

Designing Interactive Artifacts to Generate New Modes of Engagement in an Academic Makerspace

Anne-Laure Fayard, Victoria Bill, Jessica Chase and Shrishti Kush
NYU Tandon School of Engineering

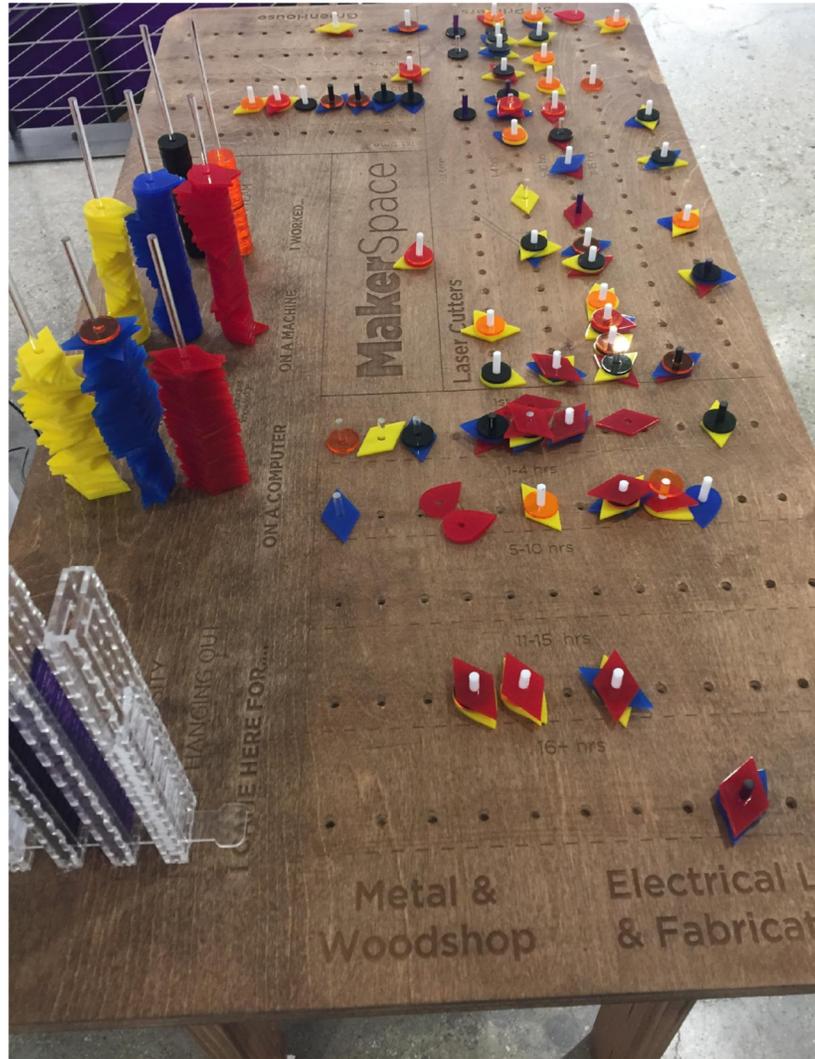
Presenter: Christina Lafontaine, Design Specialist, NYU Tandon MakerSpace

Motivation (1)

- Community building in academic maker spaces is crucial to nurture a culture of innovation (Lindsey et al. 2016; Halverson & Sheridan, 2014; Bill & Fayard, 2017); yet hard to achieve (Cooke & Charnas, 2016; Patel et al. 2016).
- Most literature on makerspaces focuses on measuring foot traffic and machine usage (Cooke & Charnas, 2016; Patel et al. 2016).
- We don't know much about *how to trigger and nurture a sense of community and develop relational modes of engagement of users within academic makerspaces.*

Motivation (2)

- We noticed that most of students in our MakerSpace space had mostly a transactive relation to the space.
- In a previous study, we designed a tangible visualization artifact. We found that
 - It could trigger reflection on practices in the space and generate a sense of belonging to the space for some users (Fayard et al. 2017).
 - But it was difficult to maintain engagement over time and some interactions were complex for students to interpret.
- *How might we create a similar type of engagement in a sustainable way?*



CAIRN, 2017

How can we shift users' mode of engagement to the space and transform them from passive users of the resources to more active producers of meaning?

Inspirations

- Space as socially constructed through everyday practice and experience (Lefebvre, 2000; Fayard & Weeks, 2011).
 - Our modes of engagement with spaces can be deeply relational and nurture the emergence of a sense of community.
- Relational art
 - We experimented with “relational art [...] (which) intends to create not only objects but situations and encounters” (Rancières, 2006)
- Different art installations and interventions as well as the literature on tangible visualizations (Gourlet & Dassé, 2017; Rezaeian & Donovan, 2015).

NYU MakerSpace



"Perfectionism: please tell me what lab rules you would like to observe."
- M.A. Rosenoff

"There ain't no rules around here. We're trying to accomplish something."
- Thomas Edison

WE ARE THE NEW

But it w

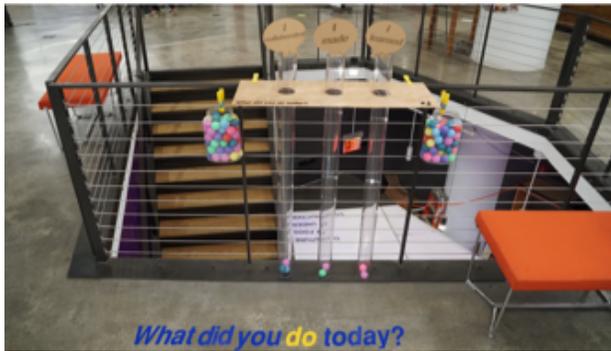
ody is a genius. n by its ability to climb life believing ed to Albert Einst

Setting

- Open to all students, staff, faculty but housed in school of engineering
- Hours
 - Monday – Friday 9AM – 11PM
 - Saturday – Sunday 12PM – 6PM
- Three full time staff plus large student staff, faculty advisory board

Approach

- Action research
- Iterative design
- “Rapid prototyping” – creating a tangible object made with makerspace tools



Tangible Tubes

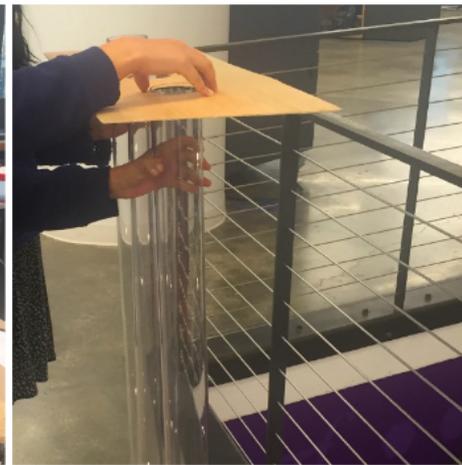
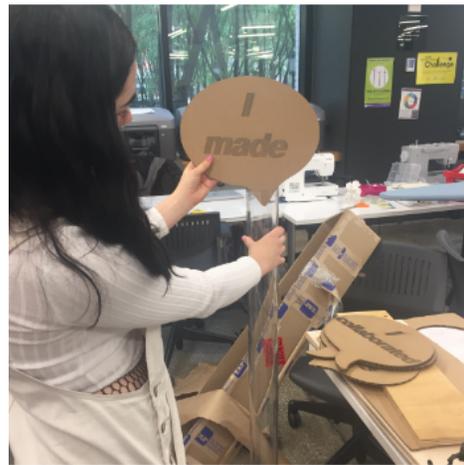
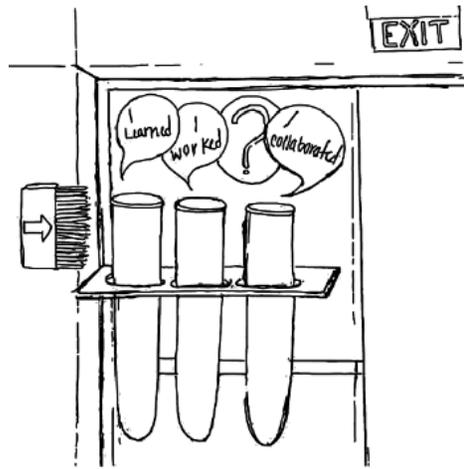


You Make Me Feel

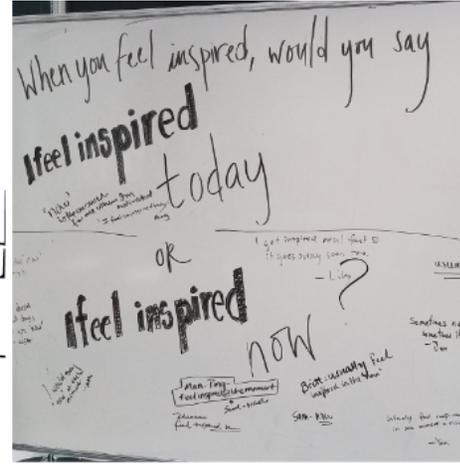
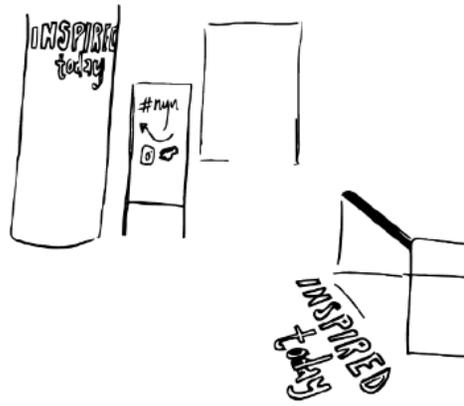


Your Totems

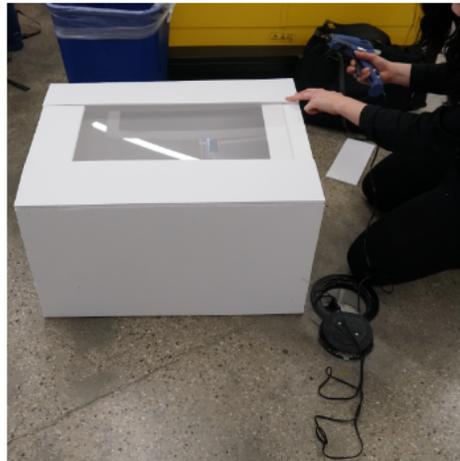
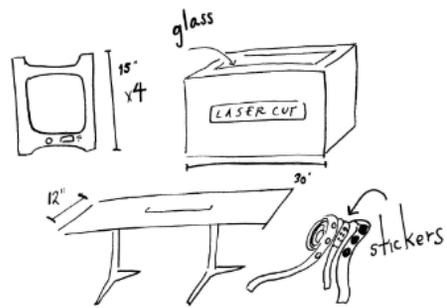
The Making



Tangible Tubes



You Make Me Feel



Your Totems

**The three interventions were disruptive
in the context of an engineering
culture because of their aesthetic and
affective dimensions.**



Tangible Tubes

"It's easy and fun."; "It made me think"

"It looks like test tubes"

"It's cool; it looks like tags for concerts on pavement."





You Make Me Feel just did not gel.

*Very little photos; even less sharing on social media;
"This is very confusing."*



Your Totems

*Those who knew Kusuma inspiration knew “what to do.
When students “understood” how to interpret the intervention, they
enjoyed it.*

“I love putting the stickers on. It gives me a nice feeling.”

Time and Ambiguity

- Two assumptions to increase engagement from CAIRN:
 - **Assumption 1:** We need to squeeze time. Yet, *behavioral and mindset changes require time.*
 - **Assumption 2:** We need to simplify the questions. Yet, *ambiguity generates reflectivity.*
- It is about navigating tensions – between **ephemerality** and **duration**; between **simplicity** and **complexity**.

Practical implications

- As any culture change, triggering new modes of engagement within a space is a long-term process that requires consistency – that is, multiple and regular interventions.
- This is about changing behavioral norms and a sense of permission is essential.
 - Role modeling by the MakerSpace Management and student workers
 - Engagement of the student workers in the process

Future research

- Possible contribution to the literature on nurturing emotional intelligence (Goleman, 1995) in engineering education (Riemer, 2003):
 - To effectively support emotional intelligence, it must be embedded within an organizational culture where emotional intelligence is recognized (Fitzgerald, 2003).
 - Our intervention aimed to build a culture of self-awareness and self-reflection, two important elements of emotional intelligence.
 - *How can makerspaces increase students' emotional understanding by providing them with opportunities to become more reflective and self-aware while developing a sense of belonging to a community?*