“Iterations and Drafts”: Educational Research Definitions In Brief

Summary

The California Tinkering Afterschool Network (CTAN) has identified that supporting students in the development of “iterations” or “drafts” with open-ended activities is a key facilitation practice for STEM-rich tinkering/making in afterschool. This focus on developing iterations/drafts acknowledges that projects can have more than one trajectory or solution, that design and redesign are important aspects of project development, and that there is space for exploration and trial/error. We believe that iteration helps students build confidence and perseverance through unexpected challenges in open-ended projects, allows students to go at their own speed, offers space for youth to take projects in a different direction than facilitators might have thought, and makes room for collaboration across youth who are focused more on the process than the final product of their projects.

Below are various ideas shared in research literature regarding the use of “iteration” or multiple “drafts” in educational contexts.

Iteration and Drafts – Valuing the design process & ideas over products

Tinkering involves a process of iterative design, play, and experimentation. Learners explore with their hands, working over long stretches of time to construct, test, rebuild, and retest. Research literature highlights that such a tinkering/making process encourages process over product, with all ideas welcome at the table. This has been important for student learning in the following ways:

• When ideas are privileged as more important than the final product, learners gain opportunities to take ownership and pride in the tinkering process while reflecting on ideas that worked and didn’t work over time (Vossoughi et al., 2013; Soep, 2014)
• Arranging and rearranging ideas with successive modifications over time is a common intellectual approach of non-Western scientists and commonly embraced in visual and linguistic arts. Supporting such iterative approaches to learning not only allows us to see students’ thought-processes and problem-solving abilities, but also allows us to invite diverse learners into STEM activities where they might not otherwise feel welcome (Turkle & Papert, 1990)

Iteration--Overcoming frustration & Reframing“failure”

Supporting iterations and drafts has also been cited as a means for helping learners become comfortable with and overcome
challenges. For example:

- When iterative processes are valued, learners become comfortable and can even enjoy dwelling on moments of frustration and overcoming challenges, taking ownership of the process and building confidence in their work (Petrich et al., 2010)
- Since “failure” is not a good word in most educational contexts, but makers/tinkerers celebrate failure as productive to understanding building processes and creating new structures; however the word “failure” has long been a negative word and educators should take caution with using it (Martin, 2014)
- Iterative design/redesign (common to engineering) allows intellectual engagement in ways that aren’t possible otherwise as long as the learning space feels “safe” enough for experiments to “fail,” edited, and tried again (Blickstein, 2013)

Iteration – “see student thinking” & Assess Learning

Another way to understand iterations/drafts is as a means of “seeing student thinking” and developing formative assessments of learning. Examining learners’ iterative drafts allows educators to:

- Monitor increasingly effective or elegant design solutions (Petrich et al., 2013)
- Capture students’ ideas and hunches as they experiment with ideas (Soep, 2006)
- Engage students in self- or peer-critique as a way of making their ideas explicit (Soep, 2006)

WORKS CITED