ENGAGED LEARNING WITH EMERGING TECHNOLOGIES

# Engaged Learning
# with Emerging Technologies

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# FOREWORD

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The theme of engaged learning with emerging technology is a timely and important one. This book proclaims the global relevance of the topic and sharpens its focus. I would like to open the book by sketching some of the historical context and dimensions of application, before the chapter authors provide the substance.

***Engagement with the world*** - To be human is to be engaged with other people in the world. Yet, there has been a dominant strain of thought, at least in the West, that directs attention primarily to the isolated individual as naked mind. From classical Greece to modern times, engagement in the daily activities of human existence has been denigrated. Plato (340 BC/1941) banished worldly engagement to a realm of shadows, removed from the bright light of ideas, and Descartes (1633/1999) even divorced our minds from our own bodies. It can be suggested that this is a particularly Western tendency, supportive of the emphasis on the individual agent in Christianity and capitalism. But the view of people as originally unengaged has spread around the globe to the point where it is now necessary everywhere to take steps to reinstate engagement through explicit efforts.

Perhaps the most systematic effort to rethink the nature of human being in terms of engagement in the world was Heidegger's (1927/1996). He argued that human existence takes place through our concern with other people and things that are meaningful to us. This analysis reversed many philosophic assumptions, including the priority of explicit knowledge. Our understanding of stated facts requires interpretation based on our previous and primary tacit understanding of our world and our concerns. Our active engagement in the world is a prerequisite for any learning.

Vygotsky's (1930/1978) socio-cultural psychology can be seen as an expansion of Heidegger's critique of Western assumptions. Not only is explicit theoretical knowledge reliant upon tacit practical knowledge, but individual learning is reliant upon collaborative learning. Vygotsky showed how most learning begins with interpersonal interactions and is only

secondarily internalized as individual knowledge. So it is our engagement with other people—whether in our family, tribe, classroom or workplace—that provides the primary context, motivation and source of new knowledge.

In the past several years, a number of theories have elaborated the perspectives of Heidegger and Vygotsky in ways that are particularly relevant to issues of engaged learning. Situated learning (Lave & Wenger, 1991) has stressed that learning is a matter of participating in communities of practice. Distributed cognition (Hutchins, 1996) has shown how engagement with artifacts can be central to learning. Activity theory (Engeström, Miettinen, & Punamäki, 1999) emphasizes engagement in a whole activity structure including tasks, people, artifacts and social structures. Group cognition (Stahl, in press) argues that knowledge is primarily built in the interactions of small groups.

Dewey (1949/1991) is a major source of the current discussion of engaged learning. Adapting the philosophic critique of individualism in Hegel (1807/1967) and Marx (1867/1976) to his pragmatist viewpoint, Dewey drew out the consequences for education. He opposed behaviorist and didactic training that emphasized drill and practice in favor of engaging students in inquiry into open-ended problem contexts. Fifty years after Dewey, we are still trying to introduce engaged learning into the classroom.

*Engagement with learning* - There are many dimensions to engagement with learning. As a number of the chapters will stress and illustrate, the nature of the problems that students are given is critical. If we want students to engage with a problem, it must be one that they "care about" in Heidegger's terms; it must involve issues that make sense to them within their interpretive perspectives on the world. In terms of Vygotsky's zone of proximal development, it should be a problem that challenges their current understanding but is within reach of their understanding, given some support by the people who are working on the problem with them. This may mean that they work collaboratively on a problem that they could not master on their own, or that adequate computer support is provided to guide them the way a mentor might.

Of course, not every problem can be in an interest area of every student. One student might have a passion for science, another for reading, drawing, sports or music. By having students work together on stimulating problems that have been designed and supported to optimize chances of successful knowledge building, educational activities can lead to increased interest and engagement with a new learning domain. Engagement with problems, people and domains can have a synergistic effect.

People are engaged in many communities simultaneously: family, neighborhood, religious, school, friendship, online, etc. These are primary contexts and motivators of engagement. People tend to learn the culture of their communities quickly and effortlessly. Communities of various sizes

and formats can be formed for purposes of engaged learning. In some cases students can be introduced to professional communities (e.g., NASA), in other cases mini-communities can be constructed that are based on the professional community but are more accessible to the students (e.g., model rocket clubs). Communities can be built online so that people with a particular interest can interact with others around the world. Groups can also be formed to create new engagements, such as classrooms in different countries corresponding with each other as a way of learning foreign languages. Engagement generally grows through involvement in such communities. Often, small groups form within larger communities so that participants can get to know each other better and establish a shared history. It is in the intense interactions within such small groups that knowledge is likely to be constructed and shared.

One should not think of engagement as an individual attribute. Communities are engaged with specific issues; that may well be why they originally formed and continue to persist. Small groups also engage in activities. The community or group engagement may not so much be motivated by the desires of their individual members as vice versa. Individual engagement is often a consequence of being involved in an engaged group. One is motivated by the group effort. If a researcher looks closely at the behavior of a group, what appears is not a clear causation in either direction between individual and group; they tend to constitute each other's engagement through subtle interactional moves.

Similarly, engagement is neither a purely intellectual, affective nor social phenomenon. Engagement may involve cognitive tasks and the manipulation of conceptual materials. But it is also a feeling that people have that they are participating in something that is important and interesting. Further, it is a social undertaking, done with, for or because of other people and groups. The impetus to do something, the options available and the methods for accomplishing it are likely to be defined by the culture of some community. What is learned, the motivation to learn it and its socially accepted value are intimately intertwined in ways specific to each case.

So engaged learning can involve engagement with problems, with a domain of knowledge, with communities and with small groups. It can be observed at the individual, small group and community unit of analysis. It appears as a blending of intellectual, affective and social relations.

*Engagement with technology* - These days, engagement with learning is likely to mean engagement with technology. This is because networked computers seem to offer open-ended possibilities for promoting and supporting engaged learning. They can connect geographically isolated and dispersed individuals into collaborative groups. They can provide scaffolding for learning without requiring the presence of a skilled mentor.

They can offer access to worldwide resources. They can incorporate computationally powerful tools.

Unfortunately, this tantalizing potential is not yet at hand. Commercially available media do not support engagement. They are largely designed based on the individual transmission model: they allow individuals to access facts and to transmit opinions. To go beyond this, we need to design technologies that can serve as mediators of person-to-person interaction that goes beyond superficial socializing and exchange of opinions to engagement in deep knowledge building (Scardamalia & Bereiter, 1996). But to do this, we need to understand computer-mediated collaborative learning interaction much better than we do now. It is a complicated process, sensitive to many factors and not predictable from any. It is easy to know what will prevent successful engaged learning, but hard to know how to foster it, particularly given today's technology. While computers are indeed computationally powerful, the technology for programming learning environments is frustratingly rigid. Educational innovators face a wicked problem in trying to realize the potential of emergent technologies.

The far-reaching goal set forth in this book, to design and promote technologies for engaged learning, requires a worldwide effort. Fortunately, the book simultaneously represents a global engagement with this task. The following chapters pursue the educational and technical potential from diverse international perspectives.

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# PREFACE

We live in exciting times where technology for education and learning has advanced not only in the technical arena, but in terms of the adoption of all kinds of technologies in everyday life and culture. Students, children, and adults alike seem to be more 'engaged' with devices such as handphones which are pervasive within more matured societies. However, in the adoption of such technologies, is 'learning' being advanced? The key question for us in this book is how learning, both in formal and informal setting, can be engaging or meaningful through the integral accomplishment of learning and educational technologies.

This book which is a series of chapters written by a renowned international collaborators attempts to address some of these issues. The timing of this book is also in tandem to a world-wide call for learner-centred or student-centred constructivist forms of learning, otherwise recognized as 'engaged learning' or 'meaningful learning'. Obviously, the assumption here is that engaged or meaningful learning occur through learner-centred constructivist approaches. We recognize that perhaps engaged learning can occur within the context of a very engaging sage-centred presenter where a captive audience is stimulated with many self-prompted questions arising from the speech. However, in this book, we limit our discussion to learner-centred approaches.

In the first chapter, David Jonassen and Johannes Strobel describe the modeling for meaningful learning. They argue that the goal of formal education should be meaningful learning and it is necessarily social, collaborative, intentional, authentic, and active. They also describe different components of individual models and collaborative mental models. The later part of the chapter focuses on how technologies can be used to support student construction of their own models and theories of how phenomena work.

Hung, Tan and Koh attempt to make sense of engaged learning in Chapter 2. They propose that approaches such as problem-based learning should be advocated because it is an authentic form of learning encouraging students to be self-regulated and thus metacognitive towards their own

thinking and behaviors. They describe the engaged learning framework focusing on both problem and process which would be necessary for authenticity in learning experience. In Chapter 3, Collis and Moonen present engaged learning and the contributing student. They state that learners can and do become engaged in learning through their own motivations, without the need for a teacher or instructional designer. They have differentiated between learning in school context and learning in workplace. The chapter consists of examples from both higher education and professional learning and illustrates how contributing model relates to engaged learning.

In Chapter 4, Oppermann and Specht examine the new approaches in situated e-learning which aim to overcome shortcomings of learning to use IT applications within working environments. They noted that the idea of situated e-learning is a continuous process of acquiring, applying, refining and exchanging of competence often taking place in communities.

Education in the knowledge age: engaging learners through knowledge building, chapter by Tan, Hung and Scardamalia focus on the classroom pedagogies which use a computer-supported collaborative learning technology to support the collaborative learning knowledge building community. The chapter includes examples of knowledge building classrooms in Canada and Singapore to illustrate how teachers can engage students as knowledge producers.

Hedberg and Metros, in their chapter, acquaints the reader with key concepts associated with leaner engagement by examining the user interface from cognitive, semiotic, psychological, artistic and pedagogical perspectives. The authors, by using a three-phase model as a foundation of creating engaging user interfaces, explore the cognitive and visual elements of effective interface design that engage learners through intuitive and direct interaction.

Allan Yuen, in Chapter 7, presents learning science through online threaded discourse anchored on the approach of knowledge building by Scardamalia and Bereiter. He reports that online discourse can broaden the basis for learning and teaching science and help in advancing knowledge in different ways. In Chapter 8, Geoff Romeo indicates that after more than two decades of computers in education in Australian schools there is still confusion at all levels about why the technology matters and widespread reluctance to move beyond the tokenistic use of computers in classrooms. To address the technology integration issues, the scenario planning technique is introduced. He argued that the scenario planning stages of establishing a focal point, identifying organizational mental models, and conducting an environmental scan can greatly assist schools in developing a shared vision, and can greatly assist in the development of realistic teaching methods.

Alan Pritchard considers that engagement with ideas and understanding is an essential for effective learning in the electronic age. In his chapter a model of the learning process which puts engagement at the

centre of the enterprise is presented and discussed in details. In Chapter 10, Lee emphasizes that creating ICT-enriched learner-centred environments requires a holistic approach that calls for changes at three levels – teacher, schooling environment and learning activities. She discusses the challenges in ICT use which include teachers encouraging students to become active participants; changing classroom dynamics; leadership in existence; and teacher having an individual sense of how they are able to successfully influence student learning. Some practical solutions are offered in her chapter.

Cybergogy for engaged learning: a framework for creating learner engagement through information and communication technology by Wang and Kang focus on issues related to online learning and engagement. They argue that there is a need to establish a framework for generating meaningful and engaging learning experiences for distance students with diverse cultural and linguistic backgrounds. The term "Cybergogy" as a descriptive label for the strategies for creating engaged learning online was introduced which has three overlapping/intersecting domains, namely, cognitive, emotive, and social in their chapter.

In the final chapter, Cathy Gunn describes the topic on engaging learners through continuous assessment. She begins with a brief overview of developments in online assessment practice over a ten year period, identifies further questions for educational research, and proposed a framework for integrating the use of online assessment into courses for maximum educational benefits. The chapter offers an evidence-based framework for successful implementation of online assessment which involves leaner engagement.

There has been astonishing technological development in recent decades. The issue at hand for educators is how to exploit the affordances of these technologies, using it as a mean to learn and make the learners engaged in meaningful way. We hope that this collection of works will give you international perspectives and some useful information on engaged learning with emerging technologies.

We would like to express our thanks to all the contributors for responding to our invitation to write about their work and sharing their experiences. We wish to thank the academic staff members of the Learning Sciences Technologies Academic Group and Learning Sciences Laboratory of the National Institute of Education, Nanyang Technological University including the Ministry of Education (Singapore) for the support of this book. Without the support of the contributors, members of the University and the Ministry, this book would not have been possible. This book is our joint achievement.

We acknowledge that many of the ideas discuss in this book arise from international collaborations and linkages of our colleagues without which we would not be able develop upon these concepts. The journey

towards engaging learners meaningfully in deep conceptual issues, metacognitive and reflective stances, knowledge building, and how designers of learning environments should situate and organize technological tools, activities, and other forms of social, emotional, and cognitive impetus remain a challenge and continuing dialogue. We wish for all readers to enter into this dialogue with us. We hope that this collection of chapters is a meaningful experience for you.

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