An Effective Planning and Reporting System in Academic Research Labs

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1   Introduction

Planning and Reporting are common practices in research collaboration for achieving effective communication among research team members. These practices are performed in different forms (e.g., verbally or text-based), in various time frequencies (e.g., weekly or monthly), and tools such as emails, document sharing tools and other team collaboration tools (e.g., Slack).

Reporting activities in the workplaces of knowledge workers were evaluated by recent studies [1, 2]. However, the working conditions and the types of tasks are different from research stakeholders (e.g., students, mentors, supervisor) that have high autonomy and flexibility to find time to set their own schedule. Well-designed reporting and planning tools are needed so that mentors and students can perform their research and reporting activities efficiently and fulfill their respective responsibilities. Therefore, we ask: (RQ1) what are the strategies that individuals in research teams use for planning and reporting? (RQ2) how might different stakeholders (mentors and students) experience planning and reporting tools differently? (RQ3) what are the expectations, requirements, and pain points of these stakeholders? (RQ4) how can we improve current planning and reporting system to better support collaboration? To address these questions, we did two studies: (1) understanding users by investigating the planning and reporting practices for early career researchers and students using a lab reporting system; (2) developing the initial stage of reporting and planning tools.

2   Study 1 - Experiment for Understanding Users

We recruited 12 participants (half females, mean age = 26.9, range = 23 − 35) among 26 lab members of a laboratory. All participants were proactively using a web-based blog system for planning and reporting practices ([Figure 1a, Figure 2a]). Participants included five project mentors (mean age = 30.9) and seven students (mean age = 24.1) and have used the blog for periods of from one month to three years; mentors had more experience than students (mean experience: mentors = 22 months, students = 14 months). After obtaining information about the experimental
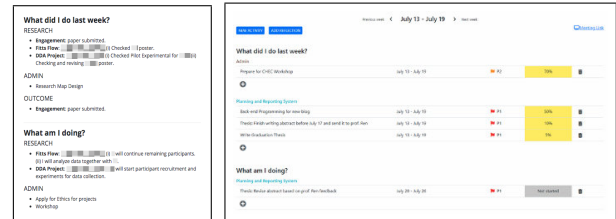
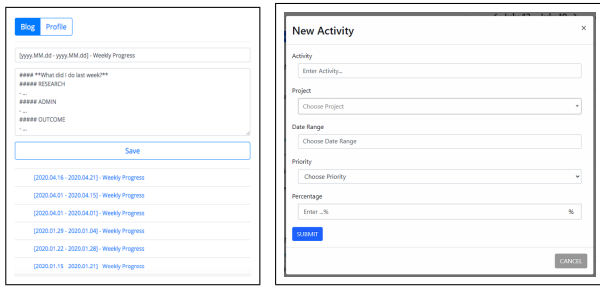(a) Previous blog interface   (b) Initial stage blog interface

Figure 1: Preview of the latest report

procedure, participants signed a consent form and participated in an interview session with an average duration of 50 minutes. We collected information about the participants' previous planning and reporting strategies and tools they use, including their pros and cons. We also investigated their preference regarding the frequency of use, format, content, and the social aspects of their practices. All interviews were audio-recorded for further evaluation by transcribing verbatim and using the codebook thematic analysis to analyze the interview content.

3   Study 1 - Findings

Our results show most of the participants motivated to write their blogs by having weekly meetings. Blog writing was perceived by half of the participants as a proper tool to communicate their progress and plan with the head of the lab, project supervisors, or mentors. Another benefit of blog writing is that students could receive feedback and advice from supervisors or mentors that can encourage them to correct their mistakes and to be more effective. Blog writing is useful in organizing meetings, supervising students remotely, and using different usability features such as seeing the previous blog, reading everyone's blog on one page, and having templates for writing the blog.

We also investigated the barriers to planning and reporting practices due to internal and external factors. Internal factors are related to a lack of intrinsic motivation or individual skills due to having fewer things to report, hard to predict the duration of a task and lack the necessary skills to compose their reports. On the other hand, external factors are uncontrollable

(a) Previous blog interface   (b) Initial stage blog interface

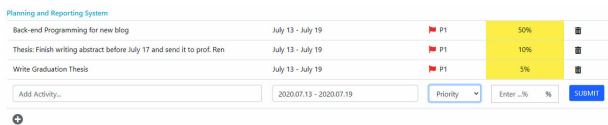Figure 2: Input the planning and reporting entries

Figure 3: Initial stage blog interface - Activity Form below the list

situations and obstacles such as family events, a workshop, and other activities that do not relate to the research but are equally important to the individual. As a result, we have provided several implications for future technology design including: (1) facilitate interaction to increase participation; (2) make the system easy to use to improve the efficiency of work; (3) engage students to gain willingness in blog writing; and (4) remote collaboration.

4   Study 2 - Blog development

These design implications are expected to facilitate productive team member interactions, to increase participation, to ease each users' concerns, to engage and motivate students to write useful blog entries and to improve the efficiency of research work. From the design implications, we start to implement the initial development of improving the blog design in the lab we studied. The initial development will continue to build on AWS EC2 and change into a dynamic website with a PostgreSQL database, SQLAlchemy, and Python Tordano. This website can also be accessed by smartphone browser to read ([Figure 1b] and write their reports and plans using the form on the new activity modal shown in the Figure 2b or below the activity list within the same project shown in the Figure 3 as seen in the computer browser.

5   Study 2 - Blog demonstration

We implemented the initial stage of the blog to motivate students to increase users efficiency in research by having three different pages on the blog: (1)

Weekly report; (2) Projects and Admin; (3) Leaderboard. Each of the pages has a left navigation bar consist of the previous pages link, user's experience points, levels, and contacts. Every week, a reflection pop up will show for their progress this week and they can see the written reflection on the top of their weekly report. The user's weekly report will be grouped by each project and including the activity name, date, priority, and the percentage of progress. Below each project, there will be a form for adding activity related to that project 3. Meanwhile, on the project page, users can see the report of all members of the project, but cannot add, edit, and delete the others report. At the end of the weekly report, users can see who has seen their reports and comments section that they can like and reply to. Every comment feature event will trigger the notification and related users will achieve it.

6   Discussion and Conclusion

Our study found that participants have a strategy to hold weekly in-person meetings that helped them get motivated to write their reports on the lab system tool. Mentors and students experienced this tool by helping them communicate their progress and plan their work with their supervisor and colleagues. Detail feedback should be provided by the project mentor to improve the quality of student's reports and mentors also expected to get feedback from students. Reporting and planning tools are expected to facilitate collaboration, help research stakeholders organizing the meetings, supervise students remotely, and help on lab communication by giving feedback and comments features. As planning and reporting continue to be beneficial for research teams, our study provides insights and design guidelines, complimented with the initial development design for future technology supported tools.

References

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