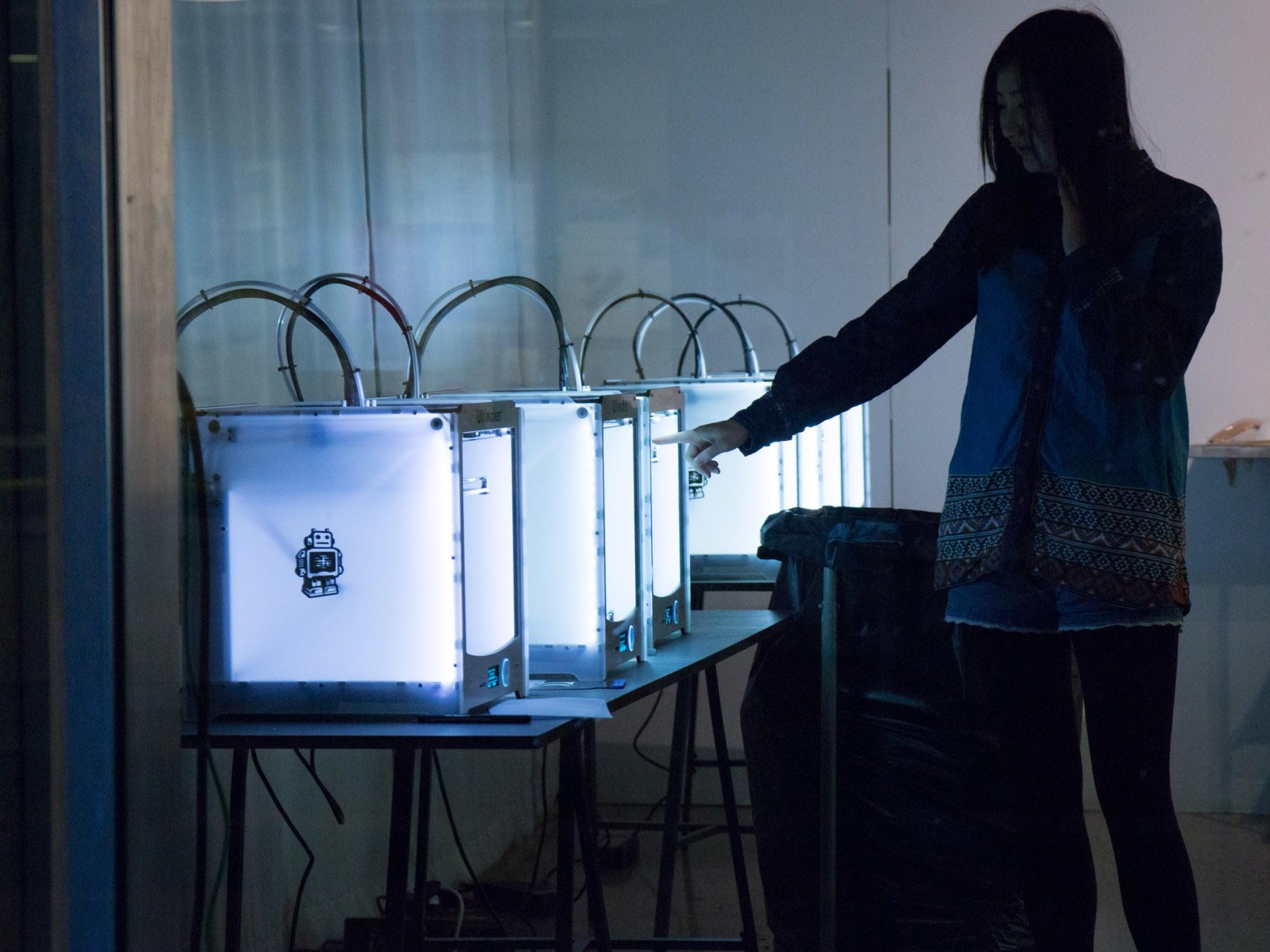
Having or Using a 3D Printer *in* Experiential Learning

William Lavatelli Kempton
william.kempton@aho.no
The Oslo School of Architecture and Design

Future of Education conference
Florence 2016



Outline of my talk

- Spaces for making
- Hypothesis
- Digital fabrication and 3D printing
- Making and fabricating in an educative environment
- Experiential learning
- 3D printing in design education
- Conclusions & Discussions

Hackerspaces in Europe, from hackaday.io

"… I began to realize that these students were doing much more than taking a class; they were inventing a new physical notion of literacy. "

Gershenfeld, N. (2008)

All primary schools should have 3D printers & design software, says former education secretary Lord Baker

May 9, 2016 | By Benedict

In a report published today, former British education secretary Lord Kenneth Baker has said that every UK primary school should have a 3D printer. The demand forms part of an eight-point plan concerning education on digital technology and the prevention of future unemployment.

Lord Baker's publication of "The Digital Revolution", a **report** on the relationship between British education and future employment prospects for young people, comes shortly after the Bank of England predicted that 15 million UK jobs were under threat due to automation, in the form of driverless vehicles, robots, and more. According to Lord Baker, radical action is needed to ensure that the next generation of working adults is equipped to handle a new era in technology—the "fourth industrial revolution", one of 3D printers, robots, and artificial intelligence.

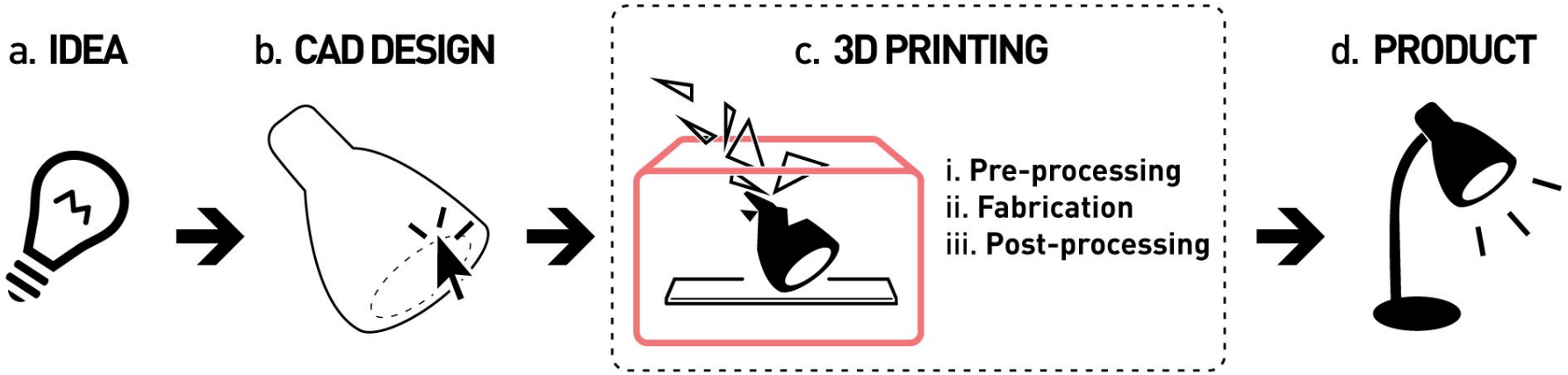
Although Lord Baker believes that students should be introduced to 3D printing and design technology at a young age, he also singles out additive manufacturing technology as a threat to once-stable career options: "The economy is changing at an unprecedented pace," he said. "Every day, jobs are being lost in professions we used to regard as careers for life. artificial intelligence, robots, 3D printing and driverless vehicles will impact on sectors as varied as the legal profession, transport and construction."

Hypothesis

While 3D printing is useful in education, it is not necessary to have it present to foster new experiences.

Remote access ⟷ **Local access**

What does 3D printing involve?



From the literature

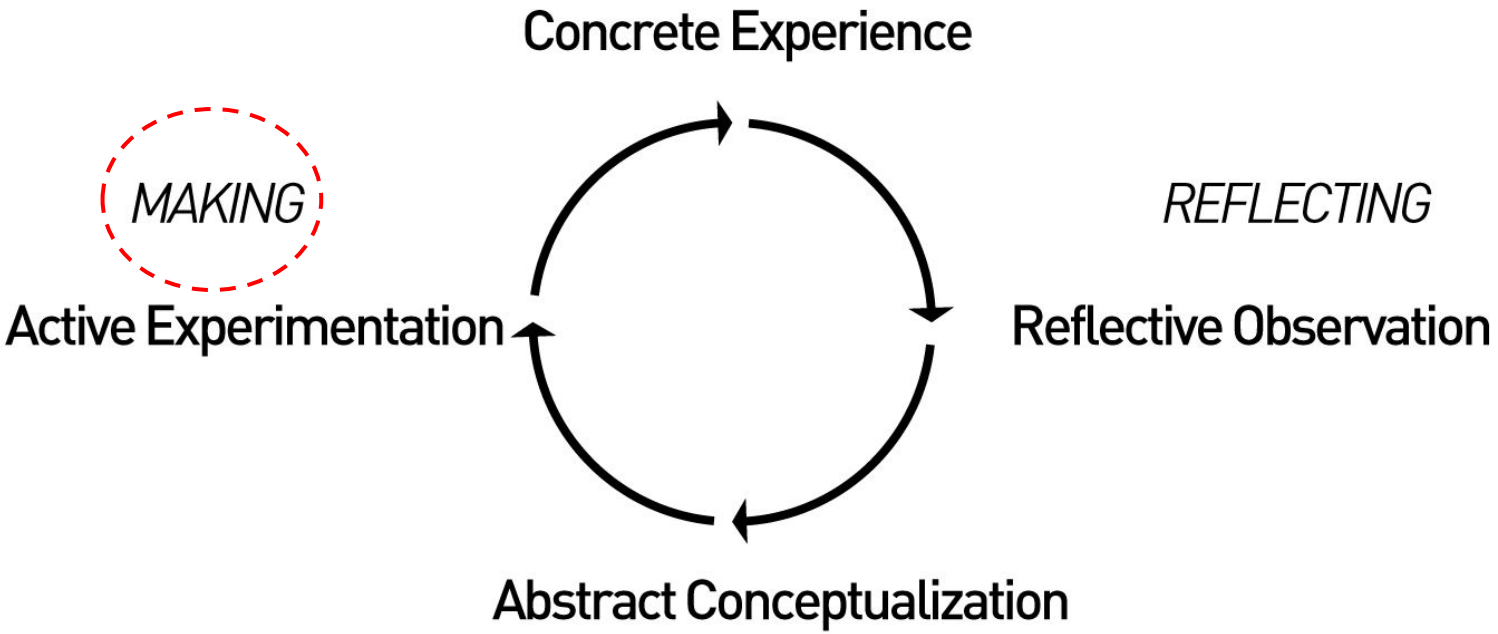
Blikstein, P. (2013) - the ‘Keychain syndrome’. Veer away from trivial, quick and admirable projects, and push towards complex tasks.

Experiential learning

"Wholly independent of desire or intent, every experience lives on in further experiences"

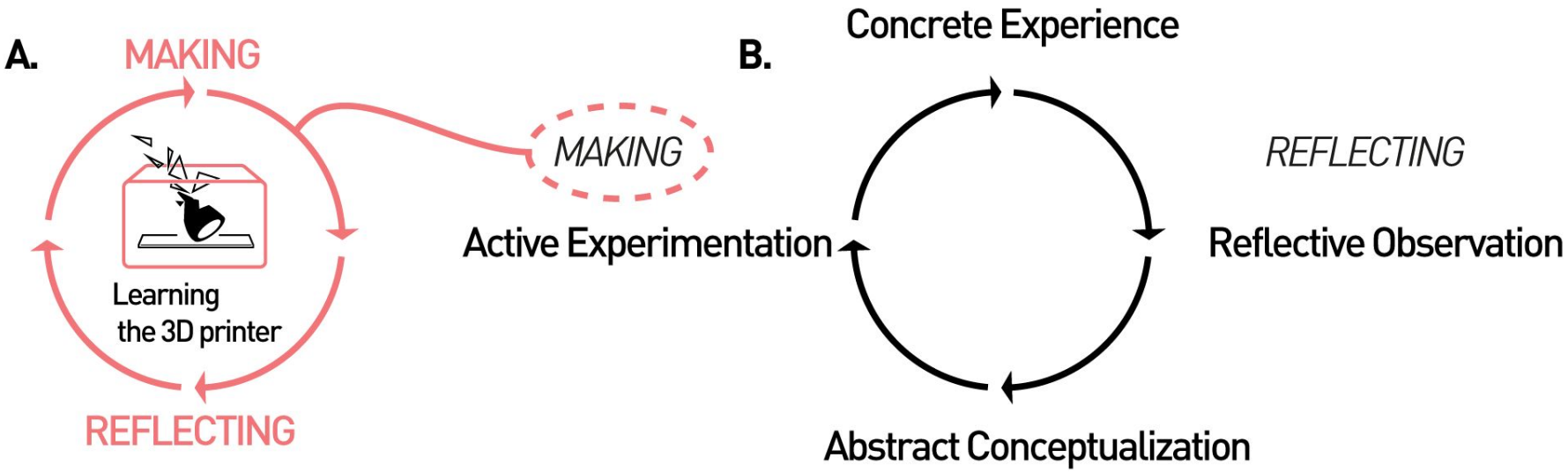
Dewey, J. (1938)

Experiential learning



Kolb, D. (1984)

Making in Experiential Learning



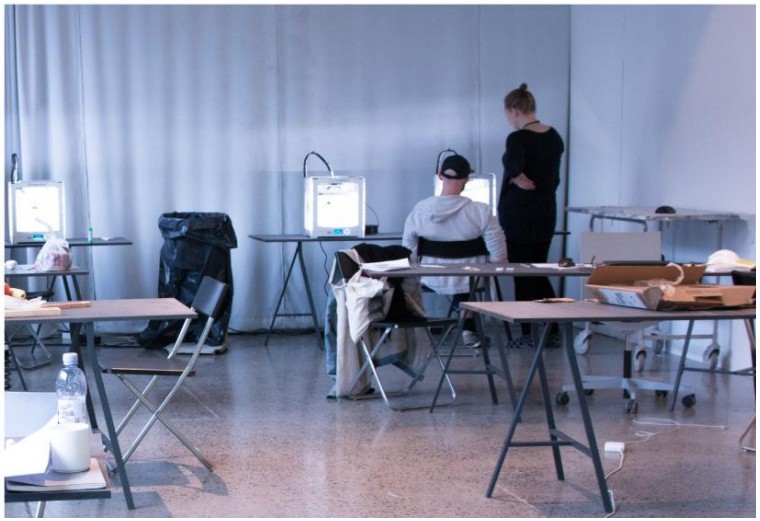
Experiential learning of or with 3D printing

REMOTE 3D *Precise, capable, recourceful*

with of

Experiential Learner

LOCAL 3D *Tangibile, present, adaptable*



Conclusions & Discussions

- Growing interest in "Maker" mentality, in and out of educative environments
- Re-introducing craft and physical literacies to younger students
- Local and remote access to 3D printers provide different learning outcomes
- Local access facilitates learning *of* the tool
- Remote access facilitates learning *with* the tool

What kinds of skills should be the focus of future, "Maker" eductation?

Bibliography

1. Gershenfeld, N. (2008). *Fab: the coming revolution on your desktop–from personal computers to personal fabrication.* Basic Books.
2. https://hackaday.io/hackerspaces
3. http://www.3ders.org/articles/20160509-all-primary-schools-should-have-3d-printers-lord-kenneth-baker.html
4. Blikstein, P. (2013). Digital fabrication and 'making'in education: The democratization of invention. In *FabLabs: Of machines, makers and inventors* (pp. 1–21).
5. Dewey, J. (1938). *Experience And Education* (Reprint edition). New York: Free Press.
6. Kolb, D. A. (1984). *Experiential learning: experience as the source of learning and development*. Prentice-Hall.
7. http://designresearch.no/projects/williams-phd/news?post_id=3984