

## Chapter 5

# Technology: Changing the Research Base on Young Children

**Shannon Audley-Piotorwksi**  
*University of Memphis, USA*

**Neha Kumar**  
*University of Memphis, USA*

**Yeh Hsueh**  
*University of Memphis, USA*

**Melanie Sumner**  
*University of Memphis, USA*

### ABSTRACT

*Technology has changed the potential for research of young children dramatically. Technology has allowed researchers to capture nuances of children's interactions such as eye movement in infants, heart rate, and physiological reactions that researcher's could never accurately track without the new technologies. Understanding the role of technology and the evidence of children's development has opened new ideas about the capabilities of children. Teachers need to understand how these technologies are being used and how researchers support learning and development based on this new approach to information collection with young children.*

## INTRODUCTION: TECHNOLOGY AND CHILD DEVELOPMENT

What we know about young children's development is dependent upon the availability of technology. For example, prominent philosophers Aristotle (Chambliss, 1982) and Rousseau (1762/1979) used the technology of their respective times, behavioral observations and logic, to argue that young children were incapable of reason. Several centuries later, and with similar technology, William James (1890/1981), the first American psychologist, also asserted that young children were incapable of reason. He described the infant's world as, "one great blooming, buzzing confusion" (James, 1890/1981, p. 462). In the twentieth century, however, Jean Piaget introduced new technology for examining children's reasoning capabilities—the clinical method (or the *méthode clinique*, see Mayer, 2005). Using the clinical method, Piaget (1926/1960) found evidence to support his argument that young children were, in fact, capable of reason (albeit, it was not the same as adult reason). By using different, and more nuanced technology, Piaget (1926/1960) was able to challenge previous beliefs about a young child's capability to reason. Recently, newer technologies, such as eye-tracking and brain scanning, have allowed researchers to examine more nuanced questions about children's ability to reason, including what does the brain look like when reasoning occurs? And when does the ability to reason first occur? With the aid of this new technology, researchers are now identifying the complex ways that infants and young children reason about their environments.

It is important to note that the technology Piaget utilized was not as electronically advanced as what is available today; the clinical method consisted of interviewing children, asking them to explain their thinking, and writing down their responses. However, technology is not limited to fancy gadgets or electronic devices; it also refers

to simple tools, such as making observations or writing down a child's response. The etymology of technology—the craft of a branch of knowledge ("Merriam Webster's Dictionary", 2007)—reveals the simplicity of what technology can be. Technology, especially in relation to the social sciences, refers to the tools and methods that scientists use to study development. While some research technology is relatively simplistic, such as taking a child's resting heart rate, technology can be complex as well, such as brain scanning using fMRI. As technology continues to advance, so will our knowledge of young children's development. Because technology, and thus our knowledge of child development, has rapidly changed over the past ten years, it is important for educators and parents to know what current technologies are used in research with young children, and how these technologies have advanced our knowledge of young children's development.

To present a more comprehensive understanding of this work the team of authors were selected based on educational backgrounds and experiences that span the digital generational gap. The authors of this chapter approach these issues from different perspectives and technology generational lives; the first two authors have backgrounds in science, while the last two authors have backgrounds in early childhood education. The first author of this chapter is a former high school science teacher and biologist who is now a doctoral student in educational psychology. The second author is a high-school student who has research experience in genetics and child development and has grown up in the digital age. The third author is a Professor of early childhood education at the University of Memphis from China and a student of Eleanor Duckworth, one of the close associates of Piaget. He has a deep understanding of the work of Piaget and provides a perspective of what this work can mean to traditional thinking about development. The fourth author has experience as a preschool teacher. She has grounded us in the realities of

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