Clinicians’ Questioning Behavior: Achieving Intellectual Intimacy in a Postmodern Professional Era

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There are moments in every loving relationship that are rendered timeless and placeless because of our focus on another person. Most people can recall such moments. We listen; we laugh; we cry; we share. We tell our story and we are heard. We grow from the experiences of another person. By listening, hearing, and trusting, we teach and we learn. This is intimacy.

INTELLECTUAL INTIMACY

Communication enables intellectual intimacy to be realized. We communicate only when we enter the experience of others. This requires perspective shifting, assuming for the moment as if we were the other person—the hallmark of communication. We communicate about many things. The focus of this article is communication that takes place in the instructional setting, specifically in professional preparation of speech-language pathologists. Such instruction commonly occurs in academic, clinical, and supervisory settings.

Instruction is an opportunity for communication. When students and faculty engage and focus on the exchange of ideas, a moment of magic occurs. What is magical is the closeness with which one experiences the thought process of another, a moment that is intellectually intimate. For just that moment, only a shared reality exists. However, moments are fleeting. The instructional obligation is to see that these moments are created, nurtured, and maintained. This article discusses one teaching method involving the specification of premises and questions by students to create such moments of intellectual intimacy and the instructional and intellectual impact of this method on students in professional preparation.
POSTMODERNISM

As university educators, we pride ourselves in preparing critical thinkers and competent problem solvers who take personal responsibility for extending professional knowledge. The emphasis here is on the process of using and generating information as a means to interact actively with professional challenges on a daily basis for the sake of best practices for our clients and their families. This process emphasis is postmodern. An earlier emphasis on information as an end in itself, rather than as a means or vehicle to achieve its own application, is viewed as modern.

According to Slattery (1995), the postmodern shift requires rethinking some firmly held and often unquestioned mechanistic beliefs and methods of curriculum development and instruction. A postmodern focus is on the context in which the information is interpreted and applied and how the clinician comes to own that information and personalize it for the sake of the client’s welfare. The most salient point of a postmodern focus is that we must study and understand the contexts in which learning takes place, where information is interpreted actively by all participants and thereby gains its meaning and utility. If one commits to critical thinking and problem solving as among the most important products and processes of professional preparation, then we must find ways to contextualize learning.

INTELLECTUAL INTIMACY IN PROFESSIONAL PREPARATION

From a postmodern perspective, we need to design learning contexts that provide each participant with a window onto the intellectual experience of others. Questioning by students provides that window. Questioning may be viewed as an effort to gather and organize information with reference to a body of knowledge or belief system that the questioner is seeking to elaborate. Knowledge and beliefs that generate questions may be termed “premises.” Questioning with reference to elaboration of premises provides the instructor with that potential window onto the students’ intellectual experiences, yielding a rich network of theoretically framed and interconnected concepts.

Postmodern concepts are not new. Gibran (1923) described teaching as, in part, an act of love. He noted:

No man can reveal to you aught but that which already lies half asleep in the dawning of your own knowledge. The teacher who walks in the shadow of the temple, among his followers, gives not of his wisdom but rather of his faith and his lovingness. If he is indeed wise he does not bid you [to] enter the house of his wisdom, but rather leads you to the threshold of your own mind. (p. 51)

How do we create such a context in which we enable another to journey to the threshold of his or her own mind? We continually work to construct in the classroom an atmosphere that nurtures the thinking of each student, an atmosphere that demonstrates and facilitates inviting, reflective decision making. We use varied mediums for specific messages and create learning opportunities that encourage and provoke the active engagement of all present. We must back up our words with action. The effect of a model in learning is strong. Students receive, process, and apply content and related experiences often with the same level of enthusiasm and enlightenment as that conveyed by the instructor. Neither learning nor teaching is free of risk, however. Students need to feel free of judgment in order to think beyond the limits they imagined possible. Instructors need to receive challenge and criticism with openness and appreciation. For these reasons, the learning environment must be a “safe house,” a place where students (learner/teachers) and faculty (teacher/learners) feel secure, nurtured, and understood. Clearly, this does not mean that the participants will or should always agree. In fact, a degree of friction is necessary as a catalyst to learning. This friction must present a judicious wedding of positive regard and frustration. In an environment where students feel unconditional positive regard and understanding, they will express themselves freely, whether their thoughts are in evolution or well formed, and should not feel even a hint of penalty.

Similar sentiments were expressed by Whitehead (1929) and more recently by Slattery (1995). Whitehead protested against the modern perpetuation of “inert ideas,” noting that “students are alive, and the purpose of education is to stimulate and guide their self-development… Teachers should also be alive with living thoughts” (p. v). Reflecting Whitehead’s vision, Slattery advised that “teachers must be lifelong learners and students must be leaders of instruction…. Educators must evoke rather than impose representations” (pp. 253–254). Discourse, he added, must be shared, empowering, emerging, and tentative.

Traditionally, students are provided with questions that they are directed to answer. This traditional teaching method is considered modern at best in its orientation to information as divorced from the mind of the learner (i.e., generated by the teacher and only passively responded to by the student). In this investigation, students were invited to engage in a questioning process by a teacher seeking to convey the importance of each student being actively involved in the learning process, facilitate rich group interaction, and provide benchmarks for the student’s individual learning experience. Students constructed their own premises and questions, enlivening the learning process with personalized meaning. This served as an invitation for the teacher to enter the student’s world, a significant departure from tradition. The point is that it is necessary and possible to create learning contexts where students are empowered by exploring the relatedness between their own assumptions (i.e., premises) and applications and extensions of knowledge (i.e., questions and questioning).

INTELLECTUAL INTIMACY IN THE PROFESSIONS

Our overriding motivation for achieving intellectual intimacy for the professions is our commitment to prepare professionals who approach clinical experiences as inviting
Premises might be viewed as deposits, an instrument of investment that reflects deliberate gathering of intellectual resources including assumptions, information, and experiences. Knowledge, then, is the yield that takes three distinct forms. These are propositional, procedural, and causal knowledge (Shapiro & Moses, 1994). Propositional knowledge is descriptive and defines the objects and events we act on as we encounter clinical problems. Procedural knowledge is directional, guiding us to the solution through a sequence of clear and discernible steps (Moses, 1994). Finally, causal knowledge is explanatory, exploring the interrelationships among variables relevant to the clinical endeavor (Moses, 1999). Questions, therefore, are the bridge between premises and knowledge. Questions, once articulated, are ultimately fixed; the variable aspect, that which is generative, is the process of questioning.

To understand the complexity of the inherent variability, one must recognize the developmental nature of the life of one’s mind. Specifically, cognitive development in adults (i.e., clinicians) is characterized by identifiable shifts in performance that reflect qualitative changes in how they (clinicians) conceptualize behavior (i.e., from unidimensional to multidimensional), generate problem-solving strategies (from one strategy without reflection to multiple alternative strategies with reflection), and establish relationships between strategy and theory (from implementing a strategy, to reflecting on causal theories, to modifying causal theories where appropriate) (Moses & Shapiro, 1996; Shapiro & Moses, 1989). Cognitive development in adults, however, is not necessarily linear. Such development often is uneven, fluctuating between holistic and complex thinking, even within a single task (Moses, 1994). Therefore, one would expect fluctuating question types and functions within and across individual courses as new topics arise, new problems are discovered and resolved, and unforeseen challenges appear.

Being a master clinician who can solve novel clinical challenges as they arise requires a body of knowledge that serves multiple functions. Those functions, reviewed earlier, include description (i.e., propositional), resolution (i.e., procedural), and understanding (i.e., causal). There remains much to be learned about what is a master clinician and the relationship between intellectual functioning and clinical performance. Notwithstanding previous work to objectify “best practice” in stuttering intervention (Shapiro, 1999) and intervention planning across communication disorders (Klein & Moses, 1999a, 1999b), there is work to be done. A better understanding of questions and the generative process of questioning holds promise for linking professional preparation to quality assurance (American Speech-Language-Hearing Association [ASHA], 2001b, 2003).

A postmodern approach to providing clinical services is at the heart of the revised 2005 standards for professional preparation, adopted by ASHA’s Council on Academic Accreditation. As a prerequisite to accreditation by ASHA, university training programs must establish and validate a process of formative and summative assessment of students’ knowledge acquisition (ASHA, 2001a). The concept of formative assessment is particularly postmodern. Formative assessment approaches knowledge acquisition as developmental in nature, evolving across numerous academic, clinical, and supervisory experiences, thus enabling the learner to personalize, internalize, and thereby “own” the curriculum. Procedures need to be developed, therefore, to monitor the evolution of particular constructs across a student’s program of professional preparation. It is within this spirit that we analyzed and studied questions asked by students in the context of their own actively generated premises about multiple aspects of communication sciences and disorders. An experience as intellectually intimate as understanding the nature and development of students’ questions holds promise as a mechanism for formative assessment of professional development.

PURPOSES OF THE PRESENT STUDY

We established earlier that it is our instructional obligation within the process of professional preparation to see that moments of intellectual intimacy between students and teachers are created, nurtured, and maintained. Within such moments, knowledge itself becomes an act of creation. Based on this premise, the present study investigated the questions posed by students within an instructional program in communication sciences and disorders. Specifically, the purposes of the present study were to identify and describe (a) domains of knowledge addressed by students’ questions, (b) information functions served by students’ questions, and (c) patterns of students’ questioning behavior within selected courses.

METHOD

Participants

The participants in this investigation were the learner/teachers; that is, 38 students who were enrolled in three courses taught by the initial author at Western Carolina University. The courses, taught in sequence, were Language Disorders in Children (undergraduate), Fluency Disorders (undergraduate/graduate), and Diagnostics (graduate). Only students who successfully completed the three-course sequence were included. All participants were undergraduate or graduate students in good standing (i.e., grade point average at the graduate level of greater than 3.0) who were enrolled in a degree program in communication disorders. Students who did not continue at Western for their graduate study and those for whom records were incomplete were excluded.
Procedures

Each student submitted to the professor on a weekly basis a set of typed questions and their underlying premises relevant to the course being taken. More than 1,600 questions were submitted in this manner by the participants. The purposes of the premise-question assignment were to

- generate independent thought,
- facilitate rich group discussion,
- provide another vehicle for interaction between the individual student and the instructor, and
- bridge the academic, clinical, and supervisory experiences—in other words, deliberately create moments of intellectual intimacy through communication for the sake of knowledge construction.

Instrumentation

A taxonomy (see Appendix) was constructed to analyze and evaluate observable differences in students’ questions on two dimensions: knowledge domain and information function. As noted earlier, the three domains of knowledge were propositional, procedural, and causal. In other words, these domains provided a window onto the knowledge being created by the student. The three portals, therefore, were propositional knowledge that is descriptive and defines objects and events, procedural knowledge that guides us to problem resolution, and causal knowledge that explains and/or explores interrelationships among variables.

- **Propositional questions** seek to describe or define the objects or events that clinicians act on as we encounter clinical challenges. These questions attempt to fact find, without discerning clinical procedures or addressing the nature of causal or other relationships among variables.

- **Procedural questions** are directional in nature, accessing knowledge that guides clinicians through a sequence of clear and discernable steps. Procedural questions seek guidance in correctly choosing, implementing, or interpreting instruments, strategies, and observations. Procedural questions are different from propositional questions; procedural questions contain inference that the knowledge gained will be applied overtly in a timely or sequential manner. Unlike causal questions, procedural questions do not attempt to determine cause and effect relationships.

- **Causal questions** attempt to explain or explore interrelationships among variables that are relevant to the clinical process. Causal questions solicit information about specific etiologies or explanations, effects of controlled or naturally occurring variables, and the interrelationships between causal factors (i.e., predisposing, precipitating, and/or perpetuating causes) and theoretic paradigms. Causal questions are different from propositional questions; causal questions seek information about underlying factors as opposed to descriptions of behavior. Causal questions are different from procedural questions; causal questions address explanations of cause and effect relationships rather than steps contained in assessment and treatment.

The taxonomy also included three information functions for each knowledge domain: discovery, exploration, and understanding. The first function, discovery, is the most basic, where the learner collects existing knowledge in order to construct a foundation for subsequent and more complex learning. Discovery enables the learner to assemble facts and achieve a preliminary familiarity with the material that is typically introduced by the instructor. Following and built on discovery, the second function, exploration, provides the learner with an opportunity to examine further the information discovered, noting more specific characteristics including inherent feelings, uses, similarities, and values. Finally, the third function, understanding, contextualizes the information discovered and explored, enabling the learner to make relationships among variables and shift between differing perspectives. This ultimate information function is significant because the learner transcends information, moving to a recognition that meaning resides within the context within which information is embedded rather than in words with which information is delivered. It is not uncommon for one who understands the context to anticipate meaning before a word is uttered. For example, when I (D. Shapiro) received a phone call from my father-in-law informing me that his wife of 47 years had just passed away, what meaning could my words possibly convey if not only as a reminder of ongoing love, support, and shared sorrow? “Some things don’t need to be put into words; some things don’t need to be said. They are just understood” (C. Slattery, personal communication, March, 2001). Soon thereafter, I learned in Japan that communication without or beyond words, or heart-to-heart communication yielding tacit or unverbalized understanding, is expressed by the terms “ishindenshin” and “haragei.” Similarly, within a learning environment, students reflect on their teacher’s point of view while they search for their own in order to attach meaning to the words they hear. Ultimately, a word becomes a mere trigger to understanding and thereby a gateway to knowledge.

Another example illustrates how attention to context facilitates understanding, enabling one to distinguish between an event and its multiple interpretations, perhaps the nexus of science. Imagine a man boarding a train with his three young children (Covey, 1989). The man sits wearily while his children run up and down the aisle, making a commotion and knocking into newspapers being read by other early morning passengers. An onlooker becomes increasingly annoyed at the apparent discourtesy if not irresponsibility of the unobservant father. At once, the irritated party approaches the father, scolding, “Can’t you see that your children are bothering me and the other passengers? I really think you should control them better.” The father looks up unaware, somewhat stunned at the revelation, and apologizes, “I am so sorry. You are right. I had not noticed that my children were being a nuisance. You see, we just left the hospital where their mother died. I guess I do need to watch them better.” Once the onlooker
understood the context, she immediately shifted perspective, offering, “Oh, I am so sorry. I didn’t know. Let me see if I can help you. Maybe I can read to your children until you arrive at your station.” The point is that only when the context is revealed and understood can one distinguish between an event (i.e., children running in the train) and its alternative interpretations (i.e., a source of annoyance and irritation vs. a situation requiring compassion and assistance). It is this ability to distinguish between events and their multiple interpretations that is captured in the third information function, understanding, in the taxonomy that was used to analyze students’ questions.

It is important to note that the taxonomy emerged as the investigators made numerous passes through the students’ questions. Constructivist descriptions of adult problem-solving behavior (Fischer, 1980; Karmiloff-Smith, 1991; Moses, 1994; Moses & Shapiro, 1996; Shapiro & Moses, 1989) helped guide the development of the categories for knowledge domain and information function. These categories, however, were based on patterns that became evident from the students’ questions themselves.

Data Analysis

The students’ questions, submitted in written form, served as transcripts for data analysis. Using the taxonomy, questions were analyzed to identify knowledge domains and information functions. The first step was to identify individual premise-question episodes. Each episode comprised a single premise and related questions. As noted earlier, a premise was defined as referenced information or beliefs that ground the question(s). Premises took the form of dependent clauses or complete declarative statements. An example of a premise in the form of a dependent clause is “Given that the interactionist approach works best for children for language problems, how might this approach be applied to people with other communication disorders?” An example of a premise as a complete declarative statement is “According to the text, there is a relationship between learning disabilities and language disorders. How can a language disorder be classified as a learning disability?” A question is a query that seeks information related to the premise. In the examples just provided, the statements following the premise are the questions (i.e., How might this approach be applied to people with other communication disorders? How can a language disorder be classified as a learning disability?). Occasionally, premises were elaborate series of declarative statements preceding the question (see Appendix).

Students were instructed on the generative value of premises and how to articulate them. Traditionally, students express questions as an expression of confusion (I can’t understand this. I’m lost. What does this mean?). In a more postmodern framework, the students learned that a premise is an expression of what they do know or understand, followed by a question that seeks to elaborate their existing knowledge. This realization was at once intellectually empowering for the students, notwithstanding occasional resistance. It is beyond the scope of this article to analyze changes in the students’ premises. Suffice it to say that the premises, which were either implicit or fractured at best, evolved into explicit expressions of knowledge and beliefs. These expressions both grounded and generated substantive questions, enabling students to access, assemble, and extend knowledge in such creative and active ways as to achieve intellectual intimacy.

Having instructed the students in the value of premises and how to write them, students organized their written questions according to premise-question episodes. Each weekly assignment was to contain no less than two such episodes, generally submitted in paragraph or block form. This format facilitated data analysis by delimiting the boundaries of premise-question episodes. The investigators reviewed these submissions, identified individual premise-question episodes, and numbered episodes consecutively.

Questions within each episode were assigned an episode number plus a course designation code (LD = Language Disorders, Fl = Fluency, Dx = Diagnostics).

Typically, students asked several questions following each premise. The investigators identified and numbered individual questions within episodes. Questions related to one premise were assigned the episode number plus a letter designation (e.g., 10a, 10b, 10c). Some questions were conjoined within a compound sentence (e.g., How does this blood-type incompatibility cause the child to have a language-learning disability and how many children who have blood-type incompatibilities with their mother develop a language-learning disability?). Within compound sentences, single questions were delineated on the basis of one superordinate subject-verb-object relation. For example, the complex question just presented was subdivided into two questions (i.e., 2a, How does this blood-type incompatibility cause the child to have a language-learning disability?; 2b, How many children who have blood-type incompatibilities with their mother develop a language-learning disability?).

Using the taxonomy, the investigators then classified each question according to knowledge domain (i.e., propositional, procedural, causal) and information function (i.e., discovery, exploration, understanding). These data for each student were analyzed further for frequency, mean, standard deviation, range, and relative proportion of occurrence.

Reliability

A procedure was implemented to ensure that the knowledge domains and information functions in the taxonomy were acceptably reliable, that the investigators classified the questions in a consistent manner, and that other raters would classify the questions in a manner similar to that of the investigators. The procedure for constructing the taxonomy was discussed earlier. Once the categories were created, the investigators classified independently the full set of questions received from 10 students (26.3% of the data) for knowledge domain and information function and discussed discrepancies until achieving a preestablished reliability criterion of 85% agreement. Then, following a training period, two graduate assistants independently classified the questions submitted from five randomly
selected participants (i.e., 13.2% of the data) for knowledge domain. To ensure an acceptable level of reliability, a criterion of 80% agreement was set (Anderson, 1980, 1988; Shapiro & Anderson, 1988, 1989). The resulting percentage of agreement between these two raters was 85% (295 agreements/347 opportunities). To ensure further consistency of rating, another graduate assistant, following the training period, and the first investigator independently classified the questions submitted from an additional four randomly selected participants (i.e., 10.5% of the data) for knowledge domain. The resulting percentage of agreement was 86% (203 agreements/236 opportunities). Following the training period, another graduate assistant and the second investigator independently classified the questions from five additional randomly selected participants (13.2% of the data) for information function. The resulting percentage of agreement was 88% (294 agreements/333 opportunities). All participants involved in the classification process reported the taxonomy to be specific and relatively easy to use. These data indicate that the categories in the taxonomy for knowledge domain and information function are acceptably reliable, that the investigators classified the questions in a consistent manner, and that others would classify the questions in a manner consistent with that of the investigators.

**RESULTS**

The 38 participants submitted a total of 1,602 questions to the instructor. Specifically, 568 were submitted in Language Disorders ($M = 14.95; SD = 4.78; range = 8–26$), 602 in Fluency Disorders ($M = 15.84; SD = 6.65; range = 7–37$), and 432 in Diagnostics ($M = 11.37; SD = 4.94; range = 3–27$). Each question served to provide a window onto the domain of knowledge being accessed by the student. The three domains of knowledge being accessed were propositional, procedural, and causal knowledge (refer back to “Instrumentation” for a description of the three knowledge domains, or to the Appendix). For each of the three courses in which students’ questions were analyzed (Language Disorders, Fluency Disorders, and Diagnostics), most of their questions were within the propositional domain, less in the procedural domain, and least in the causal domain. These results are presented in Table 1.

In the Language Disorders course, students asked 568 questions, of which 46.48% were propositional, 32.34% were procedural, and 21.18% were causal. More specifically, individual students asked an average of 7.13 propositional questions ($SD = 3.89; range = 1–18$), 4.66 procedural questions ($SD = 2.52; range = 0–11$), and 3.16 causal questions ($SD = 2.62; range = 0–11$).

In the Fluency Disorders course, students asked 602 questions, of which 40.30% were propositional, 32.30% were procedural, and 27.40% were causal. Individual students asked an average of 6.37 propositional questions ($SD = 3.90; range = 0–16$), 4.95 procedural questions ($SD = 3.13; range = 0–13$), and 4.53 causal questions ($SD = 3.77; range = 0–17$).

Finally, in the Diagnostics course, students asked 432 questions, of which 45.64% were propositional, 43.53% were procedural, and 10.83% were causal. Individual students asked an average of 5.32 propositional questions ($SD = 3.71; range = 0–16$), 4.58 procedural questions ($SD = 2.49; range = 0–9$), and 1.47 causal questions ($SD = 2.00; range = 0–7$).

**Information Functions**

Also, each question served one of three information functions. The information functions were discovery, exploration, and understanding (again, refer back to Table 1.

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<thead>
<tr>
<th>Table 1. Domains of knowledge.</th>
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<tr>
<td><strong>Propositional</strong></td>
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<tr>
<td>Language Disorders course</td>
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<tr>
<td>Percentage of total questions asked</td>
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<tr>
<td>Mean frequency</td>
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<td>Standard deviation</td>
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<td>Range</td>
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<td>Fluency Disorders course</td>
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<tr>
<td>Percentage of total questions asked</td>
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<td>Mean frequency</td>
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<tr>
<td>Standard deviation</td>
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<tr>
<td>Range</td>
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<tr>
<td>Diagnostics course</td>
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<tr>
<td>Percentage of total questions asked</td>
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“Instrumentation” for a description of the three information functions, or to the Appendix). Across the three courses studied, most of the students’ questions served an exploration function, less served a discovery function, and least served an understanding function. These results are depicted in Table 2.

In the Language Disorders course, 47.90% of the questions asked by the students served an exploration function, 30.05% served a discovery function, and 22.05% served an understanding function. An average of 7.08 questions asked by individual students served the exploration function \((SD = 3.44; \text{range} = 1–17)\), 4.53 served the discovery function \((SD = 3.55; \text{range} = 0–14)\), and 3.34 served the understanding function \((SD = 2.60; \text{range} = 0–9)\).

In the Fluency Disorders course, 60.06% of the questions asked by the students served an exploration function, 21.96% served a discovery function, and 17.98% served an understanding function. An average of 9.68 questions asked by individual students served the exploration function \((SD = 5.25; \text{range} = 0–23)\), 3.29 served the discovery function \((SD = 2.72; \text{range} = 0–11)\), and 2.92 served the understanding function \((SD = 3.09; \text{range} = 0–11)\).

Finally, in the Diagnostics course, 66.60% of the questions asked by the students served an exploration function, 24.77% served a discovery function, and 8.63% served an understanding function. An average of 7.37 questions asked by individual students served the exploration function \((SD = 3.87; \text{range} = 1–15)\), 2.87 served the discovery function \((SD = 3.06; \text{range} = 0–13)\), and 1.13 served the understanding function \((SD = 1.42; \text{range} = 0–5)\).

**Relatedness of Knowledge Domains and Information Functions**

So far, the analysis of questions asked by the students in three courses has addressed the type of information sought (knowledge domain) and the function served by the information obtained (information function). Another question naturally arose; specifically, Is there a relationship between the type of information sought by the students’ questions and the functions served by the information obtained? To determine that relationship, a Pearson chi-square test was used. The cross-tabulation of the knowledge domain (i.e., propositional, procedural, and causal) by information function (i.e., discovery, exploration, and understanding) is contained in Table 3. The chi-square revealed the relationship to be significant \((i.e., \chi^2 (4) = 169.145, p < .000)\). As expected, indeed there is a relationship between the type of information sought by students’ questions and the functions served by the information obtained.

The results indicate that students actively pursued knowledge by virtue of asking questions. The questions most frequently served to access information that was descriptive and defined objects and events (propositional); less frequently to gain knowledge in choosing, implementing, or interpreting observations, instruments, and strategies (procedural); and least frequently to establish interrelationships among variables that are relevant to the clinical process (causal). Whether the knowledge resided within the propositional, procedural, or causal domain, students sought knowledge most often by questions that functioned to explore information that had already been discovered, less often by questions that functioned to discover new information, and least often by questions that contextualized information that had already been discovered and explored. More specifically, the chi-square analysis revealed that if the knowledge domain is propositional, the information functions of discovery and understanding have a higher incidence of occurrence than in the other two knowledge domains (i.e., procedural and causal). If the knowledge domain is either procedural or causal, the information function of exploration occurs more frequently than if the knowledge domain is propositional. This analysis reveals the interdependence of the information being accessed by the students’ questions and the functions served by the information obtained.

**Table 2. Information functions.**

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<tr>
<th></th>
<th>Discovery</th>
<th>Exploration</th>
<th>Understanding</th>
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<tbody>
<tr>
<td><strong>Language Disorders course</strong></td>
<td></td>
<td></td>
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<tr>
<td>Percentage of total questions asked</td>
<td>30.05</td>
<td>47.90</td>
<td>22.05</td>
</tr>
<tr>
<td>Mean frequency</td>
<td>4.53</td>
<td>7.08</td>
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<tr>
<td>Standard deviation</td>
<td>3.55</td>
<td>3.44</td>
<td>2.60</td>
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<tr>
<td>Range</td>
<td>0–14</td>
<td>1–17</td>
<td>0–9</td>
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<tr>
<td><strong>Fluency Disorders course</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Percentage of total questions asked</td>
<td>21.96</td>
<td>60.06</td>
<td>17.98</td>
</tr>
<tr>
<td>Mean frequency</td>
<td>3.29</td>
<td>9.68</td>
<td>2.92</td>
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<tr>
<td>Standard deviation</td>
<td>2.72</td>
<td>5.25</td>
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<td>0–23</td>
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<tr>
<td><strong>Diagnostics course</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Percentage of total questions asked</td>
<td>24.77</td>
<td>66.60</td>
<td>8.63</td>
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<tr>
<td>Mean frequency</td>
<td>2.87</td>
<td>7.37</td>
<td>1.13</td>
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<tr>
<td>Standard deviation</td>
<td>3.06</td>
<td>3.87</td>
<td>1.42</td>
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<td>Range</td>
<td>0–13</td>
<td>1–15</td>
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DISCUSSION AND IMPLICATIONS

Theoretical Orientation

Guiding This Investigation

We began this article by reflecting on the moments in loving relationships where one person focuses on another, perceives the world through the other’s eyes, and in turn is heard and understood. It is our conviction—our premise—that communication in instructional settings holds potential for promoting moments of intellectual intimacy, moments in which one participant experiences the thought process of another. Such moments of intellectual intimacy are essential for learning to occur, no less essential for learning to proceed. Our focus has been the academic, clinical, and supervisory settings relevant to professional preparation of speech-language pathologists. Interactions between learners and teachers (i.e., both students and faculty are viewed as learners and teachers) in these settings offer opportunities for creating critical and lasting moments of intellectual intimacy. We established that creating, nurturing, and maintaining such moments is an instructional obligation and a distinct privilege that is unique to the university environment.

In this article, we studied one method that was used to meet this obligation: that is, having students question their professor in the context of their own (i.e., the students’) premises about the subject matter under consideration. Our point was that it is necessary and possible to create learning contexts where students are empowered by exploring the relatedness between their own assumptions (i.e., premises) and applications and extensions of knowledge (i.e., questions and questioning). This process was envisioned as a portal to communication, intellectual intimacy, and learning.

We established our theoretical notion of intellectual intimacy within Postmodernism, which is sensitive to the affective component of learning and is captured for us in the experience of intellectual intimacy. Postmodernism also is sensitive to the role of context in learning and knowing. Meaning and use of information is directly affected, if not determined, by the context in which it occurs. Learning and development are seen as continuous but not linear, similar to spiral processes that extend across the lifespan. Learning is motivated when new problems are discovered. Therefore, problems, or novel events, provide constructive challenges that become positive stepping-stones to learning and growth (S. Shapiro, personal communication, May, 1998). Development is achieved as specific problems are resolved. New problems are encountered and the process begins again, often at a developmentally earlier phase of construction. Advances in thinking and performance are achieved when connections and relations are established among diverse and previously disconnected bodies of information. These principles are shared by the neo-Piagetian constructivist perspectives on learning and development.

Knowledge Accessed and Functions Served by Students’ Questions

The results reveal that across the three courses studied (Language Disorders, Fluency Disorders, and Diagnostics), most of the students’ questions served to access knowledge that is descriptive in nature (i.e., propositional), fewer sought knowledge that is directional in nature (i.e., procedural), and fewest attempted to access knowledge that explains or explores interrelationships among variables (i.e., causal). The students’ questions also revealed three distinct information functions. Most of the students’ questions served an exploration function, fewer served a discovery function (i.e., upon which exploration is based), and fewest served an understanding function (i.e., based on discovery and exploration).

Furthermore, there is an interdependent relationship between knowledge domain and information function. When the knowledge being sought is propositional, the information functions of discovery and understanding occur more frequently than when the knowledge being sought is procedural or causal. If the knowledge being sought is either procedural or causal, the information function of exploration occurs more frequently than if the knowledge being sought is propositional. This interdependence between knowledge domain and information function supports our position that students’ questions reflect both a process and a product of inquiry. Such knowledge construction is continuous and cyclic, but not linear, as students encounter novel problems that are designed and nurtured by instructors. Students pursue propositional, procedural, and causal knowledge in an effort to explore, discover, and contextualize their intellectual and professional world.

Professional Preparation and Practice

The constructive functions of students’ questions and questioning behavior reveal students to be engaged in a process of critical thinking, relationship establishment, and problem solving. This engagement is evidence of constructive formation of knowledge, an important process targeted

<table>
<thead>
<tr>
<th>Knowledge Domain by Information Function</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propositional</td>
<td>230</td>
<td>32.2</td>
<td>289</td>
<td>40.4</td>
<td>196</td>
<td>27.4</td>
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<tr>
<td>Procedural</td>
<td>125</td>
<td>23.2</td>
<td>375</td>
<td>69.6</td>
<td>39</td>
<td>7.2</td>
</tr>
<tr>
<td>Causal</td>
<td>51</td>
<td>14.7</td>
<td>251</td>
<td>72.1</td>
<td>46</td>
<td>13.2</td>
</tr>
</tbody>
</table>

Table 3. Knowledge domain by information function.
Role of Premises in the Analysis of Questions

In this investigation, students’ questions were interpreted in the context of their written premises. Explicating premises enabled students to reflect on material they encountered in class, clinical practice, readings, or other related activities. Indeed, their premises both informed and influenced the questions they asked. Furthermore, making premises explicit provided a context for interpreting and analyzing the information being sought by the students and how that information was being used in pursuit of knowledge. Formative assessments seek evidence that students are engaged in a process of knowledge construction and acquisition. Formative assessment acknowledges that knowledge construction takes time, is developmental in nature, and spans an entire professional program if not a professional career. Summative assessment, in contrast, targets a final state, the possession of a particular professional concept, construct, or skill. ASHA’s Council on Academic Accreditation requires that programs specify their formative assessment, including information supporting the validation of those assessment procedures.

The collection and analysis of students’ questions within and across courses represents a potentially powerful tool in assessing and monitoring the formation of knowledge. This technique of having students explicate premises underlying questions was central to identifying the intellectual functions served by students’ questions. The entire process of questioning with reference to explicating and elaborating premises treats students as active, reflective, problem generators and problem solvers—an essential context for developing master clinicians and expertise in the clinical process. The reflective, questioning process situates learning within the context of theory (i.e., as manifested in students’ premises) and thus holds potential for promoting relativistic thinking about clinical practice. Relativism emerges from recognition that information can hold multiple and alternative meanings and interpretations, and that meaning is influenced by the theoretical context within which one encounters the information and to which one brings one’s own professional and personal experiences to bear.

by ASHA (2001a) for assessment by programs of professional preparation at universities that are accredited by ASHA’s Council on Academic Accreditation. This Council developed standards to be implemented in 2005: the standards distinguish “formative” and “summative” assessment of knowledge and skills being acquired by student speech-language pathologists. Formative assessments seek evidence that students are engaged in a process of knowledge construction and acquisition. Formative assessment acknowledges that knowledge construction takes time, is developmental in nature, and spans an entire professional program if not a professional career. Summative assessment, in contrast, targets a final state, the possession of a particular professional concept, construct, or skill. ASHA’s Council on Academic Accreditation requires that programs specify their formative assessment, including information supporting the validation of those assessment procedures.

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Remaining Questions About Questions

Consistent with the view that learning is a spiral process, we expect new questions to emerge as earlier questions are addressed. The present investigation raises new questions about questions that invite further inquiry and investigation. Consider the following:

- Why were the same patterns observed for the domain of knowledge sought and information function served by the students’ questions in each of the three courses studied? As reviewed earlier, knowledge domains that were accessed from most to least frequent were propositional, procedural, and causal; information functions served from most to least frequent were exploration, discovery, and understanding. Is it consistent with the goal of professional education that causal knowledge was the least frequent domain accessed and that understanding was the least frequent function served by students’ questions? Observed as consistent across courses, the data may not reflect a developmental shift in type or function of questions asked. Are such shifts a function of time, academic and clinical experience, exposure to individual academic or clinical faculty, or proficiency in reflecting on premises and asking questions? Is an academic course in speech-language pathology too broad a context in which to expect developmental changes in patterns of questions and questioning behavior? Would an analysis of questions in the context of clinical practicum reveal more dramatic developmental shifts toward causal knowledge and understanding?

- Programs of professional preparation are committed to developing master clinicians, professionals who are expert in the delivery of clinical service. Therefore, what are the critical ingredients of master clinicians or the development of clinical expertise? Is causal knowledge and understanding essential? Are professionals with advanced causal knowledge and understanding more clinically adept? Are master clinicians more facile at integrating and establishing relationships between observations and events? Are clinicians who are less facile at establishing abstract, causal connections less clinically adept? What are the elements of clinical competence? What are the effective elements of professional preparation that create competent clinicians? How should such elements be measured and evaluated in clinical instruction and professional development? What is the
nature of the relationship between professional education and clinical competence?

- Are questioning skills predictive of success in graduate school or professional practice? Are questioning skills positively correlated with grade point average (GPA), performance on the Graduate Record Examination (GRE), letters of recommendation, final grades for individual courses or clinical practicum, performance on the National Examination in Speech-Language Pathology and Audiology (NESP A), or performance appraisal across one’s professional career?

- If so, what domains of knowledge and information functions are most highly and positively correlated? If not, what is the utility of questions and questioning for a clinical profession? Should facility at asking questions be used as a criterion for admission into graduate school, completion of a program of professional preparation, or employment in a professional setting?

- Can skill in asking questions be taught and acquired? Should such skill be taught and acquired? The first author routinely directs students at the beginning of every course and practicum experience (i.e., before they review the syllabus or requirements) to write what they hope to achieve from the experience and what questions they have upon entry. It is not uncommon for students to express feelings of discomfort when responding to the initial request. They comment that they rarely have been asked for this type of input and, as a consequence, are not clear about what they hope to achieve and how their instructional experiences are interrelated. What is the value of having students (or practicing professionals) able to justify what they intend to accomplish and why? How are commitment, ambition, vision, and question-asking skills related to each other and to success in professional practice?

- Finally, consistent with Slattery’s (1995) advice that “students must be leaders of instruction,” this article challenges all students to personalize, internalize, and thereby “own” their own curriculum. What opportunities are students provided and what opportunities can students create to become leaders of instruction, to impact both the process and products of learning? In what ways might the instructional methods discussed create a learning context for students to become empowered? How might understanding of questions and questioning behavior invite and challenge students to explore the relatedness between their own assumptions and applications and extensions of knowledge? In what ways might students share the responsibility for becoming active, reflective problem solvers? How might they lead the way to becoming master clinicians and lifelong learners into the 21st century?

Many more questions could be raised. If this article is successful, it will stimulate far more questions than it has addressed while exploring interrelationships among variables related to learning, teaching, and intellectual and professional development. We hope that this article will result in open dialogue about the utility of questions and questioning behavior in academic, clinical, and supervisory settings and in the delivery of professional services.

ACKNOWLEDGMENTS

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APPENDIX. TAXONOMY FOR ANALYZING ADULTS' QUESTIONING BEHAVIOR

This taxonomy was designed to analyze and evaluate observable differences in students’ questions according to three domains of knowledge (i.e., propositional, procedural, and causal) and three information functions that the requested information served for the student (i.e., discovery, exploration, and understanding).

PROPOSITIONAL KNOWLEDGE DOMAIN

Propositional questions are attempts at fact finding in order to build a body of knowledge without discerning clinical procedures or addressing the nature of cause and effect or other relationships among variables. Propositional knowledge can serve a variety of functions, including identifying descriptive attributes, determining worthiness of clinical approaches, and establishing relationships between attributes.

Propositional Knowledge Questions—Discovery

Questions serving this function seek descriptive information about one or more attributes of the object of the question. Attributes include but are not limited to the following: description or definition, fact finding, time frame, feeling states, person or other agent, location, components or other elements, frequency. Examples are:

- What seems to be the most common communication disorder in children?
- What is included under the heading language disorder?
- What are the types of stuttering problems?

Propositional Knowledge Questions—Exploration

Questions of this type seek a list, sequence, or “cookbook approach” to the assessment or treatment of a person or specified disorder without reference to cause, underlying characteristics, or theoretic orientation. Examples are:

- What would you, as the clinician, do to help the child overcome the problem?
- How does one consciously develop a program that would help the child who has a problem with pragmatics?
- How can carryover be facilitated?

Propositional Knowledge Questions—Understanding

Questions serving this function seek to establish relationships between attributes or other variables. Examples include:

- Can reinforcement techniques of the behaviorist be altered to fit within the cognitive framework of treatment?
- Are we moving away from the traditional clinical model into perhaps a more consultative model?
- Can age or type of communication disorder play a role in the effectiveness of repetition in treatment?

PROCEDURAL KNOWLEDGE DOMAIN

Procedural questions seek guidance in correctly choosing, implementing, or interpreting instruments, strategies, and observations. They are used to determine how to do something or how to solve a problem. They are different from propositional questions in that they contain inference that the knowledge gained will be applied overtly in a timely or sequential manner. They differ from causal questions in that they do not attempt to determine cause and effect relationships.

Procedural Knowledge Questions—Discovery

Questions of this type seek a list, sequence, or “cookbook approach” to the assessment or treatment of a person or specified disorder without reference to cause, underlying characteristics, or theoretic orientation. Examples are:

- What would you, as the clinician, do to help the child overcome the problem?
- How does one consciously develop a program that would help the child who has a problem with pragmatics?
- How can carryover be facilitated?

Procedural Knowledge Questions—Exploration

Questions serving this function seek guidance about how to do something with reference to causes or underlying characteristics. Examples are:

- How do we draw the line before we become over-involved with our clients and their families so as not to jeopardize ourselves as well as our profession?
- According to class discussion as well as Van Riper’s chapters on self-concept and covert factors, most stutterers have very deep underlying fears and negative attitudes about themselves concerning their disfluencies. How do we counsel these clients?
- How can we address cerebral dominance in treatment for stuttering?
- How do we determine when sound combinations can be considered words in a young child with a language delay?
Procedural Knowledge Questions—Understanding

Questions in this category seek guidance in how to structure clinical procedures from a specified theoretic point of view. Examples are:

- If one assumes that there is a cognitive factor involved in language acquisition and that man is indeed playing an active role in language acquisition, how can we structure treatment from this cognitive point of view?
- A child with a lower IQ level may have a severe stutter and may know that he or she has trouble speaking but may not be aware of the social consequences. In this situation, stuttering modification could be appropriate because it would deal with the child’s inability to communicate and it would provide a good model, but this type of therapy may be cognitively too advanced for the child. Fluency shaping may have advantages because the system is the same as the child would use for other activities. But this system would not teach the child that talking was fun, and the child may choose not to talk rather than struggle when he or she did talk. Therefore, how could a clinician choose an approach based on this type of child?
- The language sample seems to be the best way of examining the person as a whole, yet there is a shortage of time for an in-depth language sample in a diagnostic, and when we write reports we only include what the child can do. How could Kent’s idea of seeing the whole individual be incorporated more into a diagnostic setting?

Causal Knowledge Questions—Discovery

Questions of this function ask for specific etiologies or explanations for observable phenomena. Examples are:

- What are the causes of language disorder?
- What causes stuttering?
- Why are prolongations a more severe form of stuttering?

Causal Knowledge Questions—Exploration

Questions of this type explore how one or more variables influence one another or lead to a particular outcome. Such questions often address conditional (i.e., if/then) relationships. Examples are:

- What is the outcome if this is allowed to happen?
- Is there more nonverbal learning taking place than we may realize that accounts for a child’s semantic knowledge?
- How is a particular child’s level of play related to his or her level of language functioning?
- Emerick and Haynes define echolalia as “abnormal multiword utterances.” How is it [echolalia] related to a child’s cognitive development if his/her language is characterized by such behavior?

Causal Knowledge Questions—Understanding

Questions of this type serve the function of establishing relationships between theoretic perspective and predisposing, precipitating, and/or perpetuating factors. Examples are:

- The Goldman-Fristoe (GFTA) adopts this premise and tests sound production in these three positions (initial, medial, and final). The Kahn-Lewis (KLPA) is at the other end of the spectrum, assuming that children produce sounds according to an overall pattern or concept (e.g., voicing). The GF does not appear to be congruent with its [the KLPA’s] premise. What is the premise of the KLPA and how can it be much different from [the premise of] the GF because it [the GF] is its foundation for analysis.
- You suggested that on the basis of interactionist theory, an innate linguistic ability and a rich linguistic environment are necessary for normal language to emerge. You also suggested that interactionism contains elements of both behaviorism and nativism. What is the relationship of the active learner’s exploration of his or her environment to S–R connections? How does interactionist theory relate to children’s theories of mind?
- Golinkoff (1986) suggested that negotiation of failed messages represents a refinement of the tactics necessary to establish a discourse topic. Golinkoff identified in the negotiation of failed messages the roots of communicative understanding. She concluded that learning to communicate may well require that an infant be misunderstood. Shatz and O’Reilly (1990) questioned that view. They suggested that the ambiguous nature of negotiation makes it difficult for children to discover meaning. Based on both lines of evidence, what are your thoughts on the role of clarification formats in language development? For example, is the word “what” sufficiently ambiguous to threaten a child’s ability to learn to send clear messages?