



# Technology tools to support learning design: Implications derived from an investigation of university teachers' design practices



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## ABSTRACT

The need to improve the quality of higher education has fostered an interest in technology tools to support effective design for teaching and learning. Over the past decade this interest has led to the development of tools to support the creation of online learning experiences, specifications to underpin design systems, and repositories to share examples. Despite this significant activity, there remain unanswered questions about what shapes university teachers' design decisions and how tools can best support their design processes. This paper presents findings from a study of university teachers' design practices that identified teachers' perceptions of student characteristics, their own beliefs and experiences, and contextual factors as key influences on design decisions. The findings extend our understanding of activities fundamental to higher education teaching and inform thinking about design support tools.

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## 1. Introduction

Significant resources are invested in initiatives to improve the quality of university teaching through national programs, such as the United Kingdom's *Higher Education Academy* and Australia's *Office for Learning and Teaching*, or through teaching-focused units within institutions. Many of these initiatives have focused on encouraging changes in pedagogy that lead to improved student achievement. This is informed by extensive research demonstrating that student-focused approaches to teaching encourage deep approaches to learning that result in high quality learning outcomes (Biggs, 2003; Laurillard, 2002; Prosser & Trigwell, 1997; Ramsden, 2003).

A more recent strand of research and development also concerned with improving the quality of university teaching is *learning design* (Conole, 2012; Laurillard, 2012; Lockyer, Bennett, Agostinho, & Harper, 2009). Emerging from educational technology research, learning design has been particularly concerned with how best to support university teachers to design effective online learning experiences for their students. These developments are timely, given higher education's increasing reliance on online technologies to address challenges of access and flexibility (Dahlstrom, Walker, & Dzuiban, 2013). Though relatively new, learning design includes a diverse array of activities, with an emphasis on technology-based tools and technical specifications to support the design process and the creation of online repositories to share good design examples and practices (e.g. Agostinho, 2011; Conole & Culver, 2010; Hernández-Leo et al., 2006; Koper & Bennett, 2008; Laurillard et al., 2013; Masterman & Manton, 2011; McAndrew, Goodyear, & Dalziel, 2006).

Despite these advances, learning design research and development is still in its infancy. We know much more about architectural, engineering and industrial design and even the closely related field of instructional design. There is still much to learn about how best to develop teachers' existing design practices, at which stages of the design process would support be most helpful, and what forms that support should take. Research is needed to inform the future development of technologies that support design effectively and that are likely to be adopted. The research reported in this paper was conducted to advance understanding of university teachers' design practices to identify activities or influences that support tools could target.

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## 2. Background

Learning design focuses on the routine work of university teachers who are responsible for designing effective learning experiences for their students. It is distinct from instructional design in that it is performed by teachers rather than specialist designers. Learning design encompasses not only teachers' planning and preparation for interactions with students during a teaching session, but also how they adapt designs in response to student reactions, reflect on improvements to their designs, and share design ideas.

The rationale for learning design support is that improvements to the design of learning experiences can help to improve student outcomes by creating an environment more conducive to effective learning. To do this, learning design (and related approaches such as pedagogical patterns) offer examples with guidance that university teachers can tailor to suit their specific contexts (Lockyer, Bennett, Agostinho, & Harper, 2009). It is anticipated that through the process of adapting these highly customisable examples to their students, discipline, and institution, university teachers can expand their repertoire of teaching practices. This idea is key to the learning design approach, as it is unlikely that teaching practices will develop if a teacher is merely making superficial changes to a rigid template.

It is important to note that learning design is not a naïve conception that assumes that a good design will somehow *guarantee* learning, or that learning itself can be *pre-designed*. Rather, the idea is that 'better' design enhances the opportunities for effective learning. It is this fundamental conception that underpins the development of technologies to support learning design. These include online repositories and communities to share design examples and guidance (e.g. Conole & Culver, 2010) and computer-based design tools that help teachers to build and analyse their designs (e.g. Laurillard et al., 2013). A key line of development has included tools that enable designs to run online directly or be imported into learning management systems.

Despite this progress in building design support tools, more needs to be known about how such tools can best be integrated into university teachers' design practices. There has been limited research into the processes by which university teachers design, what influences the decisions they make, and what supports they use (Goodyear, 2005). By contrast, much more is known about planning and preparation by school teachers (Clark & Yinger, 1977; Elbaz, 1991; Shavelson & Stern, 1981). As a result, many university learning design initiatives are based on suppositions about design processes rather than empirical evidence. We need to know more about how university teachers design to advance the development of effective design support tools.

A useful starting point is Stark's (2000) studies of North American college teachers. Stark identified factors causing teachers to modify their intentions during design. Assumptions teachers had about their students and about what it meant to teach in their discipline were found to be the strongest influences on their designs. Stark concluded, however, that her study "fell short of exploring in depth the actual decisions teachers make about the 'form' of instruction", and called for further research into design decisions (Stark, 2000, p. 435). More recent research also highlights the importance of contextual factors, demonstrating that an individual teacher might use both student- and teacher-focused strategies depending on the discipline, class size, year level or teaching space (Bennett et al., 2008; Norton, Richardson, Hartley, Newstead, & Mayes, 2005). Institutional policies and practices also affect teachers' designs (Bennett et al., 2011). This paper reports on work that extends this line of research, focusing specifically on identifying key influences that shape university teachers' design decisions and deriving implications these have for technologies to support design.

## 3. Methodology

This study used a qualitative approach to explore participants' experiences of design work in university teaching. Participants were recruited through four Australian professional academic organisations via a general email invitation. Participation was limited to discipline-based academics, thereby excluding academics in specialist support units or research-only positions. Respondents were provided with detailed information about the study and asked to respond to several screening questions that allowed for purposive sampling on the basis of four criteria: discipline; year level(s) of students taught; years of teaching experience in higher education; and years of experience in online teaching. From the pool of volunteers, 30 were chosen to represent diversity across the criteria and to include roughly equal proportions of participants across three broad discipline groupings – the Sciences, the Arts and the Professions. Participants from 16 Australian universities, across the spectrum of research- and teaching-oriented institutions, were included.

Data was collected through semi-structured interviews of 50–90 min duration. Most participants were interviewed by telephone, with five interviewed face-to-face. The interview protocol included questions about the participants' teaching contexts (units<sup>1</sup> taught, year levels, topic areas, and the nature of their department and institution), their conceptions of teaching in their discipline, their approaches to designing new units and revising existing ones, the main influences on their design practices, and the supports they used to assist their design processes. Participants were asked to provide specific examples of recent design experiences, as well as describe their practices more generally. The interview questions were developed from the literature, and were particularly informed by Stark (2000) and Prosser and Trigwell (1997). All interviews were audio recorded and transcribed. Transcripts were sent to participants so they could check them for accuracy.

In the first stage of analysis, the research team developed a preliminary code set based on initial annotated readings of the data as recommended by Creswell (2012). A separate code was included for 'emerging issues', and additional codes were created using key concepts from the literature and the research questions. An initial analytic framework was created by defining each code, identifying indicative quotes to provide examples for each code, and structuring related codes hierarchically into categories. Text coded under emerging issues was examined and assigned to existing codes or new codes were created and integrated into the framework.

Each interview transcript was assigned to two members of the six member research team and coded independent using qualitative analysis software. The two separate codings of each interview were then compared to locate differences in interpretation. These discrepancies were then discussed by the full research team and used to revise definitions or re-assign data to more appropriate codes. This resulted in the amalgamation of some codes and re-structuring of the code hierarchy. This process continued until consensus was reached about the application of the analytical framework and the coding was finalised. This method allowed for 100% inter-coder reliability to be reached.

<sup>1</sup> For consistency, the term 'unit' is used to refer to a component of a program of study that leads to the award of a degree. 'Course' is used to refer to the whole program of study.

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