Design research in early literacy within the zone of proximal implementation

Design Research in Early Literacy within the Zone of Proximal Implementation

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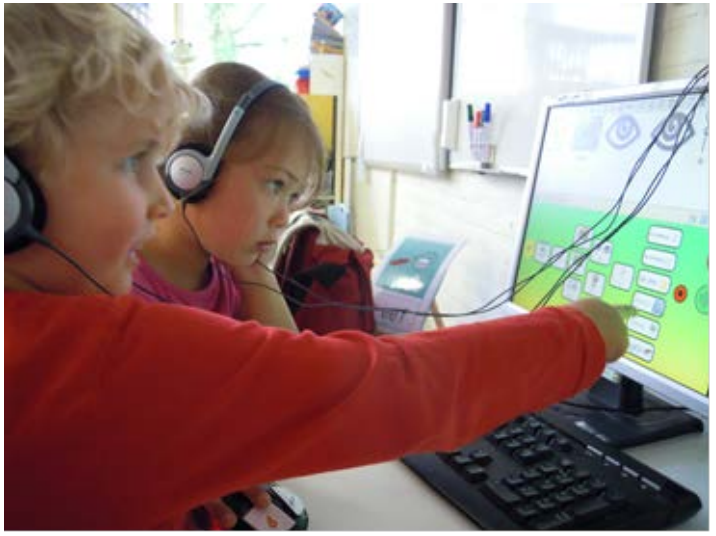
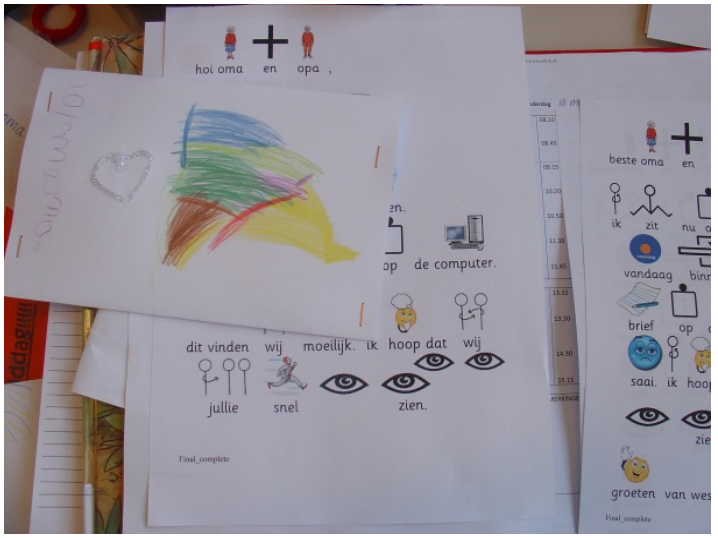
Ultimate goal of the research:

Develop insights and tools to serve teaching & learning of early literacy





Purpose of this paper: Call for & demonstrate design research for actual use

- Insufficient distinction between:
  - What is possible tomorrow
  - What is practical today
- Need for ‘usable knowledge’ (cf. Lagemann, 2002)
- Requires attention to:
  - If/how innovations are understood, adopted, used
  - Factoring implementation concerns into designed product
  - Trade-offs between ideal and practical during design process

Revisiting the research-development relationship

- **100 years ago:** (Educational) Psychologists speak of a linking science
  - E.g. Munsterburg; Dewey
- **Several decades ago:** Curriculum designers and learning scientists speak of design/development/formative research/experiments
  - E.g. van den Akker; Walker; Brown; Collins
- **Today:** Education researchers stress implementation issues
  - E.g. Hall & Hord; Penuel, Fishman, Cheng, Sabelli; McKenney & Reeves

The Zone of Proximal Implementation (ZPI)

- "ZPI refers to "…the distance between what teachers and schools can implement independently and what they can implement through guidance or collaboration"

  - McKenney, 2011

- Applies Vygotsky's well-known concept , the zone of proximal development, to the development of teachers & schools
- Requires explicitly attending to
  - Capabilities, opportunities, limitations
  - Withdrawl of implementation scaffolds
  - Cultivating ownership and expertise

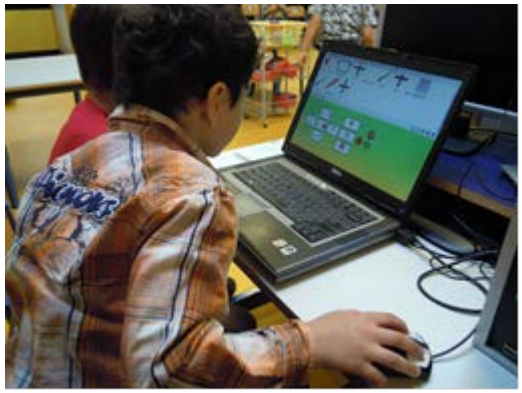
Designing for the ZPI: What to aim for?

Characteristics of implementation-prone interventions (McKenney & Reeves, 2012)

- *Added value:* something better than status quo
- *Clear:* participants easily envision their involvement, through e.g. *a priori* specifications and/or users co-define elements
- *Compatible:* congruent with existing values, cultures, practices and beliefs; aligned with system context
- *Tolerant:* withstand the natural variation in enactment resulting from differing contexts, resources, expertise, acceptance levels etc.

The PictoPal studies

- Research *on* the intervention: Technology for emergent literacy
- Research *through* the intervention: Teachers as Designers
- The PitcoPal intervention
  - Guidebook for teachers
  - Learning environment
  - Teachers (co-) design and/or implement:
    - On-computer activities to create printed texts
    - Off-computer activities to ‘use’ the printed texts for authentic tasks
- Here we see:
  - Children compose a recipe using the computer
  - Children use the recipe to make soup



Overview of studies

Study		A	B	C	D	E	F	G	H	I	J
Prototype	-	■									
	1		■								
	2			■	■						
	3					■	■				
	4							■			
	5								■	■	■
Focus	Teacher/school habits, beliefs, values, resources	■									
	Children's habits, attitudes	■									
	Pupil learning gains		■		■	■	■	■	■	■	■
	Pupil engagement		■			■	■	■	■	■	■
	Integration					■		■	■	■	■
	Teacher experiences			■				■	■	■	■
Methods	Teacher and child questionnaires	■							■	■	■
	Site visits, field notes	■							■	■	■
	Document analysis	■							■	■	■
	Pre/post-test		■		■	■	■	■	■	■	■
	On-pc observation		■				■	■	■	■	■
	Off-pc observation					■		■	■	■	■
	Teacher interviews			■				■	■	■	■
Reporting	(S. McKenney & Voogt, 2005)	■									
	(S. McKenney & Voogt, 2010)	■									
	(S. McKenney & Voogt, 2009)		■		■	■	■				
	(S. McKenney & Voogt, in press)			■				■			
	(Cviko, McKenney, & Voogt, 2012)								■		
	Cviko, McKenney Voogt, 2010)									■	
	Cviko, McKenney, Voogt, 2011)										■

Practical innovation: How research informed design

	Pre-design (needs/context analysis)	During development (prototyping and formative evaluation)	With stable design (used as means to study teacher design practices)
Value-added (better than status quo)	Site visits to see learning practices and ask about problems, in the baseline situation	Pre/post-tests of pupil learning during use	Pre/post-tests of pupil learning with implementation scaffolds removed
Clear (participants can envision their involvement)	Teacher interviews to explore mindsets, habits and conventions within the classroom/school in the baseline situation	Teacher interviews to explore mindsets, habits and conventions within the classroom/school during use	Teacher interviews to explore mindsets, habits and conventions within the classroom/school that are sustained or changed after the innovation
Compatible (compatible with values, beliefs, surrounding educational context/system)	Teacher interviews and child questionnaire to explore values, cultures, beliefs, priorities, and contextual /system factors in the baseline situation	Field notes concerning values, cultures, beliefs, priorities, and contextual /system factors that help or hinder implementation	Teacher interviews to explore values, cultures, beliefs, priorities, and contextual /system factors that are sustained or changed after the innovation
Tolerant (withstands the natural variation of actual use)	Site visits and field notes of actual behaviors of teachers and learners and reasons for them in the baseline situation	Observation of teachers and learners (and conjectured reasons for their conduct) during use	Observation of teachers and learners, and document analysis of both teacher products and learner products resulting from use with implementation scaffolds removed

Theoretical understanding: Sample types of insights for each theme

- Technology for early literacy
  - How to combine on- and off-computer activities
  - Value of dialogue with adults and peers during work
  - No need to teach the image-based vocabulary
  - Balancing independent and guided use on computer
- Teachers as designers
  - Curricular ownership relates to technology integration.
  - More willing to try new things in 2nd half of school year
  - Even modest design involvement fosters teacher ownership
  - Teacher ownership influences implementation

Reflections

- Teachers continue use even though research activities have ceased, which implies that it is within their ZPI
  - **Value added:** fills a gap in existing language curriculum
  - **Clear**: Teachers design some elements themselves; also have examples and a booklet to guide them
  - **Compatible**: Matching existing beliefs about chidren learning through play and authentic tasks
  - **Tolerant**: Tight adherence to a few key factors (duration, structure, layout of activities) allowed teachers to vary many other elements (themes, application activities) while still achieving positive learner results

Thank you! More info? Mail us…

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