Assessment of Stand-Alone Displays for Time Management in a Creativity-Driven Learning Environment

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Abstract. This paper considers the pros and cons of stand-alone displays, analog (e.g. billboards, blackboards, whiteboards, large pieces of paper etc.) as well as digital (e.g. large shared screens, digital whiteboards or similar), as tools for time management processes in a creativity-driven learning environment. A qualitative study was conducted at the Medialogy education at Aalborg University Esbjerg to probe for attitudes towards time management tools in general and towards having these on a stand-alone display in the workspace of students working in groups on joint projects. Results show that students who use a stand-alone display primarily use an analog one, whereas students who use digital collaborative time management tools prefer to access these on their individual laptops. The students who express preference for analog displays emphasize the advantage of being able to switch to a different modality for in-group discussions, as well as the increased awareness of the time plan caused by such a display. While these advantages would also be advantages for a digital, interactive display, the disadvantages of analog displays listed by the students relate to the fragility of these displays compared to storing information digitally. The findings could indicate a possible market for stand-alone, interactive digital displays combining the 'touch and feel' character of an analog board with the convenience of digital data storage.

Keywords: Time management tools · Digital vs. analog tools · Creativity-driven learning environment · Creative work practices · Workplace design

1 Introduction

This paper describes the findings of a preliminary study of the use of time management tools in the work of student project groups in the Medialogy education at Aalborg University in Esbjerg, Denmark. The focus of the study is the use or feasibility of stand-alone displays, digital (e.g. large shared screens, projections, digital whiteboards etc.) as well as analog (e.g. blackboards, billboards, large pieces of paper etc.), compared to time management tools that are only accessed via laptops, smartphones etc. or personal analog calendars.

Medialogy is an education in media technology with an emphasis on stakeholder-oriented as well as user-centered design processes [1]. The learning environment in the Medialogy education is creativity-driven: Students form groups each semester to work

on projects of their own choice within a semester theme (semester themes include e.g. audiovisual experiments and interactive experiences among others), and this project work is both a creative process and a process of learning. The learning process associated with the project work is intertwined with the courses offered in a specific semester, all of which aim to support that semester's theme [2]. Consequently, the workflow of the student to some extent mirrors that of an employee in the creative industry, given that the work is focused on the development of a project within a given timeframe.

There seems to be important differences, however, between the Medialogy students and creative professionals in a commercial company, when it comes to time management: Firstly, as evidenced by case studies co-conducted by the author at LEGO® Future Lab in Billund, Denmark [3, 4] and the design company EOOS in Vienna, Austria [5, 6], time management among creative professionals is, to a large extent, handled by designated time planners such as project managers, secretaries and the like. In contrast, Medialogy students, out of necessity, have to handle the time management process on their own, switching between the roles of designer and project manager in often uneven patterns. Secondly, perhaps as a partial consequence of the former observation, there is a tendency among Medialogy students towards having time management tools physically present in the workplace as stand-alone setups (blackboards with writing on them, wall calendars etc.), whereas the public display of time management tools in the professional creative workplace tends to be scarce, instead leaving room for emphasis on ideation, idea development and inspirational items. [3–6] Although the case study described in this paper is relative to a learning environment, it will pave the way for a discussion of the advantages and disadvantages in general, for students as well as professionals, of having stand-alone displays for time management present in the workspace.

2   Qualitative Study of the Use of Time Management Tools Among Students in the Medialogy Education

During more than 4 years of teaching and supervision in the Medialogy education, the author has gathered a general, qualitative understanding of how the student project groups manage their time. Up until 2015, the majority of project groups used a form of time management tool, which was either purely physical, e.g. a plan written on a blackboard, or had a physical counterpart, e.g. printouts of GANTT diagrams or similar, hung up in the working area of the group. However, it has not been clear whether this was simply due to the fact that students during their first semester were encouraged by supervisors to use such publically displayed time plans. Since mid-2015, various logistical obstacles have forced the Medialogy students to share workspaces using analog reservation systems. Many students also choose to work ad hoc in corridors, the library etc. Given that the students have to be more flexible with respect to the physical setup of their daily work, their choice of time management tools becomes even more interesting to probe.

2.1   Method

For this study, a questionnaire was created in Google Forms [7] and posted on two facebook groups directed at Medialogy students from Aalborg University Esbjerg. The questionnaire had a total of 9 questions, but used a branching structure that lead users quickly past questions that were rendered irrelevant by a previous response. As of the submission of this paper, 23 students (out of the 79 students currently enrolled in the education in Esbjerg) spanning 8–14 project groups (6 respondents did not know their official group no.) completed the questionnaire. The students were mostly male, with only 3 female respondents (a spread, which is actually representative of the general male to female ratio among the students). The average age of the students was 24 with a standard deviation of 2.5, the mode age being 25 and median age 23. The youngest respondents were on their 4th semester, whereas at least 8 respondents were 10th semester students (one respondent did not indicate a semester).

The questionnaire used a combination of closed and open questions, the closed ones mainly used either to collect demographics about the users, or to define which branch of the questionnaire the user would be lead through. As this was meant as a qualitative study, emphasis was put on responses to the open questions. In keeping with this, the following subsections are organized according to the topics of the open questions. The quantitative results can, however, be quickly recapped: In addition to the demographic data gathered, 18 out of the 23 respondents answered yes to the question "Do you presently use a type of formalized time management, broadly understood, in your project work (as opposed to just "going with the flow")? (Examples could be a calendar, GANTT charts, software or another type of planning tool.)" 33,3% of the respondents indicated that the time management tools they used included both analog and digital ones, whereas 38,9% used digital tools only and 27,8% analog tools only for time management. All the respondents who used analog time management tools, whether in combination with digital ones or not, had these on public display in their working area (as opposed to working with e.g. private physical calendars and notebooks).

2.2   Sharing of Information from Digital Time Management Tools

With respect to the use of digital time management tools, the picture is a lot different. The respondents who used both digital and analog time management tools did not have a public display of their digital time management, e.g. a large external screen or frequent printouts put up on a billboard. This was somewhat unsurprising, given that one would expect the analog, publically displayed time plan to fill the role of enhancing time plan awareness in the workspace, thus making a similar public display of a digital time management tool unnecessary. What was interesting, however, was that for the respondents who *only* used digital time management tools, these tools were only accessed via the individual students' computers, smartphones etc., not displayed publically. The questionnaire did not contain questions regarding where the respondents typically would sit and work, so it is unclear whether the groups who only use digital time management tools do so because of the lack of wall space, because they often work asynchronously, or for other reasons.

It is, however, interesting to look at the type of digital tools used for time management: Respondents representing 5 different project groups used Google Docs for sharing of time plan information, three groups in combination with commercial project collaboration platforms, namely Teamweek [8] (one group) and Slack [9] (two groups), whereas others used a combination of Google Docs, Google Calendar (for coordinating schedules) and e-mail. One group also mentioned using facebook in combination with Google Docs and Teamweek. Two project groups specifically referred to Google Drive, and not Google Docs for sharing information, which might indicate sharing of time plan information in other file formats via shared folders. One group referred to Google Calendar in isolation as the platform of choice for sharing time plan information. Whereas sharing of information from the aforementioned Google tools could easily be envisioned in a (at least temporarily) static, public format (printouts etc.), other more social network-like platforms, such as the aforementioned Teamweek and Slack, but also Jira [10] and Trello [11] (both mentioned by one group), have formats that seem to afford more active, individualized forms of engagement on behalf of the individual user. I.e., as one would do on facebook, the user is inspired to skim, scroll, go in and out of menus, and move the view around in uneven patterns. It is tempting to hypothesize that students who only work with digital time management tools, regardless of type, prefer to access these via their own machines, exactly because they can control how they view the used platform at any given time. I.e. they may simply have become accustomed to the convenient adaptability of the software to their individual cognitive needs in the situation. If this is the case, it does not bode well for the feasibility of a public digital display for time management, unless this is designed as an actual supplement to the 'individually accessed' time management tools, and not as a mere duplicate of these.

2.3   Pros and Cons of Stand-Alone Time Management Tools as Listed by Medialogy Students

In addition to the questions about their use of analog or digital time management tools, the students were asked the two open questions,

> Think of two scenarios: One where you have your project plan on public display in your working area, and one where you do not. How would you characterize the pros and cons of having a project plan on public display in your working area? Please write a few notes below.

and

> And conversely, if you haven't already answered this above, how would you characterize the pros and cons of not having a project plan on public display in your working area? Please write a few notes below.

Via a content analysis of the student responses [12] to these questions, the following themes were identified.

Awareness via Visibility. The majority of respondents (10 out of the 18 who had answered the first question above) saw it as an advantage of having a publically displayed time plan in the workspace that it improved awareness of the time plan among group members. At the same time, however, 6 respondents saw this as a potential disadvantage,

given that having the time plan visible all the time could lead to stress in situations where it would be preferable to focus on the work to be done. The following statements are representative of both points of view:

> Pro: having the plan in public should be an additional incentive to work harder to stay on schedule. Con: if for some reason you are behind schedule, everyone can see that and make you feel uncomfortable. (23 years old male student, 10th semester)

> Plan on a public display can remind and motivate me to stick with a schedule while I am on my free time, but when I am in a working process I see a need to remove it, because it distracts me and makes me think of all the other stuff I need to do. (22 years old female student, 6th semester)

As mentioned above in the introduction, professional workplaces in the creative industries tend to use designated time management responsible such as project managers, secretaries etc., yet one could easily imagine a scenario where the time management responsible took special care to integrate information on the time plan in the office in a visually salient way, exactly to evoke a stronger consciousness of time constraints among the designers. Whether the reason why this does not happen to a larger extent (other than the occasional small GANTT chart as part of a larger billboard) is due to a preference for digital tools over analog ones among the designated time management responsible (as documented in [3, 5]), is an open question.

Collective vs. Individual Planning. Supporting the hypothesis that some students might prefer to use time management tools on their individual devices due to the adaptive nature of the interface, two respondents commented on the lack of this trait in a publically displayed, and collectively edited, time plan:

> Not everyone in the team has the exact same personal workflow, the time plan could contain too much or too little information to be relevant for everyone when it's displayed publicly. (23 years old male student, 10th semester)

> Having a private one allows me to use my own shortened terms and keywords as opposed to having to make it explicit for others. (25 years old female student, 10th semester)

Similarly, collective vs. individual planning can be considered an issue when it comes to the flexibility of the public display, or lack thereof – i.e. the fact that a public display is location-specific:

> Pro: Sometimes it can be nice to have something physical instead of only digital, so that you can walk around and talk about it. Con: If you only have a physical board/calendar, you can only check out the schedule when you're physically present in the room. (26 years old male student, 10th semester)

> We have som[e]times used a timeline on a board, and it's easier to follow what needs to be done, and when it needs to be done. But only when you are currently in the group room. So you need to have data on a mobile platform to follow it when you are not in the group room. (28 years old male student, 4th semester)

It should be noted that these two comments clearly identify a public display with an analog one, which is not remotely editable. Having a digital display with remote access might remove exactly this problem. On the other hand, as suggested above in the short review of digital tools used by the students, the success of such a display would be highly dependent on the look and feel of the utilized digital platform.

Lastly, related to this theme, is the issue of privacy, not only between the individual group members, but also between two or more groups sharing the same workspace. At least one student commented that one might not always want other groups to be able to spy on what one's own group is doing.

Analog vs. Digital Tools.   As indicated above, some students, in fact the majority, tend to identify the idea of a public display with that of an analog display, e.g. a blackboard, whiteboard, billboard etc., and so some of their answers with respect to the disadvantages of public displays are in fact comments on the disadvantages of analog tools. Disadvantages in this context concern limits in terms of capacity (i.e. an analog info board can only hold so much information), limits in terms of tracking the work process (as an analog display does not have a tracking history), a more tedious update procedure for analog displays than for digital ones, and also the more fragile nature of the analog display compared to cloud- or otherwise web-based time management platforms (i.e. information is less likely to get lost in the latter.) On the other hand, an advantage listed by the students of analog tools over digital ones is the stability in terms of not having to rely on an Internet connection.

Tangibility.   Identifying a public display with an analog one also leads the students to praise public displays for their tangibility and related affordances for multimodal editing:

> […] it's (arguably) easier/more pleasant to move some post-its around than open some cloud storage document and modify rows/columns in an Excel document (which is what I consider a project plan not on public display). (20 years old male student, 4th semester)

> The tangibility of having it [= the analog display] tied to the work place and being able to touch and alter it in the real world is definitely a pro. (25 years old male student, 10th semester)

The students, however, also relate tangibility to the general affordances for getting up in front of the public display and explain something, as witnessed by the comment in connection with the theme of collective vs. individual planning that "sometimes it can be nice to have something physical instead of only digital, so that you can walk around and talk about it" (see above). This type of 'tangibility' is obviously not specific to analog displays, but can also be imagined compatible with e.g. digital whiteboards. (Indeed tests done within the EU-funded research project IdeaGarden [13], which the author has been part of, show that it is.)

Spatial Integration in the Workspace.   A theme, which also easily relates to both analog and digital public displays, is how to integrate said display in the physical workspace:

> Con: It might take up valuable space. Though that is dependent on the workspace itself; you might not have the room, or the room is already used for something else. (23 years old male student, 4th semester)

In addition to this more practical issue, making the display part of the surroundings may risk leading to a loss of salience over time:

> [The public display is] more visible, but may be overlooked, if people are used to it being there (30 years old male student, 10th semester)

The latter, however, seems to be dependent on how much the students actively involve the display in their daily work: Frequent use of the display should help maintain its salience.

3 Tentative Conclusions and Further Perspectives

The external validity of the findings in this study is limited by the sample size, but a few tentative conclusions seem to be supported by results from the case study co-conducted by the author at LEGO® Future Lab:

Firstly, tangibility and a modality separate from work at an individual computer seem to be key elements a successful stand-alone display of a time plan can provide to engage the user. The general preference for analog tools over digital ones in the work process of designers at LEGO® Future Lab (as documented in [3, 5, 6]) was exactly grounded on a need for tangibility and free physical movement in the creative work process, a pattern echoed in how some Medialogy students articulate their preferences for analog stand-alone displays.

Secondly, it is still an unfamiliar idea for many students as well as creative professionals that a digital stand-alone display can afford the type of alternate modality for interaction sought after when taking a break from one's own computer. In user tests conducted at LEGO® Future Lab as part of the IdeaGarden project [13] of an interactive, projection-based wall, controlled via (among other possible tools) digital pens or remote access, the main obstacle was impeded accessibility: Because it took too long to start up the prototype and climb the learning curve of the system, many designers chose to use their usual tools for collaborative meetings (post-its etc.) instead. Those who did use the system, however, returned to it on a more regular basis. Given that Medialogy students did not consider the possibility of a digital stand-alone display serving the same purpose as an analog one, it is a subject for further studies, whether students would embrace a digital stand-alone display affording macro-gestural interaction (i.e. similar to the gestural patterns of a generic pen-and-post-it-based or blackboard-based work session).

Thirdly, developers of a platform suited for a digital stand-alone display face several challenges related to interface design: Many existing time management tools with access via a private device inspire the user to modify them to suit his or her own working style. A stand-alone display will either have to be similarly adaptive to the present user – at the risk of losing its role of providing clear, quickly readable visual markers in the joint workspace – or to some extent mimic the alternate modality offered by an analog tool such as a billboard. Finally, as some of the main incitements for having a digital tool rather than an analog one are the possibilities of remote updates and integration of elements produced on private devices, another challenge is making these features work seamlessly with the software interfaces on those devices.

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