Preface

THE TIMES ARE CHANGING

The times are changing. ICT is now becoming a truly "disruptive" technology in education with the disruptive effects no longer confined to the "niche" sector distance education. In schools, classroom teaching is being "flipped"; at universities, students increasingly use small-scale and large-scale opportunities for flexible learning. While fully online courses such as the much-hyped MOOCs may largely be confined to tertiary and adult education, *blended learning* is rapidly increasing in all educational sectors, and likely a viable model for K-12 education as well. For instance, in the US in 2009 about 3 million school students took online courses in one form or another (Horn & Staker, 2011). If education follows the development disruptive innovations had in other sectors, then this number might increase to about 27 million, or 50% of the US school population (public and private), by 2019 (Christensen, Horn, & Johnson, 2008).

A key factor for online learning in general is time. On the one hand, time is an important argument for engaging in and with online learning, not so much for saving time, but for gaining more flexibility in the use of time (Barberà et al., this volume). On the other hand, the management of time spent in the context of online learning (time allocation) is becoming a big challenge: With the increase in flexibility comes an increase for the need to self-monitor and self-manage time, not something all learners are well prepared for (Garcia et al., this volume; Terras & Melody, this volume). As the metaphorical leash gets longer, one can hang oneself with it.

As we move further into the post-industrial age, the interpretation and management of time is undergoing large-scale changes (Wajcman, 2008). It was Thompson (1965) who suggested to distinguish between task-oriented and clock-oriented societies. In task-oriented societies, individuals disregard clock time because they associate time with "observed necessities," such as milking the cows. In these societies, the distinction between work and other aspects of daily life is less pronounced. With the rise of industrialism and capitalism, clock-oriented societies arose, with a much stronger separation between work (i.e., time owned by the employer) and leisure time.

Mumford famously coined the clock the most important machine of the industrial age, a mode of time-keeping that "dissociated time from human events" (Mumford, 1934, p. 15). Keeping fixed times is also one of the defining features of schools as we know them today, modelled after the industrial age factory.

What we are witnessing in today's modern society is to some extent a revival of task-oriented time keeping. The boundaries between work time and leisure time are becoming increasingly less pronounced. As long as one is connected to the Internet or the mobile communication network, one can be "working," and one can be at the workplace while attending to private matters. A related distinction is the one between monochronic and polychronic approaches to task management. It goes along with the distinction of low-context and high-context cultures, which place a low or high value, respectively, on social interactions. North America and Northern Europe are home to low-context cultures, with high-context cultures more to be found in South America, Asia, and the Middle East. Low-context cultures "…emphasize scheduling and punctuality, and tend to be monochronic, in which people complete activities one at a time" (Duncheon & Tierney, 2013, p. 247), whereas high-context cultures tend to be polychronic, performing multiple activities in parallel and integrating work and leisure. With the rise of electronic and mobile communication, however, polychronicity or "multitasking" is now a ubiquitous phenomenon, with almost synchronous attendance to multiple work-related tasks and social activities during many hours of the day being a reality for many people.

With the increase of online and mobile communication in secondary and tertiary education, a shared rhythm of clock time ("classes," "lectures") becomes less and less the way to manage time. Correspondingly, students themselves have to take on more responsibility for time planning and management. This trend makes self-regulated learning a key 21st Century competence, of relevance way beyond the niche of open and distance learning. Self-regulated learning involves a complex interplay of cognitive, metacognitive, and motivational regulatory components (Boekaerts, 1997). According to recent theoretical approaches, regulatory activities during learning include orientation in order to obtain an overview over the task and resources, planning the course of action, evaluating the learning product, and monitoring and controlling all activities. Research has revealed that successful learning corresponds with all of these regulatory activities (e.g, Azevedo, Guthrie, & Seibert, 2004; Moos & Azevedo, 2009). In terms of theory and methodological development, some researchers in the field of self-regulated learning have in recent years suggested that regulation should be seen in terms of events rather than in terms of traits and aptitudes. The phenomena worth explaining in this perspective are those relating to "the very actions that learners perform, rather than descriptions of those actions or of mental states that actions generate" (Winne, 2010, p. 269). Differences in learners' (meta-/cognitive, motivational, emotional) dispositions are

seen as less relevant than before, with the possible exception of epistemic beliefs (Greene, Muis, & Pieschl, 2010). Methodologically, this change in perspective has been progressing with an increasing focus on behavioral and verbal process data and a decreasing interest in questionnaire methods (Greene & Azevedo, 2010). The interest in event data has been fueled by technical advances that make the recording of learning-related behavior on a level close to quantitative analysis almost effortless for the researcher and largely unobtrusive for the learners (Winne & Nesbit, 1995) and the availability of appropriate data analysis methods (for an overview, Reimann, 2009; Chiu et al., this volume).

However, even with this increase in attention to the performance-related aspects of self-regulation, research on self-regulated learning has still not fully embraced the role of tools in situated learning. Thus, while students' learning is increasingly seen as being closely tied to tools and other artefacts available in the situation, students' self-regulation is still seen as an essentially "internal" capacity. In the context of learning and learning research, the richness and importance of tools and artefacts for the management of one's learning needs to be more comprehensively theorized. Just think of the many time technologies available today, taking the form of (electronic) calendars, clocks, to-do lists, reminders, schedulers, and planning tools. It is only with the more recent generation of "Personal Learning Environments" (PLEs, see Garcia et al., this volume) that time management and task management tools have become integrated with knowledge technologies. To conceptualize the use and influence of such tools for self-regulated learning processes, what is needed is a better understanding of the relationship between internal "cognitive" capacities and the capacities of external tools and artefacts. Cognition is in most theories of self-regulation seen as rooted solely in the mind/brain. However, for a number of reasons, not the least the rapid growth of mobile devices, the question of what needs to be learned *from* tools versus what we can accomplish *with* tools (Salomon, 1990) needs to be revisited—and this includes the capacities for managing time and learning. As Donald Norman famously put it, it is often "Things that make us smart" (Norman, 1993), or more precisely the distribution of cognition across brain, body, and environment, including the technical, symbolic, and social surround. And it may not be coincidental that Clark and Chalmers (1998) use an ordinary task management technology—the (paper) notebook—as a paradigmatic example for mind-environment coupling. They suggest an *active externalism* where "… the human organism is linked with an external entity in a two-way interaction, creating a *coupled system* that can be seen as a cognitive system in its own right. All the components in the system play an active causal role, and they jointly govern behavior in the same sort of way cognition usually does" (p. 8).

Even with the availability of good methods and (external) tools for task planning and time management, without students taking sufficient agency the problems

such as starting a learning task too late, time allocation being too fragmented, and running out of time will persist. It is the learner who needs to take action, and a prerequisite for action is motivation. As blended learning is becoming part and parcel of secondary education, we also have to better understand the motivation to learn independently in young people. The kind of achievement motivation that has been intensively studied in the context of highly structured and closely monitored learning typical for the K-12 classroom does little in helping to understand long-term engagement with learning and knowledge. Additionally needed is a better understanding of motivational dispositions, of interest development, and of identity development. Regarding motivational dispositions, theories of achievement goal orientation have been providing profound insights regarding the motivational basis of learning. A general finding across a number of achievement goal theories is that students differ in their basic orientation: Many students see achievement situations as providing an arena for self-worth, validation, and self enhancement; some see them as opportunities for self-development and growth (Kaplan & Flum, 2010). By and large, the development orientation is more adaptive and leads to more and more satisfying learning. Kaplan and Flum (2010) identify a similar difference in students' orientation towards identity development: Those students who have more explicit goals regarding their self development tend to enjoy achievement situations more and more actively seek for situations in which they can develop themselves further. Combined with new insights into the relation between identity development and interest development (Renninger, 2009), a powerful foundation for understanding the motivational basis for self-guided long-term learning in young people is emerging.

It is this wider context of time research, further demarcated by important recent reviews (Barbera & Clarà, 2012; Duncheon & Tierney, 2013), that this volume wants to make a contribution to the assessment and evaluation of temporal factors in online teaching and learning.

This book is organised in two main sections: The first section includes chapters that contribute research-based conceptualizations of temporal factors that supply us with a deeper understanding of online teaching and learning, concepts such as time scaffolding, time regulation, online learner time, and time flexibility. The second section comprises the chapters that study time factors in specific teaching and learning activities and tools, such as online discussions and personal learning environments, and provides recommendations for analysis and design. This includes two contributions focusing on methods for capturing and analysing time data across the online learning and teaching process.

SECTION 1: FRAMING AND CONCEPTUALISATION OF TEMPORAL MATTERS

In the first section, "Framing and Conceptualisation of Temporal Matters," chapter 1, "Tracing Online Lecturer Orchestration of Multiple Roles and Scaffolds Over Time," by Bronwen Cowie and Elaine Khoo, understands time as a social construct and a resource in the teaching and learning process assisting practitioners to enhance their practice to develop more supportive learning environments. It provides the analysis of scaffolding material across time, reconceptualising time by breaking the linearity in online education. The chapter also shows how time can be employed as a resource through the orchestration of multiple lecturer roles: pedagogical, managerial, social, and technological.

"Time and the Working Online Learner" by Bill McNeill considers the techniques used in time use studies to build a holistic view of students' choices regarding the duration and timing of their everyday activities. Going beyond statistics, the chapter provides us with qualitative data and identifies the complexities of student time use. The author reframes a number of concepts related to recent research on time use for online learning, for instance the important notion of productive study.

The third chapter, "E-Learning, Mobility, and Time: A Psychological Framework," by Melody Terras and Judith Ramsay, explores in a comprehensive manner the individual psychological dimensions of time use and time experience and relates those to the opportunities afforded by mobile learning technologies. The authors identify eight psychological factors that influence successful mobile learning, amongst them time perception and time management and metacognitive skills.

Margarida Romero and Christophe Gentil's chapter on "Characterising Online Learners' Time Regulation: Comparative Case Studies of Virtual Campuses in France and Spain" focuses on online learners' time regulation patterns. The authors compare the implementation of two "virtual" campuses and derive guidelines for improving students' individual and collaborative time regulation, at the same time contributing to the theorisation of time factor framework in online education.

The fifth contribution, titled "Temporal Flexibility in Online University Courses in Spain and Australia," comes from Elena Barbera, Marc Clara, Patrick Danaher, and Henriette van Rensburg. It probes deeper into the concept of time flexibility, which is often taken for granted in online education but is also neglected because it is seen as intrinsic to this learning and teaching modality. The authors propose an analytic definition of time flexibility, consisting of seven time aspects, introduce scales for measuring these aspects, and report the outcome of a comparative study on two universities, one in Australia and one in Spain.

SECTION 2: SPECIFIC ONLINE SCENARIOS

Chapter 6, "Supporting Learning Self-Regulation through a PLE: Dealing with the Time Management Dimension," by Garcia, Gros, and Noguera, introduces the design and implementation of a multilevel tool for online education, taking the form of a personal learning environment. Their design is grounded in an analysis of concepts self-regulation and associated empirical research.

Katalin Kabat's chapter on "Fixed and Manipulated Temporal Frames: Procedural Analysis of Students' Perceptions of Electronic Time on the Discussion Board" helps lecturers to understand the temporal issues involved in online discussions. It also makes a methodological contribution in the form of a step-by-step scheme for assessing students' participation through a spatio-temporal analytical model.

Chapter 8, "Temporal Considerations in Analyzing and Designing Online Discussions in Education: Examining Duration, Sequence, Pace, and Salience" focuses on asynchronous discussions. Wise, Zhao, Hausknecht, and Chiu address benefits and challenges of prolonged engagement as a key element of online discussions. The authors relate time scales to types and rhythms of students' contributions, presenting analyses that also have implications for pedagogical design.

In chapter 9, "Micro-Analysis of Collaborative Processes that Facilitate Productive Online Discussions: Statistical Discourse Analyses in Three Studies," Chiu, Molenaar, Chen, Wise, and Fujita present a multilevel approach to statistical discourse analysis. The approach is illustrated by comparing three different empirical studies conducted by the authors. The chapter addresses some important problems with conventional multi-level analysis, and in its combination with temporal analysis provides a significant methodological innovation.

In the last chapter, "Capturing Learning over Time for Supporting Pedagogical Decision Making: A Process Modelling Approach," Reimann, Utz, Unterberger, and Halb suggest a systematic approach for automatically capturing data on students' learning over time and across applications. Their approach takes the form of modelling teaching and learning activities first, so that the analysis of log files is informed about the pedagogical meaning of students' activities. The approach is illustrated with an implementation that also suggests new ways of capturing Web browsing activities.

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