Learning Trajectories

Every learner is on a trajectory: an individual path that involves decisions about where to go next, what to learn, and how to learn it. Typically, some of those decisions are made by the learner and some are not. The question of who makes those decisions and how they are constrained is central to understanding how learning can be achieved and, particularly, the role of education in that process.

Decisions to engage in a set of learning activities and the directions that those activities take are determined by choices and constraints. Over time, most learning experiences are the result of many choices by many people: teachers, learners, authors, parents, children, friends, relations, governments, programmers, instructional designers, educational software developers and (potentially) many more, up to and including chance acquaintances on a bus or even the family dog.

Constraints on those choices operate at all levels: from the rules of grammar to the legislative requirements of governments, from the laws of physics to the demands of narrative, from the shape of a classroom to the prior knowledge and demands of the learner, and from the interests of the teacher to the effects of the weather. Some constraints are absolute, while others simply nudge or cajole. The interplay of a potential myriad of choices and constraints determines the level of control that any individual may exert over a learning trajectory.

A central goal of education is that learners should be able to learn autonomously—to be in control of their own learning. However, the process of becoming independent often involves some delegation of control to others. Many methods that people employ to learn, whether online or not, offer too much or too little constraint. Those needing the freedom to choose and explore may be prevented from doing so by a system that is too constraining, often leading to boredom and frustration. Conversely,
the last thing that those who are lost or bewildered need is unconstrained freedom to choose. They wish to be taught. Apart from some exceptional circumstances (primarily involving one-to-one tuition), most educational systems tend to compromise, inevitably offering too little control to some but too much to others.

This book offers an exploration of the ways that a learning trajectory is determined, and, in particular, how an online learning environment can affect that trajectory. It provides suggestions about how, primarily through technologies that underlie what is vulgarly known as “Web 2.0,” networked learning environments should be constructed to give control to learners if they need it, as they need it, and when they need it.

As a guiding principle, the book is based on the belief that an effective educational system should enable the learner to choose whether and when to choose. A learner should be in control of the amount of control he or she may exercise over his or her learning trajectory. The learner should be able to take control or to delegate control as needed. This is a stance that is fundamentally opposed to a culture of managerial control and Fordism in education, that abhors the industrialisation of learning. The book will present arguments that support a way of thinking about education that hinges on the needs and wishes of the learner, not as some abstract or generalised entity, not as the subject of another’s wishes to offer advice, but as a real individual with real needs in a real context. It will provide explanations and examples of how, in broad terms, this can be achieved efficiently, engagingly and effectively in an e-learning environment.

Who Should Read This?

This book is written with three main audiences in mind: those interested in the theory of e-learning, creators and facilitators of e-learning (e.g., teachers and instructional designers), and developers of e-learning environments (e.g., programmers and computer system designers).

1. **Educators and others interested in educational theory.** The principles espoused here have a wider application to the process of education in general, especially when conducted at a distance, and may offer something to anyone involved in learning and teaching.

2. **Creators/facilitators of e-learning.** The book contains an examination of existing e-learning environments and offers thoughts on how they should be used. Therefore, another audience will be those who wish to use e-learning as part of an educational process, whether through direct teaching or through the design of educational materials and resources.
Developers of e-learning environments. This book will provide a theoretically grounded approach to building computer systems to support adult learning, using networked technologies. Therefore, an important audience is the community of developers of e-learning software.

What This Book is About

Understanding the Dynamics of Learning Trajectories

This book is grounded in an attempt to unify and synthesise aspects of an assortment of theories about learner control, autonomy, self-direction, adult learning and so on, into a single theory of transactional control. Transactional control is a refinement of an aspect of transactional distance theory (Moore, 1997), presenting a particular systems perspective. This is by no means the only systems perspective that may be employed to this end and it necessarily presents a blinkered view of its subject matter. Indeed, in many ways, it says less than transactional distance theory about the nature of online, distance, or face-to-face education. Its purpose is not to usurp but to augment other theories, most of which retain their place unchallenged. It is just another perspective—another way of knowing. By analogy, it is undoubtedly possible to explain the behaviour of birds by describing the movement of electrons within the birds’ brains, but it would not say much about the process of flocking nor of birds’ roles in an ecosystem.

Senge (1993) writes of the beer game (a device contrived to demonstrate systems behaviour):

*If literally thousands of players, from enormously diverse backgrounds, all generate the same qualitative behaviour patterns, the causes of the behaviour must lie beyond the individuals. The causes of the behaviour must lie in the structure of the game itself.*

This book is about the structure of the game of education; it is more about its rules than about how it should be played.

Building and Using Learning Environments

Transactional control theory provides ways of considering some structural aspects of learning transactions. Structure always influences and, sometimes, determines
behaviour. A learning environment provides or manifests structure. Consequently, a learning environment will inevitably affect how people learn within it. It is desirable that the environment should offer as much support as possible to the process of learning and should not make the process less effective. Learning environments that are too constraining will be harmful to some learners but, equally, so will those that offer too many choices. The design and use of most existing learning environments does not take this dynamic into account. As a consequence, learners (and, indeed, teachers) may be unduly constrained when they need freedom, or be offered too many choices when they need constraint.

The ideal balance of control will vary from person to person and context to context. Even for an individual learner, the need for control will vary constantly and will change as the learner learns. In a perfect learning environment, the learner would be able to take exactly the control that he or she needs at any point—no more, no less. The conventional way to achieve something approaching this is through dialogue, which may serve the function of, among other things, negotiating control. Dialogue works well but, in the context of control, scales poorly and may not fit in with the timing of learning requirements. To fill the gaps, the structure of the learning environment should therefore be able to adjust, adapt, or otherwise cater to these dynamically changing needs. As the book progresses, some strong recommendations will be made as to how that might be achieved in online systems through a design paradigm derived from and informed by transactional control.

What This Book is Not About

There are plenty of excellent books and treatises that seek to explain the processes by which adults learn, espousing theories or blends of theories that are behaviourist, cognitive, constructivist, andragogist, situational, experimental, experiential, social, developmental…the list is endless. This book is not one of them.

Although it is about the processes of adult learning, transactional control is not about how people learn. The theory is not dependent on understanding how learning occurs or even, beyond some aspects that relate directly to control, what are the best ways to help it happen. It is only important that someone makes choices about a learning trajectory, and they do so in a particular context with particular constraints. It is mostly left to other theories to provide the rationale for what choices are made.

Considering the learning process from the perspective of transactional control is to attempt to model the characteristics of educational transactions in a consistent fashion and to provide a common ground that allows significant aspects of their structures to be compared and analysed. Different structures will lead, inevitably, to different consequences and offer different benefits to different learners. The affordances of different media and modes of online teaching will be examined closely and sometimes matched to the needs of a range of learners. As a result, the book’s pedagogic neutrality is far from absolute: pronouncements will be made on the suit-
ability of certain forms of learning environment and certain approaches to teaching
and learning that will be appropriate for certain learners.

Some readers may be lulled by the title into thinking that this book is about psy-
chological aspects of control. This is far from the intention, although there will oc-
casionally be passing references to the area. Such concerns are raised only insofar
as they affect the dynamics of the system as a whole.

Those in the computer industry may recognise the term “transactional control” as
meaning something quite distinct about the behaviour of database management
systems. This is nothing at all to do with what this book is about.

Organisation of This Book

The three sections of this book cater to, broadly, and in turn: those interested in the
theory of e-learning, creators and facilitators of e-learning, and developers of e-
learning environments. However, it is hoped that there will be something for anyone
interested in learning throughout the book.

Section I. Control and Learning:
A Theoretical Background

The early section of this book is concerned with establishing a theoretical basis for
what follows. In particular, it describes a framework for understanding educational
systems in terms of choice and constraint. Among other things it will look closely
at how choice and constraint may meaningfully be looked at from a wide range of
perspectives and at many scales, and at the systemic behaviours that arise through
simple interactions of individuals constraining the choices of others.

Chapter I (Introducing Concepts) is concerned with defining the field and clarifying
what is meant by key terms such as ‘teacher’ and ‘e-learning’ because some of the
ways that these terms are used in the book are distinctive and may not have mean-
ings shared by all. Some basic observations are made regarding how structure can
influence behaviour. The unique nature of the computer, as (simultaneously) a tool,
a medium, and an environment, is outlined and the implications considered.

Chapter II (From Transactional Distance to Transactional Control) lays the ground-
work for the theory of transactional control, discussing some of the literature related
to control and learning, with a strong emphasis on Michael G. Moore’s theory of
transactional distance. The chapter includes a working definition of the central con-
cept of transactional control—the theory that underpins much of what follows.
Chapter III (Making Choices: The Need for Teachers) is about the nature of choice and various conceptions of it, why it is a good thing in education and why it may be a bad thing, touching on what freedom means in an educational context. In particular, it shows that control may be reduced both by too many and too few choices.

Chapter IV (All About Constraints) is an examination of constraints and the ways in which they operate to determine a learning trajectory. It considers a range of extrinsic factors and those that are intrinsic to the process, leading to a model that views constraints in terms of context and content.

Chapter V (Scale) is concerned with the central importance of scale in understanding a learning trajectory, and identifying appropriate levels of granularity to consider when looking at learning choices. It is shown that choice and control may operate at many different scales, and that the smaller scale choices tend to be more constrained by the larger than vice versa. This chapter provides the authoritative definition of transactional control.

Chapter VI (Transactional Control in Traditional Institutional Learning) contains examinations of a broad range of typical learning activities from the perspective of transactional control, leading to an identification of the process of analysis that might be followed in attempting to identify the dynamics of control in any series of learning activities.

Section II. E-Learning, Control, and Constraint

The second section of the book concerns the application of the model developed in Part One to some specific, and predominantly, e-learning situations and modes of e-learning. It contains explorations of the dynamics that can occur in such systems. It is observed that the structural aspects of different technologies influence the kind of learning trajectories that might emerge with them. Sometimes, these can be used to the learner’s advantage, but, at other times, strategies must be employed to curtail these constraints.

Chapter VII (Electronic Publication) contains discussion of various means of publishing and presenting content on the web and the ways that it might enable control by the learner and the teacher. Amongst other things, it considers approaches to the design of hypertext and the use of learning objects. Suggestions are provided to assist teachers attempting to cater to the need for control and the need for constraint in such a system.

Chapter VIII (Finding Good Stuff) presents a number of popular methods of assisting learners in finding appropriate resources, covering some aspects of resource-based learning, the uses and limitations of search engines, recommender systems, and adaptive hypermedia.

Chapter IX (Asynchronous Communication) is concerned with typical approaches to the use of asynchronous discussion such as Web forums, e-mail, and bulletin
boards, examining ways in which control may be distributed among participants. It includes an example of a discussion, which is analysed in detail to explore the levels and ways that control emerges. A number of principles are suggested for both reducing and increasing learner control.

Chapter X (Synchronous Discussion) is about synchronous communication tools such as Internet relay chat, instant messaging, and Web conferencing, in the context of the dynamics of control, observing strengths and weaknesses of different systems to support differing levels of control.

Chapter XI (Integrated Tools and Environments) considers integrated environments, in particular, focussing on learning management systems. It includes an analysis of one of the more popular examples of the genre, thereby attempting to explain generic issues of top-down control in such systems. It gives advice on reducing the pernicious effects of top-down design and includes a discussion of alternative and emerging methods of building integrated learning environments.

Section III. Designing Better E-Learning Environments

The third and final part of the book attempts to extrapolate some lessons from the application of transactional control theory. Notably, this implies that Web 2.0 technologies, especially social software, may have innate advantages when compared with currently popular learning environments. This leads to a set of eight principles for the design and construction of social software for e-learning and a description of some examples of the kind of online learning environment that follows from them. The dangers and weaknesses of social software are explored with a view of identifying the future systems that will support learning and education.

Chapter XII (Social Software and E-Learning) is primarily about the unusual nature of social software systems, the foundation of Web 2.0, whereby the group is a first class object within the system. Considering the group as a distinct actor in the system implies a change to the ways that e-learning has so far been conceptualised. In particular, it offers new opportunities for approaches to building learning environments that, by their nature, allow learners to choose the level of control they have at any point in their learning trajectories by generating structure through dialogue.

Chapter XIII (Design Principles for Social Software in E-Learning) provides eight principles that should be followed when designing social software that lets learners choose. The theoretical underpinnings of these principles include aspects drawn from (particularly) self-organisation in biological systems, city planning, information systems design, and pragmatic requirements for socialisation in an educational environment.

Chapter XIV (Social Software in E-Learning: Beyond Blogs and WIKIs) provides an overview of some instances of learning environments that use the eight principles
to a greater or lesser extent. The chapter includes an in-depth discussion of the ways that two learning environments written by the author conform to the principles to achieve self-organisation.

**Chapter XV** (Problems with Social Software for E-Learning) discusses some of the failings of such learning environments and identifies some large research questions that still remain, particularly those relating to problems of sequencing, the weaknesses of stigmergic dialogue, and the stupidity of mobs.

**Chapter XVI** (Potential Futures of E-Learning) summarises what has gone before and peers into the future. A variety of speculations are made about potential futures for e-learning, framed in the context of the Edinburgh Scenarios (Cross, 2004). A number of thought experiments are used to envisage some of the potential consequences of building and using software according to the principles outlined in this book.

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**Summary**

This is a book about the dynamics of control in intentional adult learning and the consequences for how online learning environments should be designed and used. It is not a book for those seeking to discover how people learn in general, nor will it be of much use to those wishing to understand psychological aspects of control. It presents a view of educational transactions from a systems perspective, which enables different educational techniques and learning environments to be compared and evaluated in terms of affordances and constraints. Based on this perspective, online teachers and learners will be able to take a more reflective and informed perspective on appropriate choices of methods and tools, while the makers of those tools will gain a better understanding of the effects they may have on behaviour. If that were all that this book achieved, it would be a good result. However, it may be possible to make a larger claim; from first principles, the arguments and examples in this book demonstrate that some ways of building the technologies of learning are better than others. This book does not contain all the answers: far from it. What it may provide is the means to ask the right questions.

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**References**
