Fingu—A Game to Support Children’s Development of Arithmetic Competence: Theory, Design and Empirical Research

# Details

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## Sample

"The chapter describes esearch on Fingu, a virtual manipulative housed in a game environment, which is designed to support young children’s learning and development of number concepts and flexible arithmetic competence.... In order to investigate if and how Fingu is a productive learning tool, we carried out a larger study in pre-schools and in schools, educational settings with high eco- logical validity, where children were given opportunities to play Fingu extensively. The study was designed with pre-, post-, and delayed tests. We gathered data from 112 children (approximately equally as many children in each age group...), and with equal numbers of girls and boys." (Authors, 123, 136)

## Implications For Educators About

## Implications For Stakeholders About

Industry

# Abstract

This chapter aims at describing research on Fingu, a virtual manipulative housed in a game environment, which is designed to support young children’s learning and development of number concepts and flexible arithmetic competence. More specifically Fingu targets the understanding and mastering of the basic numbers 1–10 as part-whole relations, which according to the literature on early mathematics learning is critical for this development. In the chapter, we provide an overview of the theoretical grounding of the design, development and research of Fingu as well as the theoretical and practical design rationale and principles. We point out the potential of Fingu as a research platform and present examples of some of the empirical research conducted to demonstrate the learning potential of Fingu. Methodologically, the research adopts a design-based research approach. This approach combines theory-driven design of learning environments with empirical research in educational settings, in a series of iterations. In a first series of iterations, a computer game—the Number Practice Game—was designed and researched, based on phenomenographic theory and empirical studies. In a second series of iterations, Fingu was designed and researched, based on ecological psychology in a socio-cultural framing. The design trajectory of NPG/Fingu thus involves both theoretical development and (re)design and development of specific educational technologies.

# Outcome

"In this chapter, we have described the Fingu game as a virtual manipulative, out- lined the design principles, and discussed the underlying theoretical rationale. We have also illustrated some of the affordances of Fingu and the potential effects of playing the game."