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Do International Building Researchers Mostly Work Right Before the Deadline? Yes, According to Empirical Data

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Abstract. Academic work is characterised as increasingly time-pressured and deadline-driven. Moreover, increased use of online tools underpins flexible working hours. Does this make researchers work just before a deadline or a meeting (perceived as an intermediate deadline)? The "imminent deadline-driven work habit" hypothesis seems intuitively plausible since the research and academic world is notorious for heavy workloads and multiple parallel tasks and projects. The current article investigates the activity of several collaborative online documents from international building research projects as a function of the distance to a deadline or coordination meeting. A similar analysis is conducted on the submission data of an international conference on building physics. This empirical analysis supports the "imminent deadline-driven work habit" hypothesis. Finally, the article discusses the possible reasons behind the latter and the ensuing practical implications and recommendations for the management of collaborative research/academic work in energy, building physics and indoor environment.

1. Introduction

Academic working practices used to be seen as a comparatively low-stress working environment [1], but in recent decades, a development from "Thought-time" to "Money-time" [2] has increased time pressure and hurriedness [3]. It has contributed to new demands for the temporal order of academic work [4], deadline-driven research [5], and emerging difficulties in balancing work, leisure, and everyday life with a focus on productivity [6].

Digital and online tools have provided flexibility for researchers to organize their work but also brought drawbacks, such as increased stress and time pressure. A typical observation made by the authors and other members of the international building research community is that a few hours before a coordination meeting or a submission deadline, most collaborators of a shared document related to the latter are online working on that document. This intuitively leads to the hypothesis that researchers tend to work right before a deadline, right after, or both (when the deadline is, e.g., a coordination meeting). This "working under pressure" or "cramming" habit with looming deadlines may be perceived by some as a productive way to focus and prioritize tasks. However, it can also contribute to high-stress working environments with time-pressured deadlines and an imbalance between work and everyday life. One of the unintended consequences of these work practices is the deadline-driven workload. The flexibility and "freedom" of academic collaboration might lead to time-squeeze and time-pressure with increasing risks of the precariousness of non-tenured academics [7] and, in general, counter-productivity, poorer result quality and reduced work satisfaction.

The current study aims to test the hypothesis above with empirical data from the international building research community, i.e., the temporal distribution relative to a deadline of the activity level in collaborative working documents, the submission of abstracts to a conference and the submission of abstract reviews to a conference, respectively. This article focuses on a particular professional community that has not been studied before by providing and analysing quantitative data that cannot be found in the existing literature.

2. Materials and methodology

To test the hypothesis of whether or not a deadline significantly influences the workload of researchers from the international building community, empirical data has been collected from working processes

with deadlines in which contributions and progress can be monitored over time: 1) the activity of collaborative scientific documents by small teams; 2) the abstract submission rate to a building physics conference; 3) the review of abstracts to the same conference.

For the analysis of collaborative scientific work, the writing activity was monitored on 6 shared working documents from international projects over 24 evaluation periods in 2021 and 2022, each comprising a coordination meeting. These regular coordination meetings report on the progress of a task or document and plan the follow-up action, but also serve as intermediate deadlines. The daily activity level is assessed by counting the number of versions and edits recorded on the shared document and normalized by the total number of versions and edits recorded over the whole evaluation period.

It is assumed that most of the work on the collaborative documents directly changes the latter's content. However, some of the actual work might require additional activities that are not recorded in the activity level of these collaborative documents. Similarly, submission and reviewing of abstracts to a conference necessitate some work before uploading the contribution on the online platform. Nonetheless, the contributions and work for these activities usually consist of short texts or editing. It can thus reasonably be assumed that the latter is elaborated shortly before the recorded submission or activity. Consequently, the authors are confident that the recorded activities are a good indicator of the whole process timing.

The data collected for this study has been anonymized and is open-access: it can be downloaded from <https://doi.org/10.54337/aau507456682> [8].

3. Results and discussion

One can observe the activity dynamics and temporal distribution of the three investigated processes in the following figures. Regarding the daily submission rate of abstracts to the conference, one can observe in Figure 1 that there is almost no contribution prior to 5 days before the original deadline. Most abstracts are submitted in the last few days before that deadline. Moreover, extending the original deadline by 5 additional days has increased the number of submitted abstracts by +97%. The impact of the imminent deadline on the activity level is thus very clear. One can also notice that Sunday has a very low activity, which corresponds to leisure and family-focused time in most western countries.

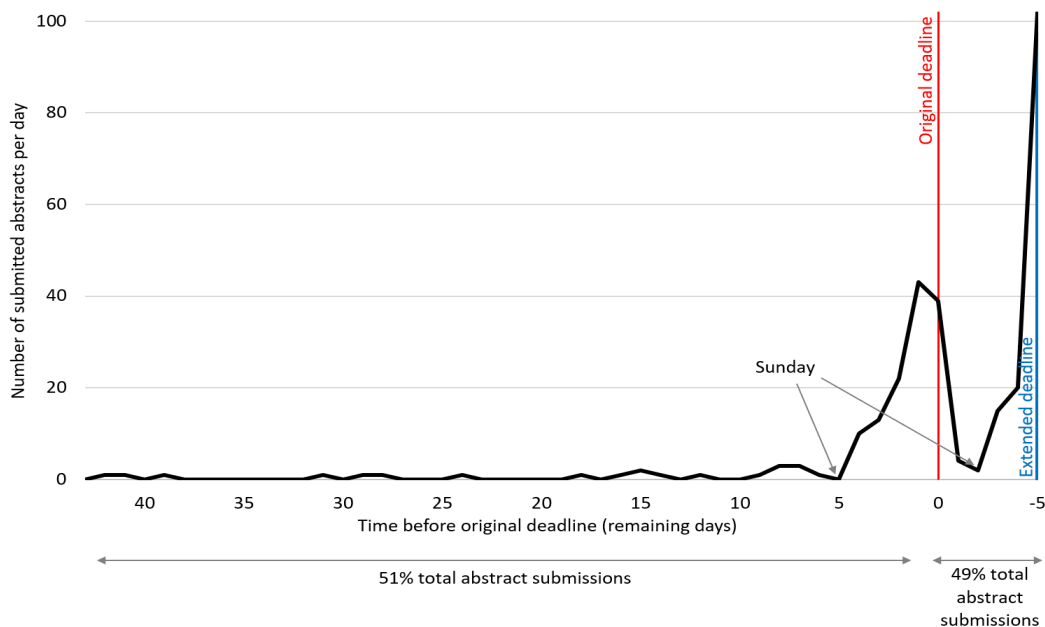


Figure 1. Daily abstract submission rate to an international conference as a function of remaining time before the original (first) submission deadline.

Focusing on the last 24 hours before the final deadline, one can see in Figure 2 similar dynamics: most of the submissions occur after working hours, with a sharp activity increase in the very last hours before the deadline. 27% of all 300 submissions occurred in the last 8 hours before the final deadline, with 8.5% of them in the final hour (between 23:00 and 23:59 CEST). Moreover, 6% of all submissions even occurred after the final deadline (authors directly sending their contributions by email to the conference

organizers). Very similar dynamics can also be observed for the abstract review process of that conference. Despite having 15 days to complete the assessment of 6 abstracts, most of the work is carried out in the last few days with an accelerating increase of activity when approaching the deadline.

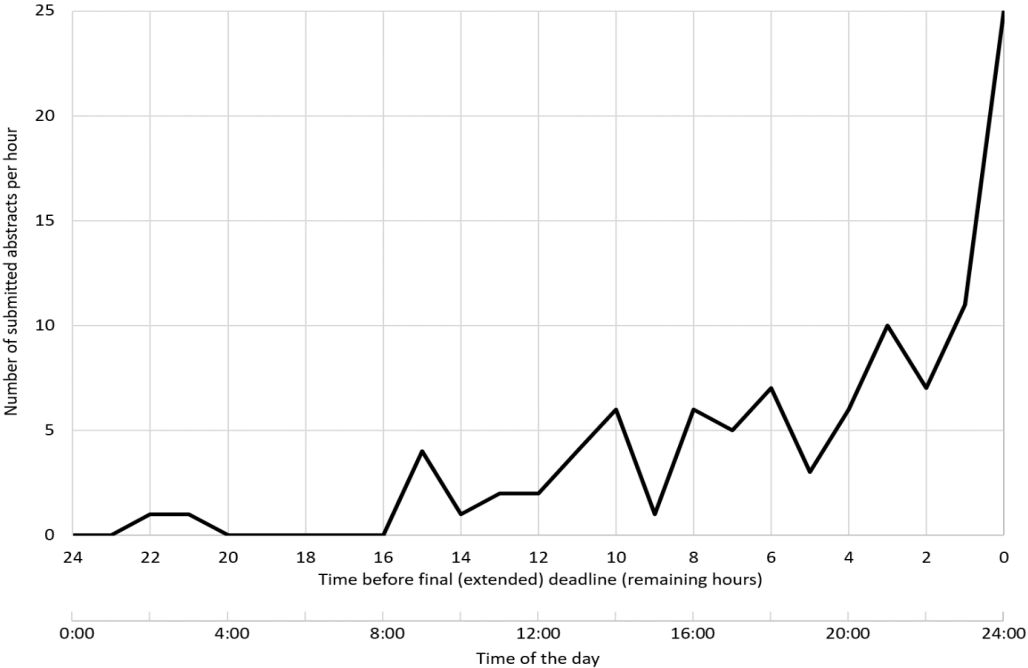


Figure 2. Hourly abstract submission rate to an international conference on the last day before the final (extended) deadline as a function of remaining time before this deadline.

These two processes were closed by a single (sometimes extended) deadline with, in principle, no activity possible after this deadline. The third process studied here concerns collaborative documents with recurrent coordination meetings serving as intermediate deadlines. Because each intermediate deadline does not end the process, one can thus examine if the activity on these collaborative documents occurs mostly right before the deadline and if it extends after the latter.

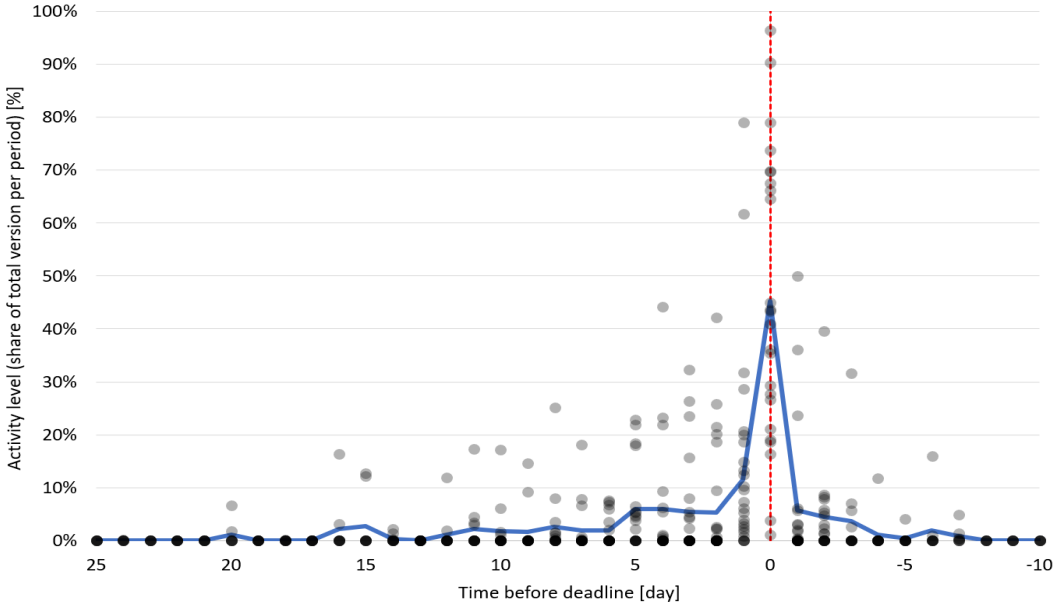


Figure 3. Daily activity level of shared working documents as a function of remaining time before the deadline (coordination meeting). The scattered points represent the activity level of a specific document for a given evaluation period. The blue line is the average activity level of all documents.

Figure 3 presents the daily activity of 6 collaborative documents aggregated over 24 evaluation periods, each comprising a recurrent coordination meeting/intermediate deadline. Similarly to the two first processes, one can observe that most of the activity is concentrated on the day of the deadline. Some moderate activity can be observed a few days prior to the deadline, but it quickly drops to zero after 2-3 days pasted the deadline. While there is almost no activity at all beyond 10 days prior to the deadline and 4 days after the deadline, one can clearly see that nearly 50% of the activity (work) on the collaborative document is carried out on the day of the deadline, mainly just a few hours before the coordination meeting begins.

4. Conclusions and recommendations

This paper set out to investigate whether researchers in the field of building physics tend to place workloads closer to deadlines. The empirical data analysis indicates that, indeed, working practices within this specific field tend to be strongly deadline-driven, and this might apply to other research fields as well. Most of the work is performed a few days before the deadline or on the day of the deadline. In the case of collaborative work document with recurrent deadlines/coordination meetings, the activity rapidly falls right after the deadline, and no significant contributions is made until a few days or hours before the next deadline. The hypothesis of this study - "do international building researchers mostly work right before the deadline?" - is thus clearly validated by the empirical data. The current findings are in line with and reinforce the literature describing how academic working practices are categorized as time-pressured, flexible and deadline-driven [5][9].

The results suggest that regular meetings act as a deadline-pressure mechanism pushing people to contribute significantly. One can thus discuss the reasons behind regular coordination meetings being an effective pressure mechanism. Although often perceived as a way to motivate collaborators and set new goals and directions to continue working on the current process, the activity on shared documents falls immediately after the meeting. The actual occurrence of the coordination meeting itself does not seem to have a sustained effect, it only serves as an imminent deadline driving contributions. This could be explained by negative drivers such as "the fear of consequences from project leaders", "the shame of not having contributed to a collaborative endeavour", or "the fear of losing face among peers and ruining future work collaboration opportunities". This could also be enhanced by systematic forgetfulness and procrastination in a work environment flooded with a constant flow of multiple deadlines, meetings and parallel heterogeneous tasks.

Regarding conference processes, the research community is accustomed to systematic deadline extensions coupled with the relatively low repercussion of missing a deadline. Indeed, the reviewing process in the scientific community is usually volunteer-based and without significant retribution or career impact. In addition, conferences on building physics occur regularly and often overlap. A researcher who is too short on a deadline can thus easily redirect his/her work to another conference if a deadline extension is not granted. This might partly explain the widely observed "last-minute submission" culture and the massive increase in contributions after a deadline extension.

The depicted situation is far from ideal and may be the worrying symptom of a research community being systematically overloaded and "slave of their own calendar". The work prioritization is then only driven by the most imminent threatening deadlines, which favours work-related stress and the detrimental effects associated with it. This can lead to a decrease in the quality of the research outputs and the well-being of a significant part of society. For instance, it has been commonly noticed during the conference process that authors and reviewers failed meeting the deadlines because of unforeseen events occurring in the last few days or hours when the contribution was planned to be made. This resulted in reviews not being submitted on time, authors' dropout, some poor-quality and uncomplete submissions rushed as the last moment, and complaints from participants having to compromise with their private life to meet deadlines.

From the observations made in this study, the authors would like to suggest some recommendations. For the organization of conferences, the organizers should be aware of the submission dynamics and should not expect much activity during the call for abstracts and review process up to the last week and few days before the deadline, even if announcements are made months beforehand. Being aware of that might alleviate some worries and pressure to the organizers and help them adjust the time needed for each phase of the conference process. In addition, sending or publishing a reminder one week before the deadline and then two days before the deadline is an effective way to stimulate contributions.

Announcing a deadline extension by one extra week a couple of days before the original deadline is a common practice that is shown to be very effective to boost abstract and paper submissions. Overwhelmed researchers might thus put the extra effort to finalize their contribution for the new deadline rather than giving up and resubmitting to another conference. However, this contributes to maintaining the "last-minute deadline rush" culture.

For collaborative projects, the project leaders are invited to pay more attention to the (hidden) consequences of specific deadlines and adjust the latter and the coordination meetings accordingly. To improve the quality of research contributions and the well-being of participants, one should take more interest in the temporal organization of workloads and consider factors such as preparation time and alternative working schedules that take into account *when*, *where*, and *how* team members work best. For instance, forwarding a text, figure, slide or another piece of work to collaborators to see a couple of days ahead of a meeting is good timing to re-activate focus and activity on that project.

Senior researchers participating in multiple parallel projects often do not have dedicated time to prepare for meetings. One solution to mitigate that is to allocate a specific working period (30 minutes to 1 hour) at the beginning of the meeting: "before the meeting actually begins, let us leave our email box for 30 minutes, and all do our assignments by reading, commenting and contributing to the document that is the point of discussion of today's meeting". This dedicated working time could also be placed at the end of a meeting to start contributing directly to the tasks elaborated on during the discussions. However, participants tend to jump out earlier from a meeting to catch another overlapping one, or discussions might last longer than expected and trim the working phase. One should also think about whether or not clearly announcing this working phase in the meeting agenda as it might give an opportunity to skip it. Given the common load of parallel tasks undertaken by researchers in the community, it is suggested that scheduling short coordination meetings (30 minutes to 1 hour) every two weeks is the best trade-off to keep a reasonable activity level on collaborative projects/documents without overwhelming the participants.

Finally, the authors advocate for systemic changes in working structures formed by universities or governmental policies, funding instruments and publication systems so that the negative impacts of overwork and deadline-driven research have on productivity, creativity, health and well-being are recognized and accounted for.

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