

# Productive Struggle: Supporting Emotion and Challenge in Informal Science Learning

Katie Todd, Elizabeth Kollmann, Sunewan Paneto, and the Productive Struggle Team\*



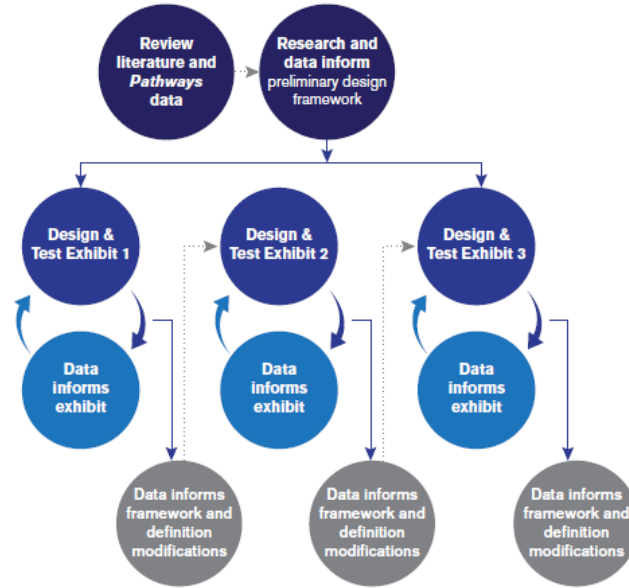
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\*Besides the listed team members, the Productive Struggle Team includes Christine Reich (PI), Gabrielle Rappolt-Schlichtmann (Co-PI), Samantha Daley (Co-PI), Jose Blackorby (Co-PI), Sara Castellucci, Amanda Cook, Kim Ducharme, Becki Kipling, Beth Malandain, Kat Marino, Sarah May, and Alana Parkes.

## About the project

The *Developing Guidelines for Designing Challenging and Rewarding Interactive Science Exhibits* project is a Research in Service to Practice grant running from 10/1/2016-9/30/2021.

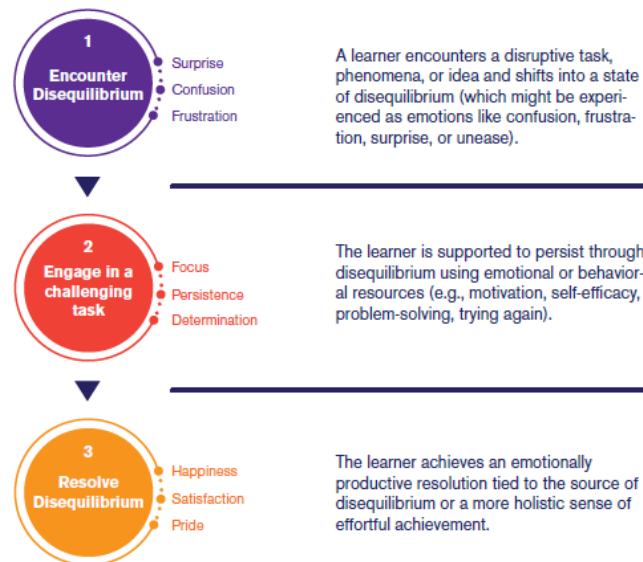
We have used a Design-Based Research (DBR) approach to refine a framework about exhibit design practices that support learners through the emotional aspects of “productive struggle” as we built three science museum exhibits.



## Productive Struggle

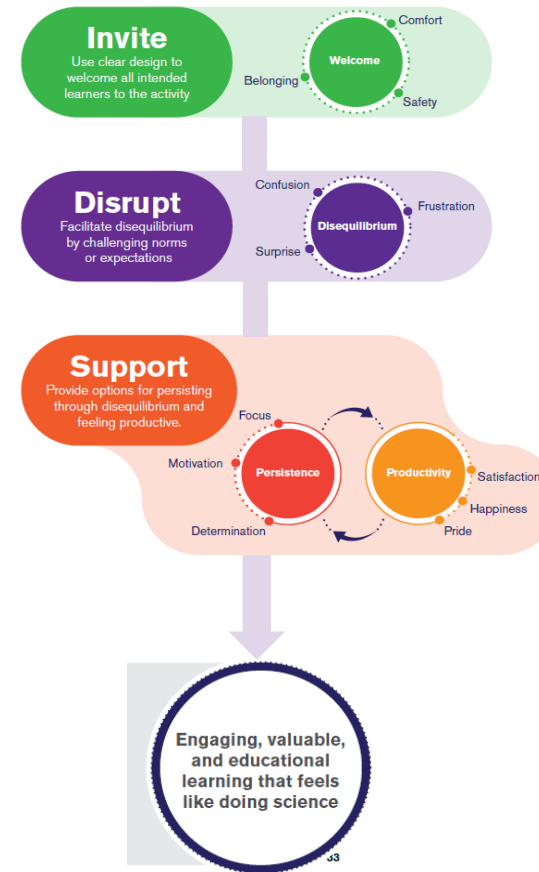
Our project was initially based on a finding from our prior *Pathways* project (DRL-1222613) which showed that mixed emotional experiences of negative feelings like frustration along with overall satisfaction led to deeper engagement and learning in museums (Rappolt-Schlichtmann et al., 2017).

In this project, we learned with youth about cultural and individual differences in emotion that helped us broaden our understanding of productive struggle to a more inclusive definition, as shown in the three-part diagram to the right.



## Design Framework

Our DBR process helped us develop a framework of evidence-based strategies for designing exhibits that support productive struggle. The graphic below provides a teaser, and the full framework is available at the QR code.



Find the full framework here

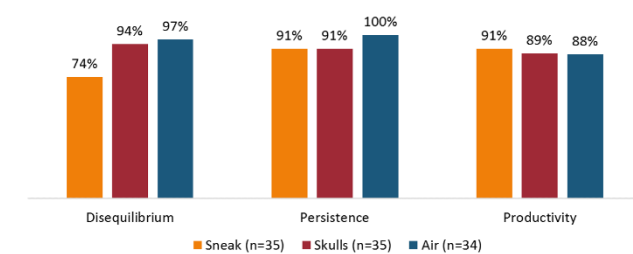


## Research Findings

In addition to our framework, we did a summative research study about the role of productive struggle in museums. Select findings are below, addressing research questions of:

- Can we reliably design exhibits to support emotional outcomes?
- What, if any, are the merits of designing for productive struggle in a science museum?

Most visitors' recall narratives included evidence of each PS phase.



When controlling for demographic factors, on average participants who experienced PS:



“My definition of a valuable experience is me trying, failing, but in the end succeeding, and I did that multiple times.” –Participant interview response

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