How Preservice Teachers' Awareness of Design Features and Academic Language Features Relates to Choosing and Evaluating Digital Math Games for English Language Learners

Allison L. Roxburgh, *Utah State University* | Patricia S. Moyer-Packenham, *Utah State University*

I. Introduction

Purpose: Examine how preservice teachers (PTs) develop awareness and beliefs about design features and academic language features when choosing and evaluating digital math games for English language learners (ELLs)

Statement of the Problem
- PTs feel underprepared to teach ELLs (Durhunohlu & Hughes, 2010; Lindahl, 2013, 1019)
- PTs have limited experiences in their preparation courses with digital math games for instruction (Belbase, 2015; Niess, 2005)
- Complex use of language in teaching math (Moschkovich, 2013; Schleppegrell, 2007)
- Effective strategies that support the preparation of PTs (Niess, 2005; Lindahl, 2019)

Background of Constructs
- PTs beliefs can impact how digital math games are used and how math instruction is delivered for ELLs (Li, 2013; McLeman & Fernandes, 2012)
- Design Features promote math learning (Falloon, 2013; Moyer-Packenham et al. 2019)
- PTs Language Awareness helps them analyze materials to enhance instruction (Andrewes, 2007; Lindahl, 2019)

Research Questions:
1. What design features do preservice teachers consider when choosing and evaluating digital math games for ELLs?
2. What academic language features do preservice teachers consider when choosing and evaluating digital math games for ELLs?
3. What are preservice teacher's beliefs about their preparation for using digital math games to support mathematics learning for ELLs?
4. What changes, if any, are exhibited in preservice teachers' awareness of design features, awareness of academic language features, and beliefs after completing the modules?
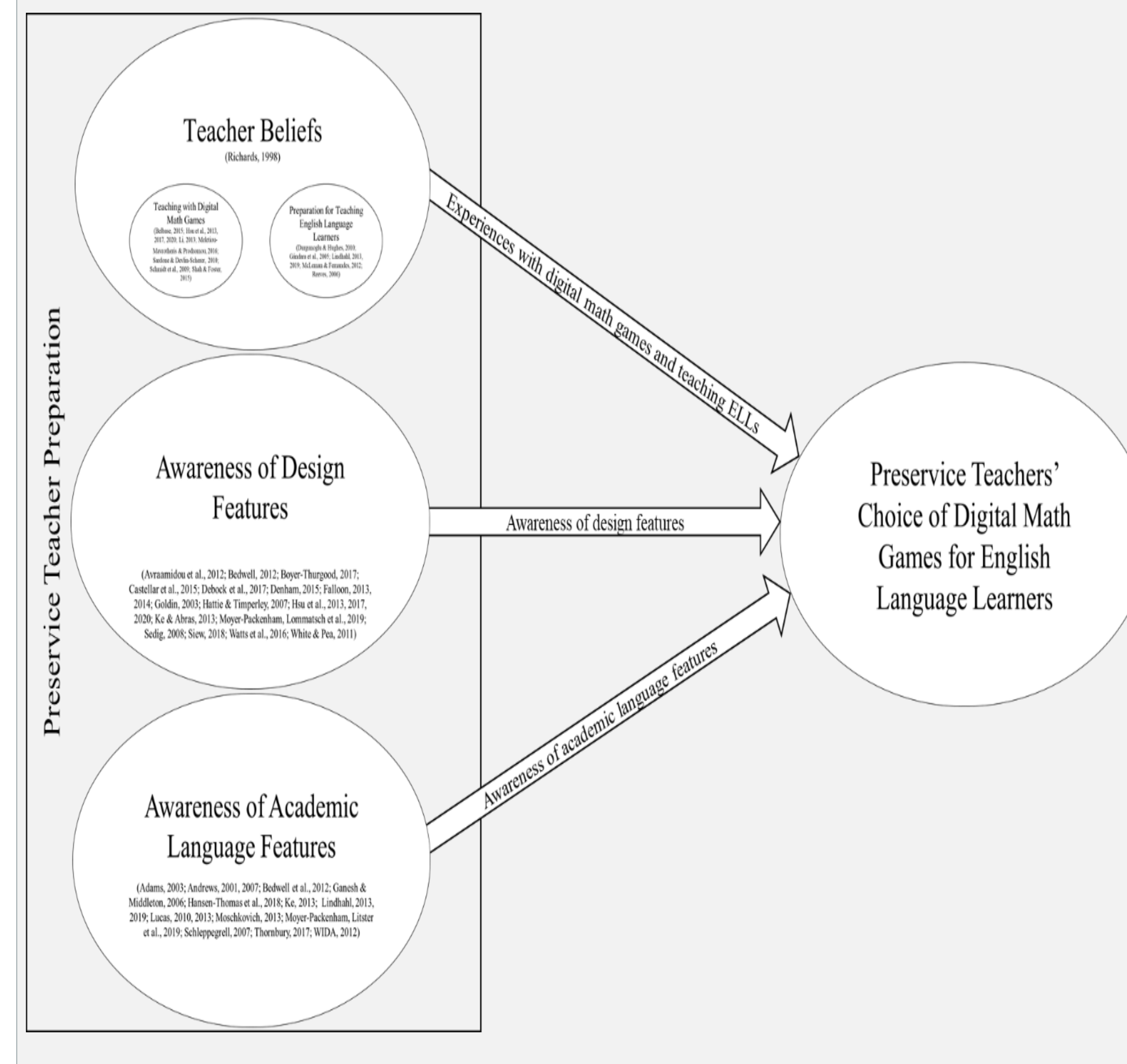
Significance
- Improve preparation programs for elementary PTs
- Use digital math games to enhance instruction for ELLs

Fractions Smart Pirate

II. Conceptual Framework

Module Content

1	Content: Choose 3 digital math games based on fictional class	
	Data Collection: Pre-belief survey and pre-evaluation rubric	
2	Content: Video that defines design features	
	Data Collection: Module 2 Reflection	
3	Content: Video that defines academic language features	
	Data Collection: Module 3 Reflection	
4	Content: Re-evaluate 3 digital math games	
	Data Collection: Post-belief survey and post-evaluation rubric	
	*Participants sign up for interviews	

III. Methods

Research Design
- Convergent mixed methods design using a survey with a questionnaire variant (Creswell & Plano Clark, 2017)
- QUAL→ quan (Tashakkori & Teddlie, 2010)

Participants and Setting
- 30 elementary PTs
- Online (COVID-19 pandemic protocol)

Data Sources
- PTs Beliefs about Preparation with Digital Math Games for ELLs Survey
- Digital Math Game Evaluation Rubric
- Module Reflections
- Semi-structured interview responses

Data Analysis
- Descriptive and pattern coding (Saldaña, 2016; Tashakkori & Teddlie, 2010)
- Frequency Tables (Boone & Boone, 2012)
- Wilcoxon signed ranked test (Boone & Boone, 2012)
- Narrative comparison (Creswell & Plano Clark, 2017)

IV. Possible Findings

- Differences in beliefs from pre- to post-survey.
- Differences in awareness of design features and academic language features from pre- to post-evaluation rubric.
- Themes that impact PTs beliefs and awareness of design features and academic language features when choosing and evaluating digital math games for ELLs.

Allison L. Roxburgh
Utah State University
Teacher Education and Leadership
Presidential Doctoral Research Fellow
allison.roxburgh@aggiemail.usu.edu