

Appropriating Digital Fabrication Technologies - A comparative study of two 3D Printing Communities

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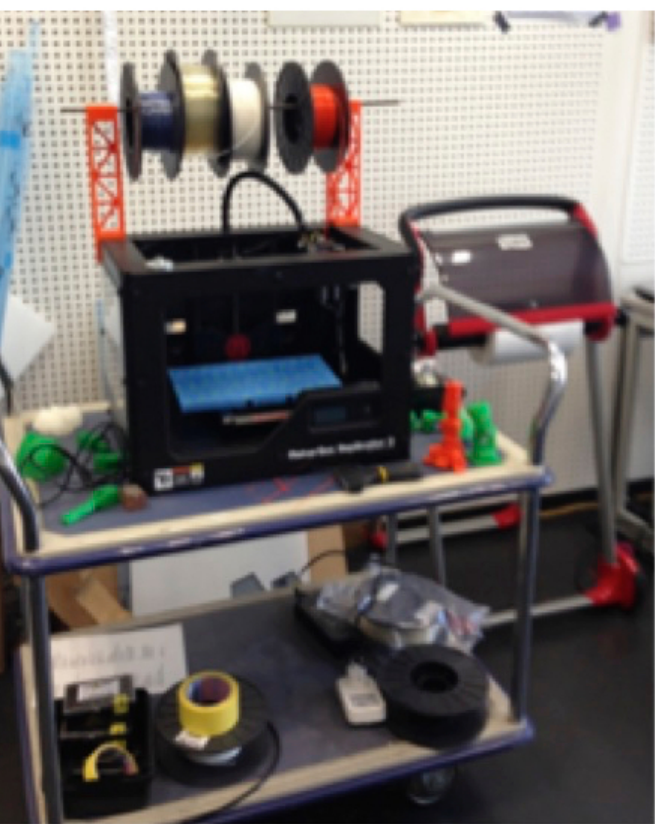
Related work

- Appropriation (Pipek 2005)
- DIY & Empowerment (von Hippel 1988, Kutznetsov & Paulos 2010)
- Digital Fabrication & "Making" (Gershenfeld 2012, Mota 2011, Eisenberg 2007), often lacking in user-focus (Avram, Boden, Posch, & Stevens, 2013)
- Maker-Communities, e.g. Fab Labs (Moilanen 2013, Troxler 2010)

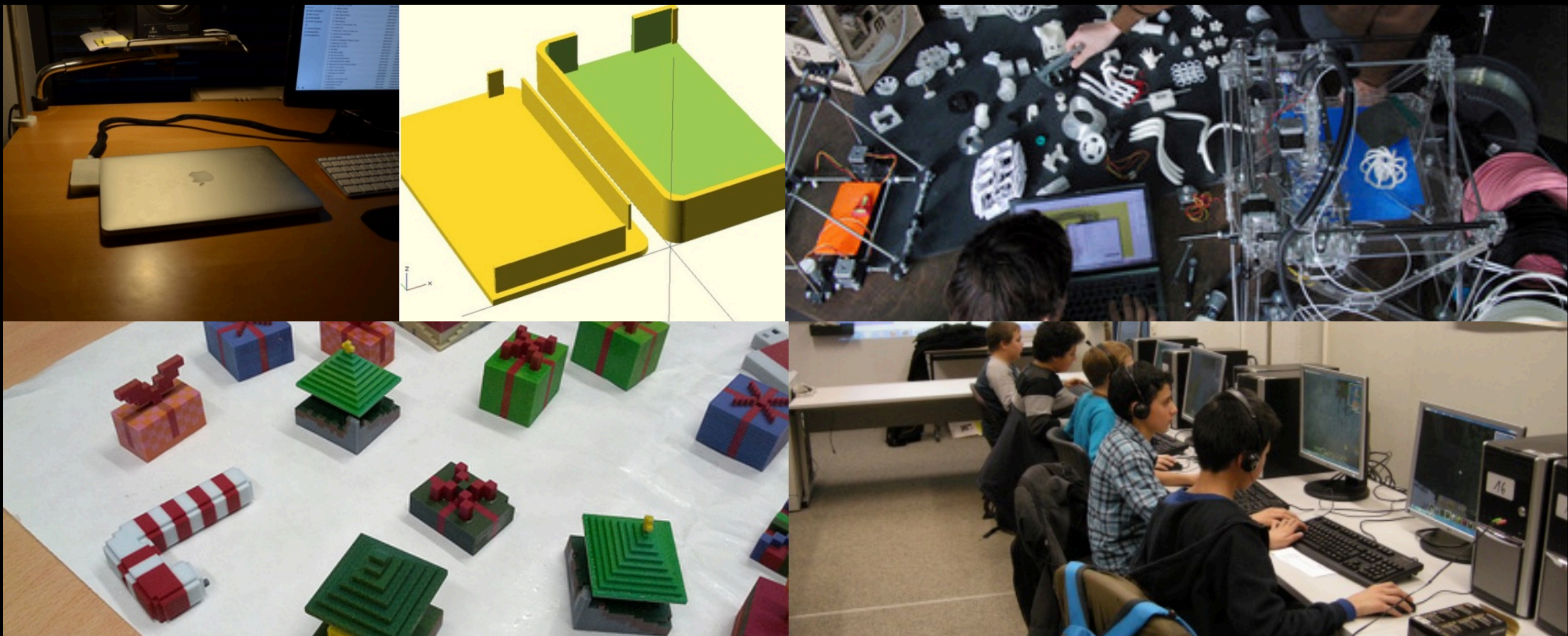


Field & Method

- 2 Maker communities (HCI researchers & students / art university)
- Understood as Communities of Practice
- Grounded Theory-oriented approach
- 10hrs observation, 4hrs workshops, 10hrs interviews (researchers, students, engineers, artists)
- Foci: work context, role, qualification, tasks, problems, collaboration & communication in the CoP, 3D modelling and 3D printing



Projects



Emergence & Self-conception

"Since I've been at the [Institution Name], there always was a need to transform the virtual, to make object" (Head of exp. imaging)

"We had this issue[...] A few colleagues were bothered by this and they started to look into what could be done and after that, they basically downloaded their own plunger from the internet, printed it and installed it." (Post-Doc)

- Utilitarian motivation for initial purchase
- Tinkering & Appropriation started quickly

Playfulness, persistence & transformation

"What really fascinates me on 3D printing is that you can finally create something on the laptop, which you can later hold in your hands [...] it is not comparable to creating just a graphic on the laptop: You can touch it - which is just so exciting." (Engineer/artist)

- Learning and appropriation intricately connected to **fun** in both communities
- Fascination of physicality as attractor & motivational factor
- *"the proof is the pudding* (Post-Doc): Learning by Doing

Contextual (mis-)understandings

"[...] the problem is deeply embedded in its own specific context. So maybe it is the particular model, maybe it is the software just now." (researcher)

"There are certain keywords like the 'raising', where everybody is talking of 'warping'" (PhD-student)

- Understanding and **locating** problems is hard & not supported
- Domain-specific vocabulary

Documentation & Sharing

"I don't use [the printer] very often and I forget a lot again" (Post-Doc)

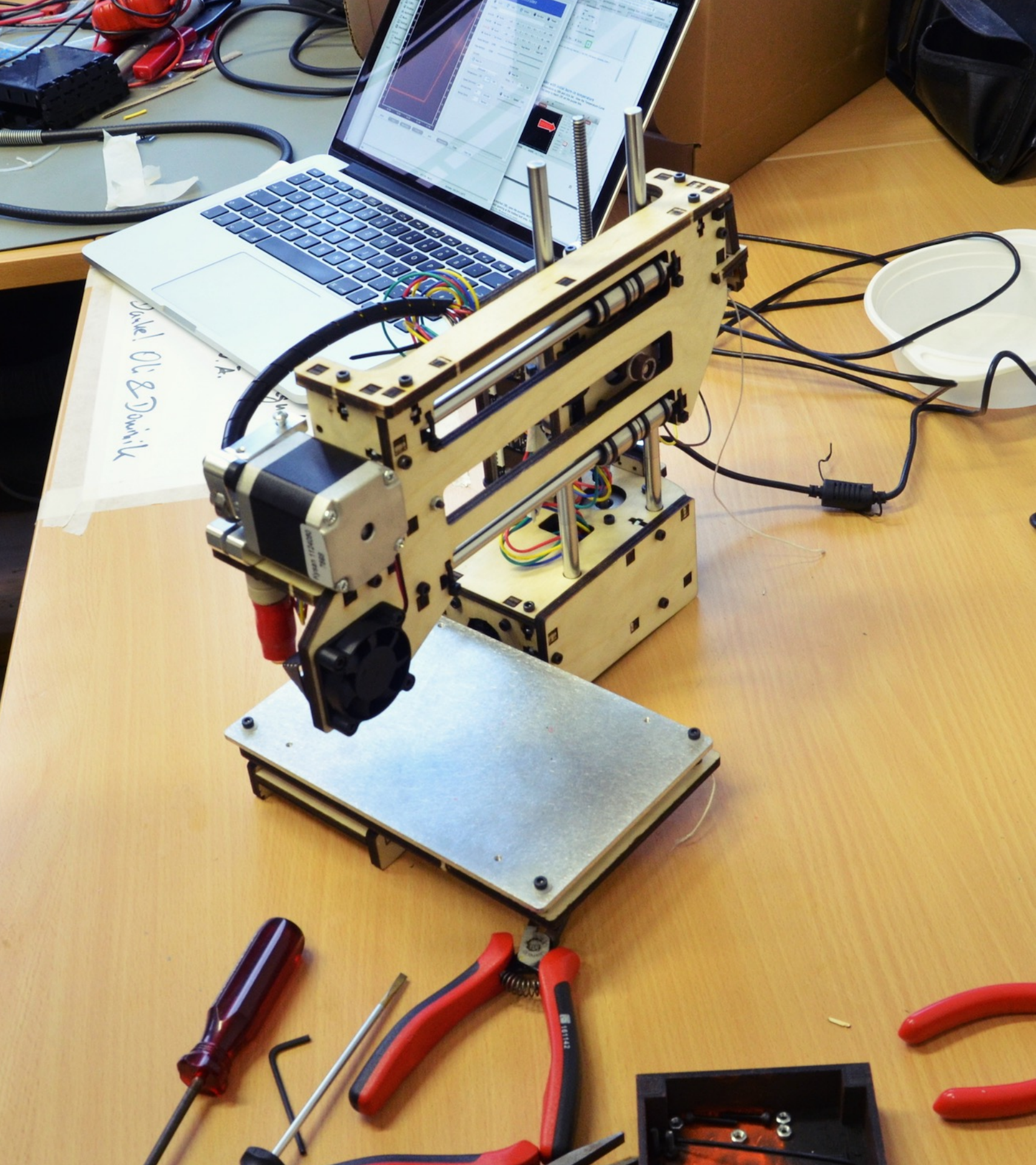
"I notice that the 3D printer is running and [the object] looks like it belongs to [colleague], I might ask him later what he made. You talk at times, when there are problems." (Post-Doc)

- Knowledge retention & sharing are problems
- Situated talks and sharing

Documentation & Sharing (II)

"[Talking about Thingiverse] you get hints, with which material on which printer [...] and so on. I think it is important [...], especially at the beginning" (Post-Doc)

- Global sharing, documentation & hints are important
- But: No standards, no automated documentation
- Often lack of motivation to document



Discussion / Conclusions

- Task focus when buying then playful exploration & tinkering & doing.
- Formation of CoP. 3D printers as boundary (negotiating) artifacts
- Printer as *Black box* (lack of feedback, contextual information)
- Documentation & sharing are not well supported
- Sociability of Maker technologies needs to be advanced

Sources

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