

Learning maps: A design-based approach for capacity building in tertiary online learning and teaching

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This paper addresses the importance of creating high quality and contextualized resources for capacity building of academics for online learning and teaching. Drawing on a design-based research framework, the paper presents work-in-progress learning maps. Learning maps are an increasingly popular concept and resource among learning designers which capture and organize various theories and resources for the target learners. In a climate where the tertiary sector struggles to provide quality resources and support for teaching and learning practice, we argue that the creation and implementation of learning maps poses clear advantages and a successful model for teacher capacity building, and subsequently improves student learning.

Keywords: Design-based research, Learning Map, Online Learning, Instructional Design

Introduction

This paper addresses current issues around the importance of creating and distributing high quality resources to assist in building teacher capacity for online learning and teaching contexts in higher education. In particular, we argue that drawing on a design based research framework will enable the interactive online resources to be underpinned by pedagogical theories which will subsequently inform teaching practice in online environments. As part of the mission to deliver improved student outcomes and build staff capacity in online learning and teaching at Deakin University, the learning map project was initiated by the central teaching and learning unit in Trimester 1, 2015. The aim of this project was to create a framework to encompass both pedagogical and technical parameters. The project delivered an effective, interactive and process-driven map which encapsulates and consolidates a diversity of resources useful for conducting assessments at Deakin University.

While there are numerous theories and frameworks employed in e-learning contexts, there are difficulties for academics outside the field of education to come to terms with the application of these theories to their own disciplinary context. This is particularly true when academics are used to traditional face-to-face classroom settings, and not necessarily engaged with the discourse of e-learning. Similarly, e-learning practitioners have a need to understand the pedagogical context they are operating within. In the past the development of toolkits has been used as an effective strategy for addressing engagement with theory by offering support through careful design and prompting reflective practice (Conole, Dyke, Oliver, & Seale, 2004).

In order to address this issue we propose that academics and e-learning practitioners should be supported with high quality and contextualized resources to develop their capacity. In the current climate of increased financial pressure on the university sector there is limited professional development opportunities for academics to build their skillsets, which impacts on their ability to deal with massification of student numbers, and in particular learn and implement educational technologies that may alleviate these pressures. For many academics the demands of maintaining currency in their disciplinary practice does not allow the time for gaining skills and knowledge in instructional design, e-learning and pedagogical theories in order to improve their teaching practice and address diverse learning needs of students. Coupled with varied student preparation and increased online activity impacting attendance patterns there are challenges for developing good learning and teaching practices in the educational landscape of the 21st century.

Taking such contexts into consideration, this paper presents a case study of creating capacity building resources underpinned by pedagogical frameworks, which we believe to be applicable to any other tertiary institutions. Drawing on design-based theory, we apply these frameworks in the conceptualization and creation of a learning map. Though the work presented here is based on a

relatively small project with primary findings only, it proposes an innovative model for the creation of contextualized interactive resources through the iterative involvement of both academics and theorists in a current learning and teaching context.

Design-based research as a framework for creating resources

Our approach for creating learning maps is underpinned by a design-based research framework. Design-based research has emerged and developed over the last few decades as a robust framework for not only a research methodology but also as an approach to designing technology-enhanced learning environments (Wang & Hannafin, 2005). The design-based research paradigm is described in the literature by a number of different terms including: design experiments; design research; development research; and formative research (Amiel 2008; Dede 2004; Wang & Hannafin 2005). Although each methodology has a slightly different focus, the underlying goals and approaches are the same (Amiel & Reeves, 2008). This paper applies the definition provided by Wang and Hannafin (2005) as an approach to the development of the learning map:

Design-based research as a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories (Wang & Hannafin, 2005, p. 7)

Design-based research approach focuses on the fact that the collaborative work between practitioners (academics in our case) and researchers (instructional/educational designers) stems from the iterative process where multiple methodologies and frameworks can be applied and re-applied to generate an optimal outcome. We consider that design-based approach fits well with the concept of creating effective resources in which academics and instructional designers work closely together to better build capacity for good teaching practice. In particular, the five characteristics proposed by Wang and Hannafin (2005) provides a sound model for the creation of our learning map. The table below summarizes our approaches in relation to the five characteristics of design-based research.

Table 1: Five characteristics of design-based research (Wang & Hannafin, 2005, p. 9) applied to the process of creating the learning map

	Characteristic	Explanation of characteristic	Creation of learning map
1	Pragmatic	<ul style="list-style-type: none"> Design based research refines both theory and practice The value of theory is appraised by the extent to which principles inform and improve practice 	The learning map has a pedagogical focus and pragmatically informs practitioners about the improvement of their teaching. There is a shift of focus from the information conveyed to the process of learning (Yelland, 2007).
2	Grounded	<ul style="list-style-type: none"> Design is theory-driven and grounded in relevant research, theory and practice. Design is conducted in real-world settings and the design process is embedded in, and studied through, design-based research. 	The learning map is a concept founded within the educational theory and is attributed to the real setting/process of leaning and teaching practice conducted by practitioners. This includes considering the contexts in which they are situated such as the physical and digital space they operate in; and institutional, social and interactional elements (Ang et al., 2010; Laurillard, 2009; Moyle, 2010)
3	Interactive, iterative and flexible	<ul style="list-style-type: none"> Designers are involved in the design processes and work together with participants. Processes are iterative cycle of analysis, design, implementation, and redesign. Initial plan is usually insufficiently detailed so that designers can make deliberate changes when necessary. 	Instructional designers are involved in the design and production of the learning map. The process is interactive and iterative in ways which practitioners and designers work together to analyse, produce and redesign the learning map. Yelland and Tsembas (2008, p. 107) propose that "pedagogies need to be reconceptualised to suit the new learning environments". Gagne (1985) presumes knowledge is external and predefined, and transmitted from knowers to learners. This

			method of instructional design is effective where content learning is fact or procedure focused.
4	Integrative	<ul style="list-style-type: none"> Mixed research methods are used to maximize the credibility of ongoing research. Methods vary during different phases as new needs and issues emerge and the focus of the research evolves. Rigor is purposefully maintained and discipline applied appropriate to the development phase. 	As new needs from practitioners arise, flexible approaches for adopting various methods and changes are necessary. In developing the learning map, the focus lies with both the process-driven design but firmly grounded within sound pedagogical frameworks. This is representative of constructivist-oriented learning, where the instructor guides the learner through dialogue, scaffolds new concepts, and provides additional support for learning (Jonassen, 2004).
5	Contextual	<ul style="list-style-type: none"> The research process, research findings, and changes from the initial plan are documented. Research results are connected with the design process and the setting. The content and depth of generated design principles varies. Guidance for applying generated principles is needed. 	The processes of designing, creating and improving the learning map are recorded in order to foster our approaches for future capacity building of academics. This can be represented by instructional transaction theory (Merrill, 2009) which describes a common framework for specifying knowledge structure, presentation, practice and learner guidance.

Learning map as a delivery mechanism for curated information

Drawing on the above-mentioned design-based framework, the current paper showcases the learning map on assessment as the work-in-progress study. Various elements of assessments are addressed in this map – including discussion points for plagiarism and academic integrity. Figure 1 below illustrates the sample under discussion while acknowledging the limited display of interactive functionality of this map.

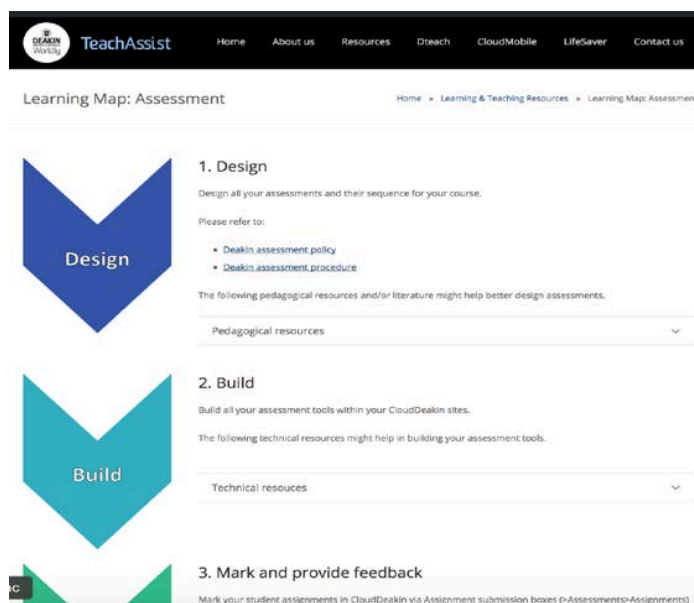


Figure 1: Learning map interface

As partially shown above, the learning map of assessment reveals five iterative steps involved in the pedagogical practice: 1) design, 2) build, 3) mark and provide feedback, 4) moderate and grade and

5) evaluate. Each step outlines short texts of what academics are expected to carry out. The links/resources embedded provide further information about the particular topics. Resources are categorized into four kinds for clarity via expandable sections: a) pedagogical, b) technical, c) institutional (e.g. Deakin University policies and resources) and d) external resources. Pedagogical resources consist of literature and latest research relevant to the outlined pedagogical concepts – both institutionally and externally sourced, while technical resources point to the how-to knowledge that academics need to know in conducting rather technical practices of teaching – e.g. building assessment tools within Deakin University's learning management system (LMS) such as rubrics, assessment submission boxes, gradebooks.

Discussion

Our preliminary findings and anecdotal feedback from the practitioners reveal that the learning map is particularly beneficial and effective in the following aspects:

1. Just-in-time resource – the resources embedded within the learning map are arranged and sequenced to suit when academics need to access them. The process driven learning map guides learning and teaching practice by outlining clearly what needs to happen within the timeframe of the teaching period, allowing academics to access relevant resources at the time they are required.
2. Non-linear learning – At a macro level the learning map provides a linear structure, sequencing activities and resources in the order that teaching delivery occurs. However because learners can 'jump' between the embedded resources by opening the sections in which they would like to further explore, the learning map offers a non-linear interactive learning experience.
3. Aesthetic design – presenting content so it is aesthetically attractive and engaging will enhance the user experience and provide the simplicity required to enhance task completion. This can have a significant impact on cognition and learning (Heidig, Müller, & Reichelt, 2015)
4. Curated and contextualized resources – the resources provided within the learning map are varied yet contextualized to teaching and learning at Deakin University. By ensuring that the learning map is concise, information-overload for academics is avoided, and task specific information provides academics with the capacity to develop their skills as required.
5. Adaptive learning focus – the learning map offers flexible and adaptive learning paths. Information is provided in chunks and/or segments and learners can skim quickly through to discover the information required, or display the detail by expanding each section. The learning map offers different learning paths for capacity building based on the learners' needs – either just in time or providing opportunity for further research.
6. Effective use of time – researching for good resources costs time and effort. The learning map provides currency of resources, and ensures they are pedagogically, technically and contextually appropriate.

Conclusion

The development of the learning map for assessment at Deakin University has provided an opportunity for academics to access current resources and theories about assessment. Firmly grounded in the design-based framework and pedagogical theories, the learning map also provides the capacity to expand teacher knowledge and skills relevant to their practice by structuring the resource in an interactive design that is process driven and aligned with trimester delivery and assessment milestones. Creating an easily accessible and re-useable resource is critical for academics trying to understand and redesign assessments in a changing higher education environment where increased student numbers and participation, issues of plagiarism, varied student preparation and an increase in online learning has significant impact.

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