

Possible Strategies for Facilitating the Exchange of Tacit Knowledge in a Team of Creative Professionals

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Abstract. This paper discusses strategies for improving how creative professionals embrace new digital tools into their workflow, in context of the EU-funded international research project IdeaGarden, which aims at developing tools and scenarios that facilitate creative collaboration. In previous research by the authors, a preference for analog tools over digital has been detected among creative professionals. In a new series of interviews done at the same workplace, it is shown that it is possible for a designer to build up *tacit knowledge* of the field in which he works, for use in a digital environment. Using examples from the interviews alongside examples from the literature on tacit knowledge, we try to describe a path for further inquiry into the challenge of facilitating the designer's shift from analog to digital tools via facilitating the exchange of tacit knowledge between co-workers, especially via making amendments to the physical arrangement of the workplace.

Keywords: Digital tools · Creative work practices · Tacit knowledge · Workplace design

1 Introduction

In this paper, we discuss different strategies for improving how creative professionals embrace new digital tools into their workflow. The discussion draws on studies done in context of the EU-funded international research project IdeaGarden, which aims at developing tools and scenarios that facilitate creative collaboration.

In previous research [1], the authors have collected evidence from qualitative interviews done at LEGO® Future Lab's office in Billund, Denmark, supporting the hypothesis that creative professionals, designers in particular, prefer to work with analog tools, both in the ideation process and in the development of actual designs. In a new series of studies done at the same workplace, an interesting anomaly has, however, presented itself: It is actually possible that a designer would work in a

digital medium as a starting point, if the person has sufficient expertise to translate in his mind between the more conceptual structure of the digital artifact and its physical counterpart. The level of knowledge possessed by such a person is typically tacit knowledge: Knowing, without testing in practice, what would fit together well in an actual, physical LEGO® model, is not necessarily something that can be verbalized in the form of a full manual, but seems to rely on a kind of pattern recognition that is trained through experience. There have, however, been studies of how tacit knowledge may be transferrable in informal, case-based encounters between co-workers, and it is precisely this possibility that motivates the research presented in this paper.

After a short discussion of the use of analog vs. digital tools in the creative workplace with LEGO® Future Lab as the main example, we discuss how tacit knowledge of analog work processes may help creative professionals embrace digital tools, and conclude with suggestions for how the creative work environment may be arranged to facilitate the possible exchange of tacit knowledge between co-workers. The latter aspect is addressed through examples formulated by other researchers within the IdeaGarden project who have been working with the workspace as a parameter for the successful creative collaboration.

2 Method

In the original study of work practices at LEGO® Future Lab [1], five semi-structured, situated interview sessions [2] were conducted over a three-day period with a total of six participants (one interview had two interviewees). In the new series of studies, 5 more interviews were conducted, similarly semi-structured and situated, more specifically in LEGO® Future Lab's offices in Billund, Denmark. Each interview ran roughly 35 min, including short show-and-tell sessions with the interviewees at their individual work desks in the office. One interviewee also took part in the original interview sessions done by the authors, while the authors knew another of the interviewees from previous conversations at meetings in the IdeaGarden project. The interview sessions used an ethnographic approach [3], making an effort to observe and understand the participants' work practices in context of their working environment. The interviews were recorded in sound files and analyzed according to three focal points: (1) the use of analog vs. digital tools, (2) the influence of the environment on the work process, and (3) the participant's relation to the IdeaGarden prototype installed in LEGO® Future Lab in the first half of 2014. The latter point of analysis is not addressed here in detail, only as a byproduct of the discussion of (1).

As the present study focuses on the designer's relation to analog and digital tools as well as the creative environment, the quotes chosen are taken from the three interviews done with designers, whereas the other two interviews done with project managers has mainly served as a reference for keeping track of the logistic details of LEGO® Future Lab's physical environment.

The names of the interviewees have been changed in the text to secure their anonymity.

3 Analog vs. Digital Tools in the Creative Workplace

The preference for analog tools in creative workplaces manifests itself in many ways. In LEGO® Future Lab, a front-line innovation department of LEGO® Group, the analog tools are, of course, often LEGO® bricks, but also include post-its, pen and paper and other materials used to create quick mock-ups of designs. In all except one interview, the tendency with respect to designers preferring analog over digital tools, made apparent in the previous studies documented in [1], repeats itself, as evidenced by the following quotes:

“I practically never build digitally [...] In the phase we are in right now [of a specific project], it is the experience that is the driving force. We have to present the experience, and in that case it is just as convenient for us to just build something physically and then use that. We don’t have to look at pricing issues, or if something is built ‘correctly’ – those things are further down the road. I think it’s easier to just build things in one go and then you have that [as a reference].” Morten, designer

“[...] I sketch something, and take a picture and then email to myself. [That way] I can paint it better in Photoshop. [...] I do a quick sketch and then I redo it in Photoshop like when you trace out an image. It’s easier for me to get the scale right [that way]. Photoshop is a bit abstract. I know what an A4 piece of paper is when I see it. In Photoshop it is on the screen and I can zoom in and zoom out so it is a bit abstract what the sizes are actually [...] It is just easier with pen and paper.” Sam, designer

Because embodiment triggers different thought processes, thereby possibly fueling a creative process that has otherwise come to a halt when a person is just sitting in front of a computer screen all the time (see e.g. [4]), the preference for analog tools among creative professionals is understandable. However, the two quotes above showcase other aspects of analog tools, which are particularly interesting in the scope of the present paper. The two designers are not simply emphasizing the preference for a more tactile or haptic mode of interaction with their surroundings, but argue for using physical artifacts rather than their digital counterparts, because the former gives them a better *understanding* of the latter. Interestingly, this understanding seems to be case-specific: When a designer works on a new case, a new understanding has to be gained through interaction with physical objects. As we will see shortly, there might, however, be possibilities for training more generalizable conceptual skills via the interaction with physical artifacts.

3.1 Embracing Digital Tools in an Analog Workflow – an Anomaly

One of the oldest members of LEGO® Future Lab, a model builder employed by LEGO® Group for more than 30 years, states in the interview the authors did with him, that as a starting point, he prefers to build models digitally, in the software LEGO® Digital Designer, rather than with real physical bricks:

“I very often start building digitally. I build in LEGO® Digital Designer, so that’s really where I often start [...] and then I just sit and play with the digital bricks and build something, because a lot of times it is really just something people need for a presentation – they don’t really need the physical product [at first], so my ‘playing’ or building often starts digitally.” Stig, model builder

When confronted with the fact that no one else of the designers the authors had spoken to in the past and present studies had stated a preference for the digital medium when working on models, he confided that

“[...] Not a lot of people [build digitally], but I actually think it’s fast and you can do a whole lot of sketches quickly [that way]. Then of course, I have the background and knowledge that enables me to see what is stable and what is instable.”

Apparently, via his many years of building with LEGO® bricks, the model builder had simply trained the ability to see whether a design would have a solid construction or not, without having to hold it in his hands. Unlike other LEGO® Future Lab members, he had built up a general knowledge of how bricks fit together, something he could use in many different cases without having to necessarily refer to a physical model. (It should, however, be mentioned that the model builder of course also experimented with physical bricks once in a while and lots of small models on his desktop and shelves. He merely stated a preference for the digital medium when working on new models.)

The kind of knowledge the model builder has trained is, however, exactly something, which is trained. Although he would probably be able to explain on a case to case basis whether a particular model was stable or not, he would most likely not be able to fully transfer his knowledge in one big explanation, because the knowledge in question is a skill, rather than a fixed set of facts. In epistemological terms, the model builder has built up *tacit knowledge* of the field in which he works. In the following, previous research on tacit knowledge will be discussed in context of the present study.

4 Previous Studies of Tacit Knowledge

The concept of tacit knowledge is widely used in epistemology (and philosophy in general). As an example, Leonard and Sensiper [5] provide the case of how nurses often have a good intuition of what is wrong with a patient, but without being able to justify this ‘knowledge’ in the concrete, evidence-based terms that a physician would. Nurses learn to recognize patterns and little signs that lead them to a hypothesis of the patient’s state, without having to take a lot of tests first. This so-called tacit knowledge is tacit because it is difficult to translate into concrete rules, instructions or other pieces of information that would help others reach the same insight.

It is however, possible, as is argued by Panahi et al. [6], that tacit knowledge can be mediated by informal encounters and case-based discussions between co-workers. While Panahi et al. provide support for social media as a way of helping co-workers share tacit knowledge among each other, another angle, which the IdeaGarden project also discusses [7] is to consider how to shape the environment of the creative collaboration, such as to facilitate informal and ad hoc communication between co-workers, e.g. quick interactions regarding a specific problem, examples given by one person to another of how to solve a specific problem via a demonstration etc. In the following, it will be considered whether such improvements on the physical environment of the creative workplace can facilitate a transfer of tacit knowledge.

5 Possible Strategies for Improving the Sharing of Tacit Knowledge in the Creative Workplace

As discussed in Sect. 3.1, the skills the older designer, who preferred constructing models digitally, had developed are most likely not directly transferrable to other team members. They are, however, drawn upon by other team members, in informal encounters:

“[...] we all sit quite closely in here, so behind me there are two electronics people who are not part of the design team. So if I need to spar with some electronics guy, there’s one right behind me. Otherwise, we are 6 people who are sitting here physically [at a cluster of tables] who can have a bit of back and forth across the table whenever. [...] I use Philip a lot who sits right across from me, because he also builds stuff. The other designers are probably more ‘concept’ people, but they go to me with questions on elements, technique and such. It’s like, if you’re sitting with something you can just say ‘what do you think about this?’” Stig, designer

The particular kind of informal encounters the designer, Stig, describes in this quote are of an intimate kind, in the sense that the interactions take place in a small-group environment. This particular kind of environment is something that LEGO® Future Lab seems to encourage:

“We often try to move stuff around so people sit together with some of the people they work with, and that that makes our work more fluent. Like right now, all of us designers are sitting down in one corner, and then those you work together with are sitting like close to you.” Morten, designer

Within the IdeaGarden project, a small team consisting of partners from Kiel University (CAU), the University of Applied Sciences Upper Austria (FHOOE) and the design company EOOS has been working on the challenge of designing spaces that can afford different levels of creative collaboration. One such level of collaboration is exactly the type of intimate interaction hinted at in the quotes above. In order to facilitate this type of interaction the so-called “Space” team within IdeaGarden has worked on suggestions for setting up “intimate spaces” (see [7], 42), which afford interaction in small groups, and in addition, integrate digital and analog working tools in a small environment. One suggestion for an intimate creative working space is the tabletop projection setup shown in Fig. 1.

Another issue is, however, encouraging co-workers who otherwise work ‘solo’ to engage in ad hoc interactions with each other. In a workspace like LEGO® Future Lab, these interactions happen outside of the individual’s personal workspace, inspired by the specific surroundings:

“Right next to where I am sitting there is this little U-shaped booth with a couple of tall tables, and on two sides there are shelves, and on the third, long side there is a whiteboard where we can write and put up post-its. That means that you get out of this ‘sitting-at-your-computer’ situation, and both of the work modes I have, where I sit at my computer and write [on the one hand] and when we build, put up things on the wall, do brainstorm and such – it’s all connected now, because [the two kinds of situation] are physically close, and I think that makes a huge difference.” Morten, designer

A specific space at LEGO® Future Lab that used to be separate from the main office, namely the building area where team members can build things in LEGO® bricks,



Fig. 1. Tabletop projection setup, where one side of the table (left) has a projection on it emitted from the projector in the middle, affording collaboration in a digital environment (e.g. on presentations), whereas the other side of the table is open for regular, analog work processes (i.e. writing and drawing on paper etc.).

either for project purposes or as a means of recreation, is now an actual part of the office. This has improved ad hoc communication a lot:

“[Having the building area inside the office] is perfect. It’s a lot more... It’s better in terms of... There is [a higher] frequency of meeting other people in the building area now than before. More people work more time in the building area because it is so close to their desks. So [there are] more chances of meeting people. Earlier you had to have a task to go down and solve it and come back. Now it is like you can work in both spaces at the same time.” Sam, designer

As a small digression, not everyone finds the building area equally useful when it comes to building itself:

“[...] If you use these [he holds up a handful of LEGO® bricks], someone has to go over [to the main storage] and get more. So if you know you need a lot of something, it’s easier to go over there [to the main storage] and bring a box with back. It’s not like we are short of LEGO® bricks here! [The building area] is fine, if you have something specific to build, but if you really want to explore [possibilities], it is nice to have a large volume [of bricks], and it’s easier pick over there [at the main storage], so you don’t have to empty [the building area] completely. We have the selection here, just not the volume.” Morten, designer

However, the building area still seems to be a typical example of what the IdeaGarden Space team has denoted a “non-hierarchic space” ([7], 45), more specifically, a space where people are encouraged to interact with the surroundings as equals, e.g. without having pre-established hierarchies influencing the interaction.

Where the building area is a stable space (disregarding the occasional moving around of the different office sections), the IdeaGarden Space team has also worked with ways of turning any area into a non-hierarchic space, i.e. a temporary space for interaction ([7], 43). The motivation for working with temporary spaces comes from

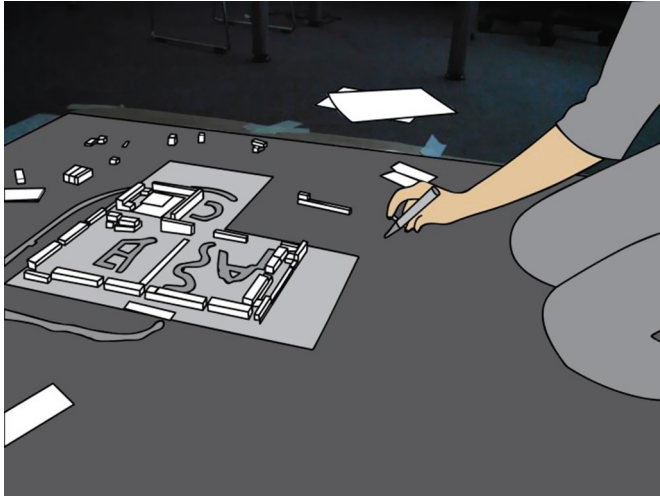


Fig. 2. Temporary space defined via a ‘play carpet’, a carpet-like desktop area, which affords both analog interaction (post-its, physical models etc.) and projections, i.e. use as a canvas.

the another test bed of the IdeaGarden project, namely the Muthesius Academy of Fine Arts and Design in Kiel, where students due to space issues often have to use whatever area is available for meetings, e.g. sometimes even hallways, corridors etc. An example of a possible set-up for defining a temporary space can be seen in Fig. 2.

Whether the above strategies with respect to defining areas for ad hoc interaction will actually result in case-based communication, aiding the transfer of tacit knowledge is a topic for further research. It is worth noting, however, that LEGO® Future Lab members recognize that the workplace needs to be arranged so as to better facilitate the informal modes of interaction mentioned above. Responding to a question regarding a recent rearrangement of LEGO® Future Lab’s office, a designer confides that

“Unfortunately it works the same. Even though we have changed [the] space we haven’t changed the [working] style. We are looking into how we can change it. It’s a bit hard for us, just because everyone is so used to do what they do, it is so hard to implement, but we would like a lot more creative spaces to brainstorm or gather... so a lot of white board spaces and shar [ing] of some models would help but we don’t really have that as much now.” Sam, designer

5.1 Accessibility

Another factor influencing the team members of LEGO® Future Lab in their acceptance of digital tools into their workflow is something as simple as immediate availability. The IdeaGarden digital whiteboard prototype developed by researchers at FHOOE has been placed within the office of LEGO® Future Lab in ways that do not necessarily afford everyday interaction with it. One installation is kept in the far back of the open office space behind dividing boards, whereas another installation of the board

is in a separate room. All interviewees verify that the digital whiteboards are being used, but not to the degree to which it was intended:

“The problem [with the installation of the digital whiteboard in a separate room] is that if someone has booked the room, you cannot access it, and as you can see [on the board outside the room], the room is almost booked for the entire day because we frequently use it for meetings.” Morten, designer

“I haven’t really used [the digital whiteboard environments] very often, because it hasn’t quite fitted into any of what we are sitting with, and we are [also] very used to working with post-it notes. When we are sitting at the tables and doing a quick brainstorm it’s very convenient to just... yeah. [...] I am probably a person of habits [...] and for us who are sitting there together, we would have to move somewhere else to do that [if using the digital whiteboard]. It would maybe be different if we had a tablet on the table and could save, share and so on [on that].” Stig, designer

“I think the biggest issue that people mention is that we don’t know how to start it up. Something as simple as [that] it is powered down. The effort of starting it up – sometimes it is just easier to use the [analog] white board and a marker, so the benefit of [getting] it started up – people haven’t found that benefit yet. [...] We’ve tried to use it for ideation, yes. Because it is online it was cool to find examples using Google images mostly so that everyone could see the same. [...] That was cool” Sam, designer

Finding ways of integrating digital tools such as the digital whiteboard developed within the IdeaGarden project so as to make them natural part of the work environment, and thereby used, is another aspect of working with the office space, which is not directly related to tacit knowledge, although a swifter change between the analog tools and their digital counterparts on an accessible digital whiteboard could maybe aid the transfer of tacit knowledge of analog work processes to the digital counterpart of those processes.

6 Conclusions and Further Perspectives

Although one must not underestimate the role of embodiment in the strong preference for analog tools we have previously described (see Sect. 3), it is worth exploring if a better tacit knowledge-based understanding of the embodied know-how of analog work practices could help creative professionals embrace digital tools, and if the transfer of such tacit knowledge between more experienced co-workers and their younger colleagues could be facilitated by additions to or rearrangements of the workplace.

In connection with the discussion of the IdeaGarden whiteboard prototype in context of LEGO® Future Lab, the importance of making digital tools readily available and accessible to the users is also highlighted.

Another perspective, which has not been pursued in detail within the IdeaGarden project, is the possibility of using gamification strategies to draw in users of the digital environment. The initial versions of the IdeaGarden digital whiteboard environment had simple games like tic-tac-toe integrated in order to help users learn basic controls with the associated digital pens, but an actual strategy for how games or other fun activities could make creative professionals embrace the new digital tools, has not yet been explored.

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