

# Characterizing the work of coaching during design reviews



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*In this exploratory study we characterize the work of coaching using a pedagogical content knowledge (PCK) framework to make visible coaches' integrated knowledge of the how, what, and why of coaching during design reviews. We observed four patterns of coaching across three design review contexts: choreography, undergraduate industrial design, and mechanical engineering. These include scaffolding articulation, driving for meaning and guidance, breaking the 4th wall to create a teaching moment, and 'suggest don't tell' to let the student figure it out. We conclude with identifying new ways to conceptualize the work of coaching in design reviews as integrated knowing, situated practice, and shared repertoires.*

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Design reviews or critiques are a common approach for helping learners in any discipline develop and demonstrate design expertise (Dym, Agogino, Eris, Frey, & Leifer, 2005; Goldschmidt, 2002; Huet, Culley, McMahan, & Fortin, 2007). Some describe the practice of moving from desk to desk explaining what is right and wrong with student work as a ritual of design teaching (Dannels, 2005; Schön, 1993); others, the “bread and butter” of design training (Goldschmidt, Casakin, Avidan, & Ronen, 2014). However, the how, what, and why of coaching during design reviews are considered an underdeveloped area of design research (Goldschmidt et al., 2014). In this paper, “coaching” refers to the dynamic functions, contributions, and roles of individuals who participate in advice-giving situations like a design review. Individuals can include instructors (those who manage a design course or project), experts (those with relevant expertise but who are not stakeholders), stakeholders (individuals or organizations that can affect or be affected by the actions of a designer or team), and peers (those who are members of a design team or class). These functions, contributions, and roles are dynamic because coaches switch functions and roles over the course of a design review in response to different situations, both planned and emergent, and to student needs that call for different coaching contributions

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(McDonnell (2016); Reich, Ullman, Van der Loos, & Leifer, 2008). While design reviews are shaped by disciplinary cultures, our use of this term is to represent a continuum of advice-giving interactions ranging from formal to informal and individual to group, and interactions over the duration of a design project such as interim, final and juried reviews (Oh, Ishizaki, Gross, & Do, 2012).

One perspective on the work of coaching is how coaching during design reviews contributes to student learning, empowerment, identity formation, and socialization into professional practice. During design reviews, coaches direct students in ways to improve designs and processes, guide design reasoning (Christensen & Ball, 2016; Dong, Garbuio & Lovallo, 2016), offer advice in making explicit key design decisions with associated rationales and consequences (Huet et al., 2007), control and offer resources (Reich et al., 2008), monitor and intervene with respect to processes and guidelines (Reich et al., 2008), and provide opportunities for students to fail, succeed, and take ownership in design decisions (Yilmaz & Daly, 2016). Coaches perform their design thinking for students, making visible their accumulated experience, knowledge, and belief systems (Uluoğlu, 2000). Goldschmidt, Hochman, and Dafni (2010) note that is an understudied “black box” representing a coaches’ personal style and accumulated wisdom. Coaches also help students form a design thinking mindset (Dannels, Gaffney, & Martin, 2008) and navigate the non-trivial aspects of learning to use disciplinary knowledge in context (Wolmarans, 2016). Coaches can also empower students to learn how to act independently (Goldschmidt et al., 2014) and construct their own design voice as they socialize students into the complexities and ambiguities of professional practice (Brandt et al., 2013; Howard & Gray, 2014; Murphy, Ivarsson, & Lymer, 2012; Oak, 2000; Oak & Lloyd, 2014; McDonnell (2016).

Other perspectives emphasize the nature of coaching as engaging students in reflective practice, critical discourse, transformative learning, and self-authorship. For example, Schön (1987) characterizes the work of coaching as listening, telling, demonstrating, and imitating. His reflective practice framework formalizes coaching as helping students make sense of their experiences and make explicit their evolving design knowledge through reflection-in-action and reflection-on-action (Schön, 1993). This can help students critically reflect on their design beliefs in ways that support significant learning transformations (Argyris & Schön, 1974; Mezirow, 2000). In engineering, Dym et al. (2005) characterize design teaching as enabling divergent and convergent reasoning through question-asking discourse. In communication, Dannels et al. (2008) characterize coaching as design critique discourse focused on judgments, process orientation, brainstorming, interpretation, recommendations, investigations, and identity invocation. Goldschmidt (2006)

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