Chapter 8: Interaction, Collusion, and the Human–Machine Interface

MIZUKO ITO
University of Southern California

In contrast with instructional media such as videos and books, the computer has held out the promise of instruction that is learner-centered and engaged, with the machine providing immediate and situationally responsive feedback. The early 1980s saw interaction with computers expand from drill-and-practice into action video gaming as well as the instructional adventure and simulation formats that we now associate with commercial edutainment. By the 1990s, multimedia had become a new buzzword in educational media, promising to rival popular culture with its fast-paced and attention-grabbing graphics and sound. These interactive qualities and multiple forms of media representation have given birth to interactive entertainment and instructional media that have proven to capture the attentions of children. At the same time, these media forms have introduced new complexities in media design and our understandings of learning with computers. Interactive media not only rely on a layering of technical, narrative, and interactive qualities that expand opportunities for engagement with media, but also make these engagements difficult to predict and determine. This indeterminacy provides unique challenges for those seeking to create and analyze learning with computers. Drawing from a more extended study of the production and consumption of children’s software (Ito, 1998; 2003), this chapter works to fill in one piece of this puzzle, by analyzing some of the basic interactional dynamics between a child and educational software.

The interaction between a child and a piece of computer code differs in important ways from interpersonal interaction and interaction with other forms of media. Not only must analytic attention be trained to the particular rhythms of human–computer interaction, but also research must pay attention to the design and symbolic content of the computer’s “voice” as it is packaged and distributed through the software. Consumer software is often designed to imitate situationally responsive aspects of human interaction while at the same time partially replicating other kinds of media that concretize culture in a relatively inflexible way. Moreover, study of human–computer interaction must poach from frameworks derived from cultural studies of media (looking at how meanings are packaged into texts that travel) and human interaction studies (looking at how meaning is constituted through interaction).

Study of computational media is enabled by the ability to observe interactions in ways not available to researchers of non-interactive media: mouse
clicks and keystrokes are accessible ways of observing the act of “reception” (use) of computational media. The challenge, however, is that the meanings of computational media are often less effectively explored outside of the actual context of use (i.e., through subsequent conversation or testing). Since there are multiple and contradictory pathways that one can take through many of the new forms of computer games, it is difficult to unpack the consumption-side meanings instantiated by a game without looking at the activity context. For example, a child might play a city simulation game for hours, treating it as a palette for drawing blobs on a grid, without ever engaging in the game as a representation of a developing city. This contrasts to, say, film, where viewers of a given movie might reasonably be expected to have journeyed through a similar set of images, albeit with different interpretations. In the case of interactive media, our understanding of what children get out of their engagement benefits from conversation with users as well as direct observational studies of use in order to capture the particular kinds of interactions and understandings that a particular software title affords.

This chapter takes some first steps towards describing the unique qualities of interaction with computational instructional media through analysis of a videotaped interaction with one educational multimedia title where a child works on a simple word-matching game with an adult helper. The case describes the space of possibility with an interactive title as indeterminate due to the multireferential quality of the interface. Alignment with the designed uses of the game is a contingent process of negotiation between child, game, and others in the local play context. Two analytical lenses are proposed for the study of children’s interactions with educational multimedia. One is the asymmetric interactional capabilities of human and machine, where the strength of machine interaction is in its inflexibility and reproducibility, and the human’s is in flexibility, indexicality, and situational responsiveness. The other is an idea of human–machine interface that extends beyond objects on the screen and the keyboard to include other people and contexts of play. After first describing the analytic framework for this study, I turn to the interaction case.

1. INTERACTION, GAMES, AND MEDIA

Studies of the details of interpersonal interaction, including conversation, gestures, and proxemics, have amply demonstrated the intricacies of the alignment work that goes into the construction and instantiation of a shared set of interpersonal understandings (e.g., Duranti & Goodwin, 1992; Garfinkel, [1967] 1994; Goodwin, 1990; Kendon, 1990; Lynch, 1985; McDermott & Tylbor, 1984; Schegloff, 1992). These studies have demonstrated how the structure of language and meaning are played out and engaged with in historically specific, context dependent, dynamic, and ongoing activity. In their essay on