Managing Research Remotely: Lessons Learned and Best Practices from a Case Study in a Research Lab during COVID19

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Abstract

COVID-19 pandemic dramatically increased distributed work in academia. Consequently, new challenges regarding the management of research tasks and teams have become even more pressing issues. To help researchers with this matter, in this paper, we share our experiences and best practices to adopt and set up an online project management system. This is presented as a case study of our own research group, homed in the Department of Industrial Engineering and Management Systems at the University of Central Florida. Data were collected from interviews with key stakeholders and from observations during group meetings. The result of this research shows that the process of choosing and installing a project management software can be accomplished in a brief time and in an accessible process. Although one of the limitations of this research is that the case study was limited in two ways, specifically the place and type of organization, our findings are relevant to other academics aiming to improve their own management processes. We contribute with a framework, a set of best practices, and lessons learned for introducing a computer-based task management system and implementing successful managerial practices for managing distributed teams.

Keywords
Research management, project management, remote research, remote work.

1. Introduction
The COVID-19 pandemic expanded the demand for the work from home model, dramatically altering the work landscape and likely shaping the future of academic work. Together with this new moment of history, new challenges in managing remote research teams have taken center stage (Swain et al., 2020) with the arrival of computer-based project management systems available to the public. Even though many experienced researchers have long used cloud-based tools to collect surveys, working collaboratively in documents or participating in remote meetings all the time, many have switched rapidly to new forms of research, involving remote qualitative interviews, or remotely conducting formerly lab-based psychology or usability type experiments. Issues that would be easily resolved quickly through an impromptu in-person conversation now require scheduling a remote meeting. Even IRBs have had to reorganize their processes and rules to conduct their own evaluations remotely and to evaluate the research methodologies adapted for the remote model to determine the impact on human subjects. Summing up the fact that workers' motivation and understanding of their work in the context of an overall project can be affected by the lack of social interaction (Das Swain et al., 2020). Tracking the tasks of the teams became even more difficult when there also needs to be greater communication about what the task entails and what work needs to be done.

Project management is not a required knowledge area to become a researcher, however, it is an essential day-to-day activity executed by these professionals. In the face of the increased management tasks necessitated by the shift to more remote work, project management abilities become even more important. For example, to improve the chances of project success, the researcher needs to manage efficiently the risks that it faces (Alencar et al., 2012), including the communication challenges. On the other hand, the communication issues caused by the social distance have interfered in collaborative work, making it difficult to maintain the traditional project management activities executed before. The informal management that allowed tasks to remain on track is no longer available to research members no

longer working in physical proximity. The human interaction component of successful teams had to become a formal feature in useful technology and management processes rather than being a byproduct of colocation.

Collaborative distributed work has become critical in this new reality, thus cloud-based collaboration tools that help to manage tasks and workers' time are increasingly being employed. To arm researchers with the tools and knowledge they need to combat the challenges they are facing, this article contributes to managerial practices by introducing lessons learned and best practices to choose and to correctly install a task management tool to manage remote teams. The methods utilized in this case analysis are geared around research project management but may be applicable to other contexts. As there are common features shared between many kinds of research (Leedy & Ormrod, 2018), researchers can benefit from our experience in implementing a project management system to improve the quality of their own management practices in the context of human-computer interaction, thus increasing the chance of success of their projects. We provide a case study along with a discussion of lessons learned by our adoption of a project management system based on Monday.com and explore potential implications of using such a system.

2. Background

The Project Management Institute (PMI) established a Guide to the Project Management Body of Knowledge (PMBOK® Guide, 2021) with 10 areas of knowledge: integration, scope, time, cost, quality, resources, communications, risk, procurement, and stakeholder. To guarantee the success and to plan the tasks of a research project, a researcher needs to manage each of the stated areas, and software tools that favor collaboration in remote work are available to help to accomplish this management task. Some recent case studies in human computer interaction address the problems related to how to conduct remote research using Asynchronous Remote Communities (Kresnye et al., 2019; Maestre et al., 2020) and to increase interaction and online presence in remotely working groups (Das Swain et al., 2020). Other research studies have explored how to manage teams remotely (Borissova et al., 2020; Michalak & Rysavy, 2020). However, none of them, to the best of our knowledge, have explored using a task management system in an academic setting under conditions of distributed work. We aim to fill this gap and provide a primer for other academics to use.

3. Framework

We have developed a framework for evaluating software tools for project management and for implementing a project management system using a computer system summarized in five steps, see Figure 1.

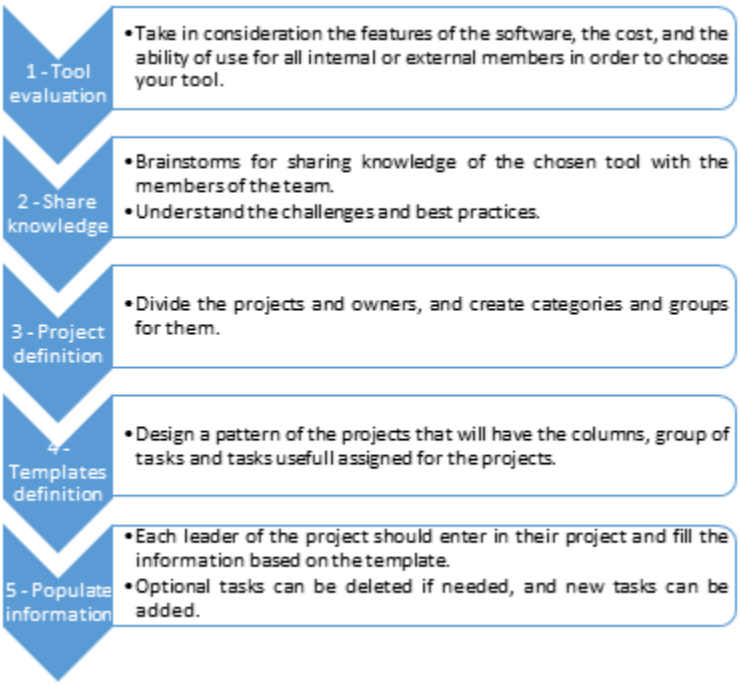

Figure 1. Flow diagram of how to choose and use a project management system in academic research

4. Methodology

To address the problem of effectively managing our research remotely, we developed a descriptive case study of the process to choose and install a project management tool that supports the task management procedures as well as providing a platform for effective communication with all the researchers involved. The data collection was realized over a period of two months and divided into two phases: interviews with stakeholders to determine the requirements for the system and observation of researchers interacting with the system.

The interviews were performed prior to the team onboarding process with the Monday.com software package but after the software had already been selected for use. Per the lab director's request, interviews were held with five lab members who oversee or are part of all the lab projects underway. The role of the interviewees is placed in Table 1, and Table 2 lists the questions asked in interviews.

Table 1. Stakeholders interviewed to investigate the needs for project management system capabilities

Interviewee	Role/Perspective
Lab Director	The lab director oversees all projects and guides the strategic direction of the group.
Principal Investigator	Co-Principal Investigator on some existing projects and planned projects, previous experience managing complex research projects, would need to integrate their current management style with that of the lab they recently joined.
Post-Doctoral Fellow	Manage some existing projects, self-directed research, supervise junior lab members.
Senior Lab Member	Manage existing projects, self-directed research, supervise junior lab members.
Senior Software Developer	Lab member involved in some of the biggest projects of the lab as the developer and data manager, affected by how projects are managed.

Table 2. Interview Questions

Question	Role/Perspective
1	How many projects do you oversee?
2	In how many projects do you participate?
3	What features would be most beneficial to the management of the various projects?
4	What other things would be important to know moving forward with the implementation of the management software?

In the observation phase, we observed and took notes of the user's feedback during team meetings. The team was composed of 12 workers: 10 lab members and 2 external members (members of other departments). By interviewing team members with different levels of engagement with the Lab, we were able to determine if the software would be able to address the varied needs of the researcher. In addition, the Lab workers have different areas of expertise which focus on different aspects of the research, and their training in different areas gives them unique needs and perspectives on project management. Any project management technology would have to be able to integrate those components into a cohesive project that is understandable to all the researchers. Table 3 introduces the quantity of workers in each area of expertise.

Table 3. Stakeholder Backgrounds

Number of persons	**Area of expertise**

6	Computers: science, cybersecurity, software engineering
1	Psychology
2	Industrial Engineering
3	Multidisciplinary

5. Results and Discussion

We decided to use Monday.com, a cloud-based software with plenty of resources related to collaboration and interaction between users. Among the reasons the lab director chose the software was: easy internet access for internal users and selective sharing with external partners. The most basic features of the software were easy to use immediately and allowed all team members to quickly understand how to use them. The software also incorporates several communication features within it, with a facility for notes, tagging responsible individuals, and tracking timelines. In addition to communication options, the software allows files to be attached to specific steps within the project, simplifying tracking of digital assets. During the interview phase, the answers to the questions varied greatly between team members, in large part, relative to the number of well-defined projects with which each person was associated. In general, the main requirement that stemmed from these conversations was the need to create processes and procedures for using the software that reflected the needs of the lab. The responses from interviews and brainstorming realized during team meetings were used as the basis for configuring the software installation and developing project management templates. Figure 2 introduces a summary of our structure in the software. We have used the following resources to organize the projects:

- We created workspaces for each distinct line of research. For example, our Lab has a designated workspace for each broad area of research as well as a workspace for administrative tasks.
- We nested some individual projects under multiple workspaces, each of these workspaces being used for different lab functions: one workspace is dedicated to internal topics such as lab meetings and common tasks, and other workspaces being used for overarching project areas with different teams.
- Projects were categorized as active, future or archived, and we created one folder for each category under the workspaces. By creating time sensitive categories, we can focus on the immediate needs of the project and prioritize work efforts.
- We created two templates for projects, a basic template with the bare bones of the project and a more advanced template which incorporated additional tasks for those lab members desiring to use a more traditional project management approach. Figure 3 shows an overview of the advanced template, divided in the project life cycle suggested in the PMBOK (PMBOK® Guide, 2021). All projects would have the same minimum tasks with the required information for each task. The lab members could add tasks, but all had to include the identified minimums such as the person responsible for each task, the timeline for the task and the priority of the task. This process-oriented template incorporates the fundamentals of project management while maintaining the flexibility needed for academic research.
- We created one board for each project. There were 23 projects that were just getting started, some which would necessitate funding prior to moving forward so they were categorized as “Future Projects.” In the past, projects did not have any documented prioritization and status of the tasks were presented at team meetings in response to requests for updates.
- Training materials were developed and circulated for how to create projects and use the project management system.

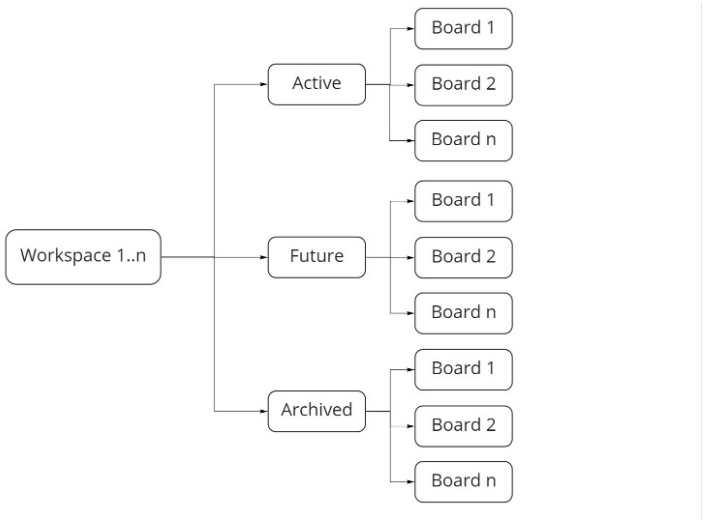

Figure 2. Overview of the nested structure of boards within folders within workspaces.

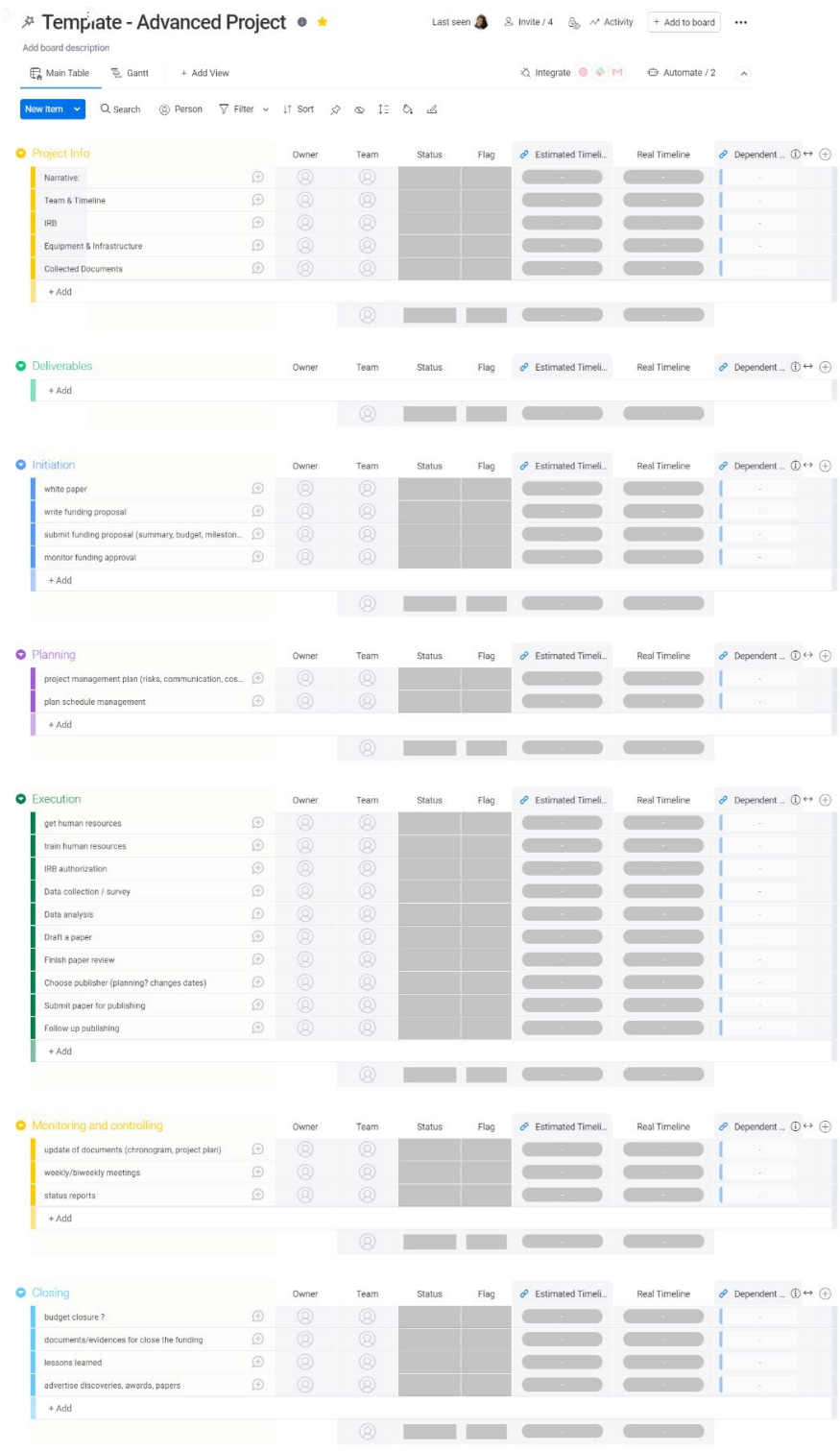

Figure 3. Overview of the advanced template

First, it is important to address that the installation of the software is still relatively new and some of the specific uses are still evolving. For example, as we have used the tool to discuss project updates, some projects were duplicating efforts and those tasks have been consolidated. Second, the creation of standards and procedures was essential to

centrally manage multiple projects since it allowed an organized way to document tasks. The open-ended questions allowed the participants to discuss issues that they thought were most important for the management tool. However, for other labs, it may be helpful to include more specific questions relevant to their research or organization to ensure that all the key needs are addressed by the software. In addition, the user-friendly interface allowed the senior members of the lab to quickly adopt the software to communicate progress on projects.

Finally, the "communication" area of knowledge, as outlined in PMBOK, has become one of the most important to manage during remote work. Many of the lessons learned and best practices presented in Table 4 are related to communication. In addition, Table 4 introduces issues related to managerial practices and lessons on the use of the software within a managerial framework.

Table 4. Lessons learned and best practices for deployment of a project management system

Lesson	Best practice
L01 - Researchers understood most of the main functionalities of the system without training, through exploration or self-study.	BP01 - Let the users familiarize themselves with the tool and direct them to the help center of the software if needed in order to understand the basics, and to provide effective feedback on how to best use the tool in the team setting.
L02 - We could not apply standard templates to projects already created, leading to missing or duplicated information fields.	BP02 - Create the templates (standards for projects) with appropriate columns and groups before starting to create the projects.
L03 - For novices in project management, it can be a challenge to understand that projects differ, but the process is repeatable.	BP03 - Train the research leaders in basic project management practices and methods, like PMBOK for example, before implementing the tool.
L04 - Communication can be lost if not directed.	BP04 – Choose a tool with features that facilitate collaboration, like tagging people, sending messages and keeping the history of the messages. BP05 - Create procedures to include tagging the appropriate people in the tool.
L05 - For novices in project management it can be a challenge to control much information of the project.	BP06 - Create an advanced template for experts who want greater project control and a basic one for novices. This will help to maintain a minimum standard for all projects.
L06 - Information can be lost if using too many tools for communication.	BP07 - Instruct the team to keep information, documents, and updates of the projects in the task management tool, instead of documenting the project in different tools.
L07 - Different expertise leads to different engagements in the software.	BP08 - The sponsor of the installation of task management tool project needs to engage users creating procedures. BP09 - Share lessons learned and success of the projects with users.
L08 – External members of the team are hard to engage because they are not obligated to follow the procedures. In addition, they may have to use other tools in their main activities and may not have bandwidth to constantly learn new platforms.	BP10 – Use practices to facilitate the process for external members, trying to summarize tasks and information instead of granularize too much. B11 – Utilize integration features to import information from other tools used by external members.

	B12 – Try to allow customizations and simplify the process so external members will have freedom to work as comfortable as they can.
L09 – It is hard to manage projects with different levels of information.	BP13 – Create templates that can be used for all projects. The templates ensure that all research projects follow the same process to go from start to finish. BP14 – Employ a common set of columns and create standards for status fields, so automation features of the software can help to consolidate tasks and reports.
L10 – It is hard to know the status of different projects without real-time-access to information.	BP15 – Create procedures and incentivize users to constantly update information, so managers do not need to contact workers to access data.
L11 - The manager needs to have an overall vision of the projects, while the project lead needs to see details.	BP16 – Create reports with the vision of all projects, or the ones that you want to manage closely for the director or manager. BP17 – Let the project manager decide the granularity of the tasks that need to be documented.
L12 - The person that oversees the vision of all the projects is the best on to decide the standards of the projects.	B18 – The lab director or manager needs to decide what to include in the templates.
L13 - The distance interferes the communication and increases the response time.	B17 - Questions can be embedded in the tasks so that members do not have to wait for a meeting to discuss progress and alert other members of changes. B18 – Utilize the integration features in the software tool to minimize juggling multiple communication software.

6. Conclusion

The use of a software project management system to support distributed work can dramatically improve chances of project success and reduce problems of coordination inherent in distributed work. This case study details our experience of rapidly adopting a new project management software suite and practices that make it useful. The selection and configuration of the software and developing guidance for how to use the software is dependent on the needs of the lab, and feedback from stakeholders must be integrated into the implementation. A software system as flexible as the one used in this case study, Monday.com, could prove unhelpful without clear guidelines from the lab director for how to use it effectively. Moreover, by following the unique contributions presented as best practices and lessons discussed in this document, researchers can be more assertive regarding the process to install and to use the tool for managerial practices. Thus, we exhort researchers and practitioners to continue exploring the use of software tools to manage research projects. Moving forward, we hope to explore more resources for creating dashboards and reports in order to facilitate the management work and improve the productivity regarding project management tasks. Additionally, considering that, future longitudinal studies can be conducted applied in different area of expertise, domains, sizes of research teams, and with greater diversity to replicate this study's findings or to explore potential trends over time.

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Biographies

Erica Castilho-Grao has more than 20 years of experience in R&D (research and development) in the software industry. Specialized in user experience, usability, and customer satisfaction in SaaS solutions related to eCommerce, CRM, email marketing, social network, and customer support. She worked in many multinationals in software development projects showing excellent product design, and project and team management abilities. Erica has deep knowledge of the U.S. and Latin American market, and previous contact with London and Paris tech environments. As an entrepreneur, achieved many awards and exceeded goals, bringing value to companies, and was recognized as a professional of exceptional ability in Computers management by the U.S. government in 2020. She is interested in human-computer interaction and emergent solutions like VR, AR, and AI. She is pursuing a Ph.D. in Industrial Engineering focusing on human-computer interaction at the University of Central Florida. She holds a Master of Science in Information Technology and a Bachelor of Science in Information Systems Technology.

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