help, protect and advertise their work, and network socially.

While these studies demonstrate that the importance of WikiProjects extends beyond production work, it is not known whether the projects studied reflect the diversity of coordination mechanisms and group dynamics among the hundreds of other projects on Wikipedia. For example, WikiProject participants interviewed in Krieger (Krieger, Stark, & Klemmer, 2009) stated that they seldom referred to project task lists when deciding what to work on, and suggested that COTWs were often unsuccessful at mobilizing collaboration even when they were prominently advertised. An analysis of coordination practices across a sample of 138 WikiProjects by Morgan (Morgan, Gilbert, McDonald, & Zachry, 2013), presented in Chapter 5 of this dissertation, found evidence that project members generally worked independently of one another and primarily used the project talk page to ask for advice or pass on generally relevant information, a lightweight approach to coordination more common in FLOSS projects than in offline groups or other types of virtual team. This study also found only mixed evidence that WikiProject members exhibit behaviors related to group identification, such as in-group favoritism, in their interactions on the project talk page.

Current study

Given the intriguing but inconsistent picture of WikiProject collaboration presented by these previous studies, we believe that these complex coordination structures warrant further investigation. Our analysis complements and contextualizes the existing body of research on WikiProjects by examining WikiProject participation over time across a large and heterogeneous set of active projects. We expand the scope of analysis in three ways in order to account for a greater diversity of projects and practices.

Examine a greater range of production work

Many WikiProjects have a topic focus, and several previous studies have operationalized the production work of WikiProjects and their members by measuring edits by a project's members to articles within that project's scope (Kittur, Pendleton, & Kraut, 2009; Choi, Alexander, Kraut, & Levine, 2010; Ung & Dalle, 2010; Wang, Chen, Ren, & Riedl, 2012; Chen, Ren, & Riedl, 2010; Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012). However, this may not be an effective metric for quantifying the work of WikiProjects organized around editing tasks that can span topical boundaries such as *WikiProject Stub Sorting*, or projects that may primarily coordinate non-editing-related activities such as *WikiProject Dispute Resolution*.

We conceptualize these as *alternative* WikiProjects and examine the work they do within and outside article space.

Investigate a larger, more diverse set of projects

Exceptionally large and active WikiProjects, like those studied by Forte (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012; Forte, Larco, & Bruckman, 2009), Zhu (Zhu, Kraut, & Kittur, 2012), and Kittur (Kittur, Pendleton, & Kraut, 2009) are unlikely to be structurally or functionally similar to hundreds of smaller and less active WikiProjects. Zhu (Zhu, Kraut, & Kittur, 2012) acknowledges that COTWs were only used consistently in 13 of the largest WikiProjects, and suggested that other projects may have stopped running COTWs or decided not to adopt this approach because of its high coordination cost. *WikiProject Military History* is one of the largest, oldest and most organized projects on Wikipedia, with 1170 active members and 1000 monthly edits in 2007. Many smaller WikiProjects may lack the critical mass of highly invested participants necessary to sustain sophisticated collaboration mechanisms like monthly newsletters and COTWs, and their members may not experience the same sense of group identity or engage in the same degree of social interaction or direct collaboration.

We seek to describe a wider variety of coordination practices by collecting data from 978 active projects and interviewing members of multiple alternative WikiProjects.

Analyze project activity over time

Finally, with few exceptions (Gilbert, Morgan, McDonald, & Zachry, 2013; Morgan, Gilbert, McDonald, & Zachry, 2013), previous studies of WikiProjects on the English Wikipedia have examined data from Wikipedia's peak years (2006 – 2008). Wikipedia has changed dramatically since then: for example, there are an increasingly smaller number of articles on major topics that need writing or significant expansion, and an increasing number of quality control tasks being performed by bots. Furthermore, as contribution volume dropped off and the community itself began to shrink after 2007, the social system of Wikipedia began to change in significant ways: the community has grown more mistrustful of the motives of outsiders and it has become more difficult for newcomers to contribute (Halfaker, Geiger, Morgan, & Riedl, 2013). Both of these factors are thought to have contributed to the editor decline.

These findings suggest both a change in the social climate of Wikipedia and a shift away from direct editing work as the primary mode of contribution to more of the meta-work activities—such as border patrol, community support, administrative work and meta-content work—described in Kriplean (Kriplean, Beschastnikh, & McDonald, 2008) barnstar analysis. Some factors that contributed to Wikipedia's rise—its openness to new contributors, its adaptable community rules—have grown more rigid, possibly precipitating or contributing to its decline. Other important coordination mechanisms, such as WikiProjects, have not been examined in this new environment: how have WikiProjects weathered Wikipedia's climate change?

METHOD

We gathered our edit log data from toolserver.org, a public data repository hosted by the Wikimedia Foundation that maintains a nearly live mirror database of the English Wikipedia. We conducted queries against the Toolserver database, parsing results to create our own metadata about WikiProjects and cached results to offload subsequent processing.

While WikiProjects share many common features, each project is individual and is not required to adhere to any specific naming or formatting conventions. In order to identify WikiProjects, we considered all of the pages in the “Wikipedia” namespace that either contained the WikiProject banner (see **Figure 11**) or had “WikiProject” in the page title. We excluded pages that met these criteria, but which were a subpage of some other page. As well, we considered any redirects and includ-



The **WikiProject Council** is a group of Wikipedians gathered to encourage—and assist with—the development of active WikiProjects, and to act as a central point for inter-WikiProject discussion and collaboration.

Figure 11. WikiProject page template (left). Stated goals of the WikiProject Council (right).

ed the page to which a redirect pointed if the page met our inclusion criteria. This resulted in a set of 1868 total WikiProjects as of May 2013.

Identifying Active WikiProjects

Some WikiProjects sustain regular participation from a large number of editors for many months or years. However, many WikiProjects that are created never garner significant participation over a sustained period of time. Measuring project activity in terms of edits by declared project members to articles is unsuitable as a universal measure of WikiProject activity simply because not all WikiProjects focus on editing a restricted set of articles and because project member lists do not accurately reflect project participation (Morgan, Gilbert, McDonald, & Zachry, 2013).

However edits to project pages, whether made by declared members or non-members are likely to reflect an overall level of community investment in a project’s work. We define an active WikiProject as one that averaged 10 edits per month to the project page and any sub-pages including talk pages (i.e., the approximate lower bound for active project from Forte (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012)) for at least one year. We exclude edits by unregistered editors and automated bots. 978 of the WikiProjects we identified (52%) were defined as current or formerly active projects using these criteria.

Identifying Alternative WikiProjects

Many WikiProjects focus on editing articles on particular topics and this norm has been formalized in a template for creating a new WikiProject page provided by the *WikiProject Council* (which is itself a WikiProject). The template¹⁷ states:

Several Wikipedians have formed this collaboration resource and group dedicated to improving Wikipedia's coverage of [the specified topic] and the organization of information and articles on this topic.

This template provides top-level section headings for the project to define its goals (the intended impact of the project), scope (the boundaries of the project’s work) and tasks. WikiProjects that follow this template are often organized around encyclopedic topics, as provided in the outline. We define these projects as *conventional* WikiProjects simply because they follow the common conventions of WikiProject organization, goals, scope and often tasks.

A number of WikiProjects deviate from this conventional description. These projects may still use the template provided by the WikiProject Council, but the scope, goals and tasks defined by the project point clearly to other types of work, with goals and scope that are not focused on encyclopedic content, or else they focus on work that spans multiple topical categories. We define these projects as *alternative* WikiProjects because their activities do not follow the conventional pattern of coordinating a *loosely defined* range of article creation and curation-related activities within a *well defined* topic area.

To identify alternative projects, we examined the current project page of each active project in our sample, identifying each of the 978 active WikiProjects as either conventional or alternative based on that project’s conformity with the WikiProject template. Thus this first pass of coding was binary: is this a conventional project or does it deviate from the norm in its goals,

¹⁷ <http://enwp.org/Template:WikiProject>

scope or tasks? Initial coding and subsequent peer-review resulted in a final set of 131 out of 978 active projects (12%) labeled as alternative.

Classifying Alternative WikiProjects

We define alternative WikiProject only *negatively*—the criterion for identifying a WikiProject as alternative is its deviation from the norm in stated goals, scope or primary tasks—in order to avoid forcing artificial distinctions onto our data and to allow patterns to surface in the analysis.

Kriplean’s barnstar categories, which were developed through a grounded coding approach on a similar dataset, serve as a set of sensitizing concepts (Blumer, 1954) and a minimal structure that provide a useful descriptive framing for the work of alternative WikiProjects. That study analyzed the work activities described and acknowledged in barnstars, some of which were even developed by WikiProjects. The coding scheme naturally includes the type of editing work found in conventional, topically oriented WikiProjects, but also includes dimensions of wikiwork outside the scope of content production such as dispute resolution, question answering, vandalism detection and removal, template creation, participation in formal review processes, administrative activities and other forms of work.

Two independent coders classified the focal type of work claimed by each alternative project using the WikiProject main page, focusing on the goals, scope and tasks. Projects were classified according to the five top-level categories from the barnstar wikiwork coding scheme. The second-tier codes from that coding scheme were used to inform our decisions of which top-level code to use. Both tiers of barnstar codes are presented alongside our results in **Table 4**.

Each coder was to identify and code the most predominant claim of work. In rare cases where it was difficult to identify a predominant form of work, two codes were applied. 16 of 131 alternative projects (12%) were coded with two different codes. Discrepant codes were discussed and resolved through adjudication.

Table 4. Work activities of alternative WikiProjects, classified according to valued work codes from Kriplean et al. 2008.

Editing work	creating content; starting articles; adding images; citing sources	57	39%
Meta-content work	template design; process design; classification	43	29%
Social & community support actions	mentorship; recognizing achievement of others; question-answering	22	15%
Collaborative action and disposition	policy interpretation; integrity; conflict mediation; explanation	10	7%
Administrative	determining article status; privilege granting; formal mediation	7	5%
Border patrol	spam removal; vandal fighting; copyright violations	7	5%
Undifferentiated work	<i>(not addressed in this study)</i>	1	1%
Total		147	100%

Characterizing participation in Alternative WikiProjects

The project pages provide a structural framework for project work, but it is editors who perform that work. In order to deepen our understanding of why editors do the work they do and the way they experience participation, the we performed 18 semi-structured interviews with WikiProject members.

The interviews were conducted as part of a larger research study focused on understanding editors' motivation and involvement in WikiProjects (both conventional and alternative) and on identifying important technical and social factors that had impact on the success of projects. The first nine interviews were conducted with members of *WikiProject Military History* in 2011 in conjunction with an informal self-assessment undertaken by members of that project. Eight interviews were conducted with project members, and a ninth with the assessment facilitator, who was also a member and founder of several WikiProjects. The second set of nine interviews were conducted in parallel with the current study, using a refined and expanded version of the initial protocol. Several initial interview candidates were approached initially because they mentioned WikiProject participation on their userpages or on personal profiles they created on the Wikipedia Teahouse (Morgan, Bouterse, Stierch, & Walls, 2013), other interview candidates were approached in person at a local Wikipedia Edit-a-thon. Additional interviewees were identified through snowball recruitment. Fourteen interviews were conducted face to face, over Internet Relay Chat, or by Google Hangout. Four of the initial 9 interviews were conducted over email.

Members of the research team analyzed written interview transcripts and identified passages related to projects that had been identified as alternative in the first coding pass. Passages were then sorted by project, and by whether they reflected a) the editor's motivation for founding or participating in the project and b) goals of the project or the activities the project focuses on (interviewee must identify as a participant). These motivations and activities informed our categorization of the other alternative projects. Data from the interviews and examination of the project pages were used to develop case studies of projects in each of five top-level barnstar wikiwork categories.

FINDINGS

Our analysis indicates that overall WikiProject participation (**Figure 12**) has declined in step with the overall active editor base of Wikipedia (**Figure 1**). WikiProjects are still a major site of editor activity—during the first three quarters of 2012, an average of 11,229 editors made 88,943 edits to WikiProject pages per quarter. However, that represents a 46% and 38% decrease in activity from the first three quarters of 2007, when both general editing activity and WikiProject participation were at their greatest level.

Between 2007 and 2012, the number of editors participating in conventional WikiProjects decreased by 51%, and the number of edits to these projects decreased by 56%. However participation in alternative WikiProjects shows a different trajectory: the number of participating editors has declined much less dramatically (13%) and the number of edits to alternative WikiProject workspaces has increased steadily to an average of 35,035 edits per quarter in 2012, compared to 22,300 edits per quarter in 2007—an increase of 57%.

The contrast between the relative stability—or even growth—in alternative WikiProjects and the decline of conventional project activity suggests that the increasingly prominent role of alternative projects in the WikiProject ecology may be due to their ability to provide editors with opportunities to perform valuable and engaging work in the mature peer production system of Wikipedia. However while the proportion of WikiProject activity within alternative projects has increased from 16% in 2007 to 39% in 2012, conventional WikiProjects still make up the majority of active projects.

The lists of the Top 20 WikiProjects in **Table 5** demonstrate that the decline in WikiProject participation has not made conventional projects obsolete. Many historically active topic-focused projects like Military History are still among the most active projects in 2012. However, participation patterns have changed: fewer than half of the top projects in 2007 are still in the top 20. Furthermore, there seems to be a greater churn among alternative WikiProjects: 75% (6/8) alternative projects in 2012 were not the among most active projects in 2007, compared with 50% (6/12) of conventional projects. Historically active alternative projects with names that suggest a focus on content creation, such as *WikiProject Missing Encyclopedia Articles*, have been replaced by different alternative projects whose focus is not known. Below, we investigate the work performed by several of these new alternative WikiProjects.

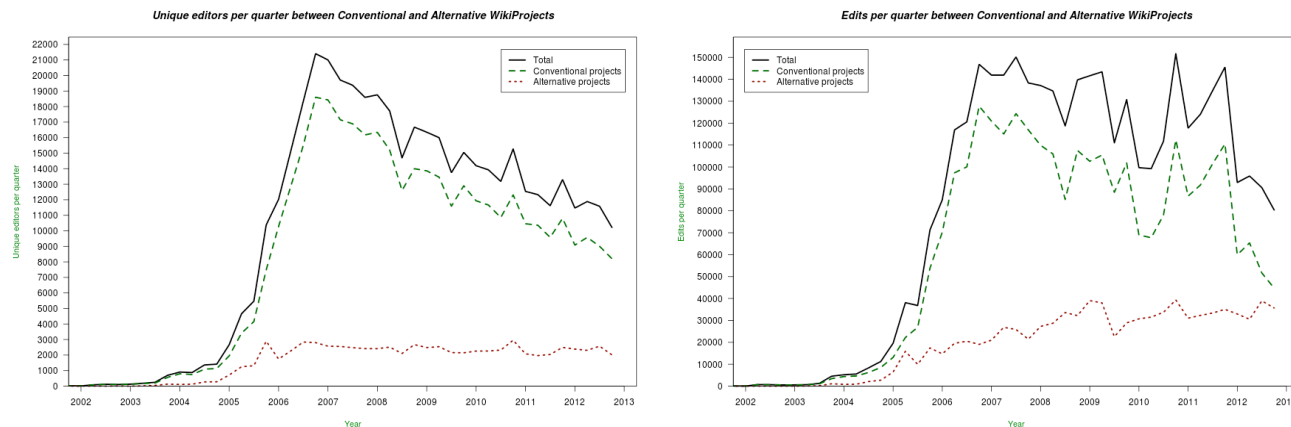


Figure 12. Number of edits to WikiProject pages (left) and registered editors participating in WikiProjects over 10 years. Alternative WikiProject activity (red dotted line) is lower but more stable than in conventional WikiProjects (green dashed line).

Range of work activities in alternative WikiProjects

Just as barnstars acknowledge the variety of work beyond editing articles, alternative WikiProjects are used to coordinate many of these same work activities. **Table 4** illustrates the distribution of assigned wikiwork codes to the alternative WikiProjects in our study. In this section, we draw on findings from our interviews with Wikipedians to show how WikiProjects both reflect the Wikipedia community’s conception of valued work and provide mechanism for performing that work across topical, temporal and even ideological boundaries.

Editing Work

Kriplean found that editing work was the largest single work category for which editors awarded barnstars (Kriplean, Beschastnikh, & McDonald, 2008). We show similar results among alternative WikiProjects. Like conventional WikiProjects, many alternative projects address the fundamental work activity on Wikipedia: making edits to articles. However, while conventional WikiProjects focus on a specific topic area and coordinate a range of activities to improve coverage of that topic, alternative projects like *WikiProject Unreferenced BLP Rescue* (founded 2010), coordinate a single, specific task. The goal of *Unreferenced BLP Rescue* was to systematically eliminate a backlog of biographical articles about living people (BLPs) that have been tagged by other editors as lacking sources. Providing sources for BLPs is particularly important work because of notorious, high profile controversies that uncovered untrue and unsourced statements in articles about public persons such as American journalist John Seigenthaler. In 2009, the Wikimedia Foundation passed a resolution on the importance of “*neutrally-written, accurate and well sourced articles on living people*” (Wikimedia Foundation, 2009). This project’s approach—setting monthly targets and efficiently coordinating work around those specific target articles—was successful in mobilizing participation by a large number of editors to eliminate the existing backlog over the course of 15 months. The project also streamlined Wikipedia’s article deletion process to combat future backlogs:

Table 5. Top 20 WikiProjects by annual edits to project pages in 2007 and 2012. Alternative Project names are highlighted and italicized. An asterisk indicates a project that was not among the top 20 in 2007.

Edit rank	2007	2012
1	WikiProject Military history	<i>WikiProject Deletion sorting</i>
2	<i>WikiProject Deletion sorting</i>	WikiProject Military history
3	WikiProject Video games	WikiProject Football
4	WikiProject Biography	<i>WikiProject Articles for creation*</i>
5	WikiProject Professional wrestling	<i>WikiProject Guild of Copy Editors*</i>
6	WikiProject Football	WikiProject Television Stations*
7	<i>WikiProject Red Link Recovery</i>	WikiProject Video games
8	WikiProject U.S. Roads	WikiProject Medicine*
9	<i>Department of Fun</i>	WikiProject Film
10	<i>WikiProject Spam</i>	WikiProject U.S. Roads
11	WikiProject Anime and manga	<i>WikiProject Wikify*</i>
12	<i>WikiProject Missing encyclopedic articles</i>	WikiProject Chemicals*
13	<i>WikiProject Council</i>	<i>Department of Fun</i>
14	WikiProject Film	<i>WikiProject Resource Exchange*</i>
15	<i>WikiProject Stub sorting</i>	WikiProject Birds*
16	WikiProject Comics	<i>Counter-Vandalism Unit*</i>
17	WikiProject Cricket	WikiProject India*
18	WikiProject Novels	<i>WikiProject Good articles*</i>
19	WikiProject LGBT studies	WikiProject Mathematics
20	WikiProject Mathematics	WikiProject National Register of Historic Places*

The project that handled referencing BLPs they managed to really kind of promote systemic change in the way BLPs are handled... they created a new deletion process, the ‘Sticky prod’¹⁸, with BLPs that don’t have references are automatically deleted after a certain time. This was a huge change in the approach. (Participant 11)

All of the articles within the scope of Unreferenced BLP Rescue are also within the scope of *WikiProject Biography*, one of the largest and oldest conventional WikiProjects (f. 2002). Other subgroups like Unreferenced BLP Rescue are frequently set up as task forces within parent projects (Forte, Larco, & Bruckman, 2009). Although task forces are generally fairly autonomous of their parent project, the interviewee suggested that *Unreferenced BLP Rescue* may have benefitted from being a distinct project because it increased the project’s exposure to the community, allowing it to draw in editors who were not interested in writing biographical articles, but enjoyed hunting for sources.

Another alternative project that coordinates direct article editing is WikiProject Wikify (f. 2006). This project also chose a limited and well-defined set of editing activities, namely wikification—the practice of fixing wikitext markup, adding internal links between related articles, and standardizing the basic page layout. This project differs from conventional projects in that it takes the whole encyclopedia as its scope. One *Wikify* member, who has often served in an unofficial coordinator role

¹⁸ http://enwp.org/WP:Proposed_deletion#Sticky_prod

for the project, was drawn to the project as a new editor because he viewed wikification as a simple way to improve the overall credibility of Wikipedia:

...for me it was like here's this thing it's got these goals and it wasn't a difficult thing to do, especially once you learn how to Wikify an article... I consider that process really important because there was an article that I didn't really change the content to but one of the greatest improvements I've made to an article was just through wikifying it because it makes it look like it's encyclopedic. (Participant 8)

Like *Unreferenced BLP Rescue*, Wikify conducts structured collaboration drives, in which editors informally compete to wikify the most articles within a given month. While some conventional WikiProjects also conduct collaborations of the week (Zhu, Kraut, & Kittur, 2012), these events focus on improving a single article, usually with the intent of gaining official acknowledgement that the article is of Good or Featured status, an official peer-review process. Contributions like wikification that do not involve adding substantial content may not be as well acknowledged in topical WikiProjects. Furthermore, creating and applying consistent wikification standards may be difficult to do within conventional projects, since these projects often create their own local style guides and formatting conventions (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012).

Meta-Content Work

Our second most frequent work category, meta-content work, was the primary focus in 29% of alternative WikiProjects. As the name suggests, meta-content work covers a wide range of activities that do not involve editing articles directly. Some of the projects in this category, such as *WikiProject Infoboxes* (f. 2007) and *WikiProject Disambiguation* (f. 2005), build and maintain Wikipedia's template and category infrastructure. *WikiProject Disambiguation* creates disambiguation pages for commonly confused titles. These pages are located in the article namespace, but rather than presenting original content they function as a reader-facing index to the content of the encyclopedia. Another alternative WikiProject, *Stub Sorting* (f. 2004) builds and maintains a complementary editor-facing index: it builds lists of categories and subcategories of stubs (very short articles) arranged by topic. Other editors and WikiProjects can use these lists to identify articles with their area of interest that need substantial improvement.

Other projects in the meta-content work category focus on editing activities at an even greater remove from articles themselves. *WikiProject Deletion Sorting* (f. 2005) performs similar work to *Stub Sorting*, but instead of categorizing articles it categorizes previous discussions at the Articles for Deletion (AFD) noticeboard according to the topic of the article under consideration to be deleted. According to one long-time member of *Deletion Sorting*, the goal of this work is to improve the decision-making process around article deletion:

Deletion Sorting I kind of went into that with the aim, the idea that this was a problem that needed to be solved... AFD was becoming very high-volume at that point and a lot of discussions were going by with not much input. And sometimes they could have benefitted from input from for example people in the UK, or Chemists, or whatever. So the idea was that we would have a list of chemistry-related deletion discussions and a list of England-related deletion-discussions so that people who were interested, it was a resource for them to use if they wanted. (Participant 9)

The *Help Project* curates pages in the Help namespace, a set of editor-facing pages devoted to tutorials and how-to guides related to technical topics such as how to redirect a page or create a table in wiki-markup. There are thousands of help pages on Wikipedia, but they are often incomplete, out-of-date, hard to find, and dense with technical jargon. The *Help Project* (f.

2006) is dedicated to making these help pages more helpful, and making the best ones easier for editors in need to find. One current member describes how the Help Project provides an alternate way to contribute content to Wikipedia for editors whose interests may lie outside of encyclopedia articles, but who want to write articles that may be read and used by thousands of other editors.

I'd been interested in a lot of this meta stuff and I'd kind of touched on Help pages before and made a few edits and done categorization and stuff... I saw someone had proposed this project to improve the help pages and I thought "God, yes they really do need improving" (Participant 9)

Another alternative project that curates meta-content resources that are primarily editor-facing is the *WikiProject Council* (f. 2006). The Council is in some ways the most meta project of all: a WikiProject founded to help coordinate WikiProjects. Its pages provide a central hub for WikiProject-related guidance and discussions. It maintains a WikiProject Directory with lists of projects sorted by their type and how active they are believed to be, making it easier for editors to find WikiProjects that they may be interested in joining. The council also provides templates, style guides and how-to's for creating a WikiProject. As the Council's founder explains:

My initial idea in creating it was actually to bring together the coordinators of the various active projects so that we could discuss common strategies and share best practices. (Participant 6)

Stub Sorting, Deletion Sorting, the Help Project and the WikiProject Council all create and maintain important resources that support content creation, but indirectly: making it easier for editors to find interesting work to do, aiding in group decision-making, clarifying complex technical problems and helping people create and maintain their own autonomous work groups.

Social and Community Support Actions

The WikiProject Council is a good example of a project that plays multiple roles: in addition to performing the valuable meta-content work, it also provides a forum for social and community support activities. The Council provides a proposal board where editors interested in creating a new WikiProject can draft a project plan and receive feedback. Other editors can indicate their interest in participating by signing up for the proposed project. While the Council has no authority over whether or not a project is created, the structured proposal process provides mentorship and guidance and also regulates the creation of projects that may be unlikely to succeed:

The best thing that could be said about it is that it's made the process of creating new WikiProjects marginally more complex which weeds out some of the most unsuitable candidates. One of the main reasons WikiProjects fail is because they choose an unsuitable scope. The proposal process provides an opportunity for someone to point that out, and ideally redirect the proposer's energy towards something more productive. (Participant 6)

The WikiProject Council was founded near the peak of both editing activity and WikiProject activity (426 new projects were founded in that year alone). Channeling thousands of new editors' efforts towards areas where they would have the greatest positive impact may have been seen as a productive approach, even in a community that is generally leery of bureaucracy.¹⁹

Several more recently-founded social and community support projects address issues related to the editor decline. These projects employ different strategies to recruit new editors and retain existing ones. *Today's Article for Improvement* (TAFI) (f. 2012) organizes Collaboration of the Day, which functions like a Wikipedia-wide Collaboration of the Week (Zhu, Kraut, &

¹⁹ see <http://enwp.org/WP:NOTBUREAU>

Kittur, 2012). Project contributors select an article to collaboratively boost to Featured Article status from a list of proposed collaborations. While improving article quality is one of the primary functions of conventional WikiProjects, TAFI differs from the norm not just in its broader scope, but in its goals:

The main motive was to create a good enough framework for all editors and collaborators to come in... It was as much of a "Rope in the newcomers" thing as "Improve the important articles" (Participant 1)

Inviting newcomers to work collaboratively on improving an article alongside more experienced editors who are there to provide friendly guidance and constructive criticism provides an opportunity for direct mentorship, which has been shown to be successful but rare on Wikipedia (Musicant, Ren, Johnson, & Riedl, 2011). As of mid-2013 TAFI members are working to feature the current Collaboration of the Day on the front page of Wikipedia in an effort to convert Wikipedia readers to editors.

Another recently-founded (2012) alternative WikiProject, *Editor Retention* (f. 2012), has a complementary focus: it provides a forum for discussing strategies for recruiting more new editors and retaining established editors, who often leave Wikipedia because of negative social experiences or a feeling that their work is not acknowledged (Wikimedia Foundation, 2010). In service of this goal, Editor Retention runs an Editor of the Week board, a “place to nominate someone for Editor of the Week recognition: an unsung hero who has been doing great work for months but is not well-known.”

Many members of the Wikipedia community have suspected for years that their shrinking community is partially due to new editors having difficulty learning the ropes and having few opportunities to interact with the Wikipedia community in positive ways, a theory supported by recent research (Halfaker, Geiger, Morgan, & Riedl, 2013; Morgan, Bouterse, Walls, & Stierch, 2013). The creation of projects like Today’s Article for Improvement and Editor Retention demonstrates how the WikiProject model for group collaboration can be adapted to address these emerging community concerns.

Collaborative Actions and Disposition

Following Kriplean (Kriplean, Beschastnikh, & McDonald, 2008), we distinguish the Collaborative Actions and Disposition category from Social and Community Support Actions by direct implication of collaborative activities such as dispute resolution or helping individuals adhere to formally-stated Wikipedia policies such as Neutral Point of View, Notability and Civility. Several alternative WikiProjects have been founded to support conflict resolution within topic areas that reflect geopolitical controversies. *WikiProject Israel Palestine Collaboration* (f. 2008) was founded to:

...create a more hospitable editing environment for Category:Israeli–Palestinian_conflict related topics, including through a) actively seeking the cooperation of people who are uninvolved or hold strong and differing points of views[sic] and b) preventing and resolving disputes about the application of Wikipedia policies to these articles. (“WikiProject Israel Palestine Collaboration,” n.d.)

Similar projects include *Ireland Collaboration* (f. 2008) and *Sri Lanka Reconciliation* (f. 2007). These projects provide a space for coordination, discussion and conflict resolution among individual editors interested in these topics, as well as other WikiProjects: the member list of Israel Palestine Collaboration includes members of the conventional WikiProjects *Israel* and *Palestine*, as well as unaffiliated editors. By providing a neutral space for cross-project dialogue, as well as oversight and informal mediation, these alternative projects play an important meta-role within topical domains where civility, neutral point of view, and verifiability are crucial but may be difficult to adhere to, even by other WikiProjects.

Another project geared towards both supporting cooperation and assuring adherence to Wikipedia policy is *WikiProject Cooperation* (f. 2012), which aims to help editors who have a potential conflict of interest related to an article that they would like to edit, such as a financial stake in the organization the article describes.

[WikiProject Cooperation] is trying to advance a model of cooperation with paid editors... They have a paid editor help board on which paid editors can come and have their drafts reviewed. Interestingly there's a counter-organization called WikiProject Integrity which is very skeptical of this model... (Participant 10)

Paid editing has been a known issue on Wikipedia since 2007, when Virgil Griffith's WikiScanner tool ("WikiScanner," 2007) first revealed that thousands of anonymous edits to Wikipedia articles were being made from corporate IP addresses. Paid editing has increased on Wikipedia as the website's popularity search ranking has risen, but Wikipedia lacks both official policies on paid editing and mechanisms for enforcing compliance. Like WikiProject Israel Palestine Collaboration, WikiProject Cooperation exists to help paid editors who are acting in good faith and would like to adhere to the rules of the site. Submitting their drafts for review may provide those editors with some assurance of protection for their work, a function that some conventional WikiProjects perform for their members (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012).

Border Patrol

Not all projects or editors on Wikipedia act with a deliberately cooperative spirit: a more common approach to unwanted content and users on Wikipedia is to revert first, and ask questions later. *WikiProject Spam* (f. 2005), one of the most active alternative WikiProjects, functions primarily as a noticeboard for reporting instances where obviously biased or trivial content has been added to articles. Another more recent border patrol project is *WikiProject Integrity* which exists "to discuss, raise awareness of, and hopefully address issues regarding paid editing on Wikipedia" ("WikiProject Integrity," 2012). Integrity was originally founded in early 2012 as WikiProject Paid Advocacy Watch, nearly simultaneously with WikiProject Cooperation, and re-named in 2013 as part of what one interview participant referred to as a "re-branding" effort. Integrity addresses the same issue as WikiProject Cooperation but takes the approach of WikiProject Spam: it maintains a noticeboard for reporting possible instances of paid editing. The project is also attempting to promote an official Wikipedia guideline for addressing issues of paid editing in articles.

While Paid Advocacy Watch and Cooperation take different approaches, they share members and have collaboratively created a detailed how-to guide—the *Plain and Simple Conflict of Interest Guide*²⁰—which is intended to help new editors understand the concept of Conflict of Interest (COI) and contribute more productively when they have a potential COI. Because WikiProjects are open, autonomous and have no formal authority, these two projects are able to work together even though some members have incompatible ideological stances. Like the talk page of WikiProject Israel Palestine Collaboration, the Plain and Simple Conflict of Interest Guide provides a common space for editors in both projects to work together to address a pressing community concern.

Complex tasks like conflict mediation and cooperative outreach requires active coordination among many different stakeholders. The cases of Integrity and Cooperation, and of Israel Palestine Collaboration demonstrate that sustained cooperation is possible even between groups with different ideologies. If Wikipedia's editor base continues to shrink, it may be more difficult to sustain these cooperative alternative projects, even as the need for them grows. Border patrol projects may be more

²⁰ https://en.wikipedia.org/wiki/Wikipedia:Plain_and_simple_conflict_of_interest_guide

successful in the long run because they require less coordinated effort to maintain, which may exacerbate Wikipedia's current tendency to revert first and ask questions later.

Administrative Actions

Work categorized in the administrative action category pertains to actions taken by administrators and to acknowledge participation in formal processes like Articles for Deletion (AfD) or Featured Article Review (Kriplean, Beschastnikh, & McDonald, 2008). Only seven alternative WikiProjects deal directly with administratorship or other formal processes. In part this may be because WikiProjects themselves have no formal authority to dictate policy or enforce decisions (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012). Other groups on Wikipedia like Arbitration Committee (ArbCom) or the Featured Article Committee (FAC) are vested with the formal authority and technical permissions necessary to make binding decisions—respectively, to block or ban a user account, and to decide what articles are featured on the front page of Wikipedia. These groups are not referred to as WikiProjects and do not use the name or the template on their project pages. They also differ from the WikiProjects we examined in other important ways. For example, both ArbCom and FAC lack open and egalitarian membership—members are appointed or elected to official roles. Other group workspaces on Wikipedia, such as the Good Articles nomination page, are designed to support case-by-case decisions about the quality designation of articles, and do not list members at all.

However, we find that in several cases alternative WikiProjects exist to support these formal processes. The *Featured Article Team* (FAT) (f. 2007) provides newer editors with informal peer feedback in preparation for nominating an article for formal peer review. Another alternative project, *WikiProject Arbitration Enforcement* (f. 2010), supports the other end of an official process: coordinating the enforcement of binding arbitration decisions issued by ArbCom by “listing the administrators who make themselves available for taking enforcement action in these areas, providing spaces to track recurring and longtime problems [and] making AE precedents and best practices more accessible” (“WikiProject Arbitration Enforcement,” 2010). This may reflect a further attempt at decentralizing Wikipedia's governance by reducing the burden of monitoring compliance on ArbCom in an increasingly conflict-driven community.

Projects that deal with administrative actions provide support for the (relatively few) official, centralized governance mechanisms of Wikipedia and also provide support for the editors who interact with those processes. They also provide a way for more editors to participate more directly in governance and formal review processes, and even lobby for regime change. As Wikipedia's official policies have grown more calcified and difficult to change (Halfaker, Geiger, Morgan, & Riedl, 2013), participating in these informal projects may be an effective way for everyday editors to have an impact on community rules, norms and processes.

DISCUSSION

WikiProjects divide so much into the different kind of work they do. Projects that are gathered around specific article subjects might lose steam once coverage of that subject becomes more complete. (Participant 11)

As the work of improving Wikipedia shifts increasingly aware from content creation and towards content curation, alternative WikiProjects may become even more important for maintaining the quality of the encyclopedia. Many valuable editing tasks, such as wikifying articles, span topic boundaries. Other tasks that focus effort within existing topical boundaries, such as eliminating backlogs, may benefit from the specialized coordination mechanisms, autonomy and visibility that comes with

setting up a stand-alone project. Meta-content work coordinated through alternative WikiProjects also helps the community maintain its organizational memory of past decisions (Deletion Sorting) and help contributors can find articles that match their interests and need substantial improvement (Stub Sorting).

As Wikipedia's social climate has evolved, new barriers to participation have arisen. Many alternative WikiProjects such as TAFI and Editor Retention, focus on newly-recognized community concerns such as the decline in retention of new editors and the shortening productive lifespan of established editors. The relevance of these newer alternative projects to the community's current needs may be part of the reason why the level of activity within the set of alternative WikiProjects has increased over the past six years while activity within conventional WikiProjects and within Wikipedia as a whole have decreased.

In addition to highlighting the importance of alternative WikiProjects to the health of the modern Wikipedia ecosystem, our findings also illuminate other important ways in which WikiProjects differ from one another. While projects like Military History maintain a high degree of engagement by fostering a collaborative atmosphere, one interviewee's description of the task of Deletion Sorting suggests that it is a relatively solo effort:

So basically we had a script which would pop up when you're on [the Articles for Deletion noticeboard] and for each debate you could click and then select which category it should be in. And it would then put it in that category it would put it on that list so that people would know, and then leave a small notice saying "This discussion has been listed in the list of chemistry related deletion discussions." (Participant 9)

Several other interviewees also described their work within WikiProjects as largely autonomous. One interviewee struggled to name a single other regular participant in their primary WikiProject! Taken together with findings from previous research on coordination in WikiProject talk pages (Morgan, Gilbert, McDonald, & Zachry, 2013), these descriptions of project life suggest that many Wikipedians do not experience WikiProjects as groups, but rather as interest-based coordination spaces that can support both independent and collaborative participation. These findings have ramification for the theoretical and methodological approaches researchers use to study WikiProjects and also for the tools that designers and community managers develop to support the work of WikiProjects and other open teams.

WikiProjects exist on several other Wikimedia wikis that are not encyclopedias²¹, and groups called WikiProjects exist within other wiki-based online communities, such as Open Street Map²² and Wikia²³. The degree to which these groups resemble Wikipedia WikiProjects in their diversity of roles, goals and practices has not been studied but could illuminate whether WikiProjects' pivotal role in coordinating work around critical tasks on English Wikipedia represents a special case or a general trend.

One domain of open collaboration that may benefit from fostering WikiProject-like groups is citizen science. Rotman (Rotman, Procita, Hansen, Sims Parr, & Preece, 2012; Rotman, Preece, Hammock, Procita, Hansen, Parr, & Jacobs, 2012) has suggested that better support for federated, task-based subgroups in the Encyclopedia of Life project could help encourage collaboration, foster a stronger sense of community, and aid in the development of a common taxonomical classification standard. In designing affordances to support such subgroups in the system, it may be helpful to follow a WikiProject mod-

²¹ e.g. http://www.mediawiki.org/wiki/Project:WikiProject_Extensions

²² http://wiki.openstreetmap.org/wiki/WikiProject_Haiti

²³ http://entourage.wikia.com/wiki/Entourage_Wiki:WikiProject

el—allowing contributors to create new groups and group workspaces freely and dynamically, in response to their own shifting interests and the overall project’s evolution.

Other citizen science projects such as Zooniverse already contain a federated system of different collaborations that participants can move between (Lehan & Gay, 2011). However, research funding is required to start a new Zooniverse subproject. Despite this constraint, in 2011 a group of volunteer participants in the climatology Zooniverse project *OldWeather* undertook their own independent research project, tracking the spread of the 1919 Spanish Flu pandemic through sick lists in archived ship log data (The Zooniverse, 2011). Explicitly supporting self-organized citizen research initiatives like this one could encourage more people to contribute to Zooniverse and also yield valuable scientific discoveries.

Implications for Design

Directing people towards engaging and important activities and allowing them to coordinate those activities in their own way is key to sustaining an open collaboration. Based on our examination of the range of work activities that all WikiProjects perform—not just conventional ones—and the different ways editors work within those projects, we offer the following set of design suggestions for supporting WikiProjects and open teams in related systems.

General requirements

While many excellent information visualization (Viégas, Wattenberg, & Dave, 2004), task recommendation, and vandal-fighting tools have been developed on Wikipedia, most of these tools are intended for use by individuals rather than groups, and are designed to support article production activities. Tools designed to support WikiProjects and similar open groups should allow these groups to maintain the openness and flexibility that enables them to support a wide variety of tasks and diverse ways of working while minimizing the effort required to maintain project resources. Building effective tools in this design space require a nuanced understanding of which features can be baked in to the platform or made available as opt-in modules and which ones need to remain open to creative reconfiguration and remixing by user-designers. Below we provide some specific suggestions.

Socially intelligent task routing

Many WikiProject participants report that they do not use WikiProject task lists, preferring to work more independently (Krieger, Stark, & Klemmer, 2009). One successful tool that supports this task management style, SuggestBot (Cosley, Frankowski, Terveen, & Riedl, 2006), uses Wikipedia’s template and category structure to generate a list of task recommendations for a user based on articles they previously edited. Intelligent task routing tools like SuggestBot could be designed to recommend tasks beyond editing, such as sorting deletion discussions or improving help pages. Socially intelligent routing tools could also recommend WikiProjects that an editor may want to join based on their edit history or stated interests. A research prototype system called WikiTasks (Krieger, Stark, & Klemmer, 2009) allowed WikiProject members to provide contextual information about the tasks they request and lets other users publically claim requested tasks. These detailed annotations were useful for helping editors understand the scope and nature of a task, and also have the potential to serve as *practice proxies* (Mugar, Østerlund, Hassman, Crowston, & Jackson, 2013) that teach new editors norms of participation.

Social translucence visualizations

Wiki pages do not surface activity well. It is difficult to tell who is active on a project without digging into the edit histories, or to distinguish a living project from a moribund one. Social translucence tools such as the Re:Flex toolbar (McDonald,

Gokhman, & Zachry, 2012) show who the most active editors are on a particular wiki page and also let users to see what other pages these editors are editing and who they communicate with. Re:Flex and similar tools that visualize dynamic relationships and activity networks could help WikiProject members find both potential collaborators and relevant tasks.

Leaderboards

Metadata about project participants' recent editing activities could also be leveraged to visualize activity at the project level. Configurable leaderboards like CommunityCompare (Xu, Chen, Matthews, Muller, & Badenes, 2013) could be enabled on WikiProjects to visualize the project's recent and historical activity across multiple dimensions of work. For example, featuring the most active contributors to the project workspace provides public acknowledgment for the often invisible work of project coordinators, which may encourage them to continue participating longer. Leaderboards can also be used to track progress towards group goals—our interviewees described handmade leaderboards in use among several projects. Automating this feature reduces the administrative cost of conducting focused editing drives and COTWs, potentially encouraging more direct collaboration among project members and deepening their commitment to the project and the community.

CONCLUSION

To understand and support group work in open collaborations, we need empirical investigations into actual work practices across a diverse set of groups. In this study we have made an attempt to more fully characterize the range of work performed by one type of group, WikiProjects, within one of the largest and longest-lived open collaborations, English Wikipedia. We have made four primary contributions to research:

- Characterized alternative WikiProjects, an important sub-set of WikiProjects that do not focus on general improvements to articles within a particular encyclopedia topic area.
- Presented empirical data on the range of work activities performed by these projects.
- Described how these projects facilitate collaboration around emergent problems and current community concerns.
- Demonstrated that participation in alternative WikiProjects has remained relatively stable, and even increased by some measures, as participation within conventional WikiProjects and Wikipedia as a whole has declined since 2007.

Participating in Wikipedia involves editing beyond articles. Wikiwork increasingly involves filling in around the edges, increasing the overall quality of the encyclopedia (not just a particular topic), and actively recruiting and retaining productive contributors. If Wikipedia remains open and active, these alternative ways of contributing will only grow more important. The fact that Wikipedians have successfully adapted WikiProjects, a mechanism originally designed for coordinated content creation, to effectively manage these emerging work activities demonstrates both the resilience of open collaboration systems and suggests a potential strategy for replicating the success of Wikipedia in new domains of commons-based peer production.

Chapter summary

In this chapter, I built on the findings from Chapter 5, in which I showed that the inclusivity and flexibility of WikiProjects afforded a wide variety of work coordination practices, by demonstrating that these same features allow projects to pursue a wide variety of work activities. The prevalence of WikiProjects that organize work beyond editing articles suggests that the open team model can be extended to support collaborative production of artifacts beyond the encyclopedia genre, potentially even in domains of open collaboration where it has not yet been applied or extensively studied. In the next chapter, I describe

the Teahouse, a new project on Wikipedia that implements several of the design proposals described in the Implications for Design section above. The Teahouse was created in the style of an alternative WikiProject and focuses on addressing an issue that is of growing importance on Wikipedia, and which may also be critical to the success of other open collaborations—recruiting and retaining a larger and more diverse set of contributors.

Chapter 7

Designing of Teahouse

In the first section of this chapter, I describe the implications of research findings from previous chapters for the new editor experience of Wikipedia. I then present related research on the barriers that new Wikipedia editors, and especially women, face when they join Wikipedia. Next, I describe the design and development of Teahouse, a WikiProject-style space devoted to the support of new editors. I provide a detailed description of my role in the Teahouse research and design process and describe the major features of Teahouse that were designed to socialize new editors and sustain the Teahouse as a volunteer-driven project.

In Chapter 4, I showed that one of the ways the Wikipedia community has changed over its history has been to formalize community norms into a set of regulating documents: policies, guidelines and essays. Policies and guidelines were actively developed until 2006, after which relatively few new policies and guidelines were created, possibly do to the implementation of a formal review process. Around the same time, it began to be increasingly difficult for editors to contribute to existing policies and guidelines, and edits to these documents were reverted with increasing frequency, especially edits by less senior Wikipedians. In response, these editors began contributing more to essays, a less formal and authoritative genre of regulating document, and these contributions were significantly less likely to be reverted. As a result, essays proliferated while policies and guidelines stagnated and calcified. I also showed that essays tend to address norms of behavior rather than legal issues or content standards, and suggested that editors may cite essays in order to nudge other editors into moderating their behavior in situations where citing a policy may be seen as heavy-handed or threatening. I further suggested that editors write essays in order to contextualize and fill in the gaps of calcified policies in an effort to make Wikipedia's community rules better address current community concerns. Overall I argued that essays provide less senior editors with an avenue for making meaningful contributions to the governance and well being of the editing community despite the calcification of the policy environment.

In Chapter 5, I showed that editors primarily turn to WikiProjects for informal advice, technical questions, and to share information rather than to seek collaborators or participate in group activities, and that this tendency has become more pronounced over time. I also showed that project participants do not discriminate between declared members and non-members when they choose to perform work requested on the project talk page. In Chapter 7, I showed that while overall participation in WikiProjects has declined since Wikipedia's activity peak, participation in alternative projects has remained relatively stable and even increased by some measures. Like essays, these alternative projects provide open, flexible mechanisms that allow editors to participate in important work activities that go beyond editing articles. Furthermore, many recently founded alternative WikiProjects address specific, current community concerns such as the decline in new editor retention.

This body of research bears on the theme of the next two chapters, which focus on designing mechanisms that provide new users with opportunities for positive socialization and peer support, in several ways. First, despite the increasing formalization of Wikipedia's collaboration model—both in the inflexibility of its community norms and process, and the increasing investment of authority in technical structures such as bots (Halfaker, Geiger, Morgan, & Riedl, 2013)—there are still open, flexible mechanisms that can provide newer editors with the opportunities to contribute in valuable ways. Many of the opportunities for participation afforded by these mechanisms involve ways of contributing that may be less heavily scrutinized and

carry less risk of reversion because they do not involve making substantial changes to article content or take place outside of the heavily monitored article namespace. Second, the way essays and WikiProjects are used suggests that these still-flexible mechanisms have the potential to effect global change on Wikipedia. Alternative WikiProjects like Today's Article for Improvement have been set up specifically to help new users learn the ropes of editing in a safe environment, and non-binding unofficial norms such as Bold Revert, Discuss Cycle (Halfaker, Geiger, Morgan, & Riedl, 2013) and the Plain and Simple Conflict of Interest Guide essay discussed in Chapter 6 have the potential to influence editors' behavior in reliable ways within particular contexts.

This chapter describes Teahouse, a new user peer support space designed in the model of an alternative WikiProject and inspired by an essay. For new editors, Teahouse provides opportunities to ask questions, meet people and learn the ropes of Wikipedia in a positive, engaging and constructive way. For veteran editors, it provides a new framework for performing important work and opportunities to be acknowledged for that work. For all participants, it provides an environment designed to reflect and encourage the development of a specific set of norms of interaction that are non-binding but powerful. For Wikipedia and other open collaborations, Teahouse offers a template for a new approach to new user support that is flexible enough to be adopted and adapted to other circumstances where new and veteran contributors editors interact.

In this chapter, I describe the design of Teahouse. In Chapter 8, I will present data on how Teahouse was received by Wikipedia and experienced by its participants, evaluate the quality of support new editors received, present preliminary analysis of the impact of Teahouse on new editor retention, and discuss the implications of the Teahouse project for other open collaborations.

WIKIPEDIA TODAY: A NEW EDITOR'S PERSPECTIVE

SubSubPop23 has just joined Wikipedia and is excited about editing. The first article she creates is about her favorite San Francisco street artist, a local legend who recently died. But when she logs in a few days after starting her article to continue working, she sees that it has been tagged for immediate removal from Wikipedia because of "a lack of notability" and "few reliable sources". She feels confused, unfairly singled out, and frustrated. But above all, she is concerned that she is about to lose all of her work. She clicks through the links on the deletion message, and tries to make sense of the process for contesting this decision. She finds the process to be overly complicated, and the whole experience feels impersonal. What does she need to do to save her article? What counts as notable on Wikipedia? How does she add a reliable source? Who does she need to convince to keep her article online while she works on it? Will anyone even respond to her inquiries before they delete her article?

The story above illustrates some of the challenges of being a new user in an established online community like Wikipedia. All open collaboration systems require a pool of volunteer contributors to function. Since all participants in such systems will eventually stop contributing, a steady stream of newcomers must join the community in order to maintain productivity. In systems like Wikipedia where 0.01% of editors contribute 44% of the encyclopedia's value (Priedhorsky, Chen, Lam, Panciera, Terveen, & Riedl, 2007), it is critical that some of these participants move from the periphery of the community to the center and become Wikipedians—power editors who not only write and edit articles but also perform critical quality assurance and community organizing roles such as coordinating group work, fighting vandalism and recruiting and socializing the next generation of editors (Bryant, Forte, & Bruckman 2005).

The likelihood that new editors contributions will be rejected by Wikipedians has increased as the encyclopedia has aged (Halfaker, Geiger, Morgan, & Riedl, 2013), a phenomenon that can have a powerful demotivating effect on newcomers: it

leads them to edit less and stop contributing sooner (Halfaker, Kittur, & Riedl, 2011). Previous research suggests that while new editors in 2012 are no less capable of high quality contributions than previous generations of newcomers, the community appears to increasingly dismiss the efforts of good faith newcomers who would benefit the encyclopedia by continuing to contribute.

Beyond the overall increase in rejection of new editors, another probable factor contributing to editor decline is the encyclopedia's inability to recruit and retain editors from outside its traditional demographics. According to a 2011 survey (Wikimedia Foundation, 2011) of 5,287 current and former contributors only 8.5% of active editors are women. Another recent study (Lam, Uduwage, Dong, Sen, Musicant, Terveen, & Riedl, 2011) of new editors found the proportion of female newcomers to be 16%, nearly double the site-wide average. This suggests that the attrition rate for female editors is even higher than for newcomers in general. The same study also found that female newcomers tended to participate at a lower rate than their male counterparts overall, see their edits reverted at a higher rate, and leave sooner. Subsequent analysis of data gathered from another survey (Glott, Schmidt, & Ghosh, 2010) of over 50,000 Wikipedia readers and editors contextualizes these findings: female editors rated their satisfaction with editing lower than men on average, citing negative social factors (such as the degree of conflict and hostility they experienced) at a higher rate than men (Collier & Bear, 2012).

The persistent gender gap represents a significant missed opportunity for increasing the pool of dedicated Wikipedians and reversing the editor decline. Furthermore, both the gender gap and the overall decline in new editor retention point to potential systemic flaws in the new user experience of Wikipedia, particularly the way the community socializes new contributors. Increasing the overall proportion of new editors who become Wikipedians, and boosting female participation in particular, requires new solutions to old challenges.

TEAHOUSE: A PLACE FOR NEW EDITORS

In this section, I discuss common challenges that new editors face—such as isolation, intimidation and limited opportunities for socialization—in the context of the user-centered design process of Teahouse, a volunteer-driven project that attempts to address these challenges through early outreach and social support.

System overview

The Teahouse (**Figure 13**) is an attempt to improve the new editor experience of Wikipedia in two ways: by meeting new editors' immediate needs and by shifting social norms for socializing new contributors. As such, it reflects a gradualist strategy for changing the culture and demographics of the editing community and reversing the editor decline. The Teahouse is designed to boost overall new editor retention and narrow the gender gap in a scalable, sustainable way: it provides early, positive socialization opportunities for more new editors and creates a safe zone for interactive community support. New editors who might otherwise stop editing are provided with proactive help to learn the ropes of Wikipedia.

At the Teahouse, new editors (called guests) have the opportunity to introduce themselves and have their questions answered by patient, friendly Wikipedians, called hosts. The Teahouse space is built around two primary activities. On the Guests page, new editors can introduce themselves by creating a personal profile (**Figure 14**). They can also browse profiles created by other new editors and, on the Hosts page (**Figure 15**), profiles created by Teahouse hosts. On the Teahouse Q&A board (**Figure 16**), guest can ask, read, and answer questions. The space as a whole presents a welcoming atmosphere and simple, user-friendly tools to reduce new users' feelings of intimidation and isolation. The overall look and layout of the Teahouse

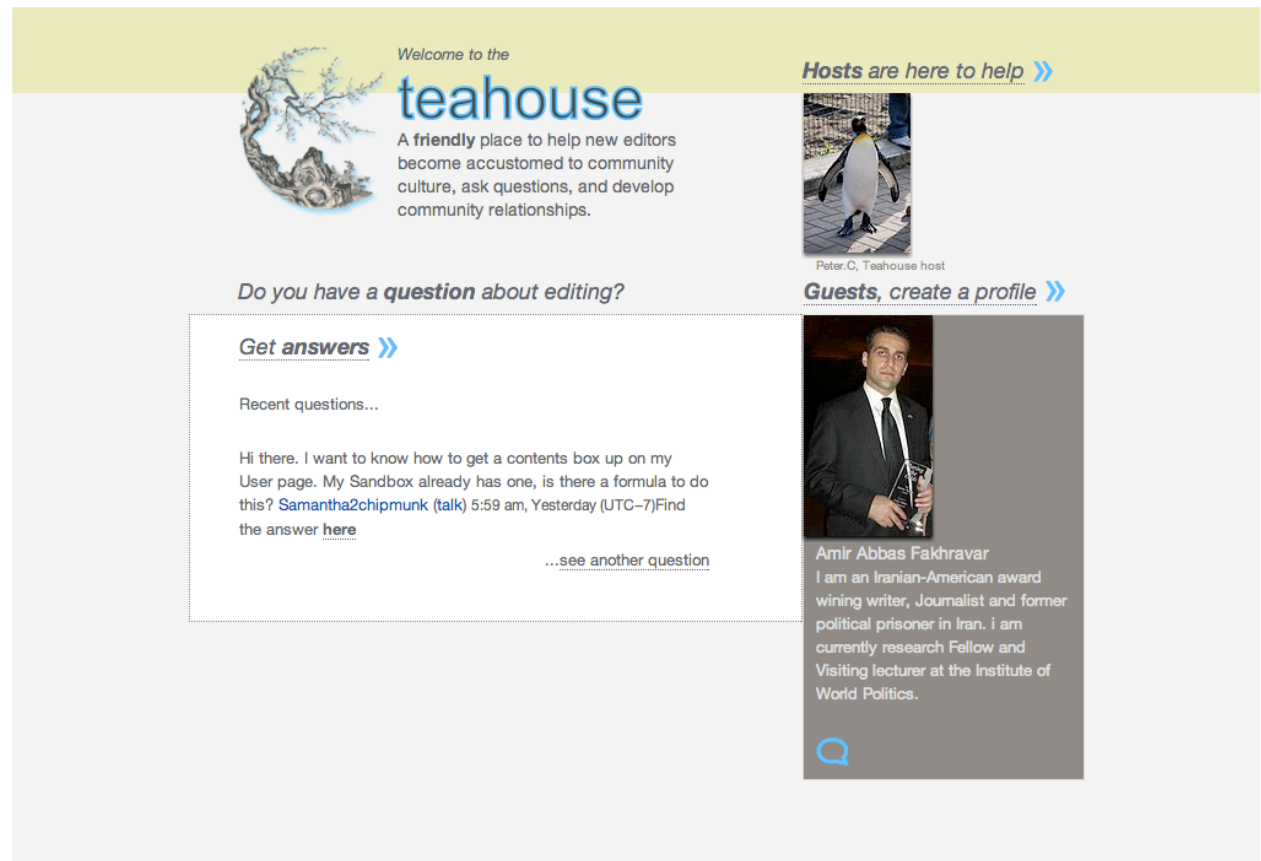



Figure 13. Landing page of the Wikipedia Teahouse, showing rotating galleries of recent questions, featured hosts, and featured guests.

and the technical mechanisms for creating a profile or asking a question are designed to reduce barriers to entry, encouraging new editors to jump in and participate. Participation by active volunteer base encourages sustained community involvement in the socialization process.

Since the Teahouse is an on-wiki space intended to provide opportunities for learning how to be a Wikipedian, most interactions require users to edit a page. While the Teahouse was deliberately designed to look and feel distinct from other pages on Wikipedia, it was designed and implemented entirely within the standard functional parameters of Wikipedia's instantiation of the MediaWiki content management system. This was done in part to demonstrate to the rest of the community the design possibilities afforded by the system. However, we also wanted to avoid giving Teahouse guests an experience that was fundamentally different from the way the rest of Wikipedia worked. We attempt to simplify more complex editing tasks through clear, contextual prompts and structured workflows. While the project team and Teahouse hosts have developed a variety of opt-in scripts and bots to streamline back end processes of the Teahouse, the only Teahouse feature that extends the core MediaWiki code is a JavaScript widget on the Q&A page called the Teahouse Gadget (**Figure 16**). I discuss the Teahouse Gadget and other Teahouse components in the Features section below.

hosts >>>
Q&A >>>



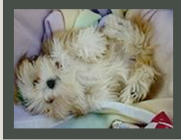
(Talk to me) **Mohamed Al-Hakeem**

"Always wanted to take part in the editing "MACHINERY" of Wikipedia, after being just as lazy reader! But still feeling Wikipedia is too BIG to a rookie like me."

visited: 00:58, 19 June 2012 (UTC)

All Teahouse guests are welcome to introduce themselves here, whether you're just passing through or you plan on hanging around a while. Tell us all a bit about yourself: what are you interests? What do you do for fun? Who's your favorite [encyclopedist](#)?

Introduce yourself >>>




(Talk to me) **Lauren**

"I like dogs. I also like politics and anywhere I have lived. I tend to edit on those topics. My current project is bringing the [Japanese Spitz](#) article back up to Good status."

visited: 11:00, 19 June 2012 (UTC)

Browse the [Guest book](#) to see more fellow Wikipedians!



(Talk to me) **Zoe**

"I'm passionate about children's books and hope I can contribute to Wikipedia in this field."

visited: 05:17, 19 June 2012 (UTC)

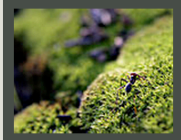


Figure 14. Teahouse Guests page, with recently created profiles.

To ensure a baseline of community involvement in the project, members of the project team approached 20 Wikipedians with a history of new user outreach at the beginning of the pilot and invited them to sign up as hosts. Of those invited at the outset, 15 subsequently participated. Although we undertook no further recruitment initiatives, many more hosts signed up and participated during the pilot period, and other experienced Wikipedians participated by inviting new users to the Teahouse and answering questions on the Q&A board without formally joining the project.

Origins of the Teahouse

In October 2012 while working as a Research Fellow for the Wikimedia Foundation, I was approached by my supervisor, Siko Bouterse, and asked to participate in the development of a “social café” for new Wikipedia editors. Over the past few weeks, Siko had been brainstorming ideas for addressing the gender gap with a new Wikimedia Community Fellow, Sarah Stierch. Sarah is an active Wikipedian and has also played an important public role in spreading awareness of the Wikipedia gender gap throughout the Wikipedia community and the English-speaking world, and also regularly organizes outreach activities to encourage more women to contribute to Wikipedia.

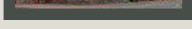
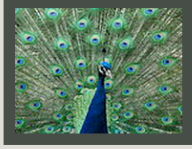
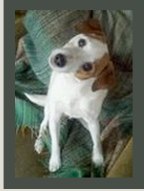

<p>Worm That Turned (or Worm^{TT}) is a UK Wikipedian who's been around for nearly four years. The majority of his work is in adoption, and he has proclaimed himself the most prolific adopter on Wikipedia. He's also an administrator and has spent a lot of time helping new users, students, unhappy subjects of articles and anyone else he can find that needs help.</p>	 <p>Nthep</p>  <p>"Mentoring is a brain to pick, an ear to listen, and a push in the right direction." -- John Crawford Crosby</p> <p>Worm That Turned</p>
<p>Writ Keeper's been editing Wikipedia for about six months. Currently working on writing user scripts for the Teahouse host interface, WK can often be found around the third opinion noticeboard, and also doing some recent changes patrol from time to time.</p>	 <p>"I think it's time for us to recognize the differences we sometimes fear to show." --Rush, "Entre Nous"</p> <p>Writ Keeper</p>
<p>Chico Venancio has been editing Wikipedia since 2006, though he has moved to use the Portuguese Wikipedia as his home wiki. Chico started using Wikipedia as a High School student and found it to help him in the college entrance exams. He likes to understand the technical side of Wikipedia and experiment with bots and template writing, but still writes a few articles every now and then. Fighting vandalism in Wikipedia is one of his favorite pastimes.</p>	 <p>"Teahouse seems like a wonderful initiative to me and I want to help it! I have been a new editor and still remember it."</p> <p>chicocvenancio</p>

Figure 15. Teahouse hosts page and profiles.

The social cafe, which I later suggested we call Teahouse, was to be set up in the style of a WikiProject: a set of wiki pages where editors could coordinate and perform a particular kind of work. In this case, the work was supporting new editors and would primarily be performed within the WikiProject workspace itself. Unlike most WikiProjects, the Teahouse was developed primarily by paid staff and contractors of the Wikimedia Foundation, who would shepherd its development (as informally and unobtrusively as possible) for the first three months, which we referred to as Phase 1 of the pilot period.

As we began to discuss what shape the Teahouse would take, we began to appreciate the extent of the challenges this project would face. How would we make new editors aware of the Teahouse? How could we encourage them to participate? What did we want them to do at the Teahouse, and what did we want them to get out of the experience? How would we encourage veteran editors to participate? How could we keep them from biting the newcomers? How would we know whether the Teahouse was effective at engaging female editors and encouraging more newcomers to continue editing? Given that many WikiProjects fail to launch or peter out quickly, how could we assure that the Teahouse continued to provide high quality support to a large number of new editors for as long as possible, on a purely volunteer basis?

Finally, how could we do all of this within the technical constraints of MediaWiki and in line with the social norms and rules of the Wikipedia community?

Over the course of the next few weeks, Siko, Sarah and I developed a project plan that included a set of basic user requirements and technical specifications for the Teahouse, established criteria for evaluating the impact of the pilot project, and

Wikipedia:Teahouse/Questions

From Wikipedia, the free encyclopedia
< Wikipedia:Teahouse

Question forum >> Host profiles >> Guest profiles >> Welcome to the Teahouse! A friendly place to learn about editing Wikipedia.

teahouse
Learn more

Experienced editor?
Become a host...

I Jetthrobot, Teahouse host
Question archive >>

Ask a question

Please join our discussions! To reply, use the edit button across from the title ↓

how to add comics portal with image of speech balloon [edit]

How do you add the small box with the image of speech balloon and comics portal, also how to adjust the location of the box.
Townboxbell (talk) 22:24, 7 November 2012 (UTC)

Hello, and welcome to the teahouse. By comics portal, are you referring to [Portal:Comics](#)? If so, the template linking to the portal can be inserted with {{portalComics}}. It's usually placed below the See Also heading.--xanchester (t) 22:37, 7 November 2012 (UTC)

Wikimedia Commons copyright images [edit]

Hi

I seem to be having a lot of Tea recently. Regardless this concept of non-free and free is confusing. So I'm just going to give the exact situation here and hope for good advice. I've read a few relevant pages but I'm not as yet decided. I am writing an article on [mywapblog.com](#) which is safely parked on my userspace. It is far from complete and my first article so let's stay on point please :). I need to upload their logo to the wikimedia commons. They are a free mobile blogging platform. Anybody can register and host a blog similar to [WordPress.com](#) except they target mobile users. Now having said that, they are free. So (1)Can I upload the logo? (Source:there site) (2)If not can I source it somewhere else and upload it? Then deeper into the question... The internet archive [archive.org](#) has there versions from 2008 onwards. They changed there logo throughout time and I also want to upload those (for history).... (3)Is that source allowed? (4)And what about full screenshots of the site? (5)If I take them myself? And use of internet archive? (6)Lastly I saw a page on [citations specifically for websites](#) but can't remember where! I searched normal [citations](#) page and couldn't find it. (7)Plus is there a project related to this in any way? Maybe CMS, internet companies or something?

I know it is a lot of questions but please try to answer them as this is a major concern of mine. — Preceding unsigned comment added

You can put your question in the textbox below.

Short summary of your question: [Help! IronHolds keeps deleting my edits](#)

A user called IronHolds keeps deleting my edits to the "Scotch Whisky" article. He says I'm vandalizing the article because I accidentally misspelled "Whisk(e)ly" ONE TIME. What should I do? ~~~~

On Wikipedia, you should sign all of your posts by ending them with four tildes (~~~~)

Ask my question

List of sources [Join this discussion](#) [edit source]

Is there a list or database of reliable, free content webpages/resources for use in articles that is accessible somewhere in wiki, I'm nearly certain I found one once quite a while ago but I'm unable to find it anymore. I probably just imagined it but it seems like it would be really useful so I'm reluctant to give up on the idea, a definitive answer either way, would be much appreciated. [Biggs Pliff \(talk\)](#) 02:10, 5 August 2013 (UTC)

Figure 16. Teahouse Q&A board (top). Clicking "Ask a question" causes the Teahouse Gadget as a JavaScript webform to appear (middle). During Phase 2, Teahouse hosts expanded the functionality with a "Join this discussion" button (bottom).

scoped our development timeline. We also formalized the overall goal of the Teahouse:

Teahouse is a user-friendly welcome center/help space that organizes experienced editors to actively reach out to newbies and provides on-wiki encouragement to promising new editors, promoting new user retention through helpful, friendly, social volunteer interaction. Teahouse will serve as an on-wiki group space for new users or interested contributors. Imagine an on-wiki "peer support space" as an incubator not for content creation but for editor development. The goal will be to help new editors become accustomed to community culture, ask questions, develop community relationships, etc. - supporting each other on their journey to become experienced Wikipedians. Although the project will welcome all good faith newbies, women are a particular target population. By creating a social experience that helps integrate women into the community and support them in getting past barriers to participation, we hope to impact the gender gap. (Internal project planning document)

Design goals

Over the next month, Heather Walls, a visual designer working for the Wikimedia Foundation, joined the team and we began planning out the space that would become the Teahouse. The user experience we wanted to create in Teahouse was formalized in a set of design goals, which I have condensed and clarified below. These design goals were based on previous research I had conducted, summarized in **Appendix D**, as well as previous research on the Wikipedia gender gap and new user experience on Wikipedia and in other online communities. Some of this related research is summarized above. Research that informed specific design choices is discussed in the Teahouse Features section below.

Goal 1: Engage a large and diverse set of promising new editors

The majority of newcomers edit in good faith. They are trying to make positive contributions to Wikipedia. Unfortunately, these good-faith newcomers are especially vulnerable on Wikipedia: they are more likely to leave in response to negative experiences. Female editors are also likely to give up on Wikipedia quickly. The Teahouse intends to reach out to as many good faith newcomers as possible, as early as possible. Before they give up for good.

Goal 2: Highlight activity and community

Many Wikipedia readers and new editors don't realize that Wikipedia is a vibrant, active community. Wikis, unlike most modern social software, do not surface activity well, making it difficult for new users to distinguish an active page from an inactive one. Teahouse intends to highlight both who is participating and what is happening in order to introduce new editors to one another and to the broader community.

Goal 3: Foster peer support and sustained participation

In order for Teahouse to provide support at a large enough scale to affect the editor decline, it needs to allow editors to learn from and assist each other in a many-to-many setting. To be sustainable, it needs to avoid burdening hosts with tedious project maintenance tasks and allow them to focus on supporting newcomers.

Goal 4: Create a strong sense of place

Teahouse must communicate its purpose in both the look and feel of the project space and in the norms of interaction within that space.

Goal 5: Provide appropriate and usable mechanisms for meaningful participation

Teahouse must make it easy for both new and veteran editors to participate in ways that are meaningful and engaging to them, without overly constraining who can participate or how they can contribute.

DESIGN PROCESS

The Teahouse was launched on February 27, 2012, in the project namespace of Wikipedia, the same area of the website that policies and WikiProjects reside in. Since that day, the Teahouse has seen sustained volunteer activity and is still going strong today. As of the end of the pilot period (October 11, 2012), over 1,000 new editors, and 400 Wikipedians, have participated in Teahouse.

Teahouse was designed by a three woman (and one man) team working together, usually remotely. It could not have been successful without the contributions of all four team members, not to mention the contributions of dozens of Wikipedians who volunteered in those critical first few months. However, I made substantial and vital contributions to the design of the Teahouse that span all five of our design goals and that are reflected in most of the major features of the Teahouse, and per-

formed all activities related to measurement and evaluation. In this dissertation, I will focus primarily on the areas of the design process that I led and the features that I made substantial contributions to, and will attempt to make it clear when I am discussing aspects of the Teahouse that were not my idea or designed according to my specifications.

I made substantial contributions to formative research and interaction design of Teahouse. I describe my contributions to the formative research and iterative design process in the next three sections. I show how these research and design activities helped inform the project team's design goals and guide the development of specific Teahouse features in the Features section.

Research sprints

Many of the design choices we made in the Teahouse were informed research I conducted the previous summer, as a participant in the 2011 Wikimedia Foundation's Summer of Research (WSOR). WSOR was a program that brought together Wikipedia researchers from different academic institutions to perform research around several of the Foundation's key areas of concern²⁴ that had been surfaced in the recently-completed Editor Trends study (Wikimedia Foundation, 2010).

The majority of the research I conducted during the summer of 2011 focused on the new editor experience: the kinds of things newcomers do and the interactions they have with other editors in their first month. I also conducted research on new editor participation in WikiProjects, and interviewed nine members of WikiProject Military History to understand what made their WikiProject successful, and what challenges they faced. Data from the interviews are used in Chapter 6 of this dissertation. WSOR research was organized into sprints of one to three weeks duration, although several sprints were often conducted in parallel. All sprints were conducted collaboratively, with two to four research fellows gathering the data and contributing to analysis and writing up results. The research sprint write-ups were published on a public Wikimedia Foundation wiki. I briefly summarize six of these sprints and provide links to their on-wiki write-ups in **Appendix D**.

User scenarios

Based on the findings of these research sprints, I developed a set of nine user scenarios to guide our development process. The story of SubSubPop at the head of this chapter is based on one of these scenarios. The scenarios were grouped into three broad categories that reflect the needs of new editors: *Requesting Technical Help*, *Negotiating People, Process or Policy* and *Finding Collaborators and Ways to Contribute*. Each scenario describes a new user who has a particular question or experiences a particular problem, and their attempts to solve that problem. The scenarios also included hypothesized ways that these new users might get the help they need from the Teahouse.

Although not all of the Teahouse features described in the scenarios were implemented in the final design, the scenarios were referred to throughout the design process and helped the project team maintain its focus on user needs. An example scenario is provided below. The full list of scenarios is provided in **Appendix E**.

KalBin, a new Wikipedia editor from Lagos, has started a new article on a famous Nigerian televangelist who has received a great deal of news coverage for his political activism in Nigeria, in other African countries, and beyond. However, KalBin has just received a message on his user talk page saying that this person is not notable enough to warrant an encyclopedia entry on the English language Wikipedia. KalBin disagrees, but is unsure how to best argue his case. He hears about the Teahouse from an automatic response he receives after setting his status to confused on the Feedback Dashboard, and decides to give it a try.

²⁴ http://meta.wikimedia.org/wiki/Research:Wikimedia_Summer_of_Research_2011/Questions

When KalBin gets to the Teahouse, he sees a comment board on the first page, which looks similar to other comment boards he's seen elsewhere on the internet (but much different from the talk page discussion boards he has encountered here on Wikipedia, which he is still a little uncomfortable with). The comment board displays a lot of recent questions by people who look to him like they might be other new users. These questions seem to be getting prompt responses, so he feels comfortable adding his own to this list. He starts a new thread and describes his situation.

The next day, he sees an email in his inbox that says that someone has commented on the thread he created. He goes back and sees that a Wikipedian has welcomed him to the Teahouse, and has recommended he look for third-party sources on the televangelist in English to establish notability. The Wikipedian also recommends that he check out WikiProject Africa, links to their page, and mentions a specific editor who is a member of that WikiProject who is also Nigerian and who might be able to give him feedback or even help him to build the article. (Scenario #4 – ‘Negotiating people, policy and process’)

Wireframes

I also developed a set of conceptual wireframes and workflow diagrams that sketched out potential information architectures and user activities. These wireframes provided the project team with a sense of how our design goals could be met through different features. These wireframes also allowed us to picture what the different spaces on Teahouse would look like, how users might navigate the space, and how we could surface activity and encourage participation. Fortunately, the Teahouse ended up looking and functioning substantially better than my wireframes once we added an experienced visual designer to the team. An example workflow diagram describing the process of manually inviting guests is provided in **Appendix G**.

TEAHOUSE FEATURES

In this section I describe the primary features of the Teahouse and how those features were designed to provide opportunities for socialization for Teahouse guests and to reduce the burden of project coordination and maintenance on Teahouse hosts.

Invitations

The first challenge we faced was how to make new editors aware that the Teahouse existed, and how to encourage them to visit early enough in their wiki lives that they benefitted from the opportunities for socialization the project was designed to provide.

Moving from a newcomer in an online community to a power user involves a series of difficult transformations. Ducheneaut (Ducheneaut, 2005) found that successfully becoming a full-fledged member of an OSS project involved a complex process wherein the new member acquired relevant expertise, constructed an in-project identity based around valued work, and learned how to participate successfully in the political life of the community. Bryant describes a similar transformative process involving the acquisition of local expertise and identity formation among new editors who go on to become highly active Wikipedians (Bryant, Forte, & Bruckman, 2005).

Unfortunately, the vast majority of Wikipedia newcomers do not make this transformation. 60% of new account creators never make a single edit after their first day (Panciera, Halfaker, & Terveen, 2009), and even among the newcomers who are most active during their first 24 hour period, only 8% go on to become Wikipedians: defined by Panciera as editors who have made at least 250 edits.

Findings from research sprints 3 and 4, as well as work by Krieger (Krieger, Stark, & Klemmer, 2009) suggested that among the common struggles that new editors face are finding tasks to do, locating help resources, learning the wikitext markup language and navigating Wikipedia's complex system of rules. In many organizations, formal mechanisms such as new member

orientations and mentorship programs exist to help shepherd newcomers through this identity transformation and promote the adoption of pro-social norms (Ostrom, 2000). While community-created mentorship programs exist on Wikipedia, these programs operate on a relatively small-scale. A study of one of the most successful programs, Adopt-a-User, found that it had served approximately 1,000 new editors between 2006 and early 2011 (Musicant, Ren, Johnson, & Riedl, 2011). However, during that same period more than 7,000 new users created an account and made 10 or more edits every month. While one-on-one mentorship affords a high degree of personal interaction and a high quality of support, the coordination cost of implementing it at the scale necessary to reach a substantial percentage of Wikipedia's good-faith newcomers may be prohibitive.

Other support mechanisms on Wikipedia may also promote pro-social behavior and improve editor retention. Unfortunately, these mechanisms are not always easy for new editors to find. Joining WikiProjects can provide a sense of belonging and motivate contribution (Forte, Kittur, Larco, Zhu, Bruckman, & Kraut, 2012), and tools like SuggestBot can help users find useful tasks that match their interests (Cosley, Frankowski, Terveen, & Riedl, 2007), but new editors may not be aware that these opportunities exist. They are not suggested to new editors by default, and links to these and other potentially helpful community-created resources are not prominently displayed within the interface.

The high and rapid newcomer attrition rate described by Panciera (Panciera, Halfaker, & Terveen, 2009) and others suggests that there is a very narrow window of opportunity for new editor outreach and socialization: most new editors stop editing within their first day, before they know their way around well enough to find the help they need or learn how to productively contribute. Contacting these editors before they give up or lose interest, ideally within the first 24 hours, and alerting them to opportunities for editing support and human interaction could increase the number of newcomers who go on to become Wikipedians.

In order to help Teahouse hosts reach out to more new editors during the critical first 24 hours, I wrote a Python script that published an automated daily report of promising newcomers to a wiki page. Following previous research on early editing patterns associated with an increased probability of retention, the report contained a sample of new editors who had joined within the past 24 hours and had made at least 10 edits, as well as new editors who had joined within the past four days and made at least 20 edits over the course of three or more edit sessions. In order to avoid attracting malicious editors to the Teahouse, I excluded editors whose accounts had been blocked from editing for vandalism or disruptive behavior or whose user talk pages displayed a limited set of serious warning messages that indicated that the user was probably not editing in good faith. Teahouse hosts viewed the contribution histories of the new editors in the report and selected those they wanted to invite to the Teahouse. This invite process is shown in **Appendix G**. This strategy facilitated the invitation of 40-60 new editors per day during the pilot period. Teahouse hosts were also encouraged to invite new editors they encountered in the course of their daily editing activities, and to invite newcomers who had recently had draft articles declined by the Articles for Creation committee.

Many newcomers receive a large number of talk page notifications. Unfortunately, these notifications are often warnings or deletion notifications, a phenomenon that has increased over time (Walling & Pinchuk, 2011). Findings from research sprint 2 showed that new editors generally do not respond to talk page notifications that invite them to participate in community processes. However, findings from Research Sprint I demonstrated that most messages posted for new users were impersonal and had a negative tone, which suggested that a more personalized, positive approach might prove more successful.

Previous research has also shown that using personalized welcome messages and including contextually-relevant information in invitations can encourage new member participation in online communities (Choi, Alexander, Kraut, & Levine, 2010; Harper, Frankowski, Drenner, Ren, Kiesler, Terveen, & Riedl, 2007). Other research conducted during WSOR (Geiger, Halfaker, Pinchuk, & Walling, 2012) also indicate that personalized messages elicited better responses from new editors than generic notifications. We designed several personalize-able Teahouse invite templates for hosts to place on new editors' talk pages, and encouraged them to sign each invitation with their username. For example, newcomers who were invited after having a proposed article declined by the Articles for Creation committee received a different invitation than newcomers who were identified as candidates for invitation on the daily invitee report (see **Appendix G**).

Social Q&A

One of the first things that new members of a community or organization do is ask questions. New users of social media and peer production communities are no exception. In online settings, question-asking by new users and lurkers often signals an intent to shift from being a consumer of to a contributor (Preece & Shneiderman, 2009).

Asking questions in a public setting, such as a forum, can have tangible benefits to new users above and beyond the specific information they gain from a useful answer. While many Q&A sites follow a transaction model, with information seekers (often lurkers or newcomers) eliciting factual information from "Answer people" (Turner, Smith, Fisher, & Welser, 2005), social Q&A platforms have been shown to host more personal, collegial, and interactive discussions (Hansen, 2009) and even micro-collaborations (Gazan, 2009) among multiple seekers and providers. A more social approach to Q&A suits the needs of new users especially well because it affords detailed and personalized explanations. These more detailed explanations benefit both the asker and also other new users who are just listening in or lurking on the thread. Collaborative support discussions may also serve as valuable opportunities for positive socialization of newcomers by introducing them to community norms and insider language, pointing them to helpful resources or engaging tasks, connecting them with potential collaborators and contacts, and leaving them with a more accurate impression of the nature and purpose of the community.

Asking questions can be intimidating for newcomers (Preece, Nonnecke, & Andrews, 2004), but intimidation can be reduced if newcomers are provided with clear cues for how to participate, and know what kinds of reaction to expect when they do. The Teahouse Q&A board (**Figure 16**) is designed to make new editors feel comfortable asking any question they might have, and to provide opportunities for constructive social interaction.

The results of research sprints 3 and 4 suggested that many of the challenges that very new editors face are related to the complexity of the Wikipedia's wikitext markup language. Unfortunately, getting technical help with markup on Wikipedia involves something of a catch-22: you have to edit a page filled with wikitext in order to ask the question! Experienced editors are both more comfortable with wikitext, and have more tools at their disposal (from custom browser add-ons, to JavaScript-based userscripts, to stand-alone software programs) for customizing the editing interface and streamlining the editing experience. But many of these tools are undocumented and unsupported, and new editors don't know that these tools exist.

The Teahouse Gadget was designed to lower the barrier to participation on an editor's first contact with the Teahouse by allowing guests to ask their question without having to edit markup. The gadget is a JavaScript-based extension to MediaWiki that was created specifically for the Teahouse Q&A board and was implemented by default for all Wikipedia editors who visited that page. Because I was not personally familiar with the process of developing MediaWiki extensions, I documented

the technical and user requirements for the gadget²⁵, and two volunteer MediaWiki developers wrote the JavaScript and shepherded it through code review.

The Teahouse Gadget pops up an inline edit form when a user clicks the “Ask a question” button (see **Figure 16**), and then posts their question to the top of the Q&A board. Initially, each posted question created a new discussion thread in which answers and follow-up comments were posted in the usual manner of Wikipedia talk pages, via a “section edit” button next to the thread header. However, several months after the Teahouse was launched, several JavaScript-savvy Teahouse hosts updated the gadget to give new editors the option to respond to questions the same way they asked them: through an inline JavaScript webform (**Figure 16**).

We also created a template message that we asked hosts to post to each questioner’s talk page in order to notify them that their question had been answered. Several months after the Teahouse was launched, a host created a userscript, which other hosts could also install for themselves, that allowed hosts to post these messages without leaving the Teahouse Q&A board.

An important feature of the Teahouse Gadget is that every new question is posted to the top of the Q&A board. On Wikipedia talk pages, both the technical limitations of the MediaWiki software and social conventions dictate that new question threads are posted below existing content. As a result article talk page and community noticeboards can look relatively inactive even when they host ongoing discussions because the newest threads are buried below the fold. On long, heavily threaded forums like the Wikipedia Help Desk (**Figure 17**), the newest content is often many screens below the top of the page.

Social Q&A sites such as Yahoo! Answers, Stack Exchange, and AskMeFi follow a different design pattern: activity streams. In an activity stream design pattern, discussion threads are presented in reverse-chronological order with the most recently created or updated thread at the top. We believe that this familiar pattern is more appropriate for new editors than the default pattern that is designed into MediaWiki. Given the prevalence of reverse-chronological ordering in social media and other Q&A sites, we felt that directing newcomers to ask a question at the top of the page only to have it appear at the bottom could be confusing. Furthermore, designing the Teahouse Gadget to post new questions to the top of the page was also advantageous for two other reasons: it showed first-time visitors that questions had been asked recently and answered rapidly, and it made it easier for questioners to find their question when they returned to the Q&A board to check for responses.

Host and guest profiles

Being a newcomer in an online community can be intimidating. A survey of peripheral participants in MSN bulletin board communities found that among the primary reasons that lurkers did not participate publicly included confusion about how to use the software, concern about being the target of aggression or hostility, and uncertainty about whether the community was a good fit for them (Preece, Nonnecke, & Andrews, 2004).

Many new editors often don’t initially perceive Wikipedia as a community at all (Antin & Cheshire, 2010; Bryant, Forte, & Bruckman, 2005) and even when they do, their initial interactions with community members are likely to be negative. Like SubSubPop23, the only form of socialization that many new editors experience before leaving Wikipedia comes in the form of generic warning messages informing them that they’ve done something wrong, or terse notices that their edits have been reverted. These messages are often delivered by bots rather than by real people. Such anonymous, negative socialization tactics are not the most constructive ways to introduce newcomers to a community.

²⁵ http://meta.wikimedia.org/wiki/Research:Teahouse/Technical_Requirements

Self-introduction is a common newcomer behavior in online communities, and has been shown to elicit positive responses from other community members (Burke, Joyce, Kim, Kraut, & Anand, 2007), but social interaction for its own sake is somewhat discouraged on Wikipedia. The results of research sprint 5 suggested that new editors who joined WikiProjects often introduced themselves on the talk page, and that their first contributions to the project were often relatively minor, peripheral contributions. These findings suggested that providing a formal context for newcomers to introduce themselves to the community might be seen as a means of legitimate peripheral participation by visitors who did not have a specific question in mind at the time they received the invitation, or who were hesitant to participate in the Q&A board for other reasons.


The Teahouse Guests page (**Figure 14**) provides a safe space for newcomers to introduce themselves to the community by creating a Guest profile. New profiles are elicited in the same manner as questions, through a prominent “Introduce yourself” button on the top of the page, similar to the “Ask a question” button on the Q&A board. Clicking that button led the guest through a simple, structured editing workflow in which they were encouraged to say something about themselves and choose a visual avatar. When they saved their changes, the information they entered was output as a CSS and wikitext-formatted profile template onto the Guests page. Unlike the Teahouse Gadget, the profile creation process was not JavaScript-driven. Instead, I designed a short, structured workflow that leveraged MediaWiki’s (overly complicated, but surprisingly robust) templating language to reduce the number of choices the user had to make, and developed simple, step-by-step instructions to guide them through the process (see **Figure 17**).

Our use a native solution based on templates and markup for the profile creation process—rather than creating an additional JavaScript extension—also provided new editors with a potential learning opportunity. Previous research on new member socialization in organizations suggests that you can help newcomers figure out what is expected of them and increase their role clarity and their sense of self-efficacy by providing them with clear goals and a defining the sequence of stages necessary to achieve those goals (Bandura, 1993; Bauer, Bodner, Erdogan, Truxillo, & Tucker, 2007; Jones, 1986). Guiding guests through the editing process step by step was intended to help newcomers view their introduction as a legitimate contribution to Wikipedia and help them perform that contribution successfully on their own.

The relative invisibility of community on Wikipedia motivated our choices to make both host profiles and guest profiles primary features of the Teahouse, and to display a rotating set of guests and hosts on the Teahouse landing page (**Figure 14**). We chose to emphasize the human side of Teahouse in order to project a friendly and welcoming atmosphere, highlight current activity, and encourage participants to contact each other directly. Hosts were encouraged to create profiles for themselves that described who they were and share their interests and activities both on and off Wikipedia (**Figure 16**). All participants were encouraged to include an avatar (a photo of themselves, or a photo they liked from Wikimedia Commons) in their profile, and most did.

Teahouse: introduce yourself!

Follow these steps to make your own Teahouse introduction.



Step 1. Type your real name after *realname*=
Tell us the name you go by, or leave this blank if you prefer to use your Wikipedia username.


Step 2. Type something about yourself after *quote*=
Who are you? What are you interested in doing on Wikipedia? Tell us in a sentence or two, or share a favorite quote.

Step 3. Copy/paste a picture file name (don't add "File:" or any formatting) after *image*=
Now you get to pick an image to represent yourself. You can either choose a picture you like from [this list of images we have collected](#), find a cool one on [Wikimedia Commons](#), (Please don't use a non-free image like a copyrighted logo, it will be removed) or upload a picture of yourself! Just remember, images you upload to Commons will be placed in the public domain for anyone to use, for any reason, even commercially.


That's it! You can click "**Show preview**" below the edit window to see what your intro looks like. Once you're happy with it, click "**Save page.**"

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Subject/headline

B I  [Advanced](#) [Special characters](#) [Help](#) [Cite](#)

[[Wikipedia:Teahouse/Guest
 |username=[[subst:REVISIONUSER]]
 <!-- FILL IN your info after the "=" signs below.-->
 |realname=
 |quote=
 |image=
 <!-- you don't need to edit anything below this line-->
 |randomimage=[[subst:Random subpage:page=Wikipedia:Teahouse/Guest image:start=1|end=20|seed=3]]
]]<div style="float:right;">"visited:" [[subst:Wikipedia:Teahouse/Guest/Timestamp]]</div>

Insert  [Sign your posts on talk pages: !\[\]\(a73c3d5158da4e207d65c821b03d1212_img.jpg\)](#) [Cite your sources: !\[\]\(7a6b2135ee865fbbd928626e86a6bfd2_img.jpg\)](#)

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Figure 17. Teahouse guest profile creation workflow with step-by-step editing instructions.

Host and Guest profile pages are in some ways functionally similar to WikiProject member lists (Figure 9), in that they provide a way for editors to explicitly affiliate themselves with the project. However to my knowledge no WikiProject has previously encouraged editors to provide such detailed information about themselves, their interests, and their online and offline activities, or allowed them to select a visual avatar for themselves. While Wikipedians do often showcase their interests, achievements and personalities in the design of their personal user pages (Le, Beschastnikh, & McDonald, 2010), the Teahouse may be the first project on Wikipedia to encourage such a degree of individual self-presentation in a community context.

Embedded social norms

The idea of a café-like space for new editor support on Wikipedia is not a new one: the Portuguese Wikipedia has had a “Café dos Novatos page”²⁶, which is set up like a help noticeboard, since 2006 although that space is currently inactive. The English Wikipedia also provides a Help Desk and a New Contributors Help Page where newcomers can ask questions. However,

²⁶ http://pt.wikipedia.org/wiki/Wikipedia:Cafe_dos_novatos

these and many other destinations for questions and discussion on Wikipedia lack a strong sense of place (Harrison & Dourish, 1996): a set of sensory and contextual cues that evoke particular expectations, suggest norms of interaction, and intended modes of participation.

To adapt an example from Harrison & Dourish, a Wikipedia article talk page and the Village Pump²⁷ are as spatially similar as a lecture hall and a theatre but they are very different places: different people participate in them, different subjects are discussed, and different rules apply for how, when and why an editor should participate. Unfortunately, these spaces and many other discussion forums on Wikipedia lack the rich social and visual cues that suggest norms of participation to us in the real world spaces we move through in our daily lives. The norms for audience participation at a university lecture and a rock concert are very different, even if these two events occur within the same space, and most people have little trouble adapting their behavior appropriately.

The Wikipedia Help Desk is a good example of the uncertainty of place that many Wikipedia forums exhibit (see **Figure 18**). The most active of Wikipedia's many Q&A boards, the Help Desk is staffed with a dedicated crew of volunteers who answer over a dozen questions every day from newcomers and veteran editors alike. However, there are few visual cues to differentiate this lively forum from the hundreds of static tutorial and help pages on Wikipedia. It may also be difficult for new users to ascertain how to participate at the Help Desk: at the head of the page many caveats, instructions and calls to action ("Search Frequently Asked Questions," "Are you in the right place?") vie for priority with the "Ask a Question" link, even though that link is the primary mechanism for participation. Additionally, no previous questions by other users are visible above the fold to cue new editors to ask their own, or to suggest what kinds of questions are appropriate. And unfortunately many of the responses that questions receive, while prompt, consist of little more than a link to some policy or static help page, or a previously-answered question, with little or no explanatory text (**Figure 18**).

With these challenges in mind, we were especially conscious of presenting newcomers with a strong impression of Teahouse as a place for them, with norms, expectations and calls to action that were clear and straightforward, and that were reflected in the visual, textual and the structural elements of the guest-facing pages.

I chose the name Teahouse to evoke a comfortable social space for meaningful personal interaction among peers. The name is also a nod to the English Wikipedia essay *A Nice Cup of Tea and a Sit Down*²⁸, which urges editors to acknowledge one another's good points, and is often used to nudge editors towards being more congenial in heated article talk page discussions. Heather Walls strong and evocative visual language also served to make Teahouse look and feel like a different place than other forums on Wikipedia, with a color palette and graphical elements that were intended to be particularly compelling to female editors.

²⁷ a community noticeboard for posting global announcements and engaging in discussions around community-wide issues

²⁸ http://en.wikipedia.org/wiki/WP:A_nice_cup_of_tea_and_a_sit_down

Welcome to Wikipedia

[Help index](#) · [Ask questions](#) · [Report a problem](#) · [Learn wikicode](#) · [Wikipedia FAQ](#) · [Glossary](#)
[Live editing help via web chat](#) · [Help desk](#) · [Reference desk](#) · [Tutorial](#)

Shortcuts:
WP:HELPPDESK
WP:HD

Wikipedia Help Desk

- This page is **only** for questions about *how to use or edit* Wikipedia. For other types of questions, use the search box or the Reference desk.
- **Do not provide your email address** or any other contact information. Answers will be provided **on this page only**.
- We are all volunteers, so sometimes replies can take some time. Please be patient.

Are you in the right place?

- **New users:** While this is a good place to ask questions, you may also ask your questions at **the Teahouse**, an area specifically for new users to get help with editing, article creation, and general Wikipedia use, in a friendly environment. There is also a **new contributors' help page**.

[Click here to ask a new question about how to use or edit Wikipedia.](#)

Skip to today's questions · Skip to the bottom · Special help services · Archived discussions · How to answer

Contents [hide]

1 February 22

- 1.1 thread answering
- 1.2 Request for Feedback
- 1.3 Global Positioning System article feedback
- 1.4 whitney houston
- 1.5 The tools above the edit box -- Internet Explorer vs. Chrome
- 1.6 Redefine "My Sandbox"?
- 1.7 Should they still be listed?
- 1.8 warning of Jacques Cousteau about our seas pollution
- 1.9 italics
- 1.10 Suggestions greatly appreciated

Search Frequently Asked Questions

Search the help desk archives

I have multiple subpages. Is it possible anyhow to get email notification when my userpage (or subpages) are edited? You can add a talkback template in my page! Thanks!--[Tito Dutta](#) ([Send me a message](#)) 16:26, 29 February 2012 (UTC)

No, as explained [here](#) ✎.— [Vchimpanzee](#) · [talk](#) · [contributions](#) · 22:31, 1 March 2012 (UTC)

Figure 18. Wikipedia Help Desk page header (top), and a typical Help Desk response to a newcomer's question (bottom).

My primary contribution to the sense of place of the Teahouse was in the development of clear calls to action, mechanisms for surfacing relevant activity and highlighting community, and in the development a set of informal social norms to help guests and hosts understand how to participate and what to expect.

As SubSubPop23's story illustrates, the new editor experience of Wikipedia can be an unsettling combination of anonymous and hostile. This, too, has increased over time. The proportion of new editors whose first interaction with Wikipedia is via a generic message left by bots or other automated tools has increased to over 80%, from less than 40% in 2006. The proportion of first contact messages that are warnings rather than welcomes was 65% in 2010 and has increased year by year (Walling & Pinchuk, 2011).


Many Wikipedians also experience Wikipedia as a hostile environment. A survey of 1200 former editors conducted in 2010 (Wikimedia Foundation, 2010) found that 27% of former contributors cited the rudeness or stubbornness of other editors as their primary reason for leaving, and among highly active editors (those who made more than 10 edits a month) the proportion was 53%. And female editors may experience Wikipedia's combative culture even more acutely. In previous studies, female editors have reported feeling uncomfortable with antagonistic exchanges among Wikipedians, and they cite conflict as a reason for ceasing to contribute more often than their male counterparts (Collier & Bear, 2012). Female editors also reported a desire for a more collaborative, less conflict-driven editing experience, and for more social interaction in general.

1. **Welcome everyone** with a friendly hello when you answer questions or **greet new guests**.
2. **Be polite and patient** with all editors who visit the Teahouse.
3. **Keep it simple**. Explain as much as possible, as simply as possible, to new editors when answering questions. (Don't use **wiki jargon!**)
4. **Avoid over-linking** when responding to questions. Wikipedia policies, procedures, and documentation are overwhelming to many editors. Do your best to explain processes and policies and answer the guest's particular question rather than pointing them to more documentation as a first resort.
5. **Leave a talkback notification** on the guest's userpage after answering a new question, to let the guest know you responded. (Find the script [here!](#))

Hi! This is how you become a Teahouse host:

Are you...

- »An editor who understands how Wikipedia works?
- »Helpful to new people, with a clear and friendly manner?
- »Familiar with the Teahouse project?



I promise to:

Remain in good standing on Wikipedia, welcome guests in the Q&A board, speak to others in a friendly and patient way, and generally uphold the **methods of the Teahouse**.

Figure 19. Host expectations document (top), and pledge to abide by those expectations during the host profile creation workflow (bottom).

The experiences that many new users have when they ask questions in online forums are often negative and off-putting. Help requests go unanswered (Burke, Joyce, Kim, Kraut, & Anand, 2007) or are answered with exhortations to “read the fucking manual” (Raymond & Moen, 2004). Established participants may react harshly to newcomers’ inadvertent violations of unstated community norms (Burnett & Bonnici, 2003). These negative experiences can drive new users away from the community. Lurkers are often hesitant to participate in Q&A forums because they fear such negative responses, and even viewing such behavior directed at other users can make a lurker think twice about posting (Katz, n.d.).

Collier (Collier & Bear, 2012) advocates design improvements to promote more female contribution to Wikipedia: forums to facilitate social or educational discussion separate from the hyper-critical, debate-style discourse frequent on article talk pages (Morgan, Mason, & Nahon, 2012), as well as features for surfacing potential common interests and fostering more direct collaboration. We believe that these same features will benefit new editors in general by introducing them to the people behind the encyclopedia in a more friendly way, and providing a supportive, engaging environment for learning.

We developed a set of host expectations (**Figure 19**), while formalized several unofficial norms of interactions that were intended to make the Teahouse Q&A experience less intimidating and more useful for guests. While these expectations were not enforceable rules, every Wikipedia editor who created a host profile was asked to agree to them (**Figure 19**), and they were displayed prominently in the Host Lounge, a special coordination space that was set up primarily for use by veteran

editors²⁹.

Findings from Research Sprint 2 suggested that new editors who received Teahouse invites were unlikely to have heard of the Teahouse before, and were unlikely to have participated in community spaces on Wikipedia before. In order to provide first time visitors with a better sense of what the Teahouse was about, we placed prominent calls to action and featured content galleries on the Teahouse landing page (**Figure 14**). The featured galleries displayed pictures of recent Teahouse guests and active Teahouse hosts, as well as questions that had recently been asked on the Teahouse Q&A board. These calls to action and galleries provided first-time guests with several important contextual cues. The calls to action made it clear that guests could participate in the Teahouse both actively and passively, by asking a question or exploring the profiles of hosts and other guests. The galleries helped them understand both what kind of contributions were expected, and also gave them a glimpse into the community. The recent questions gallery showed that the Q&A board accepted a wide variety of different kinds of questions. The host and guest profile galleries showed them that Teahouse was populated with other new users like them and with friendly Wikipedians who were there to help, not to warn or revert.

HostBot

The WikiProject members interviewed in research sprint 6 suggested that projects often fail because of the high cost of coordination and a lack of people willing to take on coordinator roles:

To be successful, a WikiProject needs to have a core of people doing administrative work, maintaining processes, building infrastructure, and so forth. This isn't necessarily very fun or very glamorous work. So most people won't do it, or will stop doing it after a brief stint. (Participant 2)

My subsequent interviews with WikiProject editors, as well as findings from other studies of WikiProjects, also suggest that maintaining a WikiProject requires a great deal of effort, especially if the project is coordinating collaborative activities within the project workspace. Projects suffer when the people who coordinate those activities and maintain the project workspace leave. To make sure that the Teahouse was sustainable long-term, we needed to reduce the degree to which the project's productivity was dependent on coordinators performing repetitive tasks. Teahouse hosts should be able to focus their time on assisting new editors, not updating lists and archiving pages. However, many of the features we created, such as galleries and profile pages, require regular curation.

On Wikipedia, repetitive tasks are often, and increasingly, performed by bots--automated scripts that make edits to wiki pages under dedicated user accounts. Bots are used for everything from correcting vandalism, warning and notifying users, fixing typos, archiving talk pages. Bots like SuggestBot even suggest tasks to editors based on their edit history. Many task management tools used by WikiProjects, such as Hot Articles (Gilbert, Morgan, McDonald, & Zachry, 2013) and Article Alerts, are also run by bots.

Maintaining the Teahouse involves a variety of repetitive tasks, from inviting new editors, to archiving profile pages, to updating the featured content galleries. To automate these activities, I created a bot user account called HostBot to reduce the burden of upkeep on Teahouse hosts. HostBot consists of a set of Python scripts and uses the MediaWiki API and a live mirror database of the English Wikipedia to track activity on the Teahouse and perform edits to wiki pages.

HostBot performs three primary functions on the Teahouse: messaging, activity surfacing, and site analytics. During the first

²⁹ http://en.wikipedia.org/wiki/Wikipedia:Teahouse/Host_lounge

three months of Teahouse, project member Sarah Stierch and several volunteer hosts used HostBot's daily invitee report to identify new editors to invite to the Teahouse. However, even with this report the task of manually posting invites to the talk pages of dozens of good faith newcomers every day is time-intensive and tedious. After the pilot period, I updated HostBot's invite scripts so that the bot itself delivered the invitations. In order to maintain a degree of personalization, several Teahouse hosts volunteered to have their usernames associated with the automated invitations and a link to their own user talk page included in each invite. This allowed us to invite over 100 new editors to the Teahouse every day, since all users who met the criteria for invitation received an invite message.

The Teahouse Gadget posts recent questions to the top of the Q&A board. HostBot performs several similar functions, surfacing recent activity on the Teahouse landing page and the host and guest profile pages. HostBot updates each of the Featured content galleries on a regular basis. The featured host gallery is updated weekly to display the profiles of the hosts who have made the most edits to the Teahouse namespace within the past two weeks. The featured guest gallery is also updated weekly, and displays a rotating assortment of guest profiles that were created a profile within the past week. The recent questions gallery is updated every four days, so that first-time guests can see that the project is currently active and get a sense of the kinds of questions that are currently being asked and answered.

HostBot also curates the lists of profiles on the host and guest profile pages (**Figures 15 and 16**) so that those lists reflect recent activity. A script automatically sorts Teahouse host profiles in place so that the profiles of the most active hosts are at the top of the list. This assures that guests who browse the host profile page looking for individual assistance are more likely to contact hosts who are currently working at the Teahouse, rather than hosts who may be focusing on other editing activities. In Chapter 5, I showed that WikiProject member lists do not reflect the project's current participants. To make sure that the Teahouse host page only displays profiles of hosts who are currently participating, HostBot moves profiles of inactive hosts to a separate page called the Host Breakroom³⁰. When HostBot moves a host's profile to the Breakroom, the bot posts a notification to the host's talk page inviting them to check in by signing a particular Teahouse page with a date-stamped signature (accomplished by typing “~~~~” in wikitext). Once the host has checked in, HostBot moves their profile back to the Host page and places it at the top of the list.

HostBot also moves guest profiles that are older than two weeks into a separate GuestBook archive, to maintain a focus on recent contributors and to keep the page from getting impractically long. An existing Wikipedia bot was configured to archive question threads on the Q&A page in a similar fashion.

³⁰ http://en.wikipedia.org/wiki/Wikipedia:Teahouse/Host_breakroom

Questions

Total questions as of 2012-10-17: 1401

month	questions	questions per day	questions per week	average questions per guest	average responses per question	mean time to first response
This month (9/2012)	187	6.23	43.61	1.42	2.35	159.07
Last month (8/2012)	222	7.16	50.12	1.21	2.54	112.1

Page views

Total page views for WP:Teahouse (not including sub-pages)

month	total pageviews	pageviews per day
This month (09/2012)	6546	218.2
Last month (08/2012)	5502	177.48

Figure 20. Monthly question metrics from Teahouse metrics report. Metrics that have improved from the previous month are highlighted in green.

HostBot also maintains a daily log of Teahouse activity within a set of MySQL tables on my user database within the Wikimedia research database cluster that tracks revisions to English Wikipedia. The bot logs metadata about every user who is invited to the Teahouse, and also tracks profiles that have been created and questions that have been asked. The bot publishes a monthly metrics report³¹ to a host-facing page on the Teahouse (**Figure 20**). This metrics report functions as a simple project-wide leaderboard that helps hosts monitor changes in participation and activity on a month-to-month basis. Data from HostBot's activity logs are also used in the pilot evaluation of the Teahouse, presented in Chapter 8.

CONCLUSION

In the preceding section, I described the major features of the Teahouse. In this section, I briefly discuss how my contributions to these features were intended to help the project team address the five Teahouse design goals I outlined earlier in this chapter.

Goal 1: Engage a large and diverse set of promising new editors

The daily invitee report I developed allowed Teahouse hosts to rapidly identify good faith newcomers and invite those users to the Teahouse within 48 hours of registration. Later, the HostBot invite script I developed made it possible to invite an even larger number of good faith newcomers to the Teahouse, reducing the amount of work that needed to be performed manually by Teahouse Hosts. Guest profiles allowed visitors to see the diverse community of new and veteran editors who participated in the Teahouse, and also provided a form of legitimate peripheral participation for users who did not want to participate in the Q&A board.

Goal 2: Highlight activity and community

The featured content galleries on the Teahouse landing page presented visitors with a window into who was currently participating in the Teahouse, as well as what kinds of questions other users had asked recently on the Q&A board. HostBot also curated the Host and Guest pages to feature the profiles of participants who were most active recently, assuring that these lists reflected current community members who were available as mentors and collaborators.

Goal 3: Foster peer support and sustained participation

The Q&A board was designed to allow guests to get the help they needed quickly and easily from a variety of other project

³¹ http://en.wikipedia.org/wiki/Wikipedia:Teahouse/Host_lounge/Metrics

participants (both hosts and other guests), and also to learn passively by browsing the questions that had already been asked and answered. The norms of interaction documented in the Host Expectations and the Teahouse Gadget are designed to encourage congenial, collaborative discussions rather than impersonal information transactions. The extensive automation of project maintenance activities provided by HostBot allowed Teahouse hosts to focus on the valuable and engaging socialization work, potentially reducing the coordinator fatigue that is common in WikiProjects.

Goal 4: Create a strong sense of place.

The clear calls to action on the Teahouse landing page and at the top of the Q&A board and Guests page are intended to make it clear to newcomers how they can participate, and the Host Expectations are designed to foster a positive and welcoming atmosphere and provide newcomers with an experience that is distinct from other support and discussion forums on Wikipedia.

Goal 5: Provide appropriate and usable mechanisms for meaningful participation

I selected Q&A and Profiles as the primary ways for new editors to participate in the Teahouse because these mechanisms support common needs and desires of new editors. Both the process of asking a question and creating a profile were carefully designed to reduce intimidation and increase newcomers' sense of self-efficacy.

Chapter Summary

In this chapter, I laid out previous research that motivated the development of the Teahouse as well as research I conducted that informed the design of specific features of the Teahouse. I described the process by which I adapted the open team model and design considerations laid out at the end of Chapter 6 to create a volunteer-driven collaborative project that focused on addressing a timely community concern that has emerged, at least in part, as a result of formalization of community processes and attitudes. In the design rationale for the Teahouse, I described an approach to specializing the technical and social structures of an open team in order to make the team both more sustainable and more effective at performing a particular type of work without sacrificing the inherent inclusivity and flexibility of the group structure and group workspace that allows teams like WikiProjects to operate effectively within open collaborations. In the next chapter, I will present data on the activity that the Teahouse experienced during its first seven months, and analyze how well the features of the Teahouse described here addressed the project's design goals. I will also present preliminary findings that demonstrate how successful the Teahouse was at addressing its overall goal of increasing new editor retention and engaging female newcomers.

Chapter 8

Evaluating the experience and impact of the Teahouse

In this chapter, I investigate whether the Teahouse, which I introduced in the Chapter 7, can be successful in improving the new editor experience of Wikipedia and combatting the editor decline. To answer these big questions I analyze the extent to which the Teahouse was able to engage a large and diverse set of newcomers and veteran Wikipedians, offered opportunities for peer support and positive socialization, and increased new editor retention.

While the design of the Teahouse was a collaborative endeavor, I performed all the analyses presented in this chapter. First, I provide an overview of the activity on the Teahouse between the launch of the Teahouse on February 27, 2012 and October 11 of that year. Next, I analyze the effectiveness of our primary mechanism for recruiting new editors: talk page invitations. Then, I report findings from three surveys I deployed during that seven-month period in order to understand the experience of participating in Teahouse for female newcomers, other new editors, and veteran Wikipedians. Finally, I attempt to quantify the impact of the Teahouse in two ways: I compare the dynamics of the Teahouse Q&A board with a more traditional help forum, the Wikipedia Help Desk, and I compare the subsequent editing activities of Teahouse visitors with invited newcomers who did not participate.

Phases of the Teahouse pilot study

The seven months of the Teahouse pilot was divided into two phases, Phase 1 and Phase 2, with an eight-week *interregnum* period in between. Phase I (February 27 through May 26, 2012) includes the soft launch of the Teahouse and a series of iterations on the design of the space, such as the implementation of several of HostBot's automated tasks. At the end of the pilot, I deployed surveys and performed an initial set of analyses of participation patterns, invitation strategies, and new editor retention. The survey text is provided in **Appendix F**.

During the interregnum, the project team implemented no major features and performed no major analyses. Phase 1 (~July 23 through October 11, 2012) was marked by a visual design makeover and the implementation of automated (as opposed to manually-delivered) invitations to new editors. In addition, I deployed more participant surveys and performed additional analyses of Teahouse participation and new editor retention, as well as an experiment on the impact of personalizing the invite template on response rate. Unless otherwise indicated, the data used in the analyses presented in this chapter are cumulative of Phase 1, Phase 2 and the interregnum.

METHODS

In Chapter 2 I provided an overview of the methods I used and data sources I drew from for this study. In this section, I provide additional details on how I gathered and analyzed all data used in the Teahouse evaluation, and describe several targeted analyses I performed to investigate the impact of the Teahouse as a whole and its specific features.

In-project activity

I tracked editor activity on the Teahouse using a live mirror database of Wikipedia. In my analysis I divide Teahouse participants into three categories: new editors (guests), hosts, and other Wikipedians. I classified a participant as a new editor if they had fewer than 100 edits at the time of their first visit, or if they had created their account in 2012. 100 edits is a standard benchmark used by the Wikimedia Foundation for inexperienced editors (Wikimedia Foundation, 2011). I counted a new

editor as a Teahouse guest if they made at least one edit to the Q&A board or the Guests page. I counted an editor as a Host if they created a host profile for themselves. Some guests went on to become hosts. I excluded these editors from my subsequent analysis in order to avoid a potential source of bias.

Many Wikipedian who did not meet my criteria for either guest or host also participated in the Teahouse. I include the activities of these editors in my overall participation metrics. I also surveyed these editors during the pilot period. However, these editors are excluded from my subsequent analysis of new editor retention.

Many Wikipedia editors participated in spaces on the Teahouse besides the profile pages and the Q&A board—such as the main Teahouse talk page and the Host Lounge—during the pilot. However, the majority of these editors were hosts or other experienced Wikipedians. Since the primary focus of this evaluation is the new editor experience, I do not report metrics related to participation in these spaces.

Invitations

I logged a total of 7339 invitations sent by Teahouse hosts during Phase 1: between February 27 and May 27, 2012. I tracked which new editors received Teahouse invitations, what kind of invitation they received, and whether or not they subsequently created a profile or participated in the Q&A board. On July 23 2012, during phase 2 of the Teahouse pilot, I received approval from the Wikipedia Bot Approvals Group³² to enable HostBot to send automated invitations to all new editors listed on the daily invitee reports. I logged 4,268 invitations sent by HostBot between July 23 and October 11th.

Findings from previous research that showed that new Wikipedia editors were more likely to respond to more personalized invitations (Geiger, Halfaker, Pinchuk, & Walling, 2012). To investigate the impact of switching to a bot-driven invitation workflow on new editor recruitment, I compare the response rate among these two samples of human- and bot-delivered invites.

Surveys

I surveyed distinct samples of Teahouse guests during weeks 5, 11, and 26 of the pilot period. I also surveyed experienced Wikipedian participants (including hosts) during week 11. In this chapter I analyze responses from 196 Teahouse guests and 71 experienced Wikipedians. The overall survey response rate for all types of Teahouse participants was 22%.

The guest surveys included questions related to satisfaction with the Teahouse, as well as general questions related to challenges of being a new editor. Respondents were asked to rate their satisfaction with the answers they received on the Q&A board, with the experience of creating a guest profile, and with the Teahouse as a whole on a 5-point Likert scale (“Very dissatisfied” to “Very satisfied”). I also elicited specific feedback on Teahouse features from guests. Guests were asked (but not required to disclose) their gender, and 92% of respondents did so. The experienced editor survey focused on satisfaction, general impressions and specific feedback.

In this chapter, I report survey results related to editor satisfaction with the Teahouse, and compare satisfaction between male and female guests. I also report responses from new editors related to their general experience of Wikipedia.

³² http://en.wikipedia.org/wiki/Wikipedia:Bot_Approvals_Group

Dynamics of Teahouse Q&A board vs. Wikipedia Help Desk

The Teahouse Q&A board was designed to be more engaging, hospitable, collaborative and usable than other Q&A forums on Wikipedia. To evaluate whether the Q&A board achieves these purposes, I first report Q&A activity over the pilot period and present survey results that describe the overall Q&A experience from both guests' and hosts' perspectives.

In order to assess whether the Q&A board provided a more interactive experience than other Wikipedia Q&A forums, I compared it with the Wikipedia Help Desk, an active community-run forum that also fields many questions from new editors. To assess whether the Teahouse provided a qualitatively different Q&A experience than the Help Desk, we compared a sample of 500 questions asked on the Q&A board between February 27 and August 18, 2012 with 500 Help Desk questions from the same time period.

For this analysis, I compare the time between the question and its first response, the number of answers per question, and the number of times the original poster replied within their own question thread. I excluded questions asked by editors who were not logged in at the time they posted their question. I also excluded any edits made by Bots, as well as minor edits. When analyzing number of responses by the questioner within their own question thread, I excluded subsequent edits made by the questioner less than 5 minutes after their original post.

Retention of Teahouse visitors vs. non-visitors

To assess the impact of Teahouse participation on subsequent editing activities and editor retention, I compared the subsequent editing activities of two cohorts of new editors during Phase I of the pilot period: 252 invited Teahouse visitors and a control group of 260 new editors who did not visit.

Teahouse hosts browsed the invitee report every day and chose which new editors to invite on a case-by-case basis. Comparing invited newcomers with those who were not invited could risk biasing our results, because hosts likely avoided inviting new editors who seemed uncommitted, or whose early edits showed blatant tendencies towards vandalism. It would also be problematic to try to compare the editing patterns and retention rate of Teahouse guests and a random sample of all new editors, because the vast majority of newcomers have stopped editing for good before their first 24 hours are up.

To avoid these biases, we compared a sample of Teahouse visitors with a random sample of editors who were invited to the Teahouse by a host, but did not visit. All editors in our *visitors* sample had been invited to visit the Teahouse by a host and had subsequently edited the Q&A board or created a profile prior to June 10, 2012. Editors in our *invitees* sample (control group) were invited during the same time period, but did not subsequently edit either the Q&A Board or Guests page. To control for the possibility that some of these invitees had stopped editing before they saw the invitation, we only included invitees who had made at least 1 edit to Wikipedia after their date of invitation, thus assuring that they at least had the opportunity to see the invitation. We analyzed edits made by editors from both groups between the day after invitation and November 23, 2012, excluding any edits they made to the Teahouse itself from our analysis.

FINDINGS

Activity and participation

Between February 27 and October 11, 2012 1,098 new editors participated in the Teahouse, at an average rate of 34 per week. Guests asked 1,381 questions and created 420 profiles. 77 Wikipedians participated as hosts during the pilot, and an average of 21 hosts participated each week. Hosts participated in a variety of ways beyond answering questions: they sent out

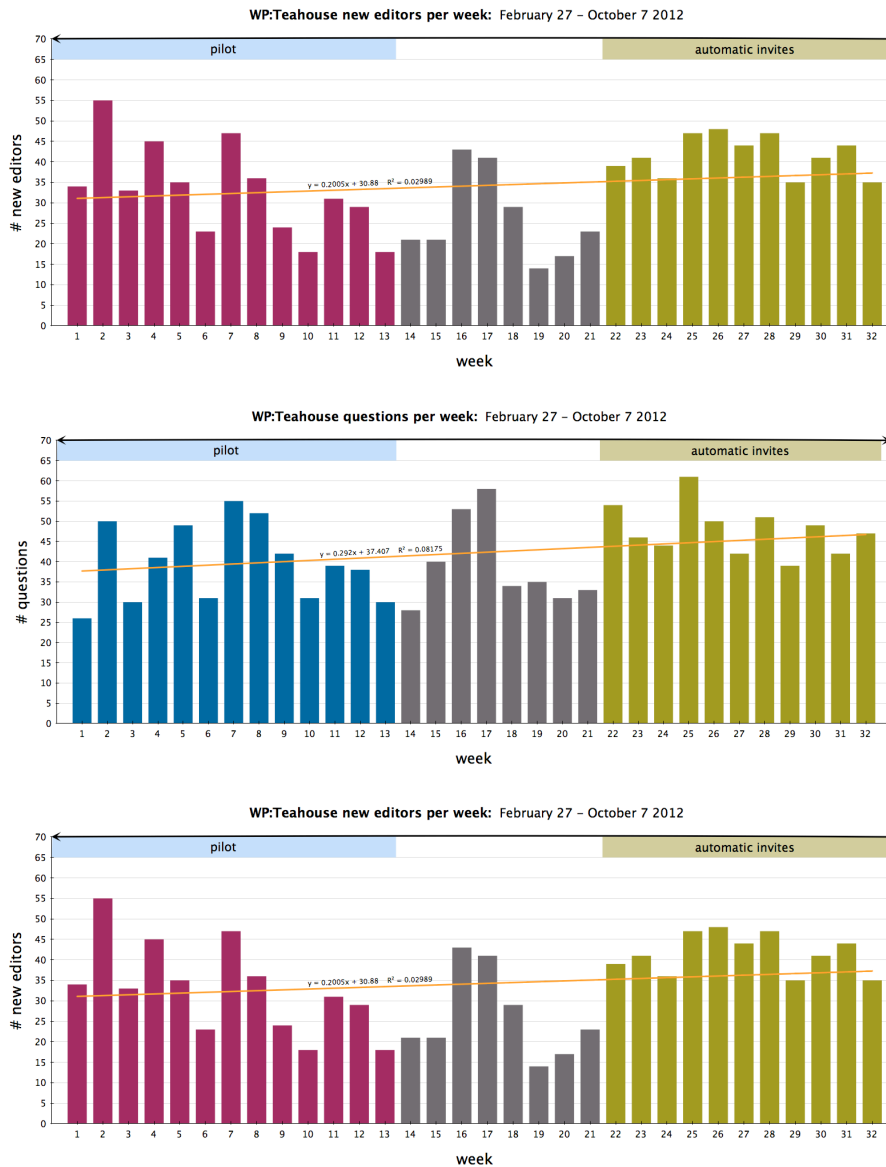


Figure 21. Activity during the Teahouse pilot. The interregnum and Phase 2 periods are represented by grey and gold bars, respectively.

invitations to new editors, discussed project-related issues in the Host Lounge, created Teahouse barnstars to award to new editors and to one another, brainstormed new features, and wrote several ingenious userscripts and templates to make their work easier.

Participation increased steadily over the pilot period, by several relevant measures (Figure 21). Part of this increase was due to an overall increase in the amount of invitations sent out per day once HostBot began sending these automatically. However, the Teahouse also became more deeply embedded in Wikipedia’s culture as the months went on, and prominent links to the Teahouse began to appear in other community spaces (including the Help Desk). Only 44% of guest survey respondents indicated that they had found out about Teahouse via a talk page invitation: nearly half of all respondents indicated that they had found the Teahouse by some other means.

Other improvements that may have increased participation include a visual redesign and additional workflow automation through new HostBot functions and host-created userscripts, all of which were intended to make participation easier and more enjoyable.

We were surprised to find that most new editors who visit the Teahouse only participate in one activity. While 70% of new editors ask a question and 40% create a profile, only 10% do both. This suggests that Teahouse visitors are attracted to different aspects of the space, and that it may be possible to boost participation by offering additional calls to action and new ways to participate.

In our guest surveys, we provided a list of several features that had been considered for the Teahouse based on the findings of my Research Sprints, but which had not been implemented. The three most commonly requested features were:

- Lists of ways to get involved in Wikipedia (60%)
- Links to help resources (60%)
- A list of WikiProjects that are looking for new members (59%)

These findings suggested to us that new editors wanted to use the Teahouse as a jumping-off point for other activities. Although we framed these features as static resources, we are intrigued by the possibility of offering this kind of support in more dynamic, social and contextually-relevant ways. Some possibilities might be new calls to action around suggesting editing tasks for newcomers, creating new discussion forums not focused on Q&A, and better surfacing of WikiProjects that would welcome new members.

We also surveyed guests to find out what they found challenging about participating in Wikipedia. The choices we provided in this question were based on findings from my research sprints.

What are some of the things that have been challenging for you on Wikipedia?

- Learning the Wikipedia editing interface (59%)
- Understanding Wikipedia policy (49%)
- Interacting with other Wikipedia editors (37%)
- Finding things I want to edit on Wikipedia (33%)
- Other (please specify) (40%)

Not surprisingly, 59% of new editors said that learning the editing interface was a major barrier to participation. However, all four of the choices were identified as challenges by at least a third of respondents. Furthermore, 40% of guests also provided a personal response. A selection of those responses are provided below.

What are some of the things that have been challenging for you on Wikipedia? (free response)

Finding sources, formatting articles. Also no one really has edited the Battle of Verdun article in months so it's kind of lonely doing everything by myself. :)

Millions of confusing and contrasting explanations, assumptions about definitions of jargon, unclear expression

If you ever try to remain friendly and solve a problem, you start a big problem.

When editors leave remarks, that then take ages to try and find the reason for - endless technical help pages that just confuse the issue further!

I don't really know what unbiased means so I had to look it up. (Guest survey responses)

Both the tone of these responses and the range of topics they cover indicate that the challenges new editors face, and by extension the decline in new editor retention, are not due to a single feature but a constellation of different features.

Invitations

The overall response rate for tracked invitations was 4%. This low response rate illustrates one of the challenges of trying to reach out to newcomers very early, before the natural ‘winnowing’ process described by Panciera (Panciera, Halfaker, & Riedl, 2009) takes effect: many new editors listed on the daily invitee reports may have stopped editing for good before they noticed that they had received an invitation. Furthermore, on many new users’ talk pages, Teahouse invitations likely had to compete for attention with a variety of other warnings and notifications (Walling & Pinchuk, 2011), and may have been overlooked for that reason.

During the Phase I of the pilot period, all invitations to visit the Teahouse were sent manually by Teahouse hosts, with two hosts (User:Rosiestep and Sarah Stierch) sending 80% of all tracked invitations during that timeframe. While this process was effective at bringing new editors to the Teahouse, hosts who sent many invites expressed frustration at the low response rate, considering how labor intensive the process of manually inviting editors was.

Many editors continued to manually invite new editors to the Teahouse during Phase 2. However, we were interested in investigating whether by automating the invite process we could make more new editors aware of the Teahouse without reducing the response rate. We also wanted to determine whether automating invitations would lead to an increase in invitations sent to bad faith editors, who might disrupt or vandalize the Teahouse. To investigate these questions, I performed two comparative analyses of the impact of invitations with different degrees of personalization.

First, I performed an A/B test of two different types of automated invitation (**Appendix G**). Version A, the personalized variant, contained the name of one of 11 Teahouse hosts as well as the username of HostBot. Version B, the generic variant, only contained the name of HostBot.

Between August 15 and September 16, HostBot delivered 1,805 invites to new editors. Roughly half of these editors received a generic invitation, and the other half received a personalized variant that was signed by a host. Editors who received a generic invite template responded at a slightly higher rate than those who received a personalized variant, (4.3% versus 3.7%), but a two-tailed Student’s T-test determined that differences were significant.

I compared the response rates for Phase I invitations that were manually-delivered to editors who had been listed on the daily invitee report with automated invitations to new editors who met those criteria during Phase 2. The response rate for manually-delivered invites was 4.27%, and the average response rate for automated invites (both generic and personalized) was 4%. A Student’s T-test showed that these two response rates were not significantly different ($t=0.68$, $p > 0.05$, 2-tailed).

In order to investigate whether automated invites would expose the Teahouse to a greater risk of disruption or vandalism from bad faith editors, I analyzed the block rate of a sample of 630 automatically invited editors and a sample of 390 manually-invited editors from Phase 1. I compared the percent of editors in these two samples whose accounts were blocked from

editing within 14 days of being receiving an invitation. In order to avoid inviting editors who were known abusers, I designed the HostBot invite script to detect whether or not a user had received a Level 4 Warning template³³. Level 4 warnings are only given to users who have performed serious acts of vandalism, and who have continued to vandalize despite repeated warnings.

The block rate between the manually- and automatically-invited groups was nearly identical: 5.5% for manual invites versus 5.7% for automated invites. These findings suggest that despite some initial concerns on the part of some hosts and the Bot Approvals Group, removing editorial discretion from the invitation process was not likely to encourage vandals or attract disruptive editors to the Teahouse. Anecdotally, we have not observed any increase in vandalism or disruptive editing on the Teahouse, in the time that automated invites have been running. In fact, there have been surprisingly few incidents of vandalism or disruption to the Teahouse overall, and the incidents that have occurred have been quickly addressed by Teahouse hosts.

Given the findings above, and the facts that automated invitations are much less labor-intensive than manual invites and have contributed to an increase in new editor participation, I view automated invitations as a key component of the Teahouse's continued success and an effective new user recruitment strategy. These experiments suggest that Teahouse guests did not perceive the bot-delivered invite as more impersonal, and that personalization was not a primary factor in that motivated new editors' decisions to visit the Teahouse. Ultimately I decided to adopt Version A, the lightly personalized variant of the invite template, on the grounds that this version contained a link to the talk page of a Teahouse host who had agreed to make themselves available to provide individual support to new users who contacted them directly.

Editor satisfaction

New editors enjoyed their Teahouse experience. Seventy one percent of new editors surveyed said that they were “Satisfied” or “Very satisfied” with their Teahouse experience, versus only 5% who said they were “Dissatisfied” or “Very dissatisfied.” When asked to describe what in particular they liked about their experience, new editors cited a range of factors, from the promptness and quality of the answers they received to the friendly atmosphere and the ease of use. A sample of guest responses is listed below.

What did you enjoy most about your experience?

Help from people who do not criticize.

Cool message when I first became a Wikipedia editor on my talk page and a really nice lady. Easy to post an answer and the community responded quickly.

Courteous, detailed and prompt responses. (Guest survey respondents)

Survey responses by experienced editors mirror those of new editors. Seventy percent of experienced editors surveyed (hosts and non-hosts) said that they were “Satisfied” or “Very satisfied” with their Teahouse experience, versus 5% for “Very dissatisfied” or “Dissatisfied.” Seventy nine percent of experienced editors surveyed also indicated that they intended to continue participating. When asked to describe what in particular they liked about their experience on the Teahouse, experienced editors also cited the promptness and quality of the answers they read or received and the friendly atmosphere. Many of these respondents also indicated that they believed that the Teahouse was having a positive impact on newcomers, primarily by

³³ http://en.wikipedia.org/wiki/Wikipedia:Template_messages/User_talk_namespace/Multi-level_templates

functioning as a friendly, safe space, and that the Teahouse was beneficial to the community as a whole. As one editor eloquently put it:

There is nothing extraordinary about [the Teahouse]. It just needs to exist and is fundamental to the Wikipedia experience. (Wikipedian survey respondent)

Other responses from Wikipedians included:

I liked that the Teahouse is a ground for new users so they have lots of support, and that hosts and new users interact a lot with each other.

Learning from others, in addition to sharing my own knowledge. Non-confrontational. (Wikipedian survey respondents)

Participation by female editors

Survey responses indicate that female newcomers participated in the Teahouse at a high rate. While Lam (Lam, Uduwage, Dong, Sen, Musicant, Terveen, & Riedl, 2011) found that 16% of new editors were women in 2009, 32% (57/178) of Teahouse guests who responded to our survey and disclosed their gender identified as female. This may indicate that we were successful in our goal of engaging new female editors. While it is difficult to get accurate gender data on Wikipedia editors, and we cannot rule out response bias without comparative data on the overall gender breakdown of new editors during our study period, a recent meta review by Hill and Shaw (Hill & Shaw, 2013) again calculated that the total proportion of female editors on Wikipedia was 16.1%. This finding strongly suggests that women did participate in the Teahouse at a higher-than-expected rate.

To determine whether women found the Teahouse more or less engaging than men, we conducted independent-sample t-tests comparing their responses related to satisfaction with Q&A board answers, Guests page profiles and the overall Teahouse experience. The results of these analyses are presented in **Table 6**. We found no statistically significant differences between men and women's satisfaction with the Teahouse, although women did rate their satisfaction with the answers they received on the Q&A board lower than men to a marginally significant degree ($M_{\text{women}} = 4.04$, $SD = 1.13$ versus $M_{\text{men}} = 4.33$, $SD = 0.78$), $t(124) = 1.71$, $p = 0.089$.

Qualitative survey responses and our own observations suggest room for improvement in Teahouse's Q&A and peer support model if the project is to effectively address the needs of female editors. The three female editors who rated the quality of their answers lowest stated:

Talk talk talk which wasn't much use except for ONE person.

It didn't help me with what I wanted to do.

My question was ignored. (Female identified guest survey respondents)

Table 6. Average Teahouse guest satisfaction by gender. Differences marked with an asterisk are marginally significant.

Gender	n	Q&A*	Profiles	Overall
Female	57	4.04	3.74	3.93
Male	121	4.33	3.78	3.86

These responses reflect our own observation that the quality of an answer in the Teahouse may vary depending on the host. Furthermore, as most Teahouse hosts who were active in the Q&A forum are male, we believe that there may be further gender dynamics to be explored in terms of the host/guest interaction.

Impact of social Q&A

The Teahouse Q&A board was designed to make the process of asking a question into an opportunity for positive socialization, not just an information transaction. Teahouse guests asked 1.6 questions on average, and 23% of guests asked multiple questions. Survey responses indicate that both new and experienced editors found Teahouse Q&A to be engaging, and recognized it as an effective mechanism for positive new editor socialization.

We performed independent sample t-tests to compare the average time between when a question was asked and the first response, the number of responses per question, and the number of posts by the original questioner within the question thread. Results are listed in **Table 7**.

We found no significant difference in response times between the two forums ($M_{\text{teahouse}} = 56.66$, $SD = 460.46$ versus $M_{\text{helpdesk}} = 23.44$, $SD = 229.05$), $t(998) = 1.44$, $p = 0.15$.

However, Teahouse questions did receive significantly more answers than Help Desk questions ($M_{\text{teahouse}} = 3.12$, $SD = 2.54$ versus $M_{\text{helpdesk}} = 2.55$, $SD = 2.01$), $t(998) = 3.91$, $p < 0.01$. Teahouse questioners also posted significantly more responses in their own question thread than Help Desk questioners ($M_{\text{teahouse}} = 1.04$, $SD = 1.79$ versus $M_{\text{helpdesk}} = 0.6$, $SD = 0.99$), $t(998) = 4.89$, $p < 0.01$.

Q&A guests seldom offered peer support

We hoped that because the Teahouse Q&A board de-emphasized the boundary between information seekers (guests) and experts (hosts) in favor of a more collaborative model, new users would feel comfortable jumping in and answering questions, in addition to asking them. While the Teahouse was more successful at eliciting newcomers to answer questions than the Help Desk, the number of newcomers who participated in a discussion around a question asked by another editor was low. Overall, only 11% of new editors who participated in the Q&A board posted in a question thread started by someone else.

Survey responses from new editors shed some light on this low level of peer support activity. Of those respondents who indicated why they had not answered a question on the Teahouse, 25% stated that they did not know they were allowed to, and 47% stated that they either did not see any questions to which they knew the answer, or felt they were too inexperienced to answer a question. No respondents stated that they could not figure out how to answer a question. However, during the pilot period we observed several guests asking questions about how to answer a question, suggesting that confusion or intimidation with the editing interface may have contributed to the low level of peer support.

Table 7. Interactivity of Teahouse Q&A board vs. Wikipedia Help Desk. Significant differences are marked with an asterisk.

Forum	Response time (minutes)	# answers	# questioner responses
Teahouse	56.66	3.12	1.04
Help Desk	23.44	2.55	0.6

Creating new opportunities for more direct interaction among Teahouse guests could help create more solid social bonds and support editor retention by fostering a greater sense of community among cohorts of editors. We intend to explore different interface design strategies and feature enhancements in the future to encourage more peer support.

Impact of participation

The ultimate goal of the Teahouse is not to bring new editors to the Teahouse, but to increase the number of editors who become frequent, high-volume contributors to Wikipedia. We performed independent sample t-tests to determine whether Teahouse visitors made more edits overall, whether they made more edits to articles, whether they edited more individual articles, and whether they participated more in discussion namespaces.

Teahouse visitors make more edits overall, and edit longer

Teahouse visitors made significantly more subsequent edits to Wikipedia than non-visitors ($M_{\text{visitors}} = 388.71$, $SD = 1683.21$ versus $M_{\text{invitees}} = 75.97$, $SD = 281.52$), $t(510) = 2.95$, $p < 0.01$. Visitors also made at least 1 edit during more weeks, post-invite, than invitees ($M_{\text{visitors}} = 7.62$, $SD = 8.74$ versus $M_{\text{invitees}} = 5.37$, $SD = 6.64$), $t(510) = 3.29$, $p < 0.01$.

Teahouse visitors make more edits, to more articles

Visitors also made significantly more edits to the article namespace of Wikipedia ($M_{\text{visitors}} = 260.81$, $SD = 1331.49$ versus $M_{\text{invitees}} = 57.12$, $SD = 223.56$), $t(510) = 2.43$, $p < 0.05$. And they edited significantly more articles than invitees ($M_{\text{visitors}} = 84.76$, $SD = 412.9$ versus $M_{\text{invitees}} = 14.31$, $SD = 47.13$), $t(510) = 2.73$, $p < 0.01$.

Teahouse visitors participate more in discussion spaces

Teahouse visitors made significantly more edits to pages within the primary ‘discussion’ namespaces of Wikipedia (User Talk, Article Talk and Wikipedia Talk) than invitees ($M_{\text{visitors}} = 62.7$, $SD = 282.9$ versus $M_{\text{invitees}} = 8.12$, $SD = 33.58$), $t(510) = 3.09$, $p < 0.01$. Edits made to a user’s own User talk page were excluded from this analysis.

Kittur (Kittur, Pendleton, & Kraut, 2009) found a similar increase in talk page participation for editors who joined WikiProjects, which they attributed to an increase in coordination work resulting from the editors becoming more engaged in group activities in these small topic-focused collaboration efforts. Since Teahouse is intended to socialize newcomers in such pro-social norms of interaction, we are encouraged to see that more Teahouse guests go on to talk before they write. However, since participating in the Teahouse was voluntary, we cannot say whether these editors are engaging in a higher level of talk page activity than they would have otherwise. It may be that editors who chose to participate in a social space like the Teahouse were already more inclined towards socializing and collaboration than those who declined to participate. Even if this is the case, our findings suggest that participating in the Teahouse gave these editors more opportunities to learn how to collaborate productively, and provided them with additional incentives to continue participating.

The elevated activity level of Teahouse visitors is a promising sign of sustained engagement with Wikipedia. We intend to continue tracking the participation of Teahouse visitors and non-visitors over time in order to determine whether Teahouse participation has a measurable long-term impact on editor retention, editing activities and quality of contribution.

DISCUSSION

Wikipedia needs more Wikipedians. Increasing a newcomer's awareness of the community behind the encyclopedia and creating more opportunities for positive experiences that both meet her immediate needs and teach her community norms in an engaging and supportive setting will help her tackle the confusion, frustration and conflicts to come.

Wikipedia also needs more *different* Wikipedians. Increasing the diversity of the community will not only increase the quality and completeness of the encyclopedia, it will increase the likelihood that any new member of the community will find like-minded collaborators and feel like they fit in.

Teahouse, a new editor support space, consists of a relatively simple set of tools, norms and procedures that frame the new editor experience in a new way. We have shown that both new editors and Wikipedians find the space itself and the activities it supports to be engaging and worthwhile, and provided evidence that Teahouse offers opportunities for positive socialization, social interaction, and interactive editor support that other support spaces and tried-and-true socialization strategies do not. And we have shown that Teahouse guests edit more and edit longer than non-visitors with similar early activity patterns.

CONCLUSION

The analysis presented in this chapter, though limited and preliminary, suggests that early outreach and social support are promising tools for community diversification and new editor retention. While the needs of Wikipedia newcomers are not necessarily equivalent to those of new users in other peer-production communities, they are reflective of them. The level of involvement in the Teahouse by new and experienced community members gives us confidence in the impact, scalability, and sustainability of gradualist, community-powered solutions for addressing complex sociotechnical problems like the Wikipedia editor decline.

Participation patterns in online collaborative communities may be cyclical or follow a more regular growth-peak-decline trajectory. Communities also evolve over time. On Wikipedia, socialization tactics that worked during the growth period do not appear to be as effective in the context of the current decline. In some cases, substantial top-down technological intervention may be the best way to attract new users or shift community dynamics. However in volunteer communities, where users are apt to rebel en masse if they feel manipulated or taken for granted by the technology owners (Gazan, 2011), supporting bottom-up, community-driven solutions may prove more effective and sustainable. Community solutions like the Teahouse can also be effective test beds, allowing designers, community managers and community members to try out new ideas in a lightweight way, while building community consensus around social or technological changes that might otherwise be seen as disruptive.

Future work

The Teahouse is not going away any time soon. Community members and Foundation staff are already at work planning Teahouses on other Wikimedia wikis, starting with the Arabic Wikipedia. Ideas from the Teahouse are also being adopted in other parts of the community: the Help Desk has implemented a "talkback" message system to alert questioners of a response, and other editors have begun to discuss the creation of local, offline Teahouse meetups. Measuring the influence of

the Teahouse on the community dynamics of Wikipedia and other Wikimedia projects over time is a challenging but intriguing possible direction for future research.

The findings from this chapter also suggest several additional avenues for future research and development. The analysis of new editor retention and post-participation activity patterns only examines these trends over a maximum of six months, among a relatively small sample of new editors. A study of these trends over a longer period and among a larger set of visitors and non-visitors will be necessary in order to demonstrate that the Teahouse has a positive impact on the problem of new editor retention.

The technical infrastructure of the Teahouse and its social norms are flexible. The Teahouse is not centrally controlled by anyone: it is free to evolve along with Wikipedia itself, or to be dynamically reconfigured or re-appropriated by its participants. Additional surveys could be used to understand whether the experience of participating in the Teahouse has changed over time, and whether preliminary findings on female editors' participation and satisfaction hold true in the long run. Longitudinal analysis of participation patterns in the Teahouse Q&A board could illuminate whether the level of peer support and interactivity within that space have changed over time.

Future work will focus primarily on boosting female participation, facilitating more peer support, and developing mechanisms for connecting new editors with both relevant and engaging tasks and potential collaborators. From the beginning, the Teahouse was intended to provide a more holistic approach to new user support than other initiatives led by Wikipedia editors—such as WikiProject Today's Article for Improvement—and by the Wikimedia Foundation, such as the Feedback Dashboard³⁴. However, this evaluation suggests several ways in which the Teahouse could be improved to provide more effective peer support and engage new editors in a wider variety of activities.

Suggesting tasks

Guest survey respondents indicated that they wanted recommendations of work tasks to do. The Teahouse could be an ideal space to surface tasks that are engaging to newcomers and important to the encyclopedia, but which are less likely to provoke negative responses from other editors.

Suggesting WikiProjects

Survey respondents also indicated a desire to join WikiProjects. In Chapter 6 I identified a wide variety of valuable work opportunities and social support functions that WikiProjects can provide. Connecting new editors with WikiProjects that match their interests and that welcome participation by newcomers could be another valuable service that the Teahouse provides. WikiProjects could advertise on the Teahouse, or a recommendation system could be developed to suggest active, welcoming WikiProjects that match a new editors' stated interests or editing history.

Supporting mentoring

Direct mentoring has been shown to be beneficial to new Wikipedia editors, but it is difficult to operate mentoring programs at scale. While the Teahouse does not directly support the development of mentor/mentee relationships, hosts did report that they unofficially adopted Teahouse visitors who approached them for help and maintained relationships with these new editors. The Teahouse could support this approach to socialization by providing ways of surfacing new editors who would like to be mentored, allowing hosts to advertise their availability as mentors, and visibly acknowledging the work of mentorship.

³⁴ http://www.mediawiki.org/wiki/Feedback_Dashboard

Many of the innovative features of the Teahouse could also be useful for other WikiProjects. Wikipedians I interviewed for this dissertation research have said that sustaining a WikiProject over time is challenging because of the high cost of maintaining project resources and coordinating group activities. On the Teahouse, HostBot automates many important but tedious tasks such as notifying editors and archiving older content, which must be performed by unofficial project coordinators in other WikiProjects. HostBot-style automation can also support coordinators by highlighting their activity within the project workspace, just as it ranks host profiles by recent activity. HostBot also surfaces recent events within the project space (e.g. new questions). This functionality could also be extended and adapted to provide richer and more effective mechanisms for ambient group awareness within WikiProjects (Gilbert, Morgan, McDonald, & Zachry, 2013).

Chapter summary

In this chapter, I described the application of a set of methods for evaluating a design intervention in an ecological context. Because open collaborations can evolve significantly over time at the hands of their users, traditional evaluation methods that depend on tightly controlled experiments or artificial settings may be difficult to implement in open collaborations. My evaluation of the Teahouse involved both comparative analysis between the Teahouse and the Help Desk and longitudinal analysis of new editor behavior over time. I also used surveys to capture users' perceptions, motivations and opinions, data that can be difficult to glean from edit logs and other behavioral traces. This mixed methods approach may be useful for analyzing the social structures of other open collaborations in the wild. I also provided evidence that unofficial norms—expressed through written interaction guidelines as well as the architecture, functionality, and look and feel of an open team workspace—can have an impact on how people behave within that space, even when those norms conflict with the established norms of the broader open collaboration community. This suggests that lightweight, community-driven design interventions may be used effectively to address complex, emergent issues in other open collaborations where community buy-in is required before changes can be made. I describe additional implications of the design and evaluation of the Teahouse for other open collaborations in the future work section of the next chapter, in which also I summarize the research and design activities presented in this dissertation and suggest directions for future work.

Chapter 9

Conclusion and Future Work

In this chapter, I conclude my dissertation and discuss related current and future work. I begin with a brief summary of my research findings and a discussion of how the formalization of Wikipedia shows some similarities to other human institutions. I then present the major theoretical, empirical and design contributions of my dissertation research and show how these contributions address my research goals and the three research questions I posed in Chapter 1. Finally, I discuss my current and future work.

The overall goal of this research project was to understand the reciprocal relationship between system-level changes on Wikipedia—such as growth and decline in the population of active editors—and community structures that coordinate and regulate work within that system. In Chapters 1 through 3, I motivated my research by describing the challenges that open collaborations face, and how the openness of these systems can help them address these challenges. I also described the tendency of organizations to become more formalized over time. I showed how formalization is a natural process that can provide organizations with certain adaptive advantages such as facilitating decentralized governance. However as more formalization occurs, it can also make an organization more rule-bound and less able to adapt to future changes. I suggested that open collaborations may be more prone to progressive formalization than other forms of mass collaborations because of their intrinsic openness. Because open collaboration systems are designed for incompleteness (Garud, Jain, & Tuertscher, 2008), formalization is accomplished through a gradual process that is primarily guided by the user-designers. While users of other mass collaboration systems are constrained by the design choices of the platform owners and system architects, in open collaborations the users themselves are in many ways the owners and architects of the system: they create persistent social structures—including formal rules and roles—and embed and enable those structures within the system’s technical infrastructure.

Alexis de Tocqueville, discussing the future of American democracy in 1835, described a process by which democratic societies may transform from decentralized, dynamic, adaptive systems into a form of rigid, centrally-controlled regime that he referred to as *soft despotism*:

...the sovereign extends its arms over society as a whole; it covers its surface with a network of small, complicated, painstaking, uniform rules through which the most original minds and the most vigorous souls cannot clear a way to surpass the crowd; it does not break wills, but it softens them, bends them, and directs them; it rarely forces one to act, but it constantly opposes itself to one’s acting; it does not destroy, it prevents things from being born; it does not tyrannize, it hinders, compromises, enervates, extinguishes, dazes, and finally reduces each nation to being nothing more than a herd of timid and industrious animals of which the government is the shepherd. (De Tocqueville & Frohnen, 2003)

I offer soft despotism as an analogy, albeit an imperfect one, for the process and consequences of formalization as it has occurred on Wikipedia. As the community developed more enforceable community rules and made existing rules easier to enforce by embedding them in community processes (such as the Arbitration Committee and the policy proposal process) and technical tools (such as bots, warning templates, and specialized vandal-fighting tools), editors found themselves more constrained in how they could contribute. As these rules became increasingly rigid and were internalized by many veteran Wikipedia editors (as implicit norms, which Tocqueville calls *moeurs*), there was less opportunity for innovation and adaptation, and potentially even less desire to innovate, among some established community members.

The analogy to democratic governance is also instructive for characterizing the role that certain social structures have played as checks and balances on bureaucracy and centralization in Wikipedia. In Chapter 4 I showed that Wikipedia editors are able to maintain a degree of flexibility in Wikipedia's policy environment by contributing to unofficial norms called essays. In Chapter 5, I showed that open teams called WikiProjects provide flexible coordination mechanisms that allow groups of Wikipedia editors to work together—in both close collaborations and loose confederations. In Chapter 6, I showed that WikiProjects can also be used to coordinate alternative forms of work that address emergent community concerns, including concerns that have emerged as direct consequences of Wikipedia's growth, popularity, and bureaucratization. In Chapter 7 I describe the Teahouse, a design intervention that attempts to leverage the power of open teams and unofficial norms to address a leading cause of the editor decline, the decrease in new editor retention, by providing more new editors with opportunities for positive socialization and peer support.

Contributions

My dissertation makes contributions to the model of open collaboration, empirical research on open collaborations, and the design of open collaboration systems. I describe my contribution to theory in the context of my overall research goal of using Wikipedia as a case study for developing the model of open collaboration. I describe my empirical and design contributions in the context of my three research questions.

Theorizing Open Collaboration

My primary contribution to theory has been to expand and operationalize the definition of open collaboration and open collaboration systems. Open collaboration is a relatively new term that describes a relatively new phenomenon. I situate open collaboration within mass collaboration, a model of distributed online production that also includes crowdsourcing, virtual teaming, and rater/recommender systems. Forte & Lampe's (Forte & Lampe, 2013) described open collaboration systems as online platforms that support collaborative production of an artifact, present low barriers to entry and allow participants to create persistent, malleable social structures. I expand on this definition, drawing on related research in a discussion of the role of community boundaries, models of governance, and formalization processes in open collaborations. I operationalize Forte & Lampe's criteria for open collaboration in terms of social and technical mechanisms of open collaboration systems that have an impact on openness by affording or constraining inclusivity and flexibility. I demonstrate how thinking of systems in terms of inclusivity and flexibility facilitates a multi-level, ecological analysis of the relationship between technical and social infrastructures, and the way they are reciprocally shaped by the actions of humans and groups over time.

Forte & Lampe provide a descriptive model of open collaboration. In this dissertation, I have begun the work of developing a theory of open collaboration by operationalizing their descriptive criteria as system properties and examining how those properties are manifested in different system features over time. Anchoring an abstract concept like "low barriers to entry" in an observable phenomenon such as the ability to make edits without being reverted renders the concept potentially testable through observation or experiment. Each phenomenon associated with the description then becomes a variable that can be traced over time or examined in relation to other variables. In Chapter 4, I demonstrated a relationship between new editors' interactions with two phenomena on Wikipedia that present different degrees of barrier to entry—policies and essays. In Chapter 5, I provided evidence that WikiProjects and FLOSS projects instantiate the descriptive criteria of Forte & Lampe's model through similar coordination mechanisms. Comparisons like this allow the model to be evaluated for its predictive, rather than merely descriptive, power because the degree to which these phenomena are related can be verified or falsified

through empirical examination. In Chapter 1, I described the challenge of supporting open collaboration as a design problem, and motivated my investigation of Wikipedia in the context of the editor decline as an opportunity to identify ways that other open collaboration systems can maintain productivity, quality, and community as they mature. If Wikipedia does in fact represent an instance of a class of collaboration system and an example of a distinct model for organizing work, then at some point other open collaborations that are fortunate enough to engage a large number of contributors may need to address the kinds of challenges Wikipedia has faced. If those projects are to remain inclusive and flexible, they too must ensure that they continue to provide mechanisms that keep barriers to participation low and social structures persistent and malleable. A fully realized theory of open collaboration would allow researchers to identify the key types of mechanism that are most essential for maintaining productive, sustained collaboration even in systems that do not resemble Wikipedia in their focus, community dynamics, or technological infrastructures. The empirical examinations that I have described in this dissertation are guided by and framed in terms of the open collaboration model, and other researchers may verify or falsify the general inferences I make about open collaborations by applying the model to other features of Wikipedia or other open collaboration systems.

The Formalization of Community Norms and the role of unofficial norms

Research question 1: *How has the increasing formalization of norms in the Wikipedia policy environment affected participation in community self-governance?*

In Chapter 4, I present the first empirical analysis of the three primary genres that constitute the Wikipedia policy environment, and the first analysis of the continued evolution these regulating documents beyond 2007. I provide evidence for the impact of the creation of an official review process for policies and guidelines, and show that Wikipedia's increasing resistance to contribution by newer editors extends beyond the article namespace. I also show that as official norms became calcified—with few new documents being created and existing norms being increasingly closed to expansion or renegotiation—the development of unofficial norms in the form of essays grew exponentially. I argue that writing essays provided newer editors with the opportunity to contextualize and rearticulate the regulatory regime of Wikipedia in their own terms and provided opportunities for legitimate peripheral participation, despite the fact that these unofficial norms were not likely to have as great an impact on community governance as official genres.

The WikiProjects as Open Teams

Research question 2: *How do Wikipedians coordinate work through open teams known as WikiProjects?*

In Chapter 2, I argued that WikiProjects serve as a critical open coordination mechanism for Wikipedia. I defined WikiProjects as open teams in order to distinguish them from other groups on Wikipedia and from virtual teams, project teams, sports teams and other systems and settings. The primary reasons I offered to support this distinction were that WikiProjects are autonomous, self-organized, feature porous boundaries, and provide no formal roles or rules beyond those that the participants themselves choose to define. In these respects, each WikiProject can be seen as a microcosm of Wikipedia as a whole.

In Chapters 5 and 6 I describe the features of WikiProjects that make them uniquely valuable to Wikipedia, situated WikiProjects within the broader ecosystem of open collaborations, and provide implications for the design of WikiProjects and other open teams on Wikipedia and beyond. In Chapter 5 I showed that the porous boundaries and autonomy of WikiProjects allow editors to use these workspaces for a wide variety of purposes: to get targeted guidance from subject matter experts, pass on relevant information, submit work requests, and to a lesser extent seek out collaborators. I showed that in many ways Wik-

iProjects function less like groups, as groups have been defined and studied in fields such as social psychology and organization science, and more like Free/Libre Open Source Software (FLOSS) projects. I demonstrate that WikiProjects and FLOSS projects exhibit similar properties such as self-selection of work tasks, centralized and public coordination and communication mechanisms, and a group structure comprised of a small, active core and a large periphery that participants circulate between informally and dynamically. By establishing a connection between WikiProjects and FLOSS projects, I show that coordination on Wikipedia, while exceptional in many ways, is not intrinsically different from coordination in other open collaborations.

In Chapter 6, I demonstrate that WikiProjects are used to coordinate a wider variety of work activities than have been described in previous research. I show that participation in conventional WikiProjects has declined since 2007, a phenomenon I attribute to both the general decline in active editors and the increasing completeness in Wikipedia's coverage of major encyclopedia topics (Kittur, Chi, & Suh, 2009; Suh, Convertino, Chi, & Pirolli, 2009). I also show that participation in alternative WikiProjects has remained relatively stable over the same period, and even increased by some measures. I attribute the success of alternative WikiProjects to the fact that many of these projects perform valuable meta-work and community support activities that are of continuing relevance to quality control and community health, and which in fact may be more important as the social dynamics of Wikipedia have become more conflict-driven and the formalization process has added layers of complexity to both production and coordination work. I also provide a set of design recommendations to support WikiProjects and other open teams in domains such as citizen science collaborations. I review findings from studies of content curation communities and citizen science collaborations that show that these open collaborations also present complex coordination requirements and could benefit from allowing contributors to self-organize around alternative work tasks that address both perennial and emergent community needs.

The research I present in Chapters 5 and 6 makes two primary contributions. First, it situates WikiProjects as an instance of a more general class of social structures that I call open teams, which coordinate tasks beyond editing articles and also exist in open collaborations beyond Wikipedia. Second, it describes a set of potential design challenges and design requirements for supporting open teams that can be examined in new work contexts and new collaboration systems.

Using Open Teams and Formal Norms to Support New Editor Socialization

Research question 3: *How can formal norms and open teams be adapted to provide opportunities for new user socialization and help Wikipedia recruit and retain a larger and more diverse set of new contributors?*

In Chapters 7 and 8, I describe a novel design intervention, the Wikipedia Teahouse. In Chapter 7, I describe how the design of the Teahouse is informed by my research on unofficial norms and WikiProjects. I describe the user-centered design process I followed in my contributions to the Teahouse. I also show how the design goals of the Teahouse address the new editor experience, the gender gap, the challenges of sustaining open teams, and the way informal, non-binding norms can be designed into technical infrastructure and embedded in a set of regular interactions to create a welcoming and supportive atmosphere for new editors. In Chapter 8, I perform a mixed-methods pilot evaluation of the Teahouse in the wild and provide findings that suggest several ways in which the Teahouse achieved the project's design goals as areas for improvement and missed opportunities. My approach to surfacing Teahouse design requirements, evaluating specific features, and quantifying the impact of Teahouse participation on new editor retention demonstrate a commitment to ecological validity and also represent several productive quasi-experimental designs that may be useful for other researchers of living laboratories.

Current and future work

In my role as a Research Strategist with the Wikimedia Foundation, I am pursuing several design-based research activities that build on the work presented in this dissertation.

The IdeaLab

In collaboration with two other members of the Teahouse project team, I am developing a WikiProject-like place called the IdeaLab³⁵ (**Figure 22**). The IdeaLab is intended to be a place where editors from all Wikimedia projects—such as Wikimedia Commons, WikiSource, Wiktionary and the hundreds of other language editions of Wikipedia—can come together to brainstorm ideas for improving their own communities and for furthering the mission of the Wikimedia movement, which is to encourage the creation and dissemination of free, multilingual educational content across the world. The IdeaLab is hosted on meta.wikimedia.org, a Wikimedia wiki for content and collaboration that spans individual Wikimedia projects.

Many Wikimedia contributors focus primarily on a single project. The IdeaLab is intended to serve as a bridge across projects, facilitating cross-fertilization of ideas for improving community health, engaging contributors and improving the quality of the resources Wikimedia provides. The IdeaLab also provides opportunities for individual learning and relationship-building. In the IdeaLab, participants can create a new idea, collaborate with others on existing ideas and introduce themselves to the global Wikimedia community by creating a Teahouse-style personal profile. The IdeaLab is also an incubator for Wikimedia Individual Engagement Grant proposals. Ideas that meet criteria for funding through the Wikimedia Grants Program can be expanded into full grant proposals and submitted for peer review by a committee of volunteers.

³⁵ <http://meta.wikimedia.org/wiki/Grants:IdeaLab>

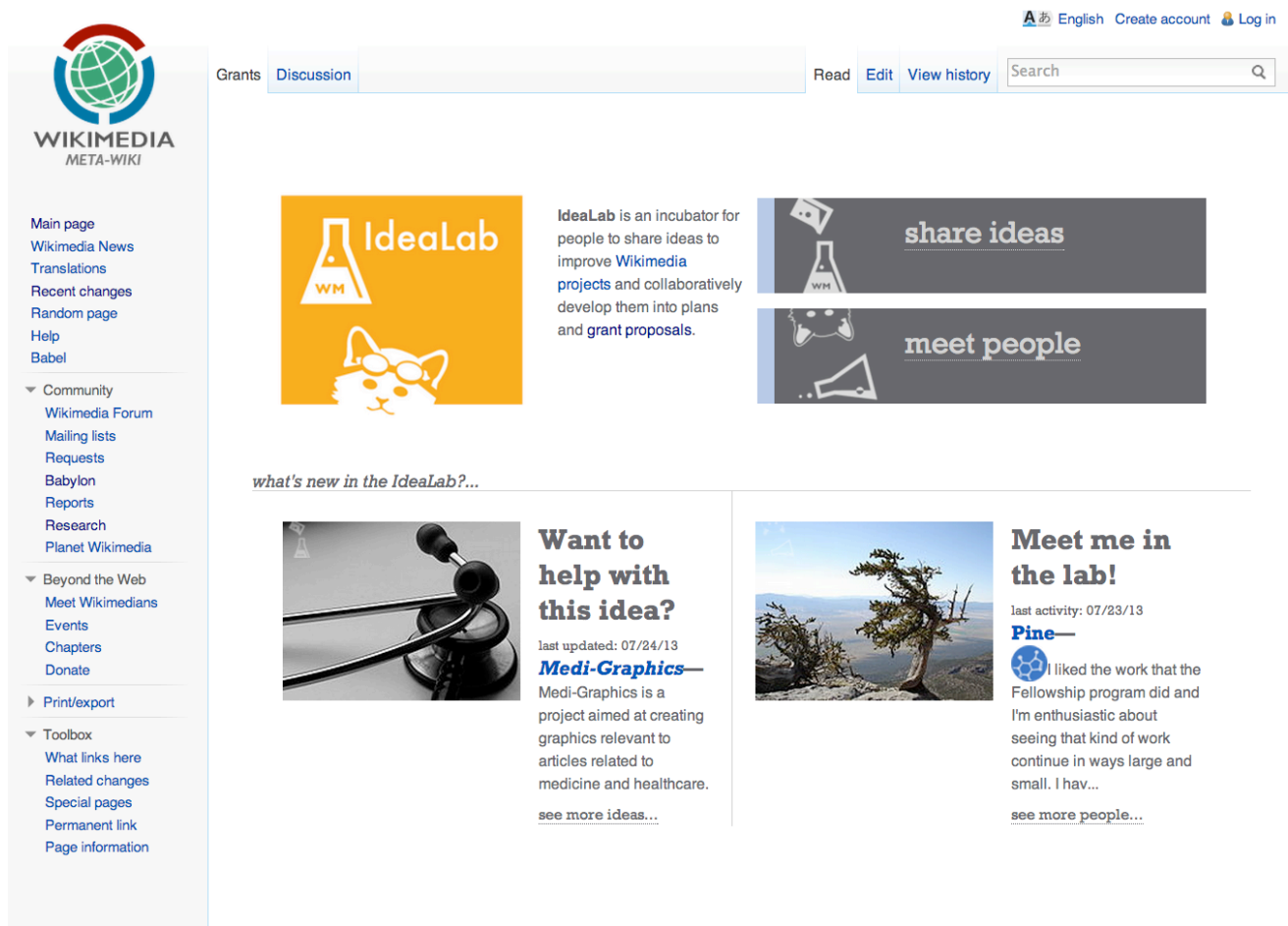


Figure 22. The landing page of the Wikimedia IdeaLab, a cross-project idea incubator, with featured content galleries.

The IdeaLab is overseen by Wikimedia Foundation staff, but incorporates many social and technical features of the Teahouse and other WikiProjects. Anyone can participate in the IdeaLab, participants are encouraged to submit ideas on diverse topics, there are no criteria for rejecting an idea, and the project is designed to scale to support sustained collaboration by a large number of participants and a high volume of ideas. Many of the design goals and features of the Teahouse are reflected in the IdeaLab, such as bot-driven mechanisms for surfacing activity, and profiles to foster a sense of community. Like an alternative WikiProject, the IdeaLab provides a framework for engaging in a new form of valuable work that addresses the current community needs. In this case, the community is the global Wikimedia movement, rather than the English Wikipedia.

I intend to evaluate the IdeaLab's success as an idea incubator by studying the trajectory of projects that begin in the IdeaLab and are realized in sustained grant-funded or voluntary collaborations across the Wikisphere. I also intend to expand the role of the IdeaLab to facilitate its use as a *research incubator* for supporting volunteer-driven research projects. Potential volunteer-driven projects could include identifying core contributors to different Wikimedia projects and identifying language editions of Wikipedia that are facing challenges that the English Wikipedia has experienced, as well as new challenges that may require different strategies. Many Wikimedia contributors have experience with scientific research methods and possess extensive technical expertise, but there are few formal mechanisms within the Wikimedia project ecology that leverage these skills support collaborative community research. The Foundation makes many useful research tools publically available, but





Profile	View	Template	Presentation
Basic profile	Guide	<pre> {{IdeaLab/Idea/Summary time= 07/10/13 idea= Accessibility - reading, reusing, and contributing idea link= Grants:IEG/Accessibility - reading, reusing, and contributing summary= Improve technology or do social outreach to encourage people with disabilities to read, reuse, or contribute to Wikimedia content. creator= [[mw:Sharihareswara (WMF) Sumana Harihareswara]] image = File:Web_Accessibility_laurel.svg }} </pre>	<p>Accessibility - reading, reusing, and contributing</p>  <p>Last updated: 07/10/13 Improve technology or do social outreach to encourage people with disabilities to read, reuse, or contribute to Wikimedia content.</p> <p>created by: Sumana Harihareswara</p> <p>see full idea</p>
Featured content	Gallery	<pre> {{IdeaLab/Feature time = 07/16/13 image = File:Asaf Bartov 006 - Wikimedia Foundation Oct11.jpg action = 5 name = Ijon badge = staff username = User:Ijon summary = I'm a longtime Wikipedian interested in the developing world, editor engagement, expert outreach, bots and tools, and library metadata. I w... }} </pre>	 <p>Meet me in the lab!</p> <p>last activity: 07/16/13</p> <p>Ijon</p> <p> I'm a longtime Wikipedian interested in the developing world, editor engagement, expert outreach, bots and tools, and library metadata. I w... see full profile</p>
Feed entry	Activity feed	<pre> {{IdeaLab/Activity/Entry time = 07/15/13 username = number of people = 4 action = 2 idea = Upload from context idea link = Grants:IEG/Upload from context }} </pre>	<p> 4 people are working on this idea: Upload from context</p> <p>Last activity: 07/15/13</p>

Figure 23. Overview of Percolate activity surfacing patterns showing preliminary typology of profiles and guides.

many Wikimedia contributors who are interested in performing research are not familiar with these tools or with other tools and methods—such as surveys and usability tests—that could be used to support their communities. In the IdeaLab, I hope to create a community research infrastructure that brings together experts and eager newcomers for the purposes of understanding and supporting open collaboration on all across the Wikisphere.

Percolate

I have also begun to develop a design pattern library, called Percolate³⁶, that formalizes some of the design approaches I developed with Heather Walls to surface activity and community within the Teahouse and the IdeaLab. Percolate is intended to provide user-designers with better tools for highlighting important artifacts and keeping track of relevant user actions within WikiProjects and other group collaboration spaces on Wikimedia wikis.

Percolate provides a relatively simple and robust way of replicating some of the AJAX-based functionality that other social software platforms (like Facebook and Quora) use to surface relevant content and recent activity, without sacrificing MediaWiki’s flexibility and inclusivity. I am designing Percolate to be implemented using accessible technologies that are native to the Wikimedia wiki ecology and can be implemented on top of the MediaWiki platform—templates, bots, JavaScript userscripts and extensions, and the MediaWiki API. This approach is intended to allow volunteer contributors with some

³⁶ meta.wikimedia.org/wiki/Grantmaking_and_Programs/Learning_&_Evaluation_portal/Surfacing_activity

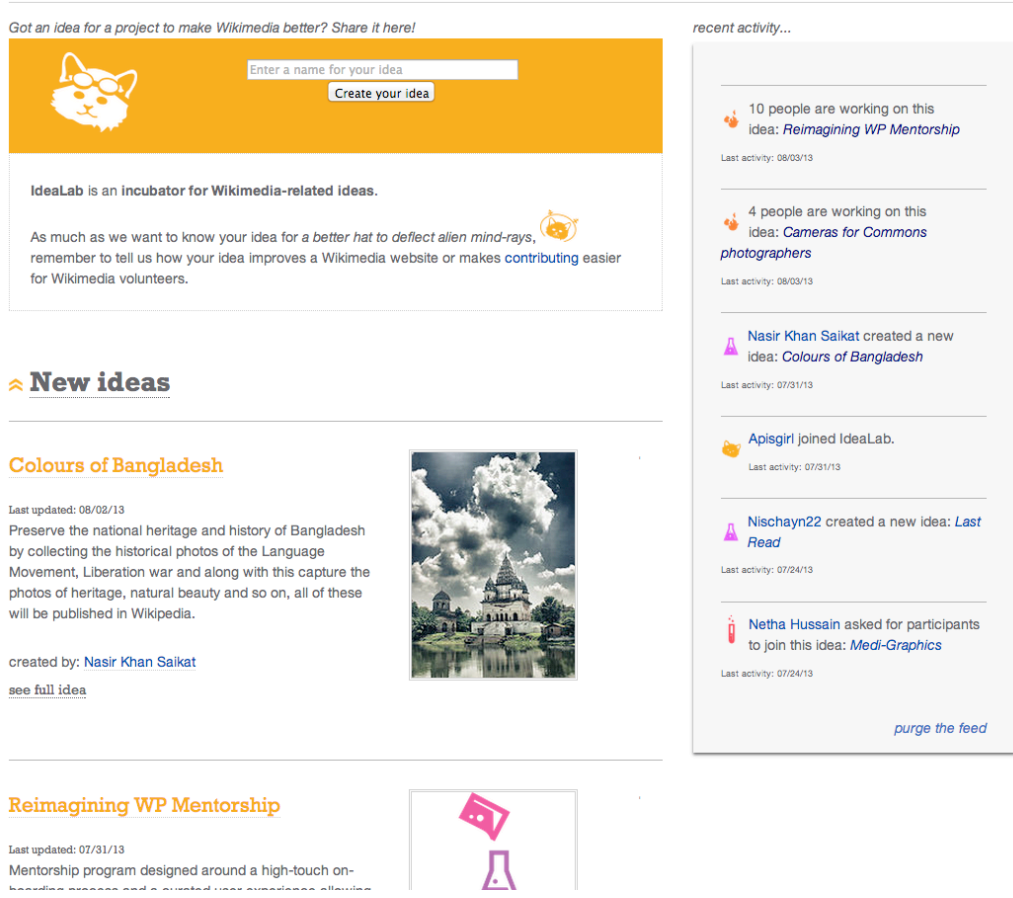


Figure 24. The IdeaLab Ideas page, which features idea profiles in a gallery pattern (left) and a feed pattern (right).

technological expertise to design and develop with Percolate without having to undergo extensive code reviews, become official MediaWiki developers, or rely on access to MySQL databases.

The three patterns I have developed for Percolate so far are based on two major elements: *profiles* and *views*. Profiles are simple templates that display formatted content. That content can be text pulled from a source page or metadata about that page. Any information about a source that can be gathered through the MediaWiki API can be included in a profile, and profiles can be formatted using CSS, HTML, wikitext or the Lua scripting language. Percolate describes three profile types: *basic profiles*, *featured content profiles*, and *feed profiles*.

Each Percolate profile is presented within a particular view. Views are different methods for displaying profiled content. I have defined three types of view: guides, galleries and feeds. Each view is based on a design element of the Teahouse or IdeaLab, and is intended to surfaces relevant activity in a different way.

The *guide* view allows for the creation of dynamic lists of profiles from various sources all on the same page. Guides provide an easier and richer browsing experience than Wikipedia categories because they provide relevant information about each source, instead of a bare list of links. Guides allow users to find out basic information about each source page without visiting that page. This is useful for displaying comprehensive information about all of the pages within a particular category, such as

all IdeaLab Idea that have put out a call for participants³⁷. The order in which profiles are displayed within the guide can be updated dynamically as well, so that new or recently-updated content is listed at the top of the guide, as on the Teahouse host profile page.

The *gallery* view is useful for surfacing content that project members want to highlight on the project's main page. In a gallery view, profiles are featured in a persistent content window on a target page. Every time the server cache of that page is cleared, a new featured profile from the gallery is displayed. The Teahouse landing page contains three galleries: recent questions, featured hosts, and featured guests (**Figure 14**).

The *feed* view shows recent events on pages within a project's scope. Feed entries are often short profiles listed in reverse chronological order, with the most recent entries at the top. The Wikimedia IdeaLab has a feed (**Figure 24**) that currently signals four types of events: when a new idea is created, when a new participant joins the IdeaLab, when an idea has been unusually active, and when an idea creator has recently asked for help with their idea. The Teahouse Q&A board (**Figure 16**) also instantiates a feed pattern. The Teahouse Gadget allows new editors to ask their question in a text input box, formats those questions as page sections and inserts each new question at the top of the Q&A board.

Percolate patterns are intended to be automated so that profiles can be created and moved, and views can be updated based on a set of predefined criteria. Automation allows WikiProjects to support many different profiles and views simultaneously and allow them to be updated on a regular basis without human intervention. At the same time, because profiles and views are instantiated in wiki pages that can be edited by end users, the way the content is presented can be changed in many ways without updating the underlying bot code. The bots and userscripts that create views and profiles are also end-user configurable, assuring that errors can be easily corrected and scripts can be adapted to changing circumstances.

Percolate does not solve the problem of editor retention, but it may encourage more Wikimedia editors to start thinking of new ways to make the editing experience more user-friendly and more engaging for new editors—and encourage them to view that task as a legitimate and valuable way of contributing to Wikimedia projects. Automated processes for surfacing activity and community based on simple, extensible design patterns can help reduce the cost of maintaining a WikiProject, allowing project members to pursue the work that engages them most, whether individually or in collaboration with others. Patterns like these can also provide design guidance for the WikiProject tools I recommend at the end of Chapter 7: leaderboards, social translucence visualizations, and socially intelligent task routing. Once these new coordination mechanisms have been developed for one project, they can be adapted to serve other WikiProjects, even those on other Wikimedia wikis.

CONCLUSION

Although my research has focused on an era in the history of the English Wikipedia that I (somewhat morbidly) refer to as the decline period, I do not anticipate that Wikipedia is destined to decline and fall. For one thing, there are hundreds of other Wikipedias, and while most other language editions are small compared to English, almost all of them are still growing. These information resources, and the communities that form around them, represent a wealth of largely untapped opportunity for understanding and supporting open collaboration. Furthermore, there is still plenty of work to be done on the English Wikipedia, and hundreds of millions of people who are qualified to perform that work. The main task for the English Wikipedia community, as well as the Wikimedia Foundation, is to encourage more contribution from a more diverse set of con-

³⁷ <http://meta.wikimedia.org/wiki/Category:IdeaLab/Ideas/Participants>

tributors. Just as both social and technological factors have contributed to the Wikipedia decline, I believe that a Wikipedia renaissance can only be accomplished through a combination of social and technological changes that make the experience of contributing to the sum of all human knowledge more engaging, meaningful, and fun.

It bears considering when discussing the decline of Wikipedia that no other open collaborations (with the possible exception of a very few open source software projects) have yet achieved anything like Wikipedia's success. Wikipedia is an open collaboration that has integrated contributions by millions of people, and which—after 11 years—still engages tens of thousands of core contributors every month, creating a valuable public good that dominates the competition. It is not known whether Wikipedia's success is reproducible in other domains of work that have been amateurized in the age of the Internet, such as citizen science, open journalism, or online civic action. But it would be good for the world if the success of Wikipedia's model of open collaboration were transferrable. We live in a world that is both increasingly data-driven and increasingly flooded with information that must be organized, analyzed and synthesized to be of any use to human society. Information itself is becoming an increasingly valuable commodity, and both national governments and private companies in the new millennium demonstrate a tendency to collect more data about their citizens and customers, to keep those data private, and guard it jealously. Systems that can sustain productive open collaborations at scale and over time are one mechanism to assure that individuals in the future continue to have access to data, information, and the common goods that can be built with them.

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Vita

Jonathan T. Morgan was born and raised in the San Francisco Bay Area, California. At St. John's College in Santa Fe, New Mexico, he earned a Bachelor of Arts degree in Liberal Arts. In 2013, he earned a Doctor of Philosophy at the University of Washington in Human Centered Design & Engineering.

Appendices

APPENDIX A: WIKIPEDIA POLICY ENVIRONMENT CODEBOOK

Code	Brief Definition	Full Definition
Content	pertains to main space article content	document is primarily oriented towards the content of Wikipedia articles, rather than the behavior of Wikipedia editors.
Behavior	pertains to user conduct	document primarily addresses editing behaviors or social/rhetorical behaviors of a specific Wikipedian or group of Wikipedians.
Legal	Wikimedia-imposed dictate	document pertains to or describes institutionally-mandated process, usually instituted for legal reasons (such as defamation, libel or copyright concerns) by official members of the Wikimedia Foundation
Formal Process	relating to a formal (bureaucratic) process	document pertains to or describes a formal bureaucratic process, such as requests for deletion of an article or the promotion or blocking of an editor undertaken by regular members of the Wikipedia community.
Other	describes a work activity or subject unrelated to the above categories	The document describes a work activity that is not well-captured by any of the above categories. Use of this category should be accompanied by notes explaining WHY none of the other categories were appropriate.

APPENDIX B: WIKIPROJECT TALK PAGE CODEBOOK

REQ-COORD-ART

Requests or proposes coordinated editing of articles

Post that contains a proposal, suggestion or request to edit a *specific* article together. The post *must contain clear language* that indicates that the author has performed edits and/or intends to perform edits to the article(s) in question, but would also like other people to perform edits.

REQ-COORD-NONART

Requests or proposes coordinated editing of content pages that are not articles

Post that contains a proposal, suggestion or request to edit non-article pages together. Examples include templates, categories, policies/guidelines, portals or WikiProject pages. The post must contain clear language that indicates that the author has recently performed or intends to perform edits themselves, but would also like other people to perform edits. The post must refer to a specific wiki page or other piece of on-wiki content around which the author proposes collaborative editing.

REQ-DISCUSSION

Requests or suggests that others join a discussion on another page

Poster asks others to join in a discussion on another wiki page. The post must contain either a specific request to participate in the discussion or a hyperlink to a talk namespace page (e.g. Wikipedia_talk OR WT).

REQ-OPINION

Requests advice, opinion or informal feedback, or attempts to gauge local consensus around an idea

Requesting advice, eliciting opinions, or taking a poll: Postings requesting advice on how to perform certain actions, seeking consensus on a decision, requesting clarification on procedures or policies, or polling. Not necessarily asking them to edit a specific thing, don't necessarily have a specific outcome in mind, not asking them to participate in an existing discussion elsewhere OR attend an event or join another project.

REQ-PEER-REVIEW

Requests that someone perform official peer review of encyclopedia content

the poster asks others to perform a peer review on article content or other reader-facing encyclopedia content (such as images). The post must be asking for peer review or evaluation of an article according to well-defined criteria, rather than just tips, assistance, advice or opinions. For more about the peer review process, see: http://en.wikipedia.org/wiki/Wikipedia:Peer_review.

REQ-OTHER-PEOPLE

Request that other people perform edits to content pages on the English language Wikipedia, but does not offer to help out

Postings that include a request or suggestion that someone else edit or create something (**not** an offer to collaborate)

REQ-TASKS

Requests suggestions of editing tasks or things to do from others

Postings where the user requests editing tasks or other ways to get involved with the project

REQ-INFO

Requests information that is not explicitly related to editing Wikipedia or being a Wikipedia editor

Postings where the user requests information that is related to the article topic, and where the user does not evince a clear intention to edit the article itself OR ask other users to edit content.

INVITATION

Request to join another project, join in a named initiative, or attend an event

The poster asks others to join an official project or attend an event online (like another WikiProject, or a Collaboration of the Week) or offline (such as a meetup or a lecture)

FYI**Statement or announcement - no request**

The post is intended to inform others of something that is relevant to editing, this Wikiproject or being a Wikipedian, without asking a question, proposing action or explicitly eliciting a response.

REQ-MONITOR

Request to keep an eye on an article, user, template etc. or perform an administrator action.

REQ-OTHER

Contains a request, but it is a request that does not fit into any of the request categories. (say why in text box).

Use this if page contains a request that doesn't fit into any of the other request categories.

APPENDIX C: WIKIPROJECT INTERVIEW PROTOCOLS

First round of interviews (July – September 2011)

- *Wikiprojects in General*
 - What defines a successful Wikiproject for you?
 - What role do you think that Wikiprojects currently play in Wikipedia? How important are they?
 - What are ways that the community (proj. leaders, members, etc.) evaluate the health/success of Wikiprojects?
 - Are there any themes, trends or changes you're seeing among Wikiprojects lately?
 - Tell me about a Wikiproject you can think of that have been successful in the past, but is no longer thriving? Why?
 - Can you point to a good example of a Wikiproject that is successful in attracting new members?
 - What are some (other) examples of healthy Wikiprojects?
- *Experiences with Wikiprojects*
 - What role(s) have you played as a Wikiproject member in the past?
 - How did your participation in Wikiprojects affect your work as an editor?
 - In your experience, do members of a Wikiproject typically share in defining tasks equally, or do some members take a clear leader role?
 - Does the work Wikiproject members engage in seem to be distributed evenly, or do subgroups emerge to address specialized kinds of tasks within the Wikiproject?
 - Can you think of any examples of different Wikiprojects coordinating their efforts with one another?
 - What would make participation in Wikiprojects a better experience?
- *Future of Wikiprojects*
 - Are there any Wikiprojects that you are particularly interested in learning about?
 - We're interested in creating a resource (a kind of browsable guide to Wikiprojects) based on the data we've collected, and sharing that resource. Who would be interested in such a resource? What kind of metrics would be valuable to you?
 - What kinds of resources (previous research, publications, or editors) already exist that relate to Wikiprojects, that we might not know about?

Second Round: November 2012 – May 2013

Background Info

First, I'd like to get a little information about who you are and what you do on Wikipedia.

- How old are you?
- What is your profession or job?
- What kind of work do you do on Wikipedia?
- When did you start editing? What made you join?

WikiProjects Involvement

- How did you find out about WikiProjects?
- How many projects are you currently involved in?
- What was the first WikiProject you were involved in? Why did you join?

Primary project(s)

Now, let's talk about the project you feel most familiar with.

- Tell me about the project and its goals.
- How big is it? (editors/articles)
- How long has it been around?

Tell me about how it is organized.

- Who are the leaders of the project? How can you tell that someone is a project leader?
- Are there smaller groups within the project, like task forces or committees? Tell me about one or two of those.

Tell me a little bit about the project's history.

- How long has the project been around?
- Who started it and why?
- How long have you been involved?
- Why did you decide to join?

Now I'd like to learn a little more about what you do in the project. Thinking about the 'work' you do related to this project:

- How do you decide what to work on?
- How do you keep up to date with what's going on with the project?
- How often do you interact with other project members?
- Where do you usually interact with them?

I'd like you to talk about some specific things you've worked on.

- Could you tell me about something you've worked on with other project members?
- Could you tell me about something you did for the project that you did mostly on your own.

Assessing the primary project

Now I would like to hear what you think about the project in general.

- How has the project changed since you became involved?
- Is it more or less active now than when you started? How can you tell?
- How has the work you do for the project changed during your time with the project?
- How has the kind of work that other members do changed? Can you think of an example?
- Tell me about a recent fun or satisfying experience you had while working on this project.
- Tell me about a situation when you were frustrated while working on this project.
- As of today, how well organized would you say the project is? What makes a WikiProject well-organized?
- How successful is the project? What makes it that way?
- What do you think makes a WikiProject "successful" in general?
- What would you say are some "best practices" for a project to follow?

Experience with other projects

Now I would like to hear a little bit about the experience you've had with other projects, even ones that you're not a member of.

- Are you a member of any other WikiProjects?
- Are you more involved in some of them than others?

- What kinds of work do you do in those projects?
- Can you give me an example of how these projects are different from the one we've been talking about?
- Are you listed as a 'member' of all the projects you're involved in? If not, why not?
- How do you show that you are a member? (e.g. name on member list, userbox on user page, etc.)
- Tell me about a situation where you participated in a project that you're not a member of?
- What are some examples of when your primary project has interacted with other projects?
- What is an example of when your project has copied or adapted something from another project?
- What is an example of when your project collaborated with another project?
- Can you think of a time when your project has had a conflict with another project?

Experience with tools

Now I'd like for us to take a look at the project page together and talk about how your project gets things done.

- Of the tools, procedures and other resources on this page, which ones do you use most often to do your work? Why?
- Of these tools, which ones are used most frequently by your project in general? Why?
- Is there any tool that you use that you wish worked differently or better? How would it help you?
- Is there any tool that your project doesn't have that you wish it did? How would it help the project?

Future of WikiProjects/Wikipedia

Finally, I would like to get your take on the state of WikiProjects in general, and the state of Wikipedia in 2013.

- What do you think about the way WikiProjects work right now in general?
- What needs to change?
- What shouldn't change?
- Do you have any other suggestions about how the Wikimedia Foundation could support/improve WikiProjects and the WikiProject experience?
- Are there improvements that would be especially useful for newcomers? For experienced editors?
- Are there any WikiProjects that you are particularly interested in learning more about, or that you think we should research? Why?
- Are there any WikiProject members you know who would be interested in chatting with us over voice/email/IM?
- Do you have any other questions for me?

APPENDIX D: TEAHOUSE RESEARCH SPRINTS

Sprint #1: Newbie teaching strategy trends³⁸

Summary. There is a steep learning curve to contributing productively to Wikipedia. New editors, even those who edit in good faith, often make mistakes when they start out. We were interested in finding out how more established community members responded to these initial edits by new editors:

- do they take the time to tell them personally what they had done wrong, and why?
- Is the criticism they offer specific enough to be constructive, instructive and actionable?
- Do they give them any kudos for the things they'd done right?
- And, most importantly, how have these teaching practices changed over time?

We were interested in various approaches to teaching new editors how to contribute most productively to Wikipedia. We coded messages on new editors' talk pages for moments of teaching/instruction, praise/thanks, criticism, and warning. We noted when these were templated or personalized interactions, and when editors referred to specific edits, types of edits, or editing Wikipedia generally.

Our question was: *How have community strategies for teaching new editors to be effective contributors shifted since 2004?*

Methods. We coded a sub-set of the data used in a previous research sprint that analysed the rise of warning templates on new users' talk pages. We adapted the coding scheme used in the previous sprint to focus specifically on identifying messages related to teaching.

Results. We found Wikipedian teaching strategies shifting in two significant ways. We saw a significant drop in messages including praise and thanks corresponded with an increase in the overlap of teaching with criticism, and a decline in personalized teaching corresponded with an increase in templated instruction.

Implications. Messages posted to new editors' talk pages reflect attempts to socialize these new community members, but the socialization tactics have become increasingly negative and generic in recent years.

Sprint #2: Alternative Lifecycles of new users³⁹

Summary. The process of socialization that new users of Wikipedia undergo is often portrayed as a gradual, stepwise process. For example, a new Wikipedia user may begin by copyediting, then contribute article content, then learn about project norms, and finally then join 'high-level' community processes like Wikiprojects, Did You Know (DYKs), Articles for Deletion (AfD) debates, and Requests for Adminship discussions. Well-established theories of organizational learning such as legitimate peripheral participation are fundamentally based on this assumption.

This project investigates to what extent new users experience these traditional modes of socialization, identifies the different kinds of spaces in which new users are participating, and to what extent they undergo alternative lifecycles— such as a new user creating an article and immediately thrust into an deletion debate.

Question. Broadly, how are new users introduced into the Wikipedian community, and has this changed over time?

Methods. The unit of analysis for this study is the individual user, 30 days after they make their first edit. A random sample was generated containing 200 new editors to Wikipedia per each 6 month period between January 2004 and June 2011, for a total of 1,400 editors. Researchers then manually coded each of the new users based on the schema of different community processes and coordination spaces, relying on the list of messages left for them as well as their contribution histories within their first 30 days.

Results. We found that new users are receiving substantially more notifications that their articles and images are being deleted. However, new users in 2011 are much less likely to participate in deletion processes (for instance, by disputing the deletion of their content). We also found that new users are participating substantially less in community processes in general, across almost all areas of activity.

Implications. Like SubSubPop in the scenario above, new users may be confused or intimidated by the impersonal nature of deletion notifications and unsure of how to respond to them or how to participate in community process such as contesting a deletion.

³⁸ http://meta.wikimedia.org/wiki/Research:Wikimedia_Summer_of_Research_2011/Newbie_teaching_strategy_trends

³⁹ http://meta.wikimedia.org/wiki/Research:Alternative_lifecycles_of_new_users

Sprints #3-4: New user help requests and participation in help spaces⁴⁰

Summary. New users receive a lot of inbound communication from the Wikipedia community in the form of (often templated) welcome and warning messages to their talk pages. These welcomes and warnings usually contain a variety of helpful links to resources, many of which were created to help teach new editors how to be successful contributors to Wikipedia. A lot of this information resides in 'help' namespace. However, despite the plethora of these helpful links, it is not known to what degree new users actually use these help resources.

Furthermore, as others have noted, the help infrastructure on Wikipedia is fragmented and confusing. For instance, with major help portals—Wikipedia:New Contributors Help Page vs. Help:Contents—divided between different namespaces, it may be difficult for new users to know where to ask a question in the first place. The help resources also suffer from inconsistent page layouts and navigation. And perhaps more fundamentally, participating in help usually requires editing pages with Wikitext, which is often challenging to new users.

Questions. What kinds of questions do new users have? Where are they asking them?

Methods. We gathered a random sample of new users from 2004-2010 (divided into half-year cohorts) who had made an edit to a non-article namespace sometime in their first 30 days. We analyzed the messages on the user's talk page (if any), and also any edits they made to namespaces other than 'Article' during that time period, for help requests. In order to gather the widest variety of data, we defined 'help' very widely to mean "Any question or request for information or assistance related to reading or editing Wikipedia pages, whether or not it was directed at a particular person."

Findings.

- New users by and large don't ask for help in help spaces, despite exposure to help resources through user talk page templates and the 'help' link in the global Mediawiki navigation menu. The three most common places where new users ask for help are: other users' talk pages, their own talk page, and article talk pages.
- More than half of all help requests that relate to norms, policies or guidelines for editing involve issues of notability or conflict of interest. 22% of new user help requests were about markup complexity or other technical issues.

Implications. New users need help on a wide variety of issues, and they don't know where to ask for it, or else they're not comfortable asking for it there. They need to be provided with places where they feel comfortable asking for whatever kind of help they need.

Sprint #5: WikiProject Participation and mentorship⁴¹

Summary. Research from previous sprints shows that new users don't have a lot of opportunities to interact positively with veteran Wikipedians. However, WikiProject participants form close-knit groups of people at all levels of editorship who have shared interests, so they should provide ideal sites for this kind of interaction. This sprint follows up on previous research on how participating in Wikiprojects helps new users learn the ropes of Wikipedia.

Questions. What kinds of contributions do new users make, and what degree of support or mentorship do they receive from other WikiProject members, during their first 30 days after joining a WikiProject?

Methods. Our sample consists of the new user talk pages and contribution histories of editors whose first edit was after 2008 and who had edited the member list of a WikiProject within their first 100 edits. We examined these users' user talk page and user contribution histories 30 days after their first edit to one of the WikiProject member list pages

Findings.

- 56% of joiners made at least one edit to the project workspace or an article within the WikiProject's scope within 30 days of joining. Although newcomers exhibited a variety of participation patterns, many of their contributions were minor edits, such as adding the WikiProject template to an article talk page or updating information in an article infobox. Most newcomers did not participate in discussions on the WikiProject talk page.
- When these editors did participate in project discussions, either on the project talk page or on the user talk page of project members, it was usually to ask a question. In the context of these questions, they often introduced themselves as newcomers and described their motivation for joining the project.

⁴⁰ <http://meta.wikimedia.org/wiki/Research:NewUserHelp-FullResearchReport>

⁴¹ http://meta.wikimedia.org/wiki/Research:WikiProject_Participation_%26_Mentorship

Implications. Many new editors who join WikiProjects make minor, peripheral contributions at first. They look to the project for assistance or guidance, and contextualize those requests by introducing themselves.

Sprints #6: Visualizing WikiProject Activity⁴²

Summary. In order to get a better sense of new user participation in WikiProjects, as well as overall WikiProject activity. We have created a set of database tables that list various activity metrics for WikiProjects (e.g. # of joiners, pages claimed, and WikiProject page activity). We use these tables to track how WikiProject participation overall has changed over time. This may give researchers and community members a better sense of whether WikiProjects as a whole are still proving to be a vital mechanism for both onboarding new users and helping existing users coordinate their work activities, as well as provide the Foundation with tools for identifying WikiProjects that are currently inactive or that are struggling to recruit new members.

During the course of this work, we decided it would be worthwhile to structure our research around the idea of a 'dashboard' for visualizing the various metrics we'd collected, at the level of individual WikiProjects. Many of these metrics had never been tracked before, at least not on such a grand scale, and for good reason .

Questions. How much coordinating activity are Wikiproject pages experiencing? What tools do Wikiproject members currently use to communicate, coordinate, advertise, track work?

Methods. However, before we started building a tool, we needed to know what kind of problems current WikiProjects are facing--whether in recruiting new members, tracking progress towards goals, or measuring activity levels--in order to make sure the visualizer we created would actually be useful to the community. So we conducted a series of interviews with core contributors to several WikiProjects, and asked these Wikipedians what their Wikiproject experience was like, why they contributed, what they did, and what challenges they experienced.

Findings.

- There are some tools and templates for tracking work towards project goals, but there is no unified framework and it's costly to set up and maintain these existing mechanisms. Also, they don't cover everything that members want to see/do.
- In general there is poor support for internal processes of WikiProjects: maintaining a project requires a great deal of maintenance and coordination work, but that work isn't engaging so it is often neglected.

Implications. Teahouse should find ways of surfacing project activity and automate critical but boring activities to reduce the burden on editors.

⁴² http://meta.wikimedia.org/wiki/Research:Visualizing_Wikiproject_Activity

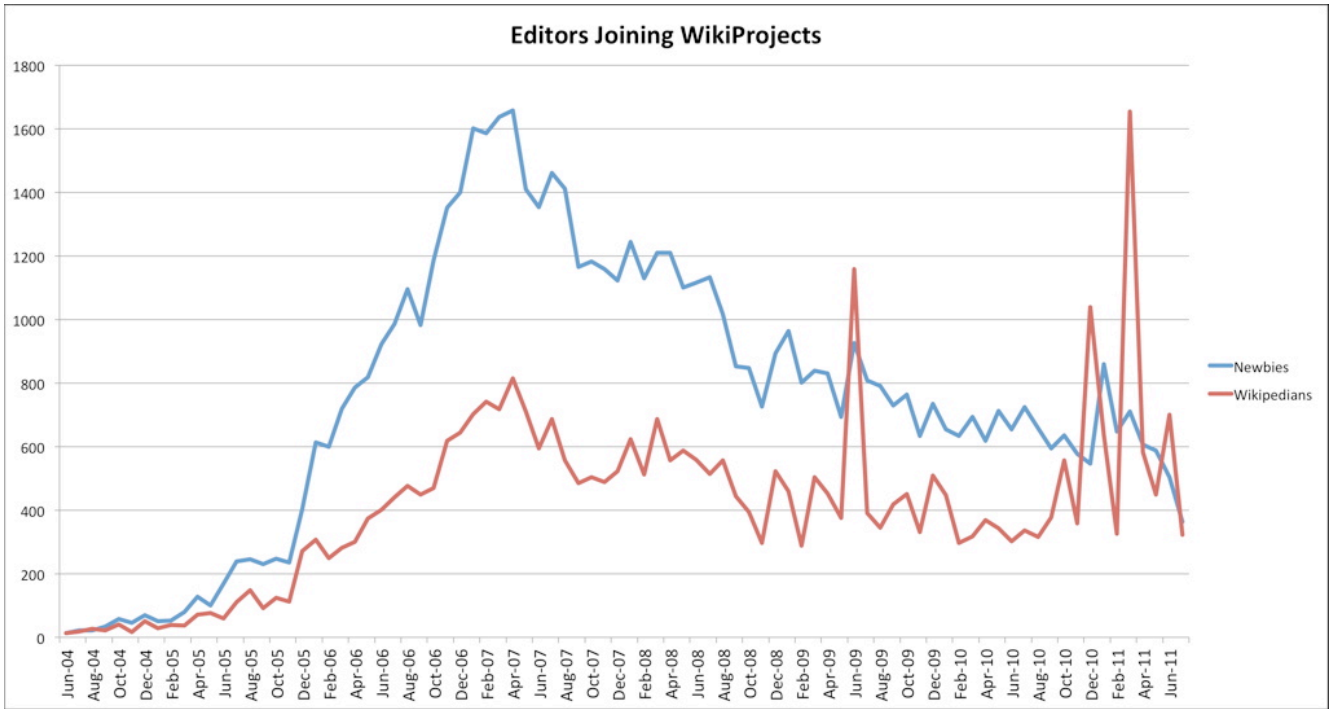


Figure 25. New editors and Wikipedians joining WikiProjects, by year, 2004 - 2011. Source: http://commons.wikimedia.org/wiki/File:Editors_joining_wikiprojects.png

APPENDIX E: TEAHOUSE USER SCENARIOS⁴³

Requesting Technical Help

Scenario #1: Dealing with Images

A new user is interested in improving an article on a historic church in the city she lives in. The article does not currently have any pictures of the building, but she has a good one that she took last year for a local history assignment she wrote for school. She isn't sure where to upload her image, or how to make it show up the right size on the page (possibly with a caption). She also doesn't know which license to choose, although she is pretty sure that there are no copyright issues, since she took the picture herself.

She sees a message on her talk page inviting her to this new thing called "The Teahouse", which is supposed to be a space set up especially for new users like her. She clicks on the "Visit the Teahouse" button embedded in the message and is taken to a new page that says "Teahouse" at the top. She sees an encouraging welcome message that invites her to ask any questions she has about Wikipedia on the discussion board below. She's never seen this discussion board anywhere else on Wikipedia, but it looks sort of like other comment boards she has used in other places online, such as on her friend's Wordpress blog and on an online news site she reads regularly.

She looks at the thread index at the top and sees that each of the discussion threads looks like it was started by someone who was asking a question. A lot of the questions are technical questions about how to do certain kinds of things on Wikipedia, so she's pretty sure this is the right place to ask her question about adding images. As she scrolls through the existing threads, she also sees that all of the questions have been responded to by someone, and that the responses happen pretty quickly: within about 24 hours, sometimes less.

She clicks the button that says "Start a new discussion" and fills out the subject line with "How do you upload images and add them to articles?" She then fills in the body of the comment form with information about what she wants to do, and what she is having trouble with so far. Then she clicks "Save Page" below her comment, and sees that her question is now listed first in the thread index at the top of the discussion board, along with the current date and time and the current number of replies (which is "0", but hopefully won't be for long). She resolves to check back tomorrow to see if anyone has answered her question. Hopefully so!

Scenario #2: Adding sources

User Acadian1710 was reading about the history of Nova Scotia, and noticed that the article did not contain any information about some recent archeological dig that had unearthed a new Viking village near his hometown. He has only made small edits so far, but he thinks he knows how to edit well enough now to make a more substantial contribution, and is excited to finally find an opportunity where he can add something new. So he adds some information about these archeological findings to the "Early history" section, and then goes on to read something else.

When he signed back in the next day, however, Acadian notices that a "citation needed" tag had been added to the paragraph he had written the day before, and an editor had posted to his talk page and asked him to provide a source. While on his talk page (which he has never visited before), he also notices that he got a message a few days ago inviting him to something called "wp:Teahouse".

He goes back to the Nova Scotia page and clicks the "edit" button for the "Early History" section, but he's confused because none of the other sources provided in that section seem to appear. After trying to figure it out on his own for a while, he gets frustrated and decides to check out this "Teahouse" place. Maybe someone there will have an answer to his question. So he goes back to his talk page and clicks the link provided in the invitation.

When he gets to the Teahouse, he sees a discussion board where people are asking technical questions. That looks promising, but he's curious about what else is here, and he also likes to figure things out himself if he can. He clicks on the "Resources" tab and sees a list of help and tutorial resources. He also sees, in the sidebar, a list of the resources that have been rated "Most Helpful" by other people. One of those resources, "Wikipedia:Tutorial", has been rated as helpful by 45 people. Acadian doesn't know who those people are, but a tutorial seems like a good place to start. He clicks on the "Tutorial" link in the sidebar, and is taken to another page, with a series of tabs across the top that have titles like "Editing", "Formatting", and "Citing Sources". Just what he was looking for! He clicks on the "Citing Sources" tab and starts reading.

⁴³ <http://meta.wikimedia.org/wiki/Research:Teahouse/scenarios>

Negotiating People, Policy or Process

Scenario #3: Establishing notability

KalBin, a new Wikipedia editor from Lagos, has started a new article on a famous Nigerian televangelist who has received a great deal of news coverage for his political activism in Nigeria, in other African countries, and beyond. However, KalBin has just received a message on his user talk page saying that this person is not notable enough to warrant an encyclopedia entry on the English language Wikipedia. KalBin disagrees, but is unsure how to best argue his case. He hears about the Teahouse from an automatic response he receives after setting his status to confused on the Feedback Dashboard, and decides to give it a try.

When KalBin gets to the Teahouse, he sees a comment board on the first page, which looks similar to other comment boards he's seen elsewhere on the internet (but much different from the talk page discussion boards he has encountered here on Wikipedia, which he is still a little uncomfortable with). The comment board displays a lot of recent questions by people who look to him like they might be other new users. These questions seem to be getting prompt responses, so he feels comfortable adding his own to this list. He starts a new thread and describes his situation.

The next day, he sees an email in his mail box that says that someone has commented on the thread he created. He goes back and sees that a Wikipedian has welcomed him to the Teahouse, and has recommended he look for third-party sources on the televangelist in English to establish notability. The Wikipedian also recommends that he check out WikiProject Africa, links to their page, and mentions a specific editor who is a member of that WikiProject who is also Nigerian and who might be able to give him feedback or even help him to build the article.

Scenario #4: Contesting speedy deletion

SubSubPop, a new editor of Wikipedia, is excited to be creating her first article: it's on a locally famous San Francisco graffiti artist who she admires, who recently died. The artist has been written up in some blogs on street art and underground public art/culture 'zines she reads regularly, but has only received stray attention in the broader community outside a few mentions in the local alternative weekly in the weeks after his death. A few days after she creates the stub of her article, she logs back in to keep working on it, only to find that it has been marked for Speedy Deletion. The template warns her that her article will be deleted very soon: possibly in the next 24 hours. She has never seen this template before, but she gets the gist of *what* it means, if not *why* her article qualifies for this negative distinction.

She's confused, embarrassed to be singled out like this, and a little angry, but most of all, she is concerned that she is about to lose all of her work. She clicks the "Hold On" button on the template, and tries to make sense of the process for contesting this deletion. But it all seems so anonymous and impersonal: for example, the editor who put the template on the article page seems to do almost nothing *but* go around and mark things for speedy deletion. How is she supposed to convince that editor to let her keep working on her article? How does she even know that they will read her message before they delete the article?

She remembers the Teahouse welcome message that was posted on her user talk page a few days ago, and decides that she might as well give it a try--maybe there will be actual people there who are willing to help her out, or at least explain what's going on and suggest options to her. She gets to the Teahouse, and sees a threaded discussion forum with lots of recent messages on it. Possibly she could ask a question there (it looks like lots of people are, and that they get answers quickly), but she's pretty nervous at this point that her article is going to be deleted any minute now, so she wants help as quickly as possible. So she goes to the chat room page, where she sees links to a couple of chat rooms that are currently "staffed" with people called "Hosts", who seem to be kind of like mentors or facilitators.

She clicks on the link to one of these rooms and it opens up in a new tab and logs her in. She sees several names in the sidebar, including the name of the Host who was listed on the chat room page as holding "Office Hours" in this room right now; these must be all the people logged in. She's unsure whether she's supposed to introduce herself, or what, when the host welcomes her, and several of the other participants do to. After some brief introductions, the host asks her whether she came by because she had a question. Relieved, she explains her predicament. The host, who identifies herself as StacyQ, tells her a little bit about Wikipedia's notability guidelines, and what "Speedy Deletion" means. StacyQ also promises to post a message for the editor who placed the speedy deletion message on the article, asking them to extend the deadline for a week or so while she and SubSubPop assess and improve the article. SubSubPop also listens to some similar stories from the two other new users in the room, who have also had negative experiences with having their content deleted. It's nice to know that she's not the only one, and that she might have a chance to get some actual help now.

With this in mind, she goes searching for some more sources on the graffiti artist in question, to help establish the artist's life and death as notable enough to be shared with the world.

Finding Collaborators or Ways to Contribute

Scenario #5: Finding an interesting WikiProject

MorrisseyGal has been editing Wikipedia off and on for about a month now, but is starting to lose steam. Overall, her few interactions with the community have been positive, but it is getting harder and harder to think of interesting things to edit. Her interests are pretty eclectic: paleobotany, informal logic, and New Wave music are among them. There seem to be a lot of articles that *could* be written or improved in these categories, but it's hard to find out what is already there, since some of the most interesting content on these subjects tends to be pretty obscure. It would also be nice to meet some editors who shared at least some of these interests, or who might suggest new things for her to edit. She has read about WikiProjects in the Signpost WikiProject report, and subsequently went hunting for ones that seemed interesting, but when she got to their pages a lot of them had been inactive since 2008 or 2009! And there seem to be literally thousands of these projects; she doesn't feel like checking through them all individually.

She remembers reading in that same issue of the Signpost about a place for new editors to meet each other and ask questions, called "Tea.." something. She finds the article again, clicks the link, and is taken to the Teahouse project space. She sees a set of pages that seem to be geared towards getting questions answered, finding help resources, and group chat. These aren't what she needs right now, but she notes them for later. Then she sees a page called "Join a Project", which sounds more promising, so she clicks on it. She sees a noticeboard that seems to contain recent bulletins from active WikiProjects which are looking for new members. She also sees messages from individual editors who want to find partners to collaborate with. This looks like the place!

She sees that WikiProject Popular Culture is currently advertising for new members, and that their collaboration of the month is an article about pop music. She clicks through to their page and checks out the kinds of things people are saying on the talk page. Looks like it is pretty active. She sees that there are currently several articles on 1980s bands that have been flagged as high importance, so she thinks she might be at home here. She adds her name to the member list and makes a few edits to the article about a semi-famous British band whose first LP she owns and loves.

She also returns to the Teahouse to "Join a Project" page and posts a message asking if there are any other new editors who are interested in editing articles on paleobotany and informal logic with her. Who knows? She might meet some kindred spirits.

Scenario #6: Figuring out where contributions are needed

MaiMerkel is a new editor who created an account today, after making a few edits as an unregistered user over the last month. At a presentation by a Wikipedia Campus Ambassador who came to his school last week, he learned that Wikipedia isn't just edited by random people, but that there are actually a lot of people (called "Wikipedians") who make thousands of edits to Wikipedia, and who work together to not just create new articles but to improve existing ones.

MaiMerkel thinks that improving existing articles sounds like more fun, and less intimidating, than creating whole new ones. However, when he goes to the Main Page of Wikipedia and starts clicking on the article links he finds there, most of the articles seem pretty complete to him. Where can he find out about articles that need improvement? While he is checking out the contribution history of the article on the Red Hot Chili Peppers album *Californication* (the campus ambassador showed his class how to read these contribution histories) he clicks on the name of a Wikipedian who has edited the article a lot. He is taken to that Wikipedians user page. Which has a userbox on the side which says "This user is a Host at wp:Teahouse". Curious, he clicks on the link in this userbox and is taken to the Teahouse.

MaiMerkel sees a welcome message on the front page of the Teahouse which explains that the Teahouse is a place for new users like him, and below that he sees a comment board where people who appear to be other new users are asking questions and responding to each other's questions (at least, they have the same kind of questions that he does, so he assumes they are other new users). Since it seems easy to ask a questions and to get a quick response (or possibly several!), he decides to ask: "I'm really excited about editing, but I don't really know where my way around yet. How can I find articles that need improvement? Are there things I can do to help out right away, even though I don't really know much about adding sources or writing encyclopedia articles yet?"

When Mai checks back to the Teahouse the next day, there are five responses to his questions! First, a Host responds and welcomes him, suggesting that he might want to check out the Copyeditor's guild, which has lots of instructions and also has an active mentorship program. Several other new users also respond to his thread, and talk about tasks they have been performing recently. Mai thinks that copyediting sounds like a great way to start out, and he feels confident that he can do this kind of work. He heads off to the Copyeditors Guild page to check it out and maybe sign up to be mentored.

APPENDIX F: TEAHOUSE SURVEYS

Phase 1 Guest survey

Q1. How did you find out about Teahouse?

- Someone invited me on my own talk page. (1)
- Someone emailed me an invitation. (2)
- Another editor referred me to Teahouse. (3)
- I am a member of a class, and my instructor told me about Teahouse. (4)
- I read about Teahouse on Wikipedia. (5)
- Other (please describe below) (6) _____

Q2. Have you asked a question on the Teahouse Q&A board?

- Yes (1)
- No (2)

Q2.1a. Did you receive any follow-up notifications after you asked your question?

- Yes; an editor posted a message on my talk page letting me know that they answered my question. (1)
- Yes; an editor posted a "Thank you" message on my talk page. (2)
- Yes; I received other feedback (please say what kind) (3) _____
- No; I didn't receive any feedback. (4)

Answer If Have you asked a question on the Teahouse Q A board? Yes Is Selected

Q2.1b. Why haven't you asked a question on the Q&A board?

- I didn't need any help (1)
- I wasn't sure if the Teahouse Q&A board was the right place to ask for help (2)
- I didn't like the quality of the answers I saw on the Q&A board (3)
- some other reason (please describe) (4) _____

Answer If Have you asked a question on the Teahouse Q A board? No Is Selected

Q2.2. How satisfied were you with the quality of the answer you received?

- Very Dissatisfied (1)
- Dissatisfied (2)
- Neutral (3)
- Satisfied (4)
- Very Satisfied (5)

Q2.2.1. Was there anything in particular you disliked about the the answer your received? Tell us about it.

Answer If How satisfied were you with the quality of the answer you... Very Dissatisfied Is Selected Or How satisfied were you with the quality of the answer you... Dissatisfied Is Selected

Q2.2.2. Was there anything in particular you liked about the the answer your received? Tell us about it.

Answer If How satisfied were you with the quality of the answer you... Satisfied Is Selected Or How satisfied were you with the quality of the answer you... Very Satisfied Is Selected

Q3. Have you answered any questions on the Teahouse Q&A Board?

- Yes (1)
- No (2)

Q3.1a. Why haven't you answered any questions on the Q&A board?

- I couldn't figure out how to answer a question (1)
- I didn't know I was allowed to answer questions (2)
- I didn't see any questions I knew the answer to (3)
- I didn't feel like it (4)
- some other reason (please describe) (5) _____

Answer If Have you answered any questions on the Teahouse Q A Board? No Is Selected

Q3.1b. What made you decide to answer a question? Please describe (details are great, if you want to provide them!)

Answer If Have you answered any questions on the Teahouse Q A Board? Yes Is Selected

Q4. Did you introduce yourself on the Guests page?

- Yes (1)
- No (2)

Q4.1a. Why didn't you introduce yourself?

- didn't feel like it (1)
- couldn't figure out how (2)
- didn't know it was there (3)
- didn't want to be visible to others (4)
- didn't want to be associated with the Teahouse (5)
- some other reason (please describe) (6) _____

Answer If Did you introduce yourself on the Guests page? No Is Selected

Q4.1b. How satisfied were you with the experience of creating your guest page introduction?

- Very Dissatisfied (1)
- Dissatisfied (2)
- Neutral (3)
- Satisfied (4)
- Very Satisfied (5)

Answer If Did you introduce yourself on the Guests page? Yes Is Selected

Q4.2.1a. Was there anything in particular you disliked about the experience of creating an introduction? Tell us about it.

Answer If How satisfied were you with the experience of creating yo... Very Dissatisfied Is Selected Or How satisfied were you with the experience of creating yo... Dissatisfied Is Selected

Q4.2.1b. Was there anything in particular you liked about the experience of creating an introduction? Tell us about it.

Answer If How satisfied were you with the experience of creating yo... Very Satisfied Is Selected Or How satisfied were you with the experience of creating yo... Satisfied Is Selected

Q5. Have you interacted with any other Teahouse guests outside of the Q&A board? If so, please briefly describe one of these interactions (details like who, where, and what happened are great, if you want to provide them!)

Q6. Have you interacted with any Teahouse hosts outside of the Q&A board? If so, please briefly describe one of these interactions (details like who, where, and what happened are great, if you want to provide them!)

Q7. How satisfied were you with your overall experience on Teahouse?

- Very Dissatisfied (1)
- Dissatisfied (2)
- Neutral (3)
- Satisfied (4)
- Very Satisfied (5)

Q7.1a. Was there anything in particular you disliked about your Teahouse experience? Tell us about it.

Answer If How satisfied were you with your overall experience on Te... Very Dissatisfied Is Selected Or How satisfied were you with your overall experience on Te... Dissatisfied Is Selected

Q7.1b. Was there anything in particular you liked about your Teahouse experience? Tell us about it.

Answer If How satisfied were you with your overall experience on Te... Satisfied Is Selected Or How satisfied were you with your overall experience on Te... Very Satisfied Is Selected

Q8. What are some things that have been challenging for you on Wikipedia? (check all that apply)

- learning the Wikipedia editing interface (1)
- finding things I want to edit on Wikipedia (2)
- understanding Wikipedia policy (3)
- interacting with other Wikipedia editors (4)
- Other (please describe other challenging things below, or use this space to talk more about the challenges you checked in the list above) (5) _____

Q9. What are some things you are excited about doing on Wikipedia?

Q10. Do you think you will participate in the Teahouse in the future? (for instance, by asking or answering questions, or by creating or browsing host & guest intro boxes)

- Yes, frequently (1)
- Maybe once in a while (2)
- No, definitely not (3)
- I'm not sure/I haven't decided (4)

Q11. Teahouse is still under development, and we're planning to add new features. Which of the features below would be most helpful to you? (check all the apply)

- Live Chat with Teahouse hosts (1)
- Live Chat with other Teahouse guests (2)
- A list of Wikiprojects that are looking for new members. (3)
- A list of other ways to get involved with Wikipedia. (4)
- Links to other 'Help' resources, such as tutorials, videos, and how-to pages. (5)
- Better host and guest profiles (6)
- Other (please suggest new features below, or use this space to elaborate on ideas you've checked in the list above) (7) _____

Q12. Teahouse is intended to be a friendly, supportive environment for all new Wikipedians, but we make a special effort to welcome female editors, who are underrepresented within the Wikipedia community. If you're comfortable telling us, what is your gender?

- I am female (1)
- I am male (2)
- I'd rather not say (3)

Q13. Teahouse is also intended to provide a friendly, supportive environment for editors from all nations and cultures. If you're comfortable telling us, what country do you live in?

Q14. Is there anything else you'd like to share with us? If so, you can let us know here. You can also post a (public) response on my talk page, or email me at <email>.

Phase 1 Host and Wikipedian survey

Q1. How did you find out about Teahouse?

- Another editor invited me to participate (1)
- Another editor told me about the Teahouse (2)
- I read about Teahouse on Wikipedia. (please say where you read about it, if you remember) (3)

- Other (please describe below) (4) _____

Q2. Have you answered a question on the Teahouse Q&A board?

- Yes (1)
- No (2)

Q3. Have you asked a question on the Teahouse Q&A board?

- Yes (1)
- No (2)

Q3.1. Why did you decide to ask a question?

- I was testing it out (1)
- I wanted help or feedback (2)
- some other reason (please describe) (3) _____

Answer If Have you asked a question on the Teahouse Q A board? Yes Is Selected

Q3.1.1. How satisfied were you with the answer you received?

- Very Dissatisfied (1)
- Dissatisfied (2)
- Neutral (3)
- Satisfied (4)
- Very Satisfied (5)

Answer If Why did you decide to ask a question? I wanted help or feedback Is Selected Or Why did you decide to ask a question? some other reason (please describe) Is Selected

Q3.1.1.a. Was there anything in particular you disliked about the answer you received? Tell us about it.

Answer If How satisfied were you with the answer you received? Very Dissatisfied Is Selected Or How satisfied were you with the answer you received? Dissatisfied Is Selected

Q3.1.1.1b. Was there anything in particular you liked about the answer you received? Tell us about it.

Answer If How satisfied were you with the answer you received? Satisfied Is Selected Or How satisfied were you with the answer you received? Very Satisfied Is Selected

Q4. Have you signed up as a Teahouse Host, or created a Host Profile?

- Yes (1)
- No (2)

Q4.1a. Why did you decide to not sign up as a Teahouse host?

- I don't intend to participate regularly (1)
- I intend to participate regularly, but do not want to be a host (2)
- I don't have time to participate regularly (3)
- I didn't know about hosts or host profiles (4)
- I didn't think I was allowed to (5)
- some there reason (please describe) (6) _____

Answer If Have you signed up as a Teahouse Host, or created a Host ... No Is Selected

Q4.1b. Why did you decide to sign up as a Teahouse host?

- I was asked to be a host (1)
- I want to get more involved in the Teahouse (2)
- I was testing it out (3)
- some there reason (please describe) (4) _____

Answer If Have you signed up as a Teahouse Host, or created a Host ... Yes Is Selected

Q5. Have you directed other editors to the Teahouse for help?

- Yes (1)
- No (2)

Q5.1. Please describe why you directed other editors to the Teahouse (details like who, where, and what happened are great, if you want to provide them!)

Answer If Have you directed other editors to the Teahouse for help? Yes Is Selected

Q6. Have you interacted with any Teahouse hosts outside of the Q&A board? If so, please briefly describe one of these interactions (details like who, where, and what happened are great, if you want to provide them!)

Q7. How satisfied were you with your overall experience on Teahouse?

- Very Dissatisfied (1)
- Dissatisfied (2)
- Neutral (3)
- Satisfied (4)
- Very Satisfied (5)

Q7.1a. Was there anything in particular you disliked about your Teahouse experience? Tell us about it.

Answer If How satisfied were you with your overall experience on Te... Very Dissatisfied Is Selected Or How satisfied were you with your overall experience on Te... Dissatisfied Is Selected

Q7.1b. Was there anything in particular you liked about your Teahouse experience? Tell us about it.

Answer If How satisfied were you with your overall experience on Te... Satisfied Is Selected Or How satisfied were you with your overall experience on Te... Very Satisfied Is Selected

Q8. Do you think you will participate in the Teahouse in the future? (for instance, by asking or answering questions, or by creating or browsing host & guest intro boxes)

- Yes, frequently (1)
- Maybe every once in a while (2)
- No, definitely not (3)
- I'm not sure/haven't decided yet (4)

Q9. Teahouse is still under development, and we're planning to add new features soon. Which of the features below do you think would be most helpful for Teahouse guests? (select all that apply)

- Live Chat with Teahouse hosts (1)
- Live Chat with other Teahouse guests (2)
- A list of Wikiprojects that are looking for new members (3)
- A list of other ways to get involved in Wikipedia (4)
- Links to other 'Help' resources, such as tutorials, videos, and how-to pages (5)
- More/better host and guest profiles (6)
- Other (please suggest new features below, or use this space to elaborate on ideas you've checked in the list above)
(7) _____

Q10. Do you have any suggestions for new features that would be helpful for Teahouse hosts?

Q11. What was the most rewarding thing about participating in Teahouse?

Q12. What was the most frustrating thing about participating in Teahouse?

Q13. What was the most surprising thing about participating in Teahouse?

Q14. What kind of work do you generally do on Wikipedia?

Q15. Is there anything else you'd like to share with us? If so, you can let us know here. You can also post a (public) response on my talk page, or email me at <email>.

APPENDIX G: TEAHOUSE DESIGN ARTIFACTS

Teahouse Invitations

Manually delivered invite templates from Pilot Phase 1



Hello! **Mcgroth**, you are invited to the [Teahouse](#), a forum on Wikipedia for new editors to ask questions about editing Wikipedia, and get support from peers and experienced editors. Please join us! [Sarah \(talk\)](#) 13:15, 23 May 2012 (UTC)



Hello! **Sweetie candykim**, I noticed your article was declined at Articles for Creation, and that can be disappointing. If you are wondering or curious about why your article submission was declined please post a question at the [Articles for creation help desk](#). Any other questions about your editing experience, we'd love to help you at the [Teahouse](#), a friendly space on Wikipedia where experienced editors lend a hand to help new editors like yourself! See you there! [Sarah \(talk\)](#) 00:21, 25 April 2012 (UTC)

Personalized and non-personalized variants of HostBot-delivered invitations from Pilot Phase 2

Version A:



Hi **New editor!** Thanks for contributing to Wikipedia. Please join other people who edit Wikipedia at [the Teahouse!](#) The Teahouse is a friendly space on Wikipedia where new editors can ask questions about contributing to Wikipedia and get help from peers and experienced editors. I hope to see you there! [Jtmorgan \(I'm a Teahouse host\)](#)

[Visit the Teahouse](#)

This message automatically delivered by your friendly neighborhood [HostBot \(talk\)](#)

00:04, 20 July 2012 (UTC)

Version B:



Hi **New editor!** Thanks for contributing to Wikipedia. Please join other people who edit Wikipedia at [the Teahouse!](#) The Teahouse is a friendly space on Wikipedia where new editors can ask questions about contributing to Wikipedia and get help from peers and experienced editors. We hope to see you there!

[Visit the Teahouse](#)

This message automatically delivered by your friendly neighborhood [HostBot \(talk\)](#)

00:04, 20 July 2012 (UTC)

Workflow diagram for inviting promising newcomers to the Teahouse during Pilot Phase 1

