Chapter 1
Advances in Describing and Managing Our Environment

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ABSTRACT

This chapter examines links between the developments in selected technologies and our ways of teaching and learning. The focus is on some domains that are developing especially fast. A postulate follows that including knowledge about developments in science and current tools into the school curricula requires immediate attention. Enhancing the curricula with information about dynamically developing branches of science would likely exert a profound effect on making informed, successful decisions about future careers of students. The following text is about a novel approach to visual way of learning and instruction about processes and products. The visual approach relates to learning about natural processes and the current ways we capture their essence. Learning about advances in science requires application of graphical ways of presentation; the use of internet and digital media by instructors, professionals, and students; and making knowledge visualization an integral part of the learning process.

INTRODUCTION

The following debate aims to bring about, with the use of graphical display, better understanding of things and conditions around us. First, the text examines how our senses are amplified by technologies, and how it enhances the exchange of ideas and knowledge. The visual approach is discussed as a way of learning and instruction, as it relates to natural processes and the current ways we capture their essence. Scientists are working on finding computational solutions that improve our ability to control our external and internal environment. Advances in technologies are often biology-inspired: for example, we apply echolocation, ultrasound imaging, and gather thermally conveyed information.

We observe, study, and often mimic nature for our individual and industrial solutions. Perhaps the best idea to find new ideas, stories, and solutions is to observe nature. Natural processes and their products are dynamic, intertwined, but often hard to follow. However, they are inspiring, challenging, and they

may solve many problems. The products are easier to depict than the processes, because matter maybe easier to grasp than energy. Now we can see the world in a nanoscale due to advances in microscopy and spectroscopy. We can learn and teach about structures measuring nanometers or microns: liquid crystals, soft matter, nanoshells, and carbon nanotubes. Nanophotonic techniques serve in biomedical and clinical research, cancer treatment, clinical neuroscience, tissue engineering, drug delivery, and diagnostics.

The mobile internet, automation, and artificial intelligence power up our actions, industry, and economy (Mims, 2018). According to Christopher Mims, "the first three industrial revolutions were driven by coal, and steam, then electricity and the automobile, then computing." After centuries of paper-based communication, digital media are now sharing, transferring, and documenting our data and thoughts. President of Mexico Enrique Peña Nieto (2018) stated, "Mexico is one of the only nations whose constitution recognizes the right of its people to a broadband internet connection," which may be the DSL (Digital Subscriber Line), fiber-optic, cable, and satellite connection. As stated by Klaus Schwab (2017, 2018), previous industrial revolutions liberated humankind from animal power (one may also say it also liberated, at least partly, animals from humankind), made mass production possible, and brought digital capabilities to billions of people. This fourth industrial revolution provides new technologies that are fusing the physical, digital, and biological worlds. Learning and teaching about fast progressing areas is an essential and urgent imperative. The 5th-generation wireless systems – 5G networks accelerate the growth and expansion of telecommunication, redefine and accelerate industries.

Below selected domains are described that are developing especially fast. It is considered to be of significance to include knowledge about developments in science and current tools into the school curricula. Such curriculum would likely have a profound effect on making informed, successful decisions about future careers of students. A novel approach to visual way of learning about processes and products relates to the graphical way the matter and processes are presented. Internet is widely used by instructors, professionals, and students, while digital media function as learning environment. Knowledge visualization, as an integral part of the learning process, supports comprehending concepts in computing, sciences, design, media communication, film, advertising, and marketing. The emphasis is on recognizing how these fields create prospects of finding jobs, which might allow students to fulfill themselves. Figure 1 presents a work *Levels and Layers.*

VISUALS AND DIGITAL MEDIA PERTAIN TO ALL ASPECTS OF OUR LIFE

Interactive computer-mediated technologies are present in our life along with traditional print media: books, newspapers, journals, magazines, and also images, movies, or audiotapes. Not only visuals but also audio and haptic experiences make the interactive media. First of all, visuals are ready to be used as graphics, animations, pre-set motions, and immersive, interactive structures. They are ready and free for anybody on the internet. Visual media, in contrast to written materials can be understood in any culture, system of believes, discipline, or profession. Digital media are present as a part of our daily perusing of websites, web pages, digital video and images, using many kinds of software, searching web pages and websites, looking for data, along with enjoying video games, MP3, and digital audio such as electronic books. Some users include also hard drives as physical digital media.

Digital media include also social media (SM) – websites and applications where we create and share information, our experiences, ideas, and messages. Figure 2 entitled, *Leisure Time* reflects upon our communication through media when we are not working or occupied. Social presence through SM

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