

Preface

The Context

It is evident that we are living through an important and rapid transformation of society that is changing the way we learn and the places where learning occurs. There is need for a fundamental change in the way in which we design and support learning. A number of changes are evident. First, the complexity of modern society requires specific types of competences to interact within this context, such as higher-order thinking skills, problem solving, systems thinking and the ability to communicate, collaborate and interact effectively with others (Rychen 2003).

Second, the connectivity in today's society has not only altered the production of knowledge but also the spaces and times where learning takes place. Sharples et al. (2012, p. 24) used the concept of seamless learning to describe when a person experiences a continuity of learning across a combination of locations, times, technologies and social settings. "Such learning may be intentional, such as when a learning activity starts in a classroom then continues through an informal discussion with colleagues, or online at home. It can also be accidental, for example when an interesting piece of information from a newspaper or television programme sparks a conversation with friends. Seamless learning can be a collective or an individual process. It can extend across time and locations, offer ubiquitous access to learning resources, encompass physical and digital worlds, engage multiple types of device, and integrate different approaches to teaching and learning".

Third, technologies have an increasing impact on how learning is designed and supported. These changes are directly promoted by the use of emergent technologies. Digital technologies enable students of all ages to operate across different contexts.

Fourth, in terms of approaches to learning, there has been a general change from instructional approaches to those that are more authentic, contextual and social in nature, as these are perceived as more appropriate for equipping learners with the skills they will need to participate in a constantly changing broadly societal context (Conole 2014).

To sum up, because the context of current education is rapidly changing, traditional approaches to the design and delivery of learning interventions are being challenged and may no longer be appropriate to meet the needs and expectations of today's learners. Everybody is aware of this situation, but the challenge is to develop new pedagogies and innovative uses of technologies to fulfil the real needs and expectations of learners.

This book aims to contribute by providing new pedagogical perspectives based on the design of new learning spaces supported by digital technologies. Four important concepts present in the different contributions should be emphasised: ubiquity, emergent pedagogies, learning designs and personalisation.

Ubiquity

Learning becomes ubiquitous. This ubiquity implies a special capacity for flexibility and adaptation to different contexts. Whereas in a traditional classroom the teacher is the main source of information and students are required to stay in the same place and participate simultaneously in the same activity, in a situation of ubiquitous learning activities can be resolved in a different space and time for each student. In addition, teaching materials are available at all times and are accessible from any device. Burbules (2013) notes that for learning to be effectively "ubiquitous" requires a more distributed experience in time and space. It is well understood that a ubiquitous learning environment is a situation in which even the student may be learning without being fully aware of the fact.

The use of mobile technology means that we are "always on", we are headed towards a time when being constantly "connected" is a way of life, and this fact has important implications. The limits between "work/play, learning/entertainment, accessing/creating information, public/private, formal/informal are distinctions that have conceptually been clear but currently are becoming unclear" (Burbules 2013, p. 2).

Besides space changes, temporal changes are also important. Burbules (2013) notes that instead of one's schedule being created around opportunities to learn, there has been a shift, and with mobile and ubiquitous computing learning can be scheduled around one's habits and preferences. Personalisation is, therefore, very important.

There is also a shift in the perception of and interaction with time. Rather than "lifelong learning" being something that adults do after traditional school is over, lifelong learning becomes continual learning. Technology has promoted this situation, and, at the same time, we need new technology to support the differences among learners as not everybody has the same approach to learning and therefore personalisation is required.

Emergent Pedagogies

Digital technologies can widen access to information, open up new ways of learning and provide opportunities for communication, collaboration, participation and the acquisition of skills. However, it is necessary to rethink the methods, content and structure of the educational process.

Emergent technologies and emergent pedagogies are interdependent. According to Veletsianos (2010, p. 33) emergent technologies are “tools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied education-related purposes”. Employing emerging technologies to further educational goals may necessitate the development of different theories, pedagogies and approaches to teaching, learning, assessment and organisation. If we employ emerging technologies in education, we should also be prepared to experiment with different lenses through which to view the world and with different ways to explore such ideas and practices as knowledge, scholarship and collaboration. The implications of emergent pedagogy for emerging technologies in education are twofold: on the one hand, technologies developed for purposes other than education find their way into educational institutions and processes, while on the other, once technologies are integrated into educational practice, they both evolve through practices.

An emerging pedagogy needs to rethink and explore new meanings of the existing/traditional pedagogies within the currently evolving contexts of a networked knowledge society.

Learning Design and Personalisation

Learning design has developed as a means of helping educational professionals to make informed choices in terms of creating pedagogically successful learning interventions that make effective use of technologies. Goodyear and Yang (2008, p. 167) use the related term educational design, which they define as “the set of practices involved in constructing representations of how to support learning in particular cases or the set of practices involved in constructing representations of how people should be helped to learn in specific circumstances”.

Design is a conscious and planned process of generating new ideas and taking decisions in order to create something different. Designs for emerging pedagogies provide specific information and research for acquiring the requisite skills to both design and support learning opportunities that harness the potential of available technologies.

To sum up, the aim of the book is to explore emerging pedagogical perspectives based on the design of new learning spaces supported by digital technologies. *The Future of Ubiquitous Learning: Designs for Emerging Pedagogies* provides specific information and research for acquiring the requisite skills to both design and support learning opportunities that harness the potential of available technologies.

Key organising questions addressed by the authors include:

- What pedagogical perspectives might provide new understanding of the assumptions underlying education needs?
- How can learning be designed following these new pedagogical perspectives?
- What are the issues that are relevant for ensuring effectiveness of adaptive and personalized learning?

Structure of the Book

The book is divided into three parts: Foundations of Emerging Pedagogies, Learning Designs for Emerging Pedagogies and, Adaptive and Personalized Learning.

The first part—Foundations of Emerging Pedagogies—has five chapters which set out the theoretical background for the book.

The book begins with an introductory chapter that provides an overview of the context of current education, the relationship between emergent technologies and emergent pedagogies, and a description of the main characteristics of emergent pedagogies.

Chapter 2 discusses guidelines for networked learning. First, several definitions are analysed and it is concluded that networks are essentially different to communities, although the former will contain the latter. After analysing pertinent metaphors of learning, epistemic design turns out to be subject to the maxim that learning networks cannot be designed, only designed *for*. With this as a limiting perspective, guidelines for the social design of learning networks are derived, in which the notion of ad hoc transient communities plays a key role. In the context of the set design, examples of tools for supporting social interaction, navigation and (formative) assessment are inventoried. Together, the results of the analysis of epistemic design, the guidelines for social design and the inventory of tools for set design provide a valuable, albeit still growing, toolkit for the designer of learning networks.

Chapter 3 discusses the principles, processes and design of heutagogic learning environments with specific emphasis on digital technologies. Heutagogy is a form of self-determined learning, it is a holistic, learner-centred approach to learning and teaching in formal and informal situations. The theory is grounded in humanistic and constructivist principles and brings together numerous threads of early learning theories into a composite picture of learning that is suitable for and much needed in today's educational systems.

Chapter 4 aims to provide a theoretical and analytical understanding of the approach and its implications for teaching and learning using Learning Analytics (LA). The authors analyse the implications based on McLuhan's semiotic analysis of media (1988). The chapter outlines which practices of teaching and learning may become more likely to become common when the LA tools are taken more widely in use, as well as which other will be relegated.

Chapter 5 proposes the metaphor of learning ecologies to provide a framework to analyse interactions between individuals and their environment, and the way their experiences across different contexts throughout life promote and shape learning processes. Learning ecologies allow exploring frontier pedagogies connecting formal, non-formal and informal educational contexts, acting as personal strategies that may orchestrate life-long, life-wide and life-deep learning.

Chapters 6–10 centres on Learning Designs for Emerging Pedagogies.

The second part of this book—Learning Designs for Emerging Pedagogies—is a theoretical and practical exploration of current trends in designs for learning in the digital era. It is composed of five chapters, ranging from Chaps. 5 to 9. Theoretical approaches to learning design, detailed processes of the design activity, and illustrative examples of leaning with technologies make up this part aiming at providing a substantive framework to meaningfully merge emerging pedagogies and technologies into the learning experience.

Chapter 6 explores the relationships between teaching and learning in light of technological and social shifts: from standardized and stable education to dynamic, flexible, distributed and open learning. The author develops the notion of multi-modal and distributed designs for learning anchored in rich media, communication and expanded networks.

Chapter 6 highly concentrates in the affordances of open spaces and availability of resources on the Web as enablers of pedagogies that provide experienced and self-regulated learners a multitude of learning opportunities. The author presents the challenges facing teachers in providing creative ways that encourage learning personalization and learners' agency.

Chapter 7 synthesizes years of experience in designing for learning from a robust design-based research approach. It presents a set of design phases that comprehensively relate the analytical and creative perspectives of design. Tools and specific examples of the design exploration and design construction of solutions phases are added.

Chapter 8 provides a state of the art of the design activity, this time on the basis of a community platform that enables teachers to share and reuse learning design solutions. A specific design environment, the Integrated Learning Design Environment (ILDE) supporting collaborative and visual design is presented and accompanied with cases of use.

Chapter 9 introduces the reader to a whole set of learning design representations that support design thinking, design communication and design implementation. An effort in the description of these design languages is put forward. The same learning activity is illustrated according to the various types of representations documented in the text.

Chapters 11–13 centre on Adaptive and Personalized Learning. A wide range of issues related to adaptive and personalizations are the focus of these chapters, illustrating the wider benefits such approaches can potentially provide to improve the learning process.

One of the crucial aspects of Adaptive and Personalized Learning is the continuous changes in the way a course is presented to the individual learners, to suit

learner's current situation. At the same time, continuous monitoring also provides opportunities for improvement in the course as and when weaknesses are detected. Chapter 11 deals with this issue by looking at measuring the quality of a course continually, formatively and summatively, through factors such as the quality of resources used, learner motivation, learner capacity, learner competency growth and instructor competence. A system, called MI-IDEM, is developed using Bayesian Belief Network, which receives streams of data corresponding to these factors and estimates of quality of the course offering based on individual factors as well as an overall quality of the offering. Through two case studies, the approach is demonstrated for a course offering in a blended online learning environment and a training course offering in an industry environment.

Chapter 12 looks at using games for adaptive and personalized learning, and the causes of their limited adoption in practice. A major issue identified is the implementation difficulties, as it usually requires a host of techniques and skills from several areas such as pedagogy, game design, adaptive instructional systems and artificial intelligence. As a solution, a conceptual model of adaptive educational games is presented in the chapter that supports educational process of reflection and analysis required at the game design stage. The model not only supports flexible game design but also enables an abstraction layer over the technical details, which allows non-technical persons, such as educators, to design educational games with ease.

Chapter 13 takes a critical look at personalizing learning in developing countries. It starts from the observation that majority of personalization efforts have concentrated on developed world context. The chapter provides an expanded definition of personalized learning that encompasses developing countries. A number of approaches are then suggested that take into consideration the capital and human resource constraints, and information and communication technology affordances, and various types of personalization opportunities in school systems of the developing world.

The last chapter in this part looks at the role of cognitive abilities of the learners in adaptive and personalized learning. While there have been significant advances in recent years towards understanding the importance of differences in cognitive characteristics of learners and associated effects on learning, there is still not much clarity regarding how these cognitive characteristics are determined and what impact various media and design choices bring on different personal characteristics changes. Chapter 1 looks at various neuropsychological tests for determining cognitive profiles, and then discusses the differences in learners' interactions with the content due to the differences in individual cognitive characteristics.

Audience

The book should be of interest to researchers and practitioners in a number of fields, including: educational technology, learning technology, learning design and education. The primary audience is researchers in the field of pedagogy and technology-enhanced learning. This includes those with a broad interest in researching the use of technology in learning and teaching, as well as individuals with more specialist interests; in particular the research areas of networked learning, learning design, pedagogical theories and personalisation. More broadly, the book will appeal to researchers in a number of related fields such as computer science, education, information sciences and psychology. It should also be of interest to researchers undertaking Master's and Ph.D. programmes in the field.

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<http://www.springer.com/978-3-662-47723-6>

The Future of Ubiquitous Learning
Learning Designs for Emerging Pedagogies
Gros, B.; Kinshuk; Maina, M. (Eds.)
2016, XIV, 271 p. 46 illus., 8 illus. in color., Hardcover
ISBN: 978-3-662-47723-6