A Framework for Designing Etiquette for Educational Technology[i]

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Abstract

There are many different ways of classifying learning technologies. Means (1994) argues for classifying educational technology on the basis of its pedagogical uses. The computer can be used (a) as a tutor, (b) to explore; and (c) as a tool. We argue that any discussion of etiquette in the realm of educational technology has to contend with the wide variety of contexts for learning and the range of technologies that support learning. This proposal looks broadly at the nature of educational technologies and how different instantiations of technologies for learning can impact the nature of etiquette and HCI

Introduction

Emily Post's classic, 627 page long, *Etiquette in Society, in Business, in Politics, and at Home* (1922/1999) lists thousands of tips on correspondence, wedding planning, party giving and conduct in every public or private setting. It is clear that the rules of etiquette depend greatly on the context of interaction, and what may be appropriate for one situation may not be for another. In a similar vein, any discussion of etiquette in the realm of educational technology has to contend with the wide variety of contexts for learning and the range of technologies that support learning. As an educational psychologist with an interest in technology, I am concerned with the design of educational tools. In this proposal I would like to extend my thinking on these issues by looking broadly at the nature of educational technologies and how different instantiations of technologies for learning can impact the nature of etiquette and HCI.

Educational technologies can be classified in many different ways. These classification strategies or categorization schemes are not mere window dressing; they implicitly assume particular sets of values and beliefs about technology, teaching and learning. I would argue that the ontological, epistemological and pedagogical implications of these different categorization schemes define or determine the nature of acceptable and desirable roles and relationships that are formed between the learner and the learning environment. Thus etiquette in HCI, particularly in the learning situation, is dependent greatly upon how these roles and relationships are understood. This understanding is co-constructed through the design of the interface as well as what the learner brings to the interaction.

We begin with a brief overview of different categorization schemes that have been proposed for educational technology. Following this I shall look at a few examples of particular categories of learning-technologies that attempt to delineate certain epistemologies of practice and ontological and pedagogical commitments. I believe that developing smarter tools for learning requires our getting a better understanding of these situated practices and implicit commitments, as well as the requirements, preferences and background knowledge of the learner.

Classifying Technologies for Learning

There are many different ways of classifying learning technologies. For instance Alessi and Trollip (1991) tended to focus just on computer based instruction. They classified instructional technologies into five categories: *tutorials*, *drills*, *simulations*, *games*, and *tests*. Thus word processors and web browsers (along with other general software tools) have no place in their classification. In contrast Taylor (1980) argued that computers in education played three roles: that of a *tutor* (as in an instructional tutorial); a *tool* (such as a wordprocessor or spreadsheet); and as a *tutee* (such as Logo or StarLogo where the student learns by "teaching" the computer program). Means (1994) argued for a different scheme where the computer could be used as a *tutor*, used to *explore*, used as a *tool*, and used to *communicate*. Her perspective reflects a move away from hardware and software features of technology towards the pedagogical use of the technology. Table I (on the following page) offers an overview of Means scheme with a slight modification. We have collapsed the tools section to include the communication tools.

Further, we will consider a few examples from each of these categories to better understand the broad outlines of etiquette required. We shall do this by looking at the implicit assumptions about (a) the nature of knowledge; (b) the nature of the relationship between the learner and the computer program; and (c) how etiquette can foster learning in each case.

Case I: Tutorial

Tutorials assume a fixed body of knowledge that needs to be imparted to the learner. This could be a range of things but clearly emphasizes the acquiring of facts or skills. It is assumed that the learner knows less of the domain than the tutor and thus there is a greater deal of control on the part of the tutor of how the learner traverses the given knowledge space. To use a cliché, the computer program becomes "a sage on a stage" delivering information to the learner in a traditional didactic manner.

Implications for etiquette: The computer program or interface needs to indicate that it is more knowledgeable about the domain in question. It needs to guide students along the desired path towards learning the facts or skills required. The personality it needs to exhibit is more that of a drill instructor. In terms of etiquette the interface needs to be pliable yet firm, sensitive to the user's knowledge state yet always guiding the learner towards the right path. Thus a mistake by a student would elicit some response from the tutorial and provide the student an opportunity to rectify their error before moving on.

Case II: Exploration

Educational technologies for exploration allow for a greater degree of autonomy for the learner. The computer program becomes more of an arena for intellectual play than a site for explicit instruction. The learner is in charge of the process, and the role of the computer program is more to offer help as and when the student "gets lost." The cliché most appropriate here is that of a "guide on the side" (as opposed to the sage on a stage).

Category Computer used …	Definition	Examples
… as a Tutor	Systems designed to teach by providing information, demonstrations, or simulations in a sequence determined by the system. Tutorial systems may provide for expository learning (the system displays a phenomenon or procedure) and practice (the system requires the student to answer or questions or solve problems).	Computer-assisted instruction (CAI), Intelligent CAI, Instructional television, Some videodisc/multimedia systems
… to explore	Systems designed to facilitate student learning by providing information, demonstrations, or simulations when requested to do so by the student. Under student control, the system provides the context for discovery (or guided discovery) of facts, concepts, or procedures.	Microcomputer-based laboratories, Microworlds/simulations, Some videodisc/multimedia systems
… as a tool	General purpose tools for accomplishing tasks such as composition, data storage, or data analysis including systems that allow groups of teachers and students to send information and data to each other through networks and other technologies	Word processing software, spreadsheet software, database software, desktop publishing systems, web publishing systems, image creation and manipulation, video recording and editing systems/software. Local area networks, wide area networks, email, Internet, WWW, Web based learning

Table I: Means' (1984) classification of Educational Technology, with examples.

Implications for etiquette: The computer program needs to exhibit a more friendly and co-exploratory face allowing the learner to explore the knowledge space and yet be willing to step out of the way when needed. It needs to have some domain knowledge built in since most exploratory tools (such as educational scientific simulations) are strongly grounded in particular content areas. There is a great deal of research on student misconceptions in particular content areas (particularly in science and mathematics). This knowledge could be used to develop systems that anticipate possible student problems and offer, unobtrusively, opportunities for students to learn more. An example of such a system would be the feedback process we prototyped to work with GenScape, a biology simulation. The computer program would send messages to the students when they did something that was perceived as being incorrect. The student, however, could ignore this feedback and continue with their exploration if he or she so desired.

Case III: Tools

It would appear that generic tools such as wordprocessors and spreadsheets do not need any particular redesign (from the etiquette point of view) when considered in the context of learning. However it could be argued that the use of these tools in a pedagogical context requires the development of some different kinds of scaffolding mechanisms. For instance, using a word processor to teach creative writing to fifth graders requires the design of help systems that offer students help on plot structure and narrative while using it for writing poetry would require help on meter and rhyme. Microsoft Word, for instance, already comes with help designed to assist people who are doing standard tasks such as writing letters and so on.

Implications for etiquette: The help functions in this case need to be somewhat similar to what we described for exploration, supportive but not in your face, with one significant difference. Since these are generic tools (applicable to multiple content areas) the software would not have content specific knowledge (as in the case of exploratory software such as simulations) though as specific contexts emerge, this may change.

These categories are clearly not exclusive. A computer program could very easily straddle all three of these categories. For instance, a simulation of frog dissection could be used as a tutorial *and* as an arena for exploration. A web site could be a tutorial as well as a medium for communication or a site for exploration. Like all taxonomies, the boundaries between the categories are fuzzy. However, our goal is not necessarily to come up with a final and complete classification but rather to suggest a framework for thinking about etiquette and how it can play out in the design of educational technology.

It is also important to remember that there are many other issues that play out in the design of interface etiquette. The spread of the Internet and online education bring cross-cultural issues of etiquette to the forefront as well. A personal example may be pertinent here. Having lived and taught for the past decade in the United States, humor has become a very important tool that I use in my teaching. A recent visit back to my native India drove home to me just how different classroom norms and student expectations can be. My attempts at humor just fell flat in Indian classrooms, even in ones with graduate students which one would expect to be more open to such informal dialogue. These are issues that interface designers have not given much consideration in the past.

That said, it is surely not the case that we do not have any existing research on how to design etiquette for learning. There exists an immense body of research on teacher behavior and its effects on student motivation and learning in human-human situations that can be brought to bear on interface design for educational technology. For instance a review of the literature on non-verbal teacher behavior indicate that nonverbal behaviors like eye-contact, gestures, vocal inflections, body movement, and combinations of nonverbal behaviors conveying "enthusiasm," "animation," and "variation of stimuli" can have positive effects on students' motivation, attention, teacher ratings, immediate recall, and achievement. Again as the CASA research indicates, much of this existing research on human-human interaction can help us develop better “behaved” tools for learning.

The Merriam-Webster dictionary defines etiquette as “the conduct or procedure required by good breeding or prescribed by authority to be observed in social or official life.” Clearly there is a lot of work to be done in developing a “better breed” of educational technology. I see this symposium as being a first step in this regard.

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