Preface

Looking outside through the window, one can see the typical scenery of a beautiful New England autumn: green leaves are changing into gold ones, a warm breeze is kissing the grassland, and bright sunshine is dancing around the rich fruits on the apple trees. As the editing process of the *Encyclopedia of Cyber Behavior* is almost complete, I am particularly pleased to write the preface, focusing on three topics: the concept of cyber behavior, the encyclopedia of cyber behavior, and the science of cyber behavior.

1. CYBER BEHAVIOR

What is cyber behavior? This is usually one of the first questions that people would ask. While it can be defined in various different ways, the simplest and broadest definition could be that cyber behavior is human behavior in cyber space. Based on this definition, cyber behavior is simply a hybrid of two entities: cyber space and human behavior. Based on this definition, any physical, social, or mental activities that humans engage in connecting to and interacting with the Internet could be broadly considered cyber behavior, as long as it directly concerns human beings and it is objectively observed in cyber space.

There exists a wide variety of types of cyber behavior, such as e-learning, e-voting, e-shopping, e-pornography, and e-therapy. These various types of cyber behavior have been repeatedly observed in a wide variety of sectors of cyber space, such as cyber education, cyber government, cyber commerce, cyber law, and cyber medicine. There also exists a wide variety of aspects of cyber behavior, including cognitive (e.g., cyber reasoning and cyber decision making), social (e.g., cyber security and cyber social capital), emotional (e.g., cyber attitude and cyber beliefs), and physical (e.g., Internet addiction and computer vision syndrome). In addition, a wide variety of contributing factors (e.g., gender and personality), resulting effects (e.g., the disinhibition effect and the time replacement effect), and underlying processes (e.g., the dual process mechanism and the cognitive workload process) that are related to cyber behavior have been widely reported.

In a sense, human behavior can be roughly divided into two types that exist separately but are seamlessly interrelated: real-world behavior that is mainly observed in the real world, and cyber behavior that is observed mainly in cyber space. Real-world behavior has been observed continuously since the first day of human history. In contrast, cyber behavior emerged only a few decades ago after the Internet was invented and widely used. Despite the relatively young age of cyber behavior, it seems that nobody would now question the independent existence of cyber behavior in modern society. In fact, many researchers would agree that cyber behavior is a new and unique human phenomenon that is ubiquitous, complex, dynamic, and important. With the still rapid development of Internet technologies and the even much wider use of the Internet in society, many new types of cyber behavior will emerge in the decades to come.

2. ENCYCLOPEDIA OF CYBER BEHAVIOR

Encyclopedias can be general, containing articles on topics in every field (e.g., *Encyclopædia Britannica* and *Brockhaus Enzyklopädie*), or specific, covering a wide variety of topics but from a particular cultural, ethnic, or national perspective (e.g., *Great Soviet Encyclopedia*, *Encyclopaedia Judaica*, *Medical Encyclopaedia*). While works included in an encyclopedia vary in the breadth of content and the depth of presentation depending on the target audience, an encyclopedia generally is a strong indication of existence of substantial important knowledge that has been accumulated over time in a general or specific subject domain.

The *Encyclopedia of Cyber Behavior* is intended to offer the first, definitive, and most comprehensive presentation of existing substantial knowledge concerning cyber behavior. It is hoped that students, researchers, teachers, managers, and policy makers would first think of this encyclopedia if they have a question regarding cyber behavior. The study of cyber behavior is essentially a multi-sector, multi-disciplinary field of research. In the past 30 years, extensive scientific knowledge has rapidly accumulated to reveal various types of cyber behaviors in a wide variety of sectors of cyber space. However, the existing knowledge has been scattered around a wide variety of disciplines such as psychology, sociology, communications, information science, medicine, law, business, economics, and political science. Thus, this encyclopedia aims to synthesize the existing knowledge of cyber behavior, examined in a wide variety of disciplines, into one single platform.

Currently, there exist various encyclopedias on either behavioral sciences (e.g., the *International Encyclopedia of Social and Behavioral Sciences* by Elsevier, *The Corsini Encyclopedia of Psychology and Behavioral Science* by Wiley, or Internet encyclopedias (e.g., *Encyclopedia of Internet Technologies and Applications* by IGI Global, *The Internet Encyclopedia* by Wiley). However, there is no encyclopedia focusing on cyber behavior. The closest competing publication is the *Oxford Handbook of Internet Psychology*, published by Oxford University Press in 2007. It is undoubtedly an important handbook prepared by a group of distinguished scholars. However, this handbook focuses exclusively on psychology rather than multiple disciplines in the behavioral sciences. It mainly *employs* a social psychology framework to organize its five sections (i.e., interaction and interactivity; groups and communities; personality, self, and identity; psychological aspects of Internet use; and Internet-based research). As a result, it covers a relatively small portion of cyber behavior that is ubiquitous, complex, dynamic, and important. Thus, to further earlier efforts in synthesizing and disseminating knowledge, the *Encyclopedia of Cyber Behavior* collects more than 100 chapters by more than 200 scholars across the world, with a total of 650,000 words, to cover the breadth and depth of all substantial knowledge concerning cyber behavior

Given the multi-component, multi-sector, and multi-discipline nature of cyber behavior, the encyclopedia uses a diamond-shaped hierarchical structure to organize and present its content. Specifically, there are 10 sections in the encyclopedia, with approximately 10 chapters within each section. It starts with one section on various general overarching issues of cyber behavior. It then uses three sections together to cover three key components of cyber behavior (i.e., cyber technologies, cyber populations, and cyber interactions) and then continues with five sections on five major sectors of cyber space (i.e., cyber law, cyber business, cyber health, cyber government, and cyber education). It ends with one section on diversity of cyber behavior across different countries. Various disciplines (e.g., behavioral sciences, history of science, technology, sociology, psychology, communications, politics, law, criminology, business, health, and education) are mapped out onto different sections of chapters to reflect the multi-disciplinary nature of the field.

To synthesize the past, showcase the present, foresee the future, and maximize educational values to prospective readers, each chapter of the encyclopedia typically includes the following eight key elements: (1) An abstract of approximately 100-150 words to provide readers with a summary of a topic, (2) A definition to provide readers with a relatively clear idea to start with studying a topic, (3) A brief overview on the intellectual history and current knowledge status by identifying 2-3 pioneering researchers and 3-5 lead researchers, (4) A detailed review of these researchers synthesizing the current scientific knowledge, (5) A list of future research directions, (6) A complete list of references, (7) A short list of additional readings authors would highly recommend for graduate or undergraduate students, and finally, (8) A short list of key terms for readers to search the literature in electronic databases.

It took approximately 15 months to complete the encyclopedia. After a letter of intent and then a full proposal were submitted to the publisher, a final contact was sign in June of 2010. The entire encyclopedia was submitted to the publisher before the deadline of September 30, 2111, after selecting prospective authors, sending out initial and formal invitations, receiving and reviewing proposals, receiving and reviewing chapters, and receiving copyright agreements. During this process, approximately 2000 scholars were initially contacted, and approximately 200 authors from approximately 30 countries and regions have contributed their important works. This reflects the true international scope of authors and the true worldwide efforts in studying cyber behavior.

This encyclopedia is intended to appeal to two large groups of prospective readers across the world: (1) libraries that collect core literature on cyber behavior, including public, academic, governmental, private, corporate, and special libraries; and (2) individuals who are interested in cyber behavior, including graduate and undergraduate students, professors, researchers, Internet product designers, business managers, policy makers, and parents.

3. THE SCIENCE OF CYBER BEHAVIOR

Science is generally considered as a systematic enterprise that advances empirical, theoretical, and practical knowledge to describe, explain, and predict natural, social, mental, and artifactual phenomena in order to improve the life of human beings. It has evolved from ancient science to classic, modern, and contemporary science. There exist a wide variety of specialized scientific fields that are either well established for hundreds of years (e.g., physics, mathematics, and philosophy) or else merged over several decades (e.g., computer science, materials science, and neuroscience).

The science of cyber behavior is a field of research that examines cyber behavior. It has a history of approximately 30 years since Sherry Turkle published her seminal book entitled *Second Self*. Over the last 30 years it has changed from an emerging field into an emerged field, and in the future will certainly become an established field.

Sherry Turkle's "*Second Self: Computers and the Human Spirit*," published in 1984, can be considered the formal starting point of the science of cyber behavior. This is because her work is the earliest and most influential in examining the "subjective side" of people's relationships with technologies, especially computers and Internet. It is analogous to Bill Gates in the earlier 1970s as one of the earliest and most influential individuals who saw the importance of the software side of computer industry when the hardware side was just booming. With rapid and wide applications of Internet technologies in almost every aspect of the modern society, due to the works by pioneering scholars in the emerging field of cyber behavior, including Turkle's multiple books on cyber behavior (e.g., *The Second Self*, 1984;

Life on the Screen, 1995; *Alone Together*, 2011), now we can more clearly see both the technology side and human side of the Internet technology and more easily understand the importance of cyber behavior research in studying human behavior in cyber space.

Since 1984, this field of research has developed its fundamental knowledge base, formed a critical mass of researchers, and began to generate broad social impacts. It has become an emerged field of research and currently is at the stage of rapid growth. The publication of the *Encyclopedia of Cyber Behavior* is strong evidence of the current status of development of the field as an emerged one.

Fundamental Knowledge Base

Extensive research has documented that human behaviors in cyber space (1) involve a wide variety of specific Internet software applications, including email, websites, text messaging, chat rooms, social network sites, smart phones, Twitter, and games; (2) includes different types of cyber behavior, such as emailing, Web browsing, instant messaging, texting, e-publishing, e-navigating, e-searching, e-gaming, e-learning, e-shopping, e-dating, e-therapy, e-reading, e-communicating, e-dating, online file sharing, and cyber bullying; (3) is subject to various factors that influence cyber behavior, including personality, age, technology literacy, education, social and economic status, attitude, culture, social structure, technology infrastructure, or legal systems; and (4) has various positive and negative consequences on physical, cognitive, social, and emotional aspects of Internet users, both online in the cyber world and offline in the real world.

At present, there are at 30 journals that exclusively or frequently publish studies on cyber behavior with an annual publication of approximately 1,000 articles. These scientific publication outlets include well-established ones, such as *Computers in Human Behavior*, *Cyber Psychology & Behavior* (now *Cyberpsychology, Behavior, and Social Networking), Social Science Computer Review*, *Journal of Educational Computing Research*, *Journal of Medical Internet Research*, *Journal of the American Society for Information Science and Technology*, *International Journal of Human-Computer Studies*, *Journal of Computer-Mediated Communication*, *Journal of Social Issues*, *American Behavioral Scientist*, and *Journal of Applied Developmental Psychology*. Some recently launched journals that have already made an impact include *Policy and Internet*, *International Journal of Cyber Criminology*, *International Journal of CyberBehavior*, *Psychology and Learning*, *International Journal of Internet Science*, *Journal of Online Behavior*, *New Media & Society*, and *Telematics and Informatics*.

Critical Mass of Researchers

In the past 30 years, hundreds of researchers in various fields of study across the world have contributed to the science of human behaviors in cyber space. Highly productive research groups across the world led by prominent leading experts include: PEW Research Center's Internet & American Life Project Led by Lee Rainie at PEW, the *HomeNet* group led by Robert Kraut and Sara Kiesler at Carnegie Melon, Berkman Center for Internet & Society led by Charles Nesson and other co-directors at Harvard, NetLab led by Barry Wellman at Toronto, The Crimes against Children Research Center led by David Finkelhor at University of New Hampshire, The Center for Mobile Communication Studies led by James Katz at Rutgers, The multimedia learning research group led by Richard Mayer at UCSB, The Oxford Internet Institute led by William Dutton and Helen Margetts at Oxford, The Children's Digital Multimedia Center

led by Patricia Greenfield and Kaveri Subrahmanyam at UCLA, The Center for research on Children, Adolescents and the Media led by Patti Valkenburg at the University of Amsterdam, EU Kids Online led by Sonia Livingstone at London School of Economics and Political Science, The World Internet Project led by Jeffrey Cole at USC, The research group of HomeNetToo led by Linda Jackson at Michigan State, just to name a few.

Intellectual and Social Impacts

The science of cyber behavior has produced profound and broad intellectual and social impacts and implications for various areas such as psychological effects, digital divides between ethnic and social groups, e-learning, Internet safety, Internet crimes, e-health, e-government, e-commerce, and Internet research methodology. Besides Turtle's significant works discussed above, good examples include: (1) the series of research reports produced and disseminated by PEW Research Center's Internet & American Life Project. This series is so influential across the world that it has now become an intellectual "compass" pointing the future trends of the social impact of the Internet, and (2) The most cited journal article regarding cyber behavior by Kraut, Patterson, Lundmark, Kiesler, Mukophadhyay, & Scherlis, entitled *Internet paradox: A social technology that reduces social involvement and psychological well-being?*. Since their seminal article was published in 1998, at one time point, nearly 50% of the journal articles regarding cyber behavior was devoted to the issue of impacts of Internet on psychological wellbeing.

Looking forward on the future of the field, the science of cyber behavior as an emerged field of research is very likely to have an exponential growth in the next decades due to both continued rapid development of Internet technologies and the unprecedentedly pervasive and profound influence of the Internet on human beings. To make this emerged field become an established one, the following efforts should be made.

At the macro level, (1) as Thomas Kuhn in his book *The Structure of Scientific Revolutions* points out, textbooks are particularly important for developing a new field via the route to normal science. Thus, textbooks targeting undergraduate and graduate students should soon be written and published. Along the same line, new faculty positions should be created and new courses should be offered. This way, future leaders and productive researchers will be appropriately trained to sustain the continuing advance of the field; (2) Timely and sufficient funding opportunities should be provided to support more significant and innovative research projects on cyber behavior research. Recently, NSF launched a new initiative focusing on cyberlearning as a way to transforming education. Hopefully this encouraging sign will be followed by various findings from federal, state, local, and private agencies; (3) New journals, such as *Annual Review of Psychology* and *Annual Review of Sociology*, should be launched to systematically synthesize and review journal articles in different disciplines. At the micro level, (1) research directions should move mainly from descriptive studies such as Internet access, Internet use, use prevalence, and online attitudes to more explanatory ones such as Internet effects, contributing factors, underlying mechanisms; (2) Research paradigms should move from either positive or negative views of Internet effects to more complex and dynamic models to truly understand the richness of cyber behavior; (3) Research methodology should move from offline-based survey methodology to more online-based experiment methodology.

While completing this large-scale project, I would like to end the preface with special acknowledgement to individuals who have made significant contributions to a successful completion of the project within 15 months.

I would like first to thank Dr. Xiufeng Liu, Dr. Jon Hobbs, and Dr. Kurt Fischer for their counsels and supports during the initial period of developing the idea of editing the encyclopedia.

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Finally, this has been an unusually humbling and unusually rewarding experience for me to edit the encyclopedia. Among about 200 authors are five Japanese scholars who literally completed their chapters during the period of the latest devastating earthquake in Japan, four scholars who just had major medical treatment, three authors who gave the birth to babies just before the submission deadline, and two Greek authors who completed their work when their university were totally shut down by demonstrating students. I have edited a few projects before, but I have never moved so deeply by all the contributing authors for their professionalism and have never learned so much from all the contributing authors about richness and complexity of cyber behavior. Without each and every of them, especially given many of them as prominent scholars in the field with particularly tight schedules and multiple responsibilities, this large-scale project would have simply been impossible to complete. For them, as well as for my friends, colleagues, mentors, and students who have been supporting the project in various ways, I am really grateful. I hope that we will continue working together to describe, explain, and predict more observed or emerging cyber behaviors so that our cyber space will be as beautiful as the New England autumn blazing outside my window.

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