


## Foundations of Educational Technology: Integrative Approaches and Interdisciplinary Perspectives

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### ABSTRACT

This paper reviews the book “*Foundations of Educational Technology. Integrative Approaches and Interdisciplinary Perspectives*”, written by J. Michael Spector (published in 2016 by Routledge, 2<sup>nd</sup> edition, first edition in 2012, 253 p.).

### KEYWORDS

Book review; educational technology; integrative approaches; interdisciplinary; educational design.

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### **Book Review: Foundations of Educational Technology**

In response to the COVID-19 epidemic, many education systems have relied on distance learning and educational technologies to an unprecedented degree. This has led to a rethinking of the role of technologies in education, and increased interest in this field among teachers, other education professionals, and even parents (Espino-Díaz et al., 2020; Huck, & Zhang, 2021).

*Foundations of Educational Technology: Integrative Approaches and Interdisciplinary Perspectives* (published in 2016 by Routledge, 2nd edition, first edition in 2012), written by J. Michael Spector, offers an interdisciplinary and problem-centered approach to those who want to improve their knowledge in educational technology. Thanks to “*Test Your Understanding*”, “*A Representative Educational Technology Challenge*” and “*Learning Activities*” sections proposed in each chapter, Spector’s book is a useful resource especially for students in master and doctoral degrees, and in teacher education programs.

The book is divided into four parts and 19 chapters. The Part I, *Introduction and Overview*, contains six chapters and serves as a general introduction to the topic. In the first chapter, *Defining Educational Technology*, the author defines the main concepts, technology, education and educational technology, with an emphasis on multi-disciplinary character of the field:

Educational technology draws on the work of multiple disciplines. Because multiple disciplines are involved and because problems in educational technology are often complex and challenging, it is especially important to think about what one does (and of course how and why) in a disciplined and systematic manner. [...] Educational technology involves multiple disciplines, multiple activities, multiple people, multiple tools, and multiple opportunities to facilitate meaningful change. (Spector, 2016, p. 11)

In the second chapter, *Values, Foundations, and a Framework*, the author explores the values and foundations on which educational technologies should be based. He defines six foundation pillars: communication, interaction, environment, culture, instruction, and learning. However, the author emphasizes that the choice of these six foundation pillars is somewhat arbitrary, and “educational technology rests on multiple bodies of knowledge and is inherently an interdisciplinary enterprise” (p. 27). In addition, the design of educational technologies should be flexible enough to adapt to different educational environments, different learners and changes over time:

[...] a values-orientation in educational technology would be to place particular emphasis on creating learning environments that work well for different learners with a wide

variety of individual differences and that are easily modified and sustained for a long period of time. (Spector, 2016, p. 27)

In the chapters three and four, *Learning and Performing*, and *Teaching and Training*, Spector focuses on two different aspects of instruction: learning and teaching. These two chapters seem to aim to draw a general framework of learning, teaching and some other related concepts before discussing their relationship with technology. In the next chapter, *Technology Support for Learning, Instruction, and Performance*, the author discusses how to decide which technologies are relevant for a particular instructional task. He argues that a number of things should be considered when selecting a technology to support an instructional activity:

- “The tool’s capabilities and functionality together with the tasks to be performed and a representative sample of persons who will be performing the task.” (Spector, 2016, p. 51)
- “The cost of acquisition, implementation, and maintenance of the targeted learning environment or instructional system.” (p. 53)
- The learning and performance goals.
- The targeted learners.
- Plan for change: “the portability and ease of modification with regard to things created using various technologies”. (p. 53)
- “Accessibility issues to comply with legal and ethical requirements to those with disabilities” (p. 53).

In sixth chapter, *Integrative Approaches to Planning and Implementation* which closes the Part I, the author advocates a systems perspective to effectively integrate technology into educational contexts. The composition of learners, and their needs, characteristics, motivations and prior knowledge changes over time. A systems perspective should consider education dynamically, holistically and systematically:

When introducing an innovative technology, one is well-advised to consider the acquisition process, the training process, the maintenance and management process, the evaluation of impact, and the implications for other components of the system in order to develop and implement adequate technology plans. (Spector, 2016, p. 61)

Part II, *Theoretical Perspectives with Example Applications* which is divided into four chapters, aims to introduce the readers to basic theoretical approaches in fields related to educational technology. In this part, J. M. Spector review briefly a number of theories and models on human development, learning and performance, information and communication,

and instruction and instructional design, such as Piaget's cognitive developmental theory, Bandura's social learning theory, Lasswell's journalistic communication model, and van Merriënboer's the four-component instructional design model.

In Part III, *Practical Perspectives with Example Applications* which is divided into five chapters, the author gets to the heart of the matter. In chapter eleven, *Introducing Innovative Technologies and Managing Change*, he addresses the problem of initiating the people to use new technologies in teaching and learning activities, as this requires an important change in their beliefs, behaviors and habits. Spector advocate a gradual and evolutive approach that involves continual assessments and appropriate adjustments:

Effective management of change involves continually assessing to what degree the measurable targets associated with the driving need are being met and ensuring that benefits continue to justify the costs of change. [...] It is not generally wise to try to change everything all at once, although there are occasions when such a strategy has worked well. More typically, it is safer to adopt a graceful evolution approach to change. Remaking the entire world of education in one fell swoop has been the fool's folly of too many educational researchers and reformers. (Spector, 2016, p. 129).

In the twelfth and thirteenth chapters, *Teaching with Technology* and *Educational Technologies in the Workplace*, the author addresses the issue of technology integration in schools and professional training programs. He argues that what is happening with the technology integration in education "is an evolution and not a revolution". In the 1970s, some people thought that with the development of technology, the educational environment would change radically and that there would be no need for teachers and even schools. However, this did not happen. Despite its enormous potential, technology integration into education has remained limited in many respects. The author proposes a flexible and adaptable perspective focused on educational objectives, subject matters and learners, rather than approaches that emphasize a particular technology or tool:

It is useful to think of activities and what people will do rather than focus on idealized processes or functions. [...] There are nearly always alternatives and issues to be considered when planning to integrate technology in learning and instruction. [...] There simply is no secret to success in teaching with technology. Being flexible and open to alternatives is important, as is a careful analysis of the situation and the involvement of students and instructors in selecting and integrating technologies in teaching and learning. (Spector, 2016, p. 138-140)

In chapters fourteen and fifteen, *Designing Technology-Supported Learning Environments* and *Integrating Technologies into Activities and Tasks*, the author focuses on how to apply educational technologies in educational contexts. He discusses educational design and technology integration principles and concerns, emphasizing that “technology integration is perhaps the most challenging and complex aspect of designing educational environments and systems of instruction” (p. 167).

Part IV, *Broadening the Context* which is the final section, is divided in four chapters. In the chapter sixteen, *Educational Technology Principles and Examples in a Variety of Contexts*, the author deals with the use of educational technologies in different contexts: K12 education, higher education, business and industry, governmental agencies, and nongovernmental organizations. The chapter seventeen, *Professional Preparation and Training*, explores training programs to boost teachers and educators with new competencies and skills in educational technology. In the following chapter, *Scalability and Replication Studies*, the author deals with how to adapt and disseminate an educational technology project or practice to different contexts, different teaching matters and different levels in the education system. In the nineteenth and final chapter, *Emerging Technologies*, Spector addresses technology's most powerful and yet most challenging aspect: change. He reviews some emergent and promising educational technologies, emphasizes its potentials, but remembers also that promises made for radical changes by new educational technologies fall short so often:

Clearly, there is great potential to use technology to improve learning, performance, and instruction. This has been the case for nearly every educational technology introduced in the last 100 years. Only a few years after television appeared was its potential use in schools advocated. Educational television was then declared to be a technology that would transform schools and dramatically improve learning and performance. While there were and still are reasonable uses for educational television, no such transformation occurred. This story has been repeated many times since then. Personal computers would revolutionize education. The internet would make high-quality education available to everyone. [...] The potential is often clear. Pilot projects often show great promise. Why have so many educational technologies fallen far short of predicted outcomes? [...] A new technology may facilitate a new kind of learning experience, but the issues of appropriate use, effective design, and the ability to take the technology to scale are critical factors in making good use of a new technology. The history of new and emerging educational technologies suggests that promises of

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significant and sustained improvements on a large scale that will dramatically transform learning are unlikely to occur as promised. (Spector, 2016, p. 212-213)

A revised new edition of the book was published by Routledge in 2022. A second author, Gwendolyn M. Morel, also contributes to this new edition. Given the evolution and challenges in educational technology during the COVID-19 pandemic, the new edition of the book will provide the readers with a more timely and satisfying view.

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