Understanding Teaching-Learning Practice

Robert A. Ellis
Peter Goodyear *Editors*

Spaces of Teaching and Learning

Integrating Perspectives on Research and Practice

Springer

Understanding Teaching-Learning Practice

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Chapter 1
Spaces of Teaching and Learning: An Orientation

Robert A. Ellis, Peter Goodyear and Alexi Marmot

Abstract This chapter provides an orientation to both the book series, *Understanding Teaching-Learning Practice*, and this book, *Spaces of Teaching and Learning*. It begins by situating the idea of *practice* in educational research and emphasises our interest in the individual and the mind and the links between these and the contexts or spaces in which we find ourselves. Understanding practice in context necessitates that we investigate how individuals interact with one another and the tools and artefacts that make up the context, the flows between the elements. Consequently, the chapter considers how spaces of teaching and learning are being shaped by the interaction of people and things and emphasises that in order to orientate this interaction more closely to help learners achieve their learning outcomes, the ideas of actionable knowledge and ecological thinking are key. The chapter finishes with a brief discussion of the links between the chapters and their contribution to the themes of the book.

Introduction

This book is the first in a new series on understanding teaching and learning practices. The book and the series aim to focus attention on the increasing complexity of relationships between teaching and learning practices and between these

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and the practices and outcomes of research. Our emphasis on practice arises from two concerns. The first of these is the disconnection between research and teaching. This has been expressed widely in decades of critical commentary about educational research (Labaree, 1998; McWilliam & Lee, 2006; Oancea, 2005; Tooley, 1998; Vanderlinde & van Braak, 2010). The second concern is partly a response to this critique. We argue that a closer look at the actual practices through which knowledge is created, shared and applied not only provides interesting insights into significant aspects of human life but also makes a useful contribution to the improvement of knowledge work. Not least, it can help explain and strengthen efforts to engage teachers, learners and researchers in novel ways of working together (Bang faber, Gurneau, Marin, & Soto, 2016; DiSalvo Yip, Bonsignore, & DiSalvo, 2017; Gutiérrez, Engeström, & Sannino, 2016; Penuel & Gallegher, 2017).

Attention to practice in educational research is nothing new (Billett, Harteis, & Gruber, 2014; Grenfell & James, 1998; Kemmis et al., 2014; Schatzki Knorr, Cetina, & von Savigny, 2001). However, educational research and thinking that has been informed by practice theories of various kinds is mainly to be found in the literature of the sociology of education, and in cultural and critical studies. It does not make so much contact with research on learning, particularly where learning is theorised from the perspectives of cognitive or developmental psychology. The main exception is in a rich anthropologically inspired tradition of research where learning is seen as a process of coming to participate more fully in valued social practices (Chaiklin & Lave, 1993; Lave, 1988, 2012; Rogoff, 1990, 2014; Rogoff & Lave, 1984; Tobach, Joffe Falmagne, Parlee, Martin, & Scribner Kapelman, 1997). Educational approaches inspired by this tradition include cognitive apprenticeship (Brown, Collins, & Duguid 1989), communities of practice (Lave & Wenger, 1991) and communities of inquiry (Brown & Campione, 1994; Scardamalia & Bereiter, 2006). These approaches are now quite familiar to many teachers, though their empirical and theoretical roots may be less well known. An added complication is that theories of learning as participation in social practice rarely speak about the individual human mind, yet most teachers see the goal of their work in terms of the individual mental accomplishments and transferable personal capabilities of their students. It is 20 years since Anna Sfard warned about the dangers of trying to do serious educational work with an inadequate understanding of human learning. As she argued, neither a conception based on learning as an individual cognitive accomplishment nor one based on learning as participation in social practice is adequate to capture everything that is important in learning.

> …the sooner we accept the thought that our work is bound to produce a patchwork of metaphors rather than a unified, homogeneous theory of learning, the better for us and for those whose lives are likely to be affected by our work. (Sfard, 1998, p. 12)

Since Sfard wrote these words, studies in neuroscience have been challenging some deep-seated beliefs about supposedly fundamental educational phenomena. The nature of concepts is one good example (Matheson & Barsalou, 2016). Insights from neuroscience, evolutionary psychology and related sources are driving

forward arguments that human cognition needs to be understood as embodied, extended, enactive and grounded (Clark, 2008; Markauskaite & Goodyear, 2017; Wang & Zheng, 2017).

From this, it should be clear that our interest in foregrounding practices of learning, teaching and research is accompanied by an insistence on also speaking about the individual and the mind, and indeed about the brain and the body. This also explains our interest in *spaces* of teaching and learning. As Schatzki and colleagues put it:

> …understanding specific practices always involves apprehending material configurations. (Schatzki et al., 2001, p. 3)

In other words, one cannot understand practices of teaching and learning, either as patterns or performances, without attending to the ways that tools and other artefacts come together with human skills and understandings. People, things and ideas flow together, combine for a time and then go their separate ways. Practices depend upon such temporary confluences and places are created by them. Understanding how technological and other material things participate in spatialised practices of teaching and learning thereby becomes a core challenge for contemporary educational research (Fenwick, Edwards, & Sawchuk, 2011; Sørensen, 2009).

The Changing Nature of Spaces of Teaching and Learning

The introduction above shows that our understanding of how learning occurs is constantly being challenged. Whether it be about new theories of brain plasticity and memory (Doidge, 2007; Draganski et al., 2006; Friston, 2010), the value of recognising embodied cognition (Markauskaite & Goodyear, 2017), symbiotically relating cognitive understandings of learning with social dimensions and vice versa (Duschl, 2008; Sfard, 1998) or looking at how material elements are recontextualising experiences of learning (Fenwick, 2010), our concern for ensuring the quality of teaching and learning in our society is paramount and one of its foundations.

No matter which perspective on learning is favoured, learning in the context of society today, whether at school, university, work or in informal situations, is occurring through increasingly rapid interaction amongst people, technologies, places and spaces. The increasing pace of learning and change internationally is one of the common forces of globalisation of education that is shaping societies and education systems on all continents. Today, we have a more detailed and immediate sense of the experiences of others through a convergence of the space and resequencing of the time in which learning takes place.

While the growth and penetration of digital technologies into all aspects of society is partly responsible for the convergence of spaces of teaching and learning, more influential, we argue, has been the response of thought leaders (some

mentioned above), as well as educators and innovators, to the fundamental precepts of what constitutes meaningful experiences of learning and how carefully designed learning environments may enhance both the experience and the outcomes of learning. Much effort is being undertaken to identify and understand how all the elements of learning in modern contexts are working together to enable the development of understanding and skills of the participants. The best of this effort results in actionable knowledge, ideas that are expressed in such a way that enables their use in practice.

In this book, we emphasise the context of teaching and learning, the spaces in which learning takes place, both physical and virtual (involving the cognitive, social, and material), as a way into considering the elements which shape modern experiences of learning and the research-informed knowledge required to make a difference to their realisation. The premise of looking at spaces of teaching and learning is that if we more fully understand the elements of modern contexts in which teaching and learning occur, we will be in a better position to uncover embodied knowledge about which configurations of them are most likely to promote the conceptual and skills development of individuals and groups.

Background

There are a number of motivating ideas that have drawn our eye and the focus of the authors in this collection. One is actionable knowledge. Actionable knowledge can be understood as a way of knowing that offers guidance for practical work. The real value of actionable knowledge as a goal for research work can be best understood if we consider it from different perspectives such as who needs what knowledge when, and what types of knowledge they need. For example, in experiences of learning, actionable knowledge can be used to shape and interpret how learners draw on their experiential knowledge, the design of the affordances of their learning environment and the design of the learning tasks that they are carrying out. In the area of learning space design, actionable knowledge can be used at all stages of design and evaluation, but changes in nature depending on the stage of development. It is different for users of learning space at the conceptual stage of development compared to the knowledge required by architects in the formalisation of the ideas. It is different to the knowledge required during space construction to that which is required in an assessment of what has worked well and what has not. Once learning space is in use but has been found to be not quite right, identifying just the right insight into the functional gaps of existing space and addressing them, even in small ways, can radically improve the relationship between people and the space, providing them with renewed interrelationships that accommodate desired ways of learning and collaborating (Marmot, 2014). The ideas in this book will emphasise that stakeholder roles, knowledge using and knowledge creating practice, different ways of thinking and philosophical positions adopted by the different approaches,

all have a role to play in contributing to our understanding of a framework for actionable knowledge, which we return to in the final chapter.

Another motivating idea for our book is ecological thinking. In modern society, in schools, universities and the workplace, spaces of teaching and learning are being created and influenced through the introduction of a multitude of ideas, participants, technologies, pedagogies and other elements, which create complexity. At the centre of these spaces is the idea of 'learning' with which all other elements need to work in balance if the participants in the experience are to benefit. Understanding how all of these elements relate, how learning and the spaces of learning are interdependent, is a non-trivial, and constantly evolving exercise, one which is well-supported by ecological thinking.

One of the main reasons for the increasing complexity of learning space concepts over the last decade is the growing role of material elements in experiences of learning. In digitally connected spaces of teaching and learning, the flows between learning, knowledge discovery and creation, the students' role, the teachers' role, technologies and space are in an ongoing state of flux. Interaction amongst these elements, accompanied by rapid changes in the state of the elements themselves, creates uncertainty. Ecological thinking encourages us to consider this uncertainty from different theoretical perspectives. For example, sociocognitive perspectives, a broad category meant to recognise that cognition in learning is both individual and related to social interaction, help us to understand how the thoughts and ideas of individuals interact to generate experiences amongst groups. Sociomaterial perspectives on interaction extend the gaze to consider the materiality of the environment (Fenwick, 2010) and any symbiotic associations between learners and things. Further extending the notion of materiality to explicitly deal with the tangible and intangible and their interaction, innovative learning space considers both the physical and virtual and how learners interact with, and across, both. Adopting an ecological stance on learning space, we look for how engaged learning occurs through combinations of learners and tools, through tasks that require the students to move back and forth between physical and virtual environments in ways mediated by material objects that offer new, and require different, ways of engaging with novel ideas, people and existing bodies of knowledge. Combining the insights from different ontological and epistemological perspectives allows us to capture some of the slipperiness of the student experience in modern spaces of teaching and learning.

We hope the collection of studies in this book gives some sense of the nature of effective spaces of teaching and learning, a developing framework for understanding their constituent parts, and a sense of the value and importance of developing research programs that offer useable advice and knowledge to improve the practice of teaching and learning.

Overview of the Chapters in the Book

Researchers and practitioners whose work focuses on learning spaces are currently creating a field from very diverse parts. Ideas and methods are being assembled from the architectural sciences, environmental psychology, the learning sciences, the scholarship of teaching and learning, science and technology studies, ergonomics, human–computer interaction, design studies and elsewhere. Understandably, most researchers draw on a small fraction of what these traditions offer and there are deep uncertainties about whether and how findings from different disciplines can be combined. There are also deep uncertainties about how research and practice can best inform each other. There is no consensus over what needs to be explained, what kinds of explanation merit attention or even over what to call some of the central objects of inquiry. Individually and collectively, the chapters in this book contribute to clarifying some of these issues. Some chapters are theory-led; others are motivated by problems of practice; all help construct a shared sense of the field and language for discussing core challenges.

The chapters in this book do not come from a single theoretical perspective or take a standardised methodological approach. They are informed by a number of contrasting theoretical positions, advance different philosophies of learning and design and refer to diverse examples of real-world practice. They exemplify the many ways in which research and educational practice can converse and become more tightly bound together.

The first four chapters bring a rich array of theoretical perspectives to the challenging task of understanding spaces of teaching and learning. They use ideas about sociomateriality, social capital and shared resources, design thinking, grounded cognition and semiotics to help sensitise us to different forms of evidence and insight and to different framings of core issues. Our reading of these chapters leads us to the view that they connect as well as compete. None covers the whole intellectual territory, or pretends to do so. While they cannot all be reduced to a common set of foundations, they nevertheless complement each other and collectively introduce many of the ideas needed to work in this domain.

Dianne Mulcahy opens the exploration of analytic perspectives by challenging some assumptions about how space is treated in educational literature—focussing particularly on assumptions that space is either some kind of neutral backdrop or static container for human action, or that it causes (or even determines) the form that human actions take. Instead, drawing on new materialist and spatial theorising, she offers a performative, relational, non-deterministic account, illustrated with examples taken from research on learning in museums and learning in open-plan schools. The performative view foregrounds the ways in which things are brought into being—the ways that materials come to participate in practice, for example. The relational view values the tracing of connections more highly than the making of distinctions. It makes it more likely that we will see how qualities and effects emerge from complex relationships and that spaces are constituted by interactions between people and things. And in combination, seeing the world being constituted

through sociomaterial interactions favours a non-deterministic, though not an arbitrary, framing of change. We share her conviction that analyses of this kind have a valuable capacity to reveal the workings of exclusivity and power—though much more besides.

Paul Temple is also concerned with place making. He aims to understand how, in universities, the spaces that architects design become places that their users enjoy and value. This is part of a larger concern about relations between academic effectiveness and self-organising communities. Temple draws upon a number of Bourdieu's ideas on habitus and social capital theory and Ostrom's common-pool resource theory (CPR) in an exploration of ways in which university communities might better understand and manage the places in which they work. This line of argument is particularly timely. Many leaders in higher education are struggling with issues of how to interpret, and act in relation to, shared resources of various kinds—including open educational resources. Moreover, their decisions cannot be decoupled from deeper educational values. Students cannot, other than by reaction and rejection, learn to engage in self-managed and collective forms of learning in an organisation that is increasingly managerialist and privatised.

Richard Elmore senses a change in the *zeitgeist*—worthwhile educational innovation means finding ways to combine radical design thinking with insights from neuroscience, in order to create powerful new learning environments that adapt and improve over time. This argument stands out clearly against a background of educational research and development as 'normal science'. On this view, normal educational research and development is self-limiting. By imposing constraints at an early stage in a design (or inquiry) process, the search for truly novel designs and insights is fatally obstructed. The outcomes are, at best, a small improvement on what we already know and can do. This is not a route to survival in a rapidly changing world. Elmore draws out some implications of recent research in embodied and grounded cognition for the design of richer learning environments and also uses these and related research findings to suggest a rebalancing of educational attention. Crucially, he identifies the role of higher executive functions in self-managing effective learning in rich and complex learning environments.

Louise Ravelli offers the fourth and last of this grouping of chapters which share a strong emphasis on theoretical ideas. She presents a social semiotic way of considering spaces of teaching and learning. Semiotics is fundamentally concerned with meaning, and with texts as instances of meaning. Ravelli introduces us to ways of understanding university buildings, including their internal arrangements, as *spatial texts* with multiple kinds of meaning: representational, interactional and organisational. Buildings as spatial texts can be understood through a variety of human practices and it is useful to distinguish between those which involve 'looking at', 'being in' and 'moving around' the spaces concerned. It is easy to underestimate the capabilities needed to participate in complex social activities—what one needs to know in order to 'take part' in a university lecture or a brainstorming exercise, for example. Spatial texts play an underappreciated role in the communicative and coordination work that makes large-scale, socially organised forms of education possible.

The chapter by Pippa Yeoman acts as a bridge between theoretical and methodological concerns. She explores Ingold's notion of 'correspondence' and uses the activity centred analysis and design (ACAD) framework of Carvalho and Goodyear (2014) to analyse the functioning of two kinds of things in a school learning environment: PDF documents and writeable walls. In the innovative school in which Yeoman did her ethnographic research, students and teachers used Task Cards as foundational structuring resources. The Task Cards existed as PDF documents, accessible anywhere at any time. Yeoman describes how the material qualities of these special PDF documents enabled their participation in a variety of important activities. They promoted self-organised activities in which students often needed additional tools to help them communicate and coordinate their work—a role for which ubiquitous writeable white walls turned out to be well suited. For example, when inscribed with hand written plans, the walls took on 'delegated authority' for quickly resolving disagreements within student groups about what they had previously agreed they should do. This chapter embodies practical theorising: there is a deep concern for how we go about understanding learning in place and process and how learning can be understood in terms of dynamic correspondence between person and environment.

Michael Johnson and Michael Khoo take us further down the path of methodology and methods. Their chapter reports on a new imaging technology and approach to space evaluation that captures aspects of learner behaviour in 'informal' learning spaces. Using a learning commons as their research site, their research offers ideas and a method to improve our understanding of how representations of students' physical locations and movement in the learning environment can be used to help identify different kinds of 'acts of learning'. In turn, this can inform future modifications of the learning space. In framing their account of this innovative method, Johnson and Khoo draw upon the literature on situated learning, making the point that acts of learning need to be understood as *multiply* situated—'situations' are nested and complex.

The chapter by Robert Ellis, Feifei Han and Abelardo Pardo uses an empirical study as a way of combining insights from distinct perspectives on student learning. The starting point is research on students' approaches to learning (SAL). Over the past 40 years or so, SAL has proved to be one of the most robust areas of research on learning in higher education. It regularly generates findings showing how students' conceptions of, and approaches to, their learning relate to learning outcomes. Most SAL research relies on students' self-reports. The chapter by Ellis and colleagues supplements this kind of data with behavioural observation data that provides evidence about students' use of online tools and social network analysis which provides some evidence of their patterns of working together. In other words, it adds sources of data that speak to the materially and socially situated nature of students' learning. The research involved students who worked in groups on a project in a teaching laboratory. They also attended lectures which focused on the development of propositional knowledge and they engaged in significant online activities. The chapter explores associations amongst sociocognitive, sociomaterial and academic performance variables and the extent to which they contribute to

qualitative differences in the student experience. The research methodology takes a relational view of *learning* and *spaces of teaching and learning* and suggests the more we understand the interplay of elements in the former, the better the evidence we can provide to inform the design of the latter.

The research reported in the book's next three chapters move the focus to the practices of designing and developing spaces of teaching and learning.

Pamela Woolner draws on her extensive experience of working with school communities in collaborative processes of designing and redesigning spaces for teaching and learning. She starts by observing that qualities of the physical spaces in a school are often found to correlate with educational outcomes, but that intentional redesigns of physical space do not lead unproblematically to educational improvements. Her chapter explains how 'user involvement' is the missing key to obtaining educational benefits from transformations of physical space. She offers four experience-based heuristic principles to help others understand what this entails: Start where people are (mentally and physically); Understand the intertwining of physical, organisational and social aspects of the school environment; Facilitate the exploration of ideas and possibilities and Appreciate that change is a complex lengthy process. Woolner illustrates and tests these four principles using a case study from a primary (elementary) school. Like Temple, she finds value in Ostrom's work on managing common resources. She extends this to show how her four principles can be used as guidance for enacting collaboration and for helping identify moments when participatory design goes off track.

Lee Yong Tay, Shanti Suraj Nair and Cher Ping Lim describe a contrasting practical experience of elaborating elementary school-based spaces of teaching and learning with digital learning spaces for Mathematics and English. Situated in one of Singapore's Future Schools, their work set out to promote innovative teaching and learning approaches using technology. Their chapter discusses the complexities of elaborating practice with digital solutions at the levels of the school, classroom and pedagogy.

Jonas Nordquist and Kenn Fisher provide a broad-ranging account of redevelopments at the Karolinska Institute and Karolinska University Hospital in Sweden over the course of an 8-year 'Future Learning Environment' project. This chapter provides a first-hand recount of the challenges in translating future-oriented pedagogical and curriculum requirements into appropriate designs for learning spaces that will last. The authors identify a number of significant issues around practices of project governance, the articulation of new requirements and the use of research evidence and international best practice in guiding space redesign. The scale, scope and complexity of this project makes it an outstanding worked example of how to frame the many problems that emerge when educational and architectural practices collide.

In the concluding chapter, Peter Goodyear, Robert Ellis and Alexi Marmot draw out the implications of the chapters using the themes of actionable knowledge and ecological thinking for translational research agendas. The chapter sketches a framework that can be used to strengthen the ties between research outcomes and the forms of knowledge which can make a useful contribution to the guidance of

practical work. To illustrate one way of framing the creation of actionable knowledge in research on learning space, the chapter concludes by adopting an ecological perspective, emphasising its affordances for the design and applicability of research programs seeking to maximise the translational value of their outcomes.

We hope you enjoy reading 'Spaces of Teaching and Learning'.

Robert Ellis, Peter Goodyear, Alexi Marmot.

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Chapter 2
Assembling Spaces of Learning 'In' Museums and Schools: A Practice-Based Sociomaterial Perspective

Dianne Mulcahy

Abstract It is often assumed in the education literature that spaces are either neutral backdrops to teaching and learning or are *themselves* agents for change such that changed spaces will change practice. In this chapter, I offer a less deterministic and dichotomous account of the space–practice relation. Drawing selectively from new materialist social inquiry and contemporary spatial theory and bringing empirical material collected within museums and schools to bear, the argument is made that space, like learning, is a practice—it is always in a process of being made. Practices of a range of kinds—affective, social and material—play a constitutive role in spaces of learning and account for support of, and challenge to, government and policy priorities with regard to them. In consequence, a more complex, nonlinear model of the space–practice relation is required. Thinking the term learning spaces as something we do (stage, perform, enact), rather than something we have (infrastructure) affords acknowledging the multiplicity, mutability and mutual inclusivity of spatial and pedagogic practices. It also invites attention to the politics that play out in them.

Introduction

> When you go to a museum and something slows you down, that often improves or deepens the experience of learning as a visitor … And so hopefully, although it might seem a bit stagey at first, including to students they might go – 'how long are we going to spend in this room?' – what's happening as they are kind of coerced into looking more closely at exhibits, will actually allow them to think well (Museum educator).
>
> I learn the best when I'm up against the whiteboard with the teacher, getting almost tutored, and that's more available to me when there's a portable whiteboard maybe around the corner or something, and I can just call a teacher and say, 'hey, I need help with this, can

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> you come help me?' And he'll be like, 'yep, sure', rather than having a whiteboard in the front of a classroom where everybody's seeing it … [it's] more specific to you as a person than it is to your class (School student).

These comments, made by a museum educator and a secondary school student, during an interview about their experiences of, respectively, visitor learning at the museum and learning within the new open learning environments that are coming to characterise Australian schools,[1] usefully open up the intellectual terrain that I aim to explore in this chapter. They point to the ways in which learning is spatially shaped and how space *participates* in, rather than serves as a setting for, or backdrop to, it. Thus, when students on a school field trip to the museum ask 'how long are we going to spend in this room?', they can be considered to be questioning curatorial intent to corral and coerce them 'into looking more closely at exhibits'. Learning can be thought to be a *materialising process* involving rooms, exhibits, students' bodies, mobility and curatorial and educational intent. Somewhat similarly, in inhabiting a newly designed learning space in a school that has been refurbished along the lines of an open and flexible plan, (some) students can be considered to be taking up 'just-in-time' learning: 'I learn the best when I'm up against the whiteboard with the teacher … I can just call … and say, "hey, I need help with this". Again, learning is a materialising process involving an open floor plan, portable whiteboards, instructional corners, calling a teacher and 'getting almost tutored'. What is clear from these data is that as *spaces* of teaching and learning, they share a number of features, the most salient of which is that they are *performative*: in association with museum educators and school teachers, they bring learning into being. They play a performative role and bring certain effects (learning, identities, affects) into effect. At the museum, it appears, learning needs to be slowed down by something towards deepening the experience of it; in newly designed schools, learning is accomplished via dynamic relations among students, teachers and 'infrastructure', that is, portable whiteboards that can help facilitate thinking. Learning spaces are staged, performed or enacted in relations between bodies and material objects, including physical spaces. My aim here is to explore this performative process and consider its outcomes and effects towards augmenting learning spaces research and ultimately, furthering educational practice as undertaken in museums and schools.

[1]Open and flexible spaces of teaching and learning are fast becoming *the* strategic option for the building of new schools and educational facilities in a number of countries, including Australia. As Dovey and Fisher (2014, p. 43) claim, these infrastructural changes are 'largely driven by long-standing changes in pedagogical theory and practice that may be broadly described as a recognition of both formal and informal learning and a move from teacher-centred to student-centred learning'. Similar changes in pedagogic approach have occurred in museum education. The long-standing approach of 'learning by looking' is giving way to more embodied and performative (practice-based) pedagogies: 'Education is now more strongly focused on producing individuals with strong personal identities, strong self-esteem, confidence, and the ability to evaluate and make judgements about their own best interests' (Hooper-Greenhill, 2007, p. 200). New epistemologies that embrace a constructivist approach to knowledge production now characterise museum education as they do school education.