Preface

Advances in information, communication, and computer technologies are impacting on the educational system in multidimensional ways. They have started to redefine the way in which teaching and learning are being dispensed, with the result that curriculum and technology have started to merge so as to stretch the definition of literacy. Traditional metrics of literacy—numeracy (simple arithmetic) and language (reading, writing, listening and speaking)—are now being endowed with a technological dimension that cannot be overlooked.

The new age metrics for literacy leverages on a range of computer-related skills. These include, but are not limited to, word processing skills (in place of writing); e-mailing (in place of composing letters); information retrieval skills using the Internet (in place of going to the library to source for information); online collaboration skills (on top of working as part of a team in the real world); familiarity in using digital media such as computers, digital cameras, video cameras, mobile phones, and e-books; data analysis skills using a suite of software programs; Web site construction skills, including ability to creatively combine audio, video, data, multimedia, and text; creative PowerPoint presentation skills; ability to use spreadsheets and databases; and so on. New forms of literacy are also emerging as technologies evolve.

Other technologies have also started to impact on the educational system—for example, broadband technologies such as asymmetric digital subscriber line and hybrid fiber coaxial cable modem, and wireless technologies. Their nexus with literacy opens up more possibilities to maximize learning.

Reformatting the curricula along lines that promote acquisition of the aforementioned skills will be very helpful in endowing students with the necessary suite of literacy skill sets required to support the needs of the emerging knowledge-based economy, which some say is already here. There is evidence that learning in a wide range of technological settings provides rich conceptual experiences for students.

The ubiquity of the personal computer, the nature of the client-server architecture on the Internet, the low cost of logging onto the Internet, and the scope for simultaneous access are all factors that have helped to fuel the evolution of various genres of learning on the technological platform, and thus help to contribute towards the acquisition of literacy skills in technology.

Recognizing that the K-12 classroom is a strategic platform to entrench more firmly the various suites of literacy skill sets in technology among students, this handbook aims to provide an overview of the state-of-the-art developments in the field of literacy in technology at the K-12 setting and to address the needs of practitioners in this fast-developing field. The various chapters draw upon best practices from practitioners and researchers in the field, and provide a holistic perspective of issues of literacy in technology at the K-12 classroom.

The international flavor of this handbook can be seen from the fact that the 35 chapters accepted for publication represent the contributions of 51 authors from 37 institutions in nine countries: Australia, Canada, Cyprus, Hong Kong (China), Ireland, Israel, Italy, the UK, and the United States.

The 35 chapters in the handbook span a useful spectrum of topics in the field. For convenience, they are grouped under three broad sections. Though all chapters are distinctly different, inevitably there will be some
mirroring of content in the various sections and even between chapters. Herein, our approach has been that it is good for readers to get a diversity of perspectives from different experts as they are likely to approach issues from different angles and thus offer valuable insights from the lens of their experience.

The chapters in Section I present Perspectives on Technological Literacy from various experts. Such perspectives are useful in defining the directions that technological literacy is moving towards and how experts perceive its multifaceted dimensions and conceptual underpinnings. In the chapter “New Paradigm of Learning and Teaching in a Networked Environment: Implications for ICT Literacy,” Yin Cheong Cheng presents a model that aims to develop students’ contextualized multiple intelligence and their lifelong independent learning through a triplization process leveraging on individualization, localization, and globalization in both teaching and learning. The chapter “Technologies Challenging Literacy: Hypertext, Community Building, Reflection, and Critical Literacy,” by Agni Stylianou-Georgiou, Charalambos Vrasidas, Niki Christodoulou, Michalinos Zembylas, and Elena Landone, discusses how new genres of texts transform conceptualization of literacy development and present new challenges for reading and writing.

Jared V. Berrett presents a framework for understanding perspectives on technological literacy in his chapter “Technological Literacy, Perspectives, Standards, and Skills in the USA” and argues that technology educators have a role to play in preparing K-12 students to be technologically literate citizens. In the process of meeting the necessary standards of technological literacy, Leonard J. Waks, in his chapter “Globalization, At-Risk Students, and the Reconceptualization of Technological Literacy,” offers a revision of the concept of technological education that assigns important new roles for non-governmental organizations serving low-tier workers and that places hands-on use of networked computers at its core. Aidan Mulkeen, in her chapter “ICT in Schools: What is of Educational Value?”, argues that many uses of ICT have little educational value. The real value of ICT in schools lies in enabling more challenging learning activities that develop higher-order thinking skills among students, she says. In the chapter “Web-Based Technologies, Technology Literacy, and Learning,” Wan Ng illustrates how some Web-based technologies can be used to foster not only the desired suite of technology literacy skill sets, but also promote constructivist learning in the K-12 classroom.

The chapter “New Media Pathways: Navigating the Links between Home, School, and the Workplace,” by Helen Nixon, Stephen Atkinson, and Catherine Beavis, presents the viewpoint that school-based courses in new media are important because they increase student retention and the chance of success in post-school employment; in this context, the authors stress that school curriculum and pedagogy have much to learn from young people’s informal and leisure-based learning. Elizabeth A. Buchanan and Tomas A. Lipinski, in their chapter “Responsible Technologies and Literacy: Ethical and Legal Issues,” stress the proper use of technology in the classroom and provide recommendations for creating greater awareness of the ethical and legal implications surrounding technology use and copyright in particular. Cushla Kapitzke professes the viewpoint that unsympathetic social policies and the increased surveillance of physical environments have contributed to the uptake of virtual space and online chatrooms as a means of social contact and engagement by youths in her chapter “Internet Chatrooms: E-Space for Youth of the Risk Society.” It is clear that the potential of such avenues for promoting technological literacy cannot be overlooked.

Colin Baskin, in his chapter “Transforming the K-12 Classroom with ICTs: Recognizing and Engaging New Configurations of Student Learning,” raises questions as to where and how the discourses of literacy, education, and technology are converging in the ICT-enabled classroom, and urges that before the transformative values of ICTs in teaching and learning are discounted, a case can be made for a new definition of student learning that focuses on the demands of the new world environment.

With the pervasiveness of technology in the classroom, evaluating its impact is often fraught with challenges — in this context, the chapter “The Complexities of Measuring Technological Literacy” by Marcie J. Bober draws in part on the best of many standards systems and offers strategies for improving the operationalizing of technological literacy as a construct. In the chapter “Systemic Innovations and the Role of Change-Technology: Issues of Sustainability and Generalizability,” Chee-Kit Looi, Wei-Ying Lim, Thiam-Seng Koh, and Wei-Loong David Hung discuss the challenges that lie in the effective implementation of IT into the curriculum for meaningful student learning.
The series of chapters in Section II focus on Teaching and Learning with Technology; technology tools which afford immense scope for classroom use are explored here. In the chapter “Digital Video in the K-12 Classroom: A New Tool for Learning,” Christopher Essex describes how digital video can provide tangible, real-world benefits in learning, as it requires that students work actively and collaboratively in authentic real-world tasks. Ann E. Barron, J. Christine Harmes, and Katherine J. Kemker, in their chapter “Technology as a Classroom Tool: Learning with Laptop Computers,” call for the integration of laptop computers into the curriculum as it can create collaborative, student-centered learning environments that increase student and teacher technology literacy. Handheld computers can have a tremendous impact on teaching and learning given the right context — this is the subject of the chapter “Tapping into Digital Literacy: Handheld Computers in the K-12 Classroom” by Mark van ’t Hooft, who discusses how they can be integrated into the classroom. In the chapter “Digital Literacy and the Use of Wireless Portable Computers, Planners, and Cell Phones for K-12 Education,” Virginia E. Garland addresses the use of wireless technologies as instructional and managerial tools in the classroom, and suggests that they have the potential to shape the learning environment tremendously.

With the ubiquity of the personal computer and increasing access to a networked environment, Susan E. Gibson, in her chapter “Using WebQuests to Support the Development of Digital Literacy and Other Essential Skills at the K-12 Level,” suggests that WebQuests can promote constructivist learning when they are carefully designed to encourage student-directed learning, problem solving, higher-order thinking, perspective taking, and collaborative learning on authentic real-world tasks. David A. Huffaker introduces the use of blogs as an educational technology in the K-12 classroom in his chapter “Let Them Blog: Using Weblogs to Advance Literacy in the K-12 Classroom.” He argues that blogs can promote verbal, visual, and digital literacy skills through storytelling and collaboration. The potential of the Internet to foster technological literacy skills needs to go into higher gear — this is the thrust of the chapter “Information Problem-Solving Using the Internet” by Steven C. Mills, who describes how the vast resources of the Internet can supply communication tools and information resources that facilitate the application of a robust set of instructional methodologies in the classroom. In his chapter “How to Teach Using Today’s Technology: Matching the Teaching Strategy to the E-Learning Approach,” Moti Frank reviews the benefits and challenges of a number of approaches for integrating technology and teaching. A case study of how teachers integrate computer literacy into subject teaching is explored in the chapter by Allan Yuen and Patrick Wong entitled “Integrating Computer Literacy into Mathematics Instruction,” where the focus is on the Hong Kong experience.

One of the new tools that have impacted the educational space in very recent times is the Tablet PC — this is the subject of the chapter “Teaching and Learning with Tablet PCs”, drawing upon the experience of a school which introduced this tool to an entire cohort of students, the editors suggest that Tablet PCs are a utility tool for further enhancing the effectiveness of teaching and learning with technology. Lyn C. Howell, in her chapter “Using Technology to Create Children’s Books for Students by Students,” describes a project in which high school students used technology to create e-books for younger students. In her chapter “Electronic Portfolios and Education: A Different Way to Assess Academic Success,” Stephenie M. Hewett argues on the need to use e-portfolios as another tool for assessment, especially as technology is rather pervasive in teaching and learning.

Section III focuses on Issues Related to Teacher Education and School-Based Matters. The success of technology literacy initiatives at the K-12 level depends very much on the extent to which teachers are technology enabled to infuse the desired suite of attributes among their students, as well as how the school administration prioritizes these concerns in their scheme of things. Karen Cadiero-Kaplan focuses on the pedagogy necessary in critically considering technology development for K-12 teachers and their students in her chapter “Teachers and Technology: Engaging Pedagogy and Practice,” and outlines techniques and strategies that have been implemented successfully in building capacity among new and experienced teachers when using technology for lesson planning, teaching enhancement, and portfolio development. Kristina Love, in her chapter “Literacy in K-12 Teacher Education: The Case Study of a Multimedia Resource,” identifies three areas faced by teachers in dealing with the complex forms of literacy that are
increasingly required for success across the K-12 curriculum in Australia, and describes a video-based interactive CD-ROM that has been developed to address teacher concerns in these areas.

Paul Adams introduces constructivism as a pedagogical context from which educational professionals can analyze new technology exploiting learning-teaching interactions in his chapter “Demystifying Constructivism: The Role for the Teacher in New Technology Exploiting Learning Situations.” Kendall Hartley describes the reality of K-12 classroom practice and of how this compares to common tenets in the field of instructional design in her chapter “K-12 Educators as Instructional Designers.” She suggests how changes in teacher preparation and access to the appropriate tools could facilitate increase in student achievement. Tamara L. Jetton and Cathy Soenksen, in their chapter “Creating a Virtual Literacy Community between High School and University Students,” describe a project in which a university professor and a high school English language teacher redesigned the curricula of a class so that their students could participate in a literacy project that focused on computer-mediated discussions of literature, in the process creating a virtual literacy community in which high school and university students incorporated traditional literacies of reading and writing within a virtual environment that facilitated communication, collaboration, and learning with text.

In the chapter “Online Learning Communities: Enhancing Learning in the K-12 Setting” by Chris Brook and Ron Oliver, a design framework intended to support and guide teachers in advancing K-12 literacy through collaborative learning and development of online learning communities is discussed. In the chapter “Knowledge Management, Communities of Practice, and the Role of Technology: Lessons Learned from the Past and Implications for the Future,” Leo Tan Wee Hin, Thaim-Seng Koh, and Wei-Loong David Hung discuss the role of technologies and the issues of literacy in technology from the context of communities of practice and knowledge management. They draw implications on how teachers and students can be a community of learners-practitioners through technologies which support their work and learning processes. Christopher O’Mahony uses an Australian example to look at the decisions and dilemmas facing schools in developing their own virtual learning and managed learning environments in his chapter “The Emerging Use of E-Learning Environments in K-12 Education: Implications for School Decision Makers.”

An exploratory study undertaken in Cyprus schools that examines the status of using ICT from the perspective of socio-technical systems is afforded in the chapter “A Socio-Technical Analysis of Factors Affecting the Integration of ICT in Primary and Secondary Education” by Charoula Angeli and Nicos Valanides. Kate Mastruserio Reynolds, Ingrid Schaller, and Dale O. Gable conclude the handbook with their chapter “Teaching English as a Second Language with Technology: Making Appropriate Pedagogical Choices,” in which they outline the various constraints and challenges faced by K 12 teachers in attempting to include technology in the classroom and suggest a variety of ways to integrate technology into the K-12 classroom.

With the 35 chapters supporting this handbook, we trust that it would be a useful resource book and reference text for teachers, teacher educators, educational policy makers, and other practitioners.

Leo Tan Wee Hin and R. Subramaniam
National Institute of Education, Singapore