Teacher Design Knowledge for Technology Enhanced Learning:
An ecological framework for investigating assets and needs

Purpose: To support the work of teachers as designers of technology enhanced learning (TaD of TEL)

Approach: Synthesis of research on in classical design fields, instructional design, and teachers' design

Conclusion: A framework that can be used: (a) by researchers to study teacher design knowledge and work across projects; and/or (b) by developers and facilitators identifying key areas to encourage/support in teacher professional development programs that involve teacher-designers in specific settings

Synthesis	**Technical**	**Phenomenological**	**Realist**
Description	Models and frameworks to guide design	Designers' reflections on and responses to the environment, and their related experiences	What designers actually do, how they do it and why they do it
Inter-disciplinary example	Design thinking (Brown & Wyatt, 2010)	Reflective practitioner (Schön, 1987)	Design cognition (Cross, 2001)
General education example	4C/ID model (van Merriënboer & Kirschner, 2012)	Educational connoisseurship (Eisner, 1976)	Expert-novice differences (Kirschner et al, 2002)
TaD of TEL example	Learning activity types (Harris & Hofer, 2009)	HEART methodology (Donald et al, 2009)	Developing TPACK through design (Koehler & Mishra, 2005)

Framework	**Powerful design heuristics**	**Teacher-designer consciousness and situated experience**	**Realistic understanding of design practices**
Know-what (fundamental knowledge base)	What is design thinking and which models or frameworks are likely to be most useful for teachers in a given situation?	What intuitive knowledge, awareness and experiences do teachers bring with them to design technology enhanced learning?	What do teachers typically consider when designing technology enhanced learning and what issues are typically overlooked?
Know-why (productive beliefs)	Why is teachers' careful attention to shaping design processes (before and during their enactment), critical for successful outcomes?	Why are teachers more and less aware of their own decision-making rationales in certain situations?	Why do teacher designers make certain kinds of design decisions and how does this change with experience?
Know-how (repertoire for action)	How do healthy design processes proceed? (and how similar or different are they from the natural design inclinations of teachers?)	How do teacher design schemas develop and how does this relate to their own intuitive knowledge?	How do teachers use their TPACK during design and in what ways does this influence their overall pedagogical design capacity?
Know-when (judgment in various contexts)	When should teachers choose, re-assess or change a particular approach to guide the design process?	When do teachers decide to improvise and when are one's own ideas put to use, given the setting and goals?	When do teachers base decisions on tacit rather than reflective knowledge, and when do they draw on (other) design expertise?
Know-who (awareness for consulting relevant expertise)	Who should teachers consult for guidance on design processes and/or the products of design in certain contexts?	Who might enrich and inspire teacher awareness and/or educational connoisseurship?	Who do teachers typically consult during different stages of design work and for which main purposes?

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