

# Designing and Researching a Program for Preparing Teachers as Facilitators of Computational Making Activities in Classroom and Informal Learning Environments

Ricarose Roque, Melissa Braaten,  
Ronni Hayden, Elizabeth Tetu

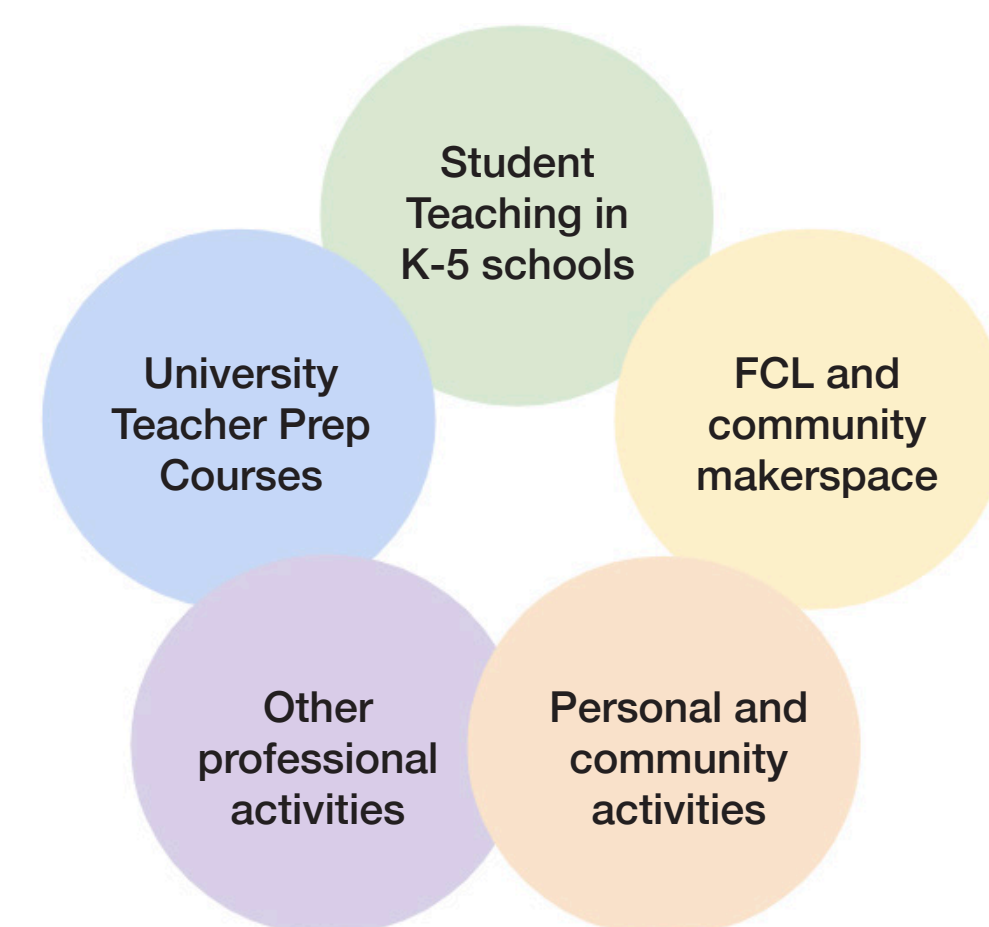
Information Science, School of Education, ATLAS  
Institute  
University of Colorado Boulder

## INTRODUCTION

Our design work examined the different roles in a learning ecology and the consequential transitions of educators across settings. We focus on pre-service teachers (PSTs) as they participated as facilitators in a culturally expansive and creative computing environment within an intergenerational, out-of-school setting. PSTs have limited engagement with families that include short parent-teacher meetings and one-way communication systems like CoderDojo.

## CONSEQUENTIAL TRANSITIONS

Thinking beyond traditional notions of transfer, we use the concept of “consequential transitions” which emphasizes that “transitions are consequential when they are consciously reflected on, often struggled with, and the eventual outcome changes one’s sense of self and social positioning” (Beach, 1999, p.114).



## FAMILY CREATIVE LEARNING

Teachers participated as facilitators in Family Creative Learning (FCL), a series of workshops hosted at community-based organizations that invite families from non-dominant groups in computing to create and learn together with new technologies. In this FCL implementation, families created interactive light boxes using Circuit Playground Express, MakeCode, neopixels, and everyday materials to express a family story.

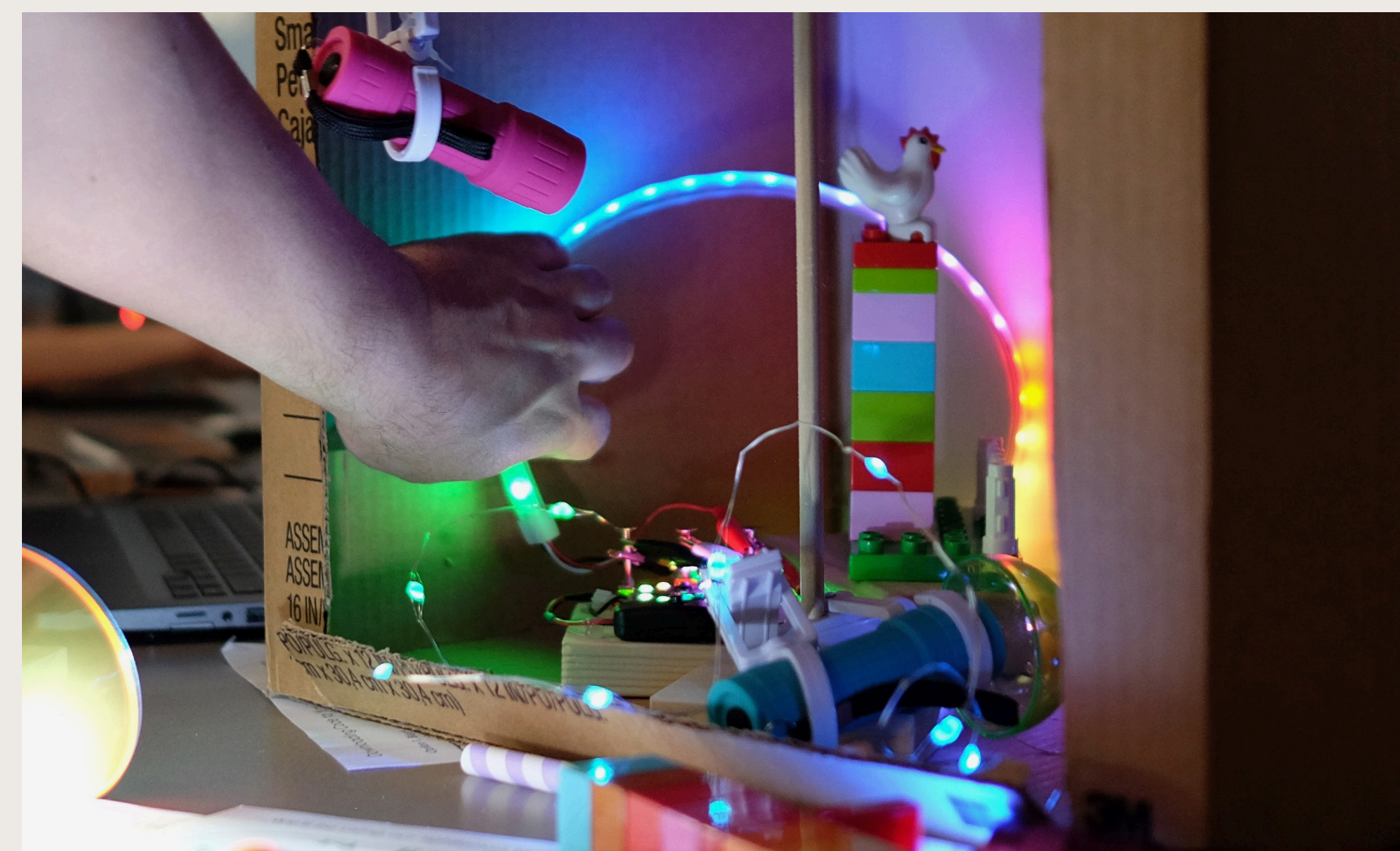
## METHODS

The research team recruited PSTs from a School of Education at a university in the Mountain West of the US. We used an ethnographic approach to study PSTs and families’ experiences. In Spring 2022 and Spring 2023, we followed two cohorts of PSTs (total of six PSTs). PSTs participated in two FCL implementations hosted at an ideaLAB makerspace in Denver Public Library. We followed the second cohort of PSTs into their student teaching. We collected data that included field notes, photo and video documentation, and project artifacts. We also conducted interviews with PSTs and families.

## IMPLICATIONS

Our inclusion of pre-service teachers has implications for the kinds of experiences that are provided for PSTs during their education, especially experiences with families and with out-of-school organizations to engage in alternate possibilities, perspectives, and roles as educators.

## Learning to Facilitate Family Learning



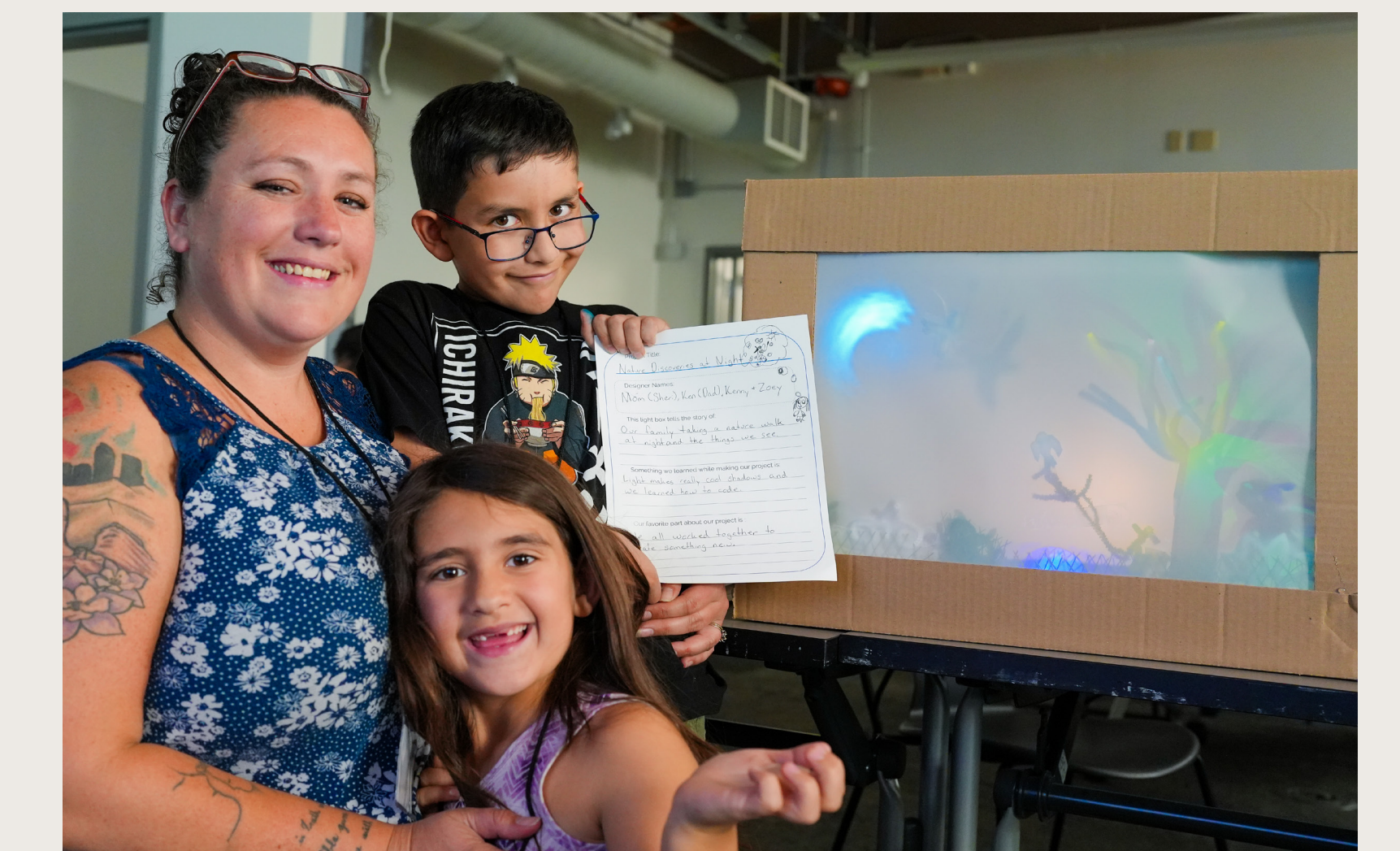
### Building relationships and building projects

Prior to FCL, PSTs participated in the makerspace to get to know the space and community. We held a facilitator retreat for PSTs, where they engaged in the same activity as families: an interactive light box about family stories. PSTs practiced taking documentation using the Reggio Emilia approach.



### Facilitating and documenting family learning in FCL workshops

In addition to supporting families, PSTs captured, curated, and shared documentation with families to make sense of learning together.



### Dreaming of alternative and expansive possibilities in schools

We will hold a “dreaming” session to help PSTs imagine what they might take forward in their roles as new teachers



## Consequential Transitions for Teachers

### Seeing parents’ and families’ identities and practices in more expansive ways beyond what’s made available in school

“*They are whole people too... not just so-and-so’s mom or so-and-so’s dad... Parents are also learners.*”

### Building their identities with STEM, creativity, and computing across settings

“*When I saw that the families wanted to [learn to code], that’s what encouraged me to be okay [with coding].*”

### Strengthening their ability to identify and compare structural features between school and out-of-school engagement

“*[Documenting families’ experiences in FCL] was the opposite of CoderDojo.*”



familycreativelearning.org  
ricarose@colorado.edu

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