

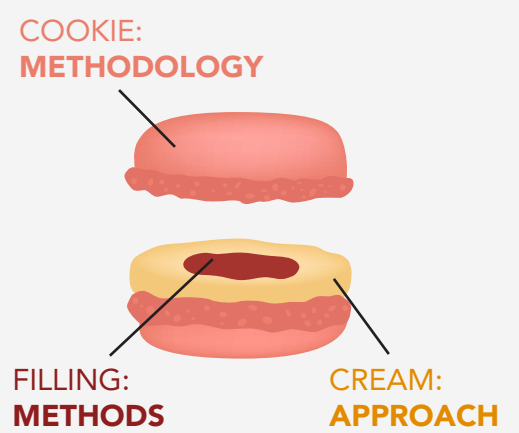
LEARNING SCIENCES TOOLBOX

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My learning sciences toolbox contains three layers of tools and frameworks that I use to approach the design and study of environments for teaching and learning. When constructing my toolbox, I used an analogy of my passion for experimental baking, specifically when making macarons. In baking, I use a few core ingredients and mix and match flavors for the situations they make sense for. I do the same in my research.

My core base is made up of tools within Design-Based Research methodology, where my research is situated. The middle layer describes three teaching and learning approaches that I apply to my research, followed by frameworks and principles within each approach. Finally, the filling, the most flavorful part that ties everything together, dives into methods I use to study these approaches.

MACARON



COOKIE: DESIGN-BASED RESEARCH (DBR) METHODOLOGY

(McKenney & Reeves, 2018)

Participatory Co-Design (Gomez, Kyza, & Mancevice, 2018)	Conjecture Mapping (Sandoval, 2014)	Boundary Objects (Akkerman & Bakker, 2011)	Interdisciplinary Collaborations (Herrenkohl & Polman, 2018)
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CREAM: TEACHING + LEARNING APPROACHES

ORCHESTRATION <i>Supporting teachers as they facilitate learning environments</i> Conceptual framework of orchestration (Prieto, Dlab, & Gutierrez, 2011) Contextual inquiry (Dillenbourg & Jermann, 2010) Design principles for orchestration: empowerment, awareness, flexibility, minimalism, and integration (Dillenbourg, 2013)	DESIGN <i>Using design as a teaching tool and understanding how students learn content while creating</i> Design Thinking (Aflatoony, Wakkary, & Neustaedter, 2018) Human Centered Design (Lawrence, Shehab, & Tissenbaum, under review) Learning by Design (Kolodner, 2002)	COLLABORATION <i>Using collaboration to foster learning with and without technology</i> Framework for teaching collaboration (Kaendler, Wiedmann, Rummel, & Spada, 2015) Social and cognitive skills in collaborative problem solving (Hesse, Care, Buder, Sassenberg, & Griffi, 2015) Equitable complex instruction (Cohen & Lotan, 1999) Computer Supported Collaborative Learning (Stahl, Koschmann, & Suthers, 2014)
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FILLING: METHODS

The methods used to study teaching and learning is highly dependent on the context of the study, theoretical perspectives, and research questions. In my work I study teaching and learning using multiple methods dependent on these factors.

	DBR	Orchestration	Design	Collaboration
Video analysis (Derry et al., 2018)	●	●	●	●
Quality of interactions (Roschelle, 1992)	●	●		●
Boundary objects (Akkerman & Bakker, 2011)	●		●	
CORDTRA analysis (Kangas et al., 2013)		●	●	●
Linkography (Goldschmidt, 2014)	●		●	●
Student portfolios (Crismond, & Peterie, 2017)			●	
Log file analysis (Rosé, 2018)		●		●
Multimodal learning analytics (Blikstein & Worsley, 2016)		●	●	●
Interview/reflections (Powney & Watts, 2018)	●	●	●	●
Design research analysis (Collins et al., 2004)	●		●	

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