**Kermit and the Keyboard**

Three years ago, Kermit decided that he wanted to learn to play the keyboard. Many years ago, he studied music formally, and he enrolled as a music performance major at a local university. He became proficient at clarinet and saxophone and played in both the community symphony and a five- piece dance band. However, the repetitive nature of concerts— playing the same pieces time and again—eventually bored Kermit, and he dropped out of school before earning a degree. Kermit became attracted to the keyboard because he liked the idea of a one-man band. The electronic capabilities of these instruments are truly amazing. One person at the controls can indeed sound like many instruments playing in harmony. The instrument Kermit bought had many built-in features (e.g., prerecorded backgrounds and accompaniments, different voices and rhythms, the ability to play and record multiple tracks, the ability to slow down or speed up the accompaniments). As one might imagine, the instrument also came with a lengthy manual illustrating and describing all its various features and how to use them. Although Kermit learned to read a musical score when he was taking formal lessons, he has never played a keyboard before, so he spends time hunting and pecking on the keys to familiarize himself with the layout. He hauls out some old music instruction books with simple exercises in them, and he buys a couple of fake books that contain familiar popular songs. Fake books show what chords are to be played during each measure of a song. These chords correspond with shortcut keys on the keyboard, so the player has to play only one key instead of the entire chord. Kermit selects some exercises to practice and makes a list of a dozen or so songs that he would like to learn to play. Every day, Kermit plays for about an hour. On some days, he plays for longer; on others, he might quit after 20 minutes. Some days, he plays more than once, perhaps 30 minutes in the morning and 20 minutes in the evening. The more mistakes he makes while playing, the more likely he is to quit after a short time. He plays a few songs frequently, but he makes so many mistakes on some songs that he stops playing them at all. One of the songs that Kermit plays often is “House of the Rising Sun,” and he tries many different voices and accompaniments to hear how different the song sounds using each one. He seems to enjoy coming up with unique arrangements by mixing voices and backgrounds. One day, toward the end of the song, Kermit makes a mistake and holds one note longer than the music score indicates, but it sounds fine with the rhythm of that particular accompaniment, so he doesn’t seem aware that he has made a mistake. Every time he plays the song using that accompaniment again, he makes the same mistake. Playing the song with other backgrounds, though, he performs flawlessly. When he first started practicing this song, Kermit had to play it quite slowly to avoid making mistakes, but now he plays it at the recommended tempo. About once a week, Kermit reads a section of the keyboard manual, usually pertaining to some feature with which he has been experimenting during his practice sessions. Occasionally, he seeks help understanding the text, asking questions of his wife or going on-line to participate in a chat session. He is considering joining a group that meets every other Sunday to play together. He has attended the jam session a couple of times, and it is mostly a social event. The group is very fluid; people attend as their schedules permit, and they play whatever pieces strike their fancy on a given evening. Some members of the group play by ear, but many share pieces of music that they practice individually before getting together. Kermit can’t decide whether he would learn more by playing with others or whether the same boredom would set in that he remembers from his dance band and symphony days.

**A CIP Look at “Kermit and the Keyboard”**

Let us consider some cognitive information-processing concepts that might be relevant in understanding and explaining Kermit’s learning in this story. An information-processing analysis of the act of performing a song at the keyboard might go something like this. Kermit must first attend to the printed page of a musical score (the input). To process its contents requires recognition of the symbols (reading music is a process similar to reading text) and relating this to what he already knows. For instance, he notes the signature, which tells him how many beats per measure, and the key, which indicates how many sharps or flats. This information is retrieved to assist him in organizing a response, which is pressing down each key as it corresponds to that indicated in the score. Frequent rehearsal helps Kermit’s playing to become more automatic and less fraught with mistakes. Using different voices and backgrounds enables Kermit to vary the encoding cues so that he learns to play the same song in different contexts. One might explain his persistent error in “House of the Rising Sun” as a consequence of encoding specificity. He makes this mistake only when a particular background is used, the same background with which he made the mistake in the first place. Reading the keyboard manual could be, for Kermit, very much like Rosemary’s experience of reading the computer manual in the scenario “A Tale of Two Readers.” Highly unfamiliar and complex and difficult content can cause comprehension problems, which Kermit encounters. CIP offers a useful perspective on the continuing development of Kemit’s keyboarding skills, but behaviorism provides a better explanation of why Kermit spends 20 minutes practicing some days and an hour other days. However, like behaviorism, CIP offers no particular insights into Kermit’s motivation to study the keyboard to begin with.

**A Piagetian Perspective on “Kermit and the Keyboard”**

Because Kermit is an adult, he would be expected according to Piaget’s theory to have reached the formal operational stage of development. As such, Piaget’s theory would have relatively little to contribute to our understanding of Kermit’s learning in this story. However, children clearly learn some of the same knowledge and skills. In fact, my 12-year-old niece has been taking lessons in piano and violin for several years, so her learning has spanned the concrete operational stage (she should be entering formal operations about now). What insights might therefore be gained through a Piagetian perspective? To begin with, we might consider what type of knowledge is being acquired from Piaget’s viewpoint (see Table 6.1). Certainly, there is physical knowledge of the keyboard itself—what the keys feel like, how much pressure it takes to depress them, what sounds they make and under what settings. According to Piaget, this type of knowledge is acquired through actions on objects, so Kermit and my niece must actually experiment with the instrument to discover these properties. Learning to read music involves learning a symbol system, which Piaget defined as social knowledge, or knowledge made by people. And according to Piaget, acquiring social knowledge requires actions on and interactions with people. This is an interesting point. For the most part, Kermit is learning by himself in this story, although he has already acquired the basic skills of reading a musical score. What about my niece? This would suggest that for her to be successful in learning music, she must interact with others. Certainly, she is doing that by taking music lessons and playing in the school orchestra. In addition, there is a great deal of social support at her home for learning music, as most of the family either plays an instrument or sings in a choir. These experiences would be considered critical for learning, according to Piagetian theory. It is hard to see how Piaget’s stages of development might apply to this story, even if we consider my niece’s experience rather than Kermit’s. The reason is likely to be that most of the research surrounding cognitive development (whether Piaget’s or information-processing theorists’) has focused on logical-mathematical knowledge rather than either physical or social knowledge. This shows, perhaps, the privileged position occupied by logical mathematical knowledge in traditional school learning.

**“Kermit and the Keyboard” from the Perspective of Interactional Theories of Cognitive Development**

Like Piaget’s theory, the interactional theories of Bruner and Vygotsky are focused on cognitive development as it relates to learning, not on learning itself per se. Because Kermit is an adult learner, we would expect these theories to have relatively little to contribute toward understanding what and how he is learning in this story. However, Bruner himself pointed out that his “bogus stage theory” did not put age limits on the modes of understanding that children develop, and I suggested in the chapter that adults might well exhibit the same progression through the three modes of understanding as they are learning subject matter that is new and unfamiliar. Because Kermit had prior training in music, the task of learning to play the keyboard is not entirely new or unfamiliar. Reading music is a skill that is already in his repertoire, and we can see that he easily understands the music symbol system involved in being able to do this. Thus, he may be learning specific songs at the symbolic level. Enactive understanding can perhaps be seen in Kermit’s trial-and-error playing, as he attempts to connect particular notes on the keyboard with the notes represented on the musical score. Vygotsky’s ideas about the interaction of an individual with his cultural milieu might be implicated in Kermit’s decision to study the keyboard in the first place. After all, why not take up the instruments that he learned to play years ago? Surely, it would be easier to become proficient on those a second time than to become as well skilled on the keyboard. However, the computer is ubiquitous in the modern age, and today’s computer-based keyboard is truly an incredible tool for making music. It enables the performer to sound like almost any instrument, to play with many different accompaniments, and to compose and record his or her own arrangements. The versatility of this tool is a powerful incentive because the player can sound nearly professional on simple compositions in a relatively short period of time.