In this book about technology and education, editors Michael Clough, Joanne Olson, and Dale Niederhauser present research by 23 different authors organized in 21 chapters addressing the impact of new technologies on individuals, society, education, and learning and teaching processes. The 21 chapters of the book are organized in four different sections.

The book’s first section, “Philosophical & Historical Issues in the Nature of Technology,” includes six chapters written by Neil Postman, Gordon Hull, Michael Bugeja, Suvi Tala, Teresa Shume, and David Jonassen. The overall message of this section is related to how technology has been viewed as a purely positive catalyst or an absolute positive enhancement. The section focuses on examining technology and putting it to the test. Technology should be approached with care rather than with an attitude of unrestricted usage.

Postman compares passion for technology to unquestionable religious beliefs; he mentions how some technology advocates are unwilling to view technology through any lens other than a positive one. However, while Postman points out, “A new technology sometimes creates more than it destroys,” he also contends, “Sometimes, it destroys more than it creates” (p. 8). Hence, a balanced
approach is necessary. For example, young people, or “digital natives,” are becoming more like mindless consumers who lack conceptualizing, analyzing, and synthesizing skills due to their dependency on technological gadgets (Bugeja, p. 35). According to Hull, technology comes with a certain level of moral responsibility since “advances in technology pose ethical questions” (p. 24). Hence, leaders and decision makers should not accept technological advances blindly based on materialistic outcomes such as performance and quality only. Leaders should also examine the impact technology can have on ethical standards. For example, social media can be used to keep people connected or to conduct virtual classroom discussions. However, social media can be used as a cyberbully tool as well. Thus, the need to know one’s “cyborg-self,” how a person can be impacted by technology, and how technology can impact a person is ever important. In line with Bugeja’s philosophy, Tala argues the importance of integrative learning where students understand the objectives of learning writing and math skills in order to conduct experiments and write reports. In education, “Nature of Science (NOS) and Nature of Technology (NOT) are often taught in separated science and technology lessons—and rarely in interactive settings with history and philosophy teachers” (p. 51). Understanding the historical perspective, the ethics of science, and the effect of new technologies on humans should go hand-in-hand with learning scientific theories. Tala explains that the concept of the Nature of Technosciences (NOTS) should provide a unifying view of NOS and NOT and “help[s] to understand the inevitable intertwined nature of these fields” (p. 62).

Shume states many people believe “Technological determinism holds that technological advances and corresponding social changes are inevitable and cannot be stopped” (p. 90). However, Shume, as does Hull, rejects that idea and calls for a more selective adaptive methodology to technology in which individuals are able to make the right decisions regarding technology’s impact on their personal lives, society, and the environment. Jonassen also views technology as a democratic alternative in which beneficiaries are able to utilize and customize technology to serve their interests. Technology can “emancipate learners from the obligation to regurgitate that which has no relevance to them, to empower them to reflect on and represent what is important to them” (p. 109). The first
section explains how computers are machines able to provide raw information but not ethical guidance. Section 1 raises concerns related to the risk of viewing technology as the end of all goals without actually understanding the negative impact it can have on learners and on society.

The second section of the book, “Technology’s Faustian Bargain for Education,” includes seven chapters written by Jocelyn Wishart, Joanne Olson, Michael Clough, Kimberly Penning, Michael Edwards, Suzanne Harper, Robert Klein, Amy Parks, Dale Niederhauser, and Warren Blumenfeld. Wishart points out the valuable benefits of using technology to create learning models to help illustrate theoretical concepts. Moreover, Wishart is aware of limitations possibly intrinsic to models and software packages that can hinder creativity in classrooms. In their chapter, Olsen, Clough, and Penning emphasize the importance of going beyond the utilization of technology in educational settings interactively and inquisitively. “Meaningful technology education is far more than learning how to use technology. It includes an understanding of what technology is, how and why technology is developed, how society directs, reacts to, and is sometimes unwittingly changed by technology” (p. 154).

On a similar note, Edwards, Harper, and Klein welcome the use of technology in education as long as educators are aware of the advantages and disadvantages of incorporating technology in education. “The suggested alternatives include significant uses of technology, though structured with a keener understanding of the pitfalls involved in their use” (p. 186).

For example, the use of technology in the classroom can limit creativity, as Wiatr and Olsen and Clough note. “Technology in classrooms often circumvents critical requirements of learning and can hide and even inhibit students’ thinking” (Olsen & Clough, p. 198). Parks asserts that understanding that technology in education has its disadvantages is a good first step to initiating change. It will help keep all alternatives open and not assume that technology is the only answer to all problems related to education. “Teacher educators committed to reform pedagogies of all kinds must begin to interrupt the dominant discourse insisting that newer technologies are inherently better for students” (p. 213). Students should be viewed as stakeholders and educated about the science behind technology and not just be treated like clients, as Olson mentions. “Our children deserve better than to be
treated as trained employees and ignorant consumers of technologies” (p. 245). Technology can—when appropriate—support the different aspects of the teaching and learning process, as Niederhauser highlighted, and teachers’ and students’ comprehensive understanding of technology and its parts are crucial for that support. In his chapter, Blumenfeld explains how technology can come with some negative side effects like cyberbullying and offered some recommendations to minimize or eliminate the side effects, such as “assessment, policies, personal training, counseling, information in libraries, curriculum & school programs, and teacher certification” (p. 286). The issues of cyberbullying and the unauthorized release of personal photographs, videos, or e-mails by classmates are examples of how technology can have negative effects and emphasize the importance of training educators on best ways to deal with these situations. The second section of the book highlights some of the drawbacks of unconditionally implementing technology into education. The importance of including all stakeholders—including students—in the decision-making process is emphasized. Moreover, teachers should be empowered to make the decision on how, when, and where technology should be incorporated into the different learning and teaching engagements and how to reap the positive benefits and minimize the negative side effects.

The third section of the book, “Teacher Education and the Nature of Technology,” includes three chapters written by Benjamin Herman, Heather Tillberg-Webb, Johannes Strobel, and Jerrid Kruse. In his chapter, Herman calls for a return to the basic brick and mortar building blocks of education to prepare students for necessary personal, social, economic, and political skills needed to succeed in life. “School teaching, learning, and discourse can often resemble how television and internet media communicate information” (p. 236). Students can then become limited in their abilities to interact appropriately in person and communicate effectively without the aid of media or technology. Herman’s call does not escape Tillberg-Webb and Strobel who call for understanding and implementing new technological pedagogies that augment education and enhance knowledge, rather than take the place of physical interaction. “A robust educational system will critically evaluate the role of our instructional technologies and the impact they have on the human experience” (p. 324). Kruse comments that completely
positive perceptions about technology put up obstacles to any logical attempts to examine the overall impact of technology on students’ creativity and decision-making skills. “Dominant discourse surrounding education technology inhibits critical analysis of technology in education” (p. 366). A lack of critical analysis of technology in education can lead to teachers and students not utilizing the full range of what technology has to offer education. The third section calls out the negative impact of the unregulated and unexamined use of technology on students’ experiences, human skills, creativity, and critical analysis.

The fourth part of the book, “Teaching the Nature of Technology,” includes four chapters written by Michael Clough, Jerrid Kruse, James Jadrish, Crystal Bruxvoort, and John Spenser. Much like his contemporary Niederhauser, Clough highlights the importance of understanding the disadvantages of new technologies and the science behind the applications before embracing them as part of the educational process. “Examining technology is crucial for understanding what is gained and what is lost in blindly adopting particular technologies in and out of schools” (p. 387). In his chapter, Kruse emphasizes the benefits of incorporating the basic principles of technology to expand the learning environment beyond the limitations of politics, finance, and other non-educational factors that impact pedagogy and curriculum. Teachers should “integrate the Nature of Technology (NOT) into instruction while knowing the political and economic factors are causing a narrowing of the curriculum and assaulting the very meaning of what being educated means” (p. 408). So, rather than use technology to limit innovation, technology can be used to expand curriculum, enhance learning, and improve communication skills. In their chapter, Jadrish and Bruxvoort promote the concept of having engaged teachers dedicated to training students to appreciate the science behind technological applications to create future generations who are not mere consumers of technology but are also innovators who understand and value creativity through technology. In his chapter, Spencer calls for a balanced approach toward technology as a tool within the educational process. “In order to think critically about technology, students need to avoid the polar extremes of blind acceptance or absolute rejection of a medium” (p. 434). Hence, Spencer signals a realistic approach in which
new technologies are scrutinized methodically to evaluate
the overall risks and advantages before being dismissed or
adopted. This fourth section calls for understanding the
basics of science in addition to the applied technologies.
The authors recommend a more balanced approach to
technology adaptation by scrutinizing what needs to be
taught, how, why, and the long-term impact of any new
technology so pitfalls may be avoided.

At first glance, this collection might appear to be
promoting anti-technology rhetoric. The authors do raise
some questions about technology’s impact on education
and society in general. However, the book’s main message
is to discourage the unconditional use of technology in
educational settings without infusing the learning and
teaching of moral thinking and social skills at the same
time. It also advocates that technology should be critically
analyzed and examined before adaptations. Society should
not deal with technology from a purely consumeristic
perspective. The authors call for a critical analysis of the
pros and cons of technology in classrooms and emphasize
the importance of teaching students the basic sciences
behind technology. They also warn against us becoming a
one-dimensional society where only the academic impact
of technology on students’ access, retention, and success is
considered. In order to help prevent this, the authors
further call for incorporating ethical and critical learning
skills into the education process. In doing so, they
emphasize the importance of understanding the hidden side
effects that can come with the unconditional adaptation of
technology and the possible negative impact on pedagogy,
curriculum, young learners, adult learners, educational
systems, policy, and society. Overall, the assembled
authors present a convincing case for more careful
examinations of the impact of technology on students,
society, critical thinking, and creativity.

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