Preface

INTRODUCTION

Education and technology shaped primitive societies. When humans were hunters and gathers, they had to ensure that their skills, experience, and knowledge were passed onto the younger generations (normally their sons and daughters) so that they could survive and thrive. Education took the form of elders trying to initiate change in the younger generations. Indeed, that signifies the beginning of how education is defined in our society. Education has never been separated from technology. In the Stone Age, humans began to use stones or bones from certain animals to make tools for hunting. Humans developed rudimentary means to make fires to cook their meals. The connection between education and technology has existed since primitive times. The more education humans receive, the more sophisticated the technology becomes. Likewise, the more sophisticated the technology, the more education is driven to be more complex.

Human societies have been changing from the Stone Age to modern civilization (from primitive society, to the dark ages, to a long agrarian society, to industrialization, and finally to the post-industrialized society we currently live in). These changes have taken several thousand years. Early formal education took the form of training scribes to copy documents from other documents in Egypt. Technology took the form of Egyptians having invented their picture-writing system called hieroglyphics. Although labeled as formal education, this kind of training could not meet the requirements of industrialization where a large pool of trained workers was needed. At the beginning of industrialization, the power loom, the locomotive, the sewing machine, and the telegraph were invented. The railroad system was developed. All these technologies put a strain on formal education, which was described as manual training at the time.

For thousands of years, students, including adult students, have been educated and trained according to the levels of technological developments in their societies. When did we get rid of the chalkboard in our classroom settings? Even to this day, although computers have become ubiquitous in our classrooms, the chalkboard is still being used to complement and supplement the use of computers. This is not to say that the chalkboard will never become obsolete. Someday, it may be replaced by a new technology, such as Smart Boards, which educators currently use to teach, for example, the formulae in Math, Physics, or Chemistry. With educational and technological developments over time, there came into being the great educators who have shaped the thinking of generations. From Aristotle, Plato, Confucius, Comenius, and Pestalozzi to Dewey and Knowles, these great educators have prescribed teaching methodologies that have helped make a difference in the education of the next generations. Aristotle’s sayings about education have been interpreted in different languages. In Chinese, it is understood as educators being able to teach or sharing a cup of water out of a bucket only if they have a full bucket of knowledge, experience, and skills. Comenius is considered as the father of pedagogy; he believed that children should learn “from
things to words,” what we now call experiential learning. Pestalozzi is considered the father of manual training, and Dewey popularized a problem-solving approach to education and “learn by doing,” which is also the foundation of experiential learning, and was actually advanced 2,000 years ago by Confucius.

Most of these methods of education have focused on pedagogy instead of andragogy; andragogy has brought a revolution to education and training. This revolution was initiated by Malcolm Knowles, now considered to be the father of adult education. In this post-industrialization society characterized by the fast pace of change, it is no longer appropriate to emphasize the verb “teach” even in our elementary schools where children are capable of multi-tasking. Many children teach themselves to use a new technology such as the iPad intuitively. Self-directed learning as a learning skill or style is possessed not only by adults, but also by children. Times have changed and our students have changed the way they acquire knowledge, skills, and experience. Educators and parents alike must be concerned with how students can be “educated” in this changing technological society. If it is not appropriate to use the verb “educate,” then what would be the new term to replace it? Or, we can ask ourselves if the verb “educate” is broad enough to describe current methods of helping students learn. Some scholars suggest “facilitate” as a replacement word, but this falls short of describing helping students to learn technical and practical skills in, for example, the trades and technologies.

One conspicuous change in our changing society is that education in the 21st century is often delivered electronically. College courses are being delivered through computer screens to bring a convenience and flexibility unimagined 30 or 40 years ago. E-learning powered by technology has permeated our elementary schools, middle schools, and high schools. Education without the proper use of technology in the new century would be unthinkable; yet in some societies, schools ban laptops. A famous U.S. journalist, Alvin Toffler (1980), once said, “You think you know the situation, but the situation you know has changed.” What is conveyed in this message reinforces that change is the constant in our society. Above all, education and technology provide the primary foundation for our changing society. A Chinese proverb indicates, “If you want one year of prosperity, grow grain; if you want ten years of prosperity, grow trees; if you want one hundred years of prosperity, grow people (education).” Indeed, education is for the long-term development of our changing society, and technology serves to complement and supplement education.

Educators and scholars enjoy labeling themselves as “K-12 educators,” “human resource development instructors,” “adult educators,” or “Kings or Queens” of the use of technology in the new century. However, learners, regardless of their age differences, acquire knowledge, skills, and attitudes through the same senses. The differences lie in the context in which adults learn, the context in which pre-adults learn, and the amount of experience they bring to the learning context. Technology used to be sophisticated and difficult to operate. Now, as humans receive more education and as technology has become simplified and user-friendly, it has become much easier to use technology. Ten years ago, Web developers had to use computer languages to launch Websites; now, a fifth-grader can create a Website by using Word Press in 20 minutes. Then, is it appropriate to use the term K-20 education, or even K-70 education, to describe our roles as educators in the field of education and technology? The mission of this definitive book is to have all leading authors with a diverse educational and technological background address pertinent perennial issues and concerns involving education and technology in our changing society. Too many books have focused narrowly on certain segments of education and technology. Thus far, we cannot find a handbook that addresses in depth and with breadth the issues and concerns that help push forward our society. Now, this handbook has become a reality.
OBJECTIVE OF THE HANDBOOK

The Handbook of Research on Education and Technology in a Changing Society features full-length chapters authored by leading experts offering an in-depth description of concepts related to different areas, issues, and trends in education and technology at all levels in this changing society. Additionally, this volume provides a compendium of terms, definitions, and explanations of concepts, processes, and acronyms.

ORGANIZATION AND IMPACT OF THE HANDBOOK

As the name The Handbook of Research on Education and Technology in a Changing Society implies, this rich volume features 90 cutting-edge, full-length chapters by frontline faculty, scholars, and researchers from 20 countries. While many chapters provide an in-depth examination of a combination of Education and Technology in a Changing Society, other chapters deal with Education alone. Still other chapters delve into Technology alone. As the contributing authors were completing their chapters, they were reminded to satisfy the mission of this definitive book, that is, to have all leading authors with a diverse educational and technological background address pertinent perennial issues and concerns involving education and technology in our changing society. During the blind review and editing process, constructive feedback was provided. Successful contributing authors exceeded the criteria and expectations set for this groundbreaking volume. All the chapters point to three areas for our readers:

- Education.
- Technology.
- Education and Technology in a Changing Society.

Issues and concerns related to education parallel humanity from the Stone Age to modern civilization. First of all, education is defined as a process whereby the teachings of an educator or of an external change agent influence the learning of individuals and groups that learners may grow in the educator's expected mode or direction. The emphasis is placed on the educator or the external change agent. The learner is led and may assume a submissive role of following the educator. The educator and the learner in different times may carry different names. For instance, during the Industrial Revolution, the educator was called “the master craftsman” and the learner was called the “journeyman.” The father of Adult Education, Malcolm Knowles, considered Carl Rogers his “mentor.” In our contemporary society, mentor is still used to refer to the educator, and mentee is used to refer to the learner. However, the relationship between the mentor and the mentee indicates either a directing relationship or a helping relationship, depending on who defines the term, mentor or mentee. During different times in human history, researchers and scholars have been addressing these issues and concerns related to Education and Technology in a Changing Society. As times change, these issues and concerns may remain the same. For example, Education in Asian countries has a rather different meaning than Education as defined by their North American or European counterparts. For thousands of years, Education in Asian countries, especially Confucius heritage countries has meant two things:

1. Educators teach books by analyzing textbooks in great detail to students of all ages;
2. Educators serve as role models to elevate the learners' moral levels.
Specifically, Confucius teaches educators to refrain from four things: arbitrariness of opinion, dogmatism, obstinacy, and egotism. Confucian teachings are recorded in the Four Books: *Daxue* (The Great Learning) (Confucius 500BCE), *Lunyu* (The Analects) (Confucius 500BCE), *Zhongyong* (The Way of the Mean) (Confucius 500BCE), and *Mengzi* (The Mencius) (Mencius 500BCE). If we convert Confucian philosophy into contemporary classrooms in the aforementioned countries, the teachers can be best understood as using “pedagogy,” the art and science of teaching children as defined by Malcolm Knowles. What pedagogy means to these Asian educators is that educators are considered the authority figures who represent knowledge, wisdom, skill sets, and attitudes (morals) as desired by their learners. It is not surprising to hear Asian learners say, “once you are my teacher (or for just one day), you are my lifetime father and mother (academic sense, of course).” The amount of respect expressed by this saying is seen as unusual by today’s North American and European educators. This is not to say that North Americans or Europeans frown upon the educational model as practiced by their Asian counterparts. North Americans and Europeans, as well as educators from other continents, have practiced “pedagogy” before. In other words, Education in these continents other than Asia was treated as the art and science of teaching children. It was not until the term “andragogy” was coined in 1833 in Germany by a grammar school teacher, Alexander Kapp, that educators began to question the concept of pedagogy. In the early 1920s, American educator Eduard Lindeman (1926) began to describe Education in a rather different fashion: “In an adult education class, it is hard to tell who is doing the teaching and who is doing the learning; the teacher may be an expert in one subject only; the learners may be experts in other fields.” Lindeman advanced a truly democratic form of Education. Lindeman explained the term andragogy as defined by Knowles as the art and science of helping adults learn. In our contemporary society, pedagogy and andragogy are no longer considered as a dichotomy, but rather as a continuum. Knowles (1980, p. 59) himself even conceded by saying, “I don’t believe andragogy is good and pedagogy is bad.” His implication was there are times it is appropriate to practice pedagogy and also it is appropriate to practice andragogy even when it comes to teaching children. In contemporary Australia, scholars have coined a new term “Heutagogy” to indicate the continuum from pedagogy to andragogy. As we teach in our schools of all levels, it is not surprising that both our educators and learners do not know who is the father of pedagogy, who is the father of adult education, and who is the father of manual training. Or some may say, John Dewey is the father of pedagogy. Others may say Jack Mezirow is the father of Transformative Learning. In fact, Dewey is not the father of pedagogy. He popularized “learn by doing.” Dewey might have borrowed such an idea from China where he lectured in Beijing between 1919 and 1921. Likewise, Mezirow popularized Transformative learning by publishing his definitive works in this area. However, Confucius, 2,000 years ago, already advanced Transformative Learning as “rectification of the mind” via “Silent Reflection” (called “critical reflection” by Mezirow). There are a variety of ways of understanding the different approaches to education and the roles of teacher and learner within those approaches. Although our educators and learners may not be able to use the political language, they do know that in our changing society, regardless of which continent they are from, educators basically practice pedagogy or andragogy or a combination of these two strikingly different schools of thought to influence change in learners in primarily three areas: psychomotor, cognitive, and affective domains as described in Bloom’s (1956) Taxonomy of Learning Domains.

What has Technology done to Education? Technology has assisted Education from the Stone Age to modern civilization. The primitive men and women used some form of rudimentary technology to build fires to cook their meals. The ancient Chinese invented four things via some higher form of technology: paper, printing, gunpowder, and the compass, and these four inventions have served as the foundations of modern nations from the agrarian age to the modern information age where our educators deliver
education electronically via contemporary technology such as the ubiquitous computer and the omnipotent Internet. It is through Technology that human beings were able to say goodbye to the agrarian society and move to the Industrial society where machines replaced “manual labor.” During the Industrial Revolution, such inventions as the locomotive, the power loom, the telegraph, and the sewing machine were advanced. The railroad system was also developed. Technology during the Industrial Revolution put a strain on the former educational methods simply because a large pool of workers needed to be trained in the shortest possible time. The former “apprenticeship” was sometimes discarded in bigger manufacturing factories. As we review the use of Technology associated with Education from the long past, we cannot help but conclude that Technology can only serve to supplement and complement human work. Technology changes the way Education is delivered. Technology by no means can replace human beings simply because human beings make inventions via the use of Technology. Even contemporary Distance Education started with the assistance of Technology. About 150 years ago, Distance Education started with correspondence education. In some countries, educators still rely on this form of education to a certain extent. Nowadays, as discussed by some of our contributing authors, the buzz term is MOOC, which means Massive Open Online Course, aimed at unlimited participation and open access via the Web (especially Web 2.0 technologies). Giant online universities have recruited a large number of learners via the use of cutting-edge technologies.

Indeed, Education and Technology are like Siamese twins who cannot be separated. Once separated, either Education or Technology may die. Despite this inseparable relationship, our readers may wonder what may be the impact of this groundbreaking volume, trying to make an attempt to analyze the relationship between Education and Technology in a Changing Society? As we ponder such sayings as “we live in this global village where funds cross the borders within 24 hours; we have a global shopping mall; we live in such a small world; humans reproduce via cloning; test-tube twins were successful for a 64-year-old Chinese hospital president….” Professor Kathleen P. King (2006) has also popularized such sayings:

- The working mother in rural Nebraska completing her bachelor’s degree online through her local state university while her children sleep at night.
- The single young man in New York City studying for the GED exam via public television and telephone tutoring.
- The mid-career business woman executive pursuing her doctorate in education via a hybrid online and residency program in order to change careers.
- The retired bus driver engaged in a collaborative Webinar for his class through a University of Beijing class on the Eastern perspective of global issues.

As mentioned earlier, this volume was written by leading authors with a diverse academic background. These authors approached the cutting-edge chapters from their unique research backgrounds. The rich volume may serve as a premier resource for teaching and learning for both educators and learners at all levels. Although it is not the goal of this research-based book to change the fundamental practice of educators and the fundamental mode of learning on the part of our learners, it is guaranteed that reading this volume will be an eye-opening experience. Many readers’ popular practices on Education and Technology will be reinforced and others may be revised after reflection on the chapters in this volume.

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REFERENCES


