

# Preface

What interface design of digital textbooks do we need for twenty-first century students? Should printed textbooks digitized or digitalized? How important is to identify issues before the design of affordable digital textbooks? How should digital textbooks be designed and developed? Who and why should develop digital textbooks? In order to understand how to respond to these questions it is important to accept that metasystems learning design of digital textbooks is a trend for sustainable education and innovative decision-making processes, activities, and actions. These questions inspired the ideas presented in this book.

The initiative to replace printed textbooks with digital textbooks provides unrivalled functional content that allow discovering new ways of learning, but also inhibit learning. Nevertheless, most of the learning designers and educational policy makers believe that digital textbooks are only the digitalised version of the printed textbooks and they do not want to think about the learner and learning. This causes a misunderstanding of the pedagogy as a frontier science and leads on many projects without any impact on successful learning.

But digital textbooks theory and practice is a hot area of frontier research between pedagogy, psychology, philosophy, cybernetics, and knowledge management. User interface design is the main topic in this area. The research question of the proposed author book: *How screens affect learning?* is focused on investigation the correlations between learning theory and practice in using and development of digital textbooks in order to synthesis the main theoretical questions for applied research.

What the proposed research question is so important? First, because data, information and knowledge on digital screens mainly appears as abstract information and not as a (meta)cognitive tool for sense-making, decision, and communication. Thus, in many cases digital textbooks are designed for reading and not for development of the practical skills. Second, the most acclaimed feature of the digital textbooks is in *affordability*. This issue is common for digital reading because it takes longer time and requires more efforts to reach the same level of understanding than on printed version, even in a controlled digital learning environment. It was observed, for example, that transferring the printed page of textbooks into PDF is a

more convenient access to distractions than for learning. The scanning pattern from reading on digital screens is less intensive and takes longer time than when the student reads a printed paragraph. These and many other facts allow to establish the importance of research in user interface design of digital textbooks in accordance with the real problems of learning and not only with a digital fashion.

Students prefer digital textbooks for its lower price they are less heavy instead of printed textbooks. But, digital content may embody, also, the immediate feedback, animation, simulations, networking, extension of provided content and other interactive features. In the same way, digital reading on screen is harder when designers ignore norms, provided by paradigm. Maybe, design science should find a new way to make digital screen affordable for learning.

According to scientific research, opinions of students regarding the efficiency of the digital textbooks are contradictory. Thus, the survey taken in USA shows that 57.8 % of students prefer digital textbooks over the printed versions. The other survey, reported by Schaub (2016) provides the evidence that 92 % of college students prefer print books instead of e-books because printed textbooks are less distractive. Therefore, user interfaces of digital textbooks require an ecological way that allow a new understanding of educational technology.

Changing the way in which digital textbooks interfaces will be designed is a FRONTIER PEDAGOGY theme, especially because it is applied MetaSystems Learning Design principles for solving real issues in a practical way. *The aim of the book is to synthesize correlations between theory and practice, especially those related of changing paradigms.* Subject line relies on digital textbooks effectiveness for sustainable education, as an attempt to validate the MetaSystems Learning Design principles for guaranteed learning outcomes.

User interface design of digital textbooks are presented from the perspectives of the linear, systems, and holistic (metasystems) approaches. The readers will gain understanding of the terminology, overall user interface design phases, the design of specific mechanisms, processes, and pedagogical scenarios. It provides guidelines regarding how to identify and design learning objects, how to develop pedagogical scenarios, how to embody students in instructional design process and how to develop an open digital textbook.

The central focus of the author book is on how digital screens affect learning. Five chapters of the book discuss the following: impacts of digital revolution on learning; a paradigm shift and user interface design models; digital screens and issues of multiliteracies learning; teacher-centered versus learner-centered design of screen; knowledge ecology and sustainable development. The book was written to provide a single reference point for all interested in user interface design. Beginners and the experienced users of digital textbooks alike will find information they need to cover nearly transdisciplinary theories, models of learning, principles, and norms required to use and to develop digital textbooks in and for a sustainable education.

User Interface Design of Digital Textbooks

How Screens Affect Learning

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