

# Using Collaborative Coding to Study How Research Teams Coordinate Work

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## Abstract

This project shares research into collaborative distributed work by undergraduate researchers, as part of a larger investigative team, conducted with the Corpus & Repository of Writing (Crow). This study tests the “Constructive Distributed Work (CDW)” model, a heuristic for ethical collaboration developed by Crow, to study Crow’s application of the framework. Through coding a dataset pulled from a team communication platform used by Crow, we describe the collaborative processes of researchers on our team, and share information about our evolving methods for coding and analyzing the data.

## CCS Concepts

• **Human-centered computing** → Collaborative and social computing; Empirical studies in collaborative and social computing; • **Social and professional topics** → Professional topics; Computing and business; Computer supported cooperative work; Professional topics; Management of computing and information systems; Project and people management.

## Keywords

collaboration, distributed work, research teams, coding

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## 1 Introduction

Collaboration is an essential component of academic research in technical communication [2]. Functional teams allow for the achievement of research-based goals in a productive and efficient manner. This is true not only for traditional in-person collaboration, but for distributed approaches that bring together researchers across multiple sites, using asynchronous and synchronous means [1, 4]. Constructive distributed work (CDW) is a three-dimensional heuristic for project management and team building developed by researchers with the Corpus & Repository of Writing (Crow, write-crow.org). CDW is focused on building an inclusive and ethical

approach to collaboration in academic research teams. By developing rhetorical confidence, using a networked model of mentoring, and encouraging attention to sustainable infrastructure, CDW seeks to advance individual and team goals simultaneously. Our research better explains the CDW heuristic and provides background on the larger research project. It describes our research methods, details our coding process and workflow, explains how we refined the pilot study’s initial coding strategy, and examines our findings from our study. It features graphics from our collaborative coding spreadsheet and tables that detail our results. We also document how our roles as undergraduate researchers affected the coding process and will shape onboarding for future Crow student researchers.

## 2 Studying how research teams coordinate work

This analysis is one component of a larger ongoing study that uses data from our Basecamp team communication platform to analyze how the Crow team achieves the goals of CDW. After obtaining IRB Approval (North Carolina State University #23676) and informed consent from Crow team members, we used the Basecamp API to download threaded conversations about Crow projects, organizing them in shared spreadsheets for analysis. This part of our larger study closely examines six Basecamp threads and focuses on the “orientations to work” dimension of the CDW heuristic, aiming to identify how researchers approach and carry out work within their research teams. We thus investigate how team members collaborate to complete Crow tasks, in order to better understand Crow researchers’ purposes for using Basecamp, and to refine the CDW heuristic to better achieve the ethical goals described above.

Prior to this study, CDW researchers developed an initial set of codes using pilot data [6] and an iterative coding process [3]. Ten codes were developed to describe interactions between Crow team members which are detailed in Table 1.

The data set we analyzed included 68 Basecamp threads pulled from different Crow projects of varying scopes, engaging over 20 researchers, including students and faculty, in approximately 1,200 utterances. Three undergraduate researchers coded this data set both individually and collaboratively. A shared spreadsheet was used, containing tabs for individual codes and a tab for collaborative codes. Within the tabs, each row contained contextual information about the Basecamp discussion, a corresponding link to the thread, and cells containing drop down menus where researchers could select from a list of 10 codes and mark which codes they believed were present in the data. Individual coding passes were structured around each researcher’s interpretation of the initial set of codes and their respective definitions listed in the CDW codebook. Once these coding passes were completed, we wrote individual analysis reflections that summarized our thoughts regarding the coding

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**Table 1: Codes used in this study. This information was paraphrased from the CDW codebook.**

Code	Description
Scheduling	Discussion of specific dates and times to meet and collaborate. Also involves establishing concrete deadlines.
Planning	Long-term strategizing and decision-making regarding the approaches and scopes of projects. Includes discussion of distant, fluid deadlines and hypothetical, loosely-defined tasks.
Assigning tasks	Splitting up work and distributing specific responsibilities among team members. Task assignment can occur in question form.
Coordinating access to internal information	Providing references to links, addresses, or information gathered from sources within Crow’s immediate network (i.e. website, Google Workspace, Basecamp, GitHub, etc.).
Linking to external information	Sharing of links, addresses, or information from locations outside of Crow’s workflow. Includes emails from external sources, links to external websites, and references to feedback from outside origins.
Mentoring and/or training	Advising, offering assistance, or providing feedback to Crow team members. Consists of reminding team members of their tasks and responsibilities, making oneself available to answer questions, and offering praise and encouragement.
Asking for help	Requesting assistance with or further clarification on tasks and assignments.
Writing discussion	Discussion of methods and approaches to writing projects. Includes writing-related questions and requests for feedback.
Discussing technology and/or tools	Conversations involving the use, demonstration, or explanation of technology and/or tools outside of Crow’s typical workflow to complete work (e.g. a comment thread that contains a link to an external tool such as Lucidchart or Qualtrics).
Other purposes	Used only if discussion does not match other codes.

process as well as our respective findings. After completing our initial coding passes individually, we held four Zoom meetings that facilitated the collaborative coding [5] of the data set. Meetings followed an approach of “reaching agreement through collaborative discussion” (p. 401). We compared our individual codes on a line-by-line basis, returning to each Basecamp thread to explain our

coding choices and share our interpretations of the codebook definitions before reaching a consensus. Experienced Crow researchers assisted by taking notes, offering suggestions, and providing additional context and insight into the Basecamp threads.

### 3 Results

The result was threefold: first, better understanding how Crow researchers coordinate projects and communicate with each other using Basecamp. We noted that the tone and type of expression (use of emoji, humor) established early in Basecamp threads stuck. Basecamp’s Boosts feature, which allows team members to reply to comments with a short note or an emoji, strongly contributed to this and helped shape the tone of many conversations. Additionally, one undergraduate said the process of coding made her feel like part of the team. Crow’s identity as a supportive, collaborative workplace was made apparent in each thread through interactions between team members, which displayed the conduct that is expected of Crow researchers. When writing was the task at hand, approaches to providing feedback varied but utterances were always positive. Across numerous threads, team members praised good work and brought attention to the work’s strengths first before following up with feedback. Some team members provided broader, sweeping suggestions while others made more precise and detailed comments. Finally, we were glad to see that Crow team leaders were good at turning differences in knowledge into opportunities for learning.

Second, through our research, we discovered that redefining the codes was necessary to account for differences in connotation and meaning across the various researchers. In some sample utterances, for example, we identified a difference between the “assigning tasks” and “planning” codes that had not been previously articulated. “Assigning tasks” requires researchers to designate duties to specific team members, whereas “planning” for a project presents loosely-defined, future assignments to entire teams. We decided that while these codes are similar in nature, they needed to be distinguished from one another to explain the more urgent nature of assigning a task rather than planning ahead. However, codes are not exclusive to each other. In fact, the coding process was approached holistically with the intent to be inclusive. In other cases, like the “mentoring and/or training” code, the code was not redefined, but expanded to include new activities like a mentor making themselves available to work with, or pointing to other researchers with more expertise on a specific topic. While we are still analyzing data, the observed redefining of these codes is helping us understand how Crow researchers collaborate on a functional and cultural level. The overlap of certain codes also suggests we may need to refine our approach to code exclusivity and inclusion.

Third, developing a collaborative coding workflow that evolved with each meeting, which will help us include other researchers in similar analyses in future research projects. For instance, we asked our advising researcher to separate the codes we agreed on from codes we disagreed on in each line, so we could allot more time to discuss complex Basecamp threads. Our advising researcher separated the codes by coloring the agreed upon codes green, and leaving the differing codes uncolored. The formatting of the shared spreadsheet changed over time to model this rearrangement. At the same time, we agreed to do another individual coding pass after

clarifying and combining our interpretations of the codes, while also approaching the coding process more inclusively. We reconvened again, and recognized that our ensuing meetings worked at a faster pace. Our workflow evolved from us discussing every code we identified, to explaining where and how we identified codes that the other researchers might not have seen. This identified workflow can be adapted to future Crow projects, where new researchers can understand the context of using CDW in Crow settings, which can be modified by other academic teams who conduct data coding-based research.

All of the undergraduate researchers agreed that the process of coding data was made much easier by the codebook collectively developed by the research team. Access to the codebook helped, of course, but being able to make suggestions for refining the codebook, in conjunction with our collaborative coding discussions, really helped our team become more confident in coding. In the future, we will seek ways to encourage researchers to use the codebook as early as possible, and keep encouraging them to make suggestions for clarity and improvement.

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