Clinical reasoning, the thought process occupational therapists use during evaluation and treatment, is central to practice (Dutton, 1995; Mattingly & Fleming, 1994). Teaching clinical reasoning is therefore vital to the professional preparation of occupational therapy students (Royeen, 1995). The various types of clinical reasoning that occupational therapists use in practice have been well explained in the literature (e.g., Fleming, 1991a, 1991b; Mattingly 1991a, 1991b; Rogers & Holm, 1991; Schell & Cervero, 1993). Various strategies for teaching some of these types of reasoning have also been described (e.g., Cohn, 1989; Neistadt, 1987, 1992; VanLeit, 1995). However, to date, no one has examined teaching strategies for all types of occupational therapy clinical reasoning in a single article. This article reviews clinical reasoning teaching strategies, using the different types of occupational therapy clinical reasoning as an organizing framework.

Clinical Reasoning

Clinical reasoning is not new to occupational therapy. Therapists have always engaged in clinical reasoning, and educators have always sought to teach students how to think like therapists. Although these thought processes are not new, the language that we now have available to describe those thought processes is relatively new. This naming of our thought processes provides advantages for both therapists and educators. For therapists, the current clinical reasoning terminology can help to (a) improve clinical decision making through giving therapists tools for self-conscious reflection on their decisions; (b) improve abilities to explain the rationales behind therapist decisions to clients, family members, team members, and insurance carriers; and (c) improve job satisfaction by making therapists more aware of the complexity of their work (Hall, Robertson, & Turner, 1992; Parham, 1987; Slater & Cohn, 1991; Terry & Higgs, 1993). For educators, the current clinical reasoning language can (a) allow more explicit mentoring of clinical reasoning, (b) help students develop more precise thought processes sooner, and (c) give students a vocabulary for self-evaluation and improvement of their clinical reasoning skills (Dutton, 1995; Royeen, 1995).

If occupational therapy educators are to derive the potential benefit of current clinical reasoning language, they must use that language to describe their teaching methods. Just as clinical practice may be strengthened when therapists become consciously aware of thought processes that were previously automatic or tacit, so too can education become more effective when educators explicitly tell students what types of reasoning various
assignments are meant to foster.

The development of clinical reasoning follows a continuum through the following stages: novice, advanced beginner, competent, proficient, and expert (Benner, 1984; Dreyfus & Dreyfus, 1986; Dutton, 1995; Slater & Cohn, 1991). A novice is "characterized by the rigid application of rules and principles learned in school" (Dutton, 1995, p. 8), regardless of the circumstances of a particular case. A novice therapist or student performs a complete sensory evaluation on all clients in a physical dysfunction setting—even on those who are not suspected of having sensory problems—because he or she learned in school that a thorough physical dysfunction evaluation includes a detailed sensory evaluation.

An advanced beginner can modify rules and principles for specific situations (i.e., "situational thinking" [Dutton, 1995, p. 8]) but still has difficulty prioritizing evaluation information. The advanced beginner therapist will use goniometry to measure only those joints that appear to have less than full range on observation of functional movement but will see decreased range at any joint as an occupational therapy problem, even if the client does not experience any functional limitations from some of those reduced ranges.

The competent therapist is able to adjust procedures to specific situations and perceive the relative importance of different pieces of information about a client but may still have difficulty altering initial treatment plans. The competent therapist will identify as occupational therapy problems only those range of motion deficits that cause functional limitations. However, this therapist may be resistant to changing the treatment activity planned for a given day (i.e., switching from active range of motion exercises to kitchen activities) because he or she has difficulty in seeing quickly how different activities can be modified to accomplish given treatment goals.

The proficient therapist has the flexibility to alter treatment plans as needed in the treatment process and has a clearer sense than therapists in earlier developmental stages of the client's total situation, including the physical and social aspects of the potential discharge situation. The proficient therapist can easily change his or her treatment activity, at the client's request, from teaching active range of motion exercises to making tea because he or she understands the symbolic and practical importance of kitchen activities for the client and can see how to adapt the tea task to elicit maximal active range of motion from the client.

Expert therapists seem to be able to organize their approach to treatment more from client cues than from preconceived plans of therapeutic action. The expert therapist can begin an initial evaluation from any data point and gather information in whatever sequence is dictated by a particular client situation. Experts are able to recognize client problems and potentials quickly on the basis of their recognition of patterns from previous clinical experiences.

It is not reasonable to expect occupational therapy students to graduate as competent, proficient, or expert therapists. Those levels of clinical reasoning require years of clinical practice and continuing education. However, it is possible for students to enter practice as novices or advanced beginners who are capable of progressing to higher levels of clinical reasoning if their academic preparation for Level II fieldwork has given them an awareness of the types of reasoning they will be using in practice (Benner, 1984). This awareness of clinical reasoning concepts can help students learn about their thinking and doing in clinical practice simultaneously, intensifying the learning derived from clinical experience (Pesut & Herman, 1992). Educators can foster that awareness by explicitly naming the types of reasoning different assignments and learning experiences are meant to promote.

The types of clinical reasoning that have been identified in the occupational therapy literature to date include narrative reasoning, interactive reasoning, procedural reasoning, pragmatic reasoning, and conditional reasoning. Narrative reasoning deals with the client's occupational story and focuses on the process of change needed to reach an imagined future (Clark, 1993; Mattingly, 1991a). The occupational story answers the following questions:

1. What activities and roles were important to this client before his or her injury or illness?
2. What valued activities and roles can this client perform now?
3. What valued activities and roles are possible in the future, given his or her residual disability?
4. Which valued activities and roles would the client choose as priorities for the future?

Interactive reasoning deals with how the disability or disease affects the client (i.e., the client's illness experience) and focuses on the client as a person (Crepeau, 1991; Fleming, 1991b). Interactive reasoning has also been termed the community aspect of practice (Hasselkus & Dickie, 1994) because it deals with the therapeutic relationship the therapist forms with a client and his or her caregivers.

Procedural reasoning involves identifying occupational therapy problems and implementing treatment strategies via systematic gathering and interpreting of client data. This thought process, which has also been called
Teaching Strategies

Because all occupational therapy curricula seek to teach clinical reasoning, the teaching strategies reviewed and described in this article can be integrated into existing courses within any curricula. It is not necessary to offer specific courses on clinical reasoning. In fact, integrating clinical reasoning teaching throughout a curriculum is very effective in helping students connect all their course work with clinical reasoning skills and transfer their reasoning from the classroom to the clinic (Higgs, 1992; Terry & Higgs, 1993). Generally speaking, facilitation of pragmatic and conditional reasoning is most appropriate toward the latter part of a curriculum, after students feel somewhat comfortable with their basic narrative, interactive, and procedural reasoning skills (Cohn, 1989; Dutton, 1995). Table 1 categorizes different teaching strategies according to the type of clinical reasoning those strategies facilitate. These teaching strategies come from the literature and my teaching experiences. The following sections analyze the characteristics of assignments appropriate to facilitating specific types of reasoning and describing selected strategies.

Narrative Reasoning

The first three strategies listed in Table 1 for narrative reasoning aim to help students understand the narrative concept of life stories. These assignments help students appreciate that we all live and create our own life stories every day and that those life stories can be changed and altered unexpectedly by illness and disability. Crepeau (1991), for example, suggests that novels like Miller's (1990) Family Pictures and personal accounts of disability like Murphy's (1990) The Body Silent can "enhance our understanding of the effects of disability on persons and their families" (p. 1024). A more complete list of suggested readings is provided in Peloquin and Davidson's (1993) article.

Asking students to write narratives, or stories, about persons with disabilities who they have met in Level I fieldwork or in classroom settings is another way to foster narrative clinical reasoning skills. Students can be asked to focus these stories on the possible future of a person with a disability and on how this person's past and present might be reflected in that future. This type of writing shifts students out of the "chart talk" (Mattingly & Fleming, 1994, p. 60) of medical terminology associated with procedural reasoning into a more client-centered storytelling mode.

To apply the general concept of client narratives to clinical practice, students need specific instruction on how to build occupational narratives with clients. Orienting students to interview instruments such as the Canadian Occupational Performance Measure (Pollock, 1993) or the Patient Participation System (Payton, Nelson, & Ozer, 1990), which focus on the activity preferences of clients, is a way to help students translate the concept of occupational narrative—a life story of occupation (Clark,
Table 1
Teaching Strategies for Different Types of Clinical Reasoning

<table>
<thead>
<tr>
<th>Narrative Reasoning</th>
<th>Interactive Reasoning</th>
<th>Procedural Reasoning</th>
<th>Pragmatic Reasoning</th>
<th>Conditional Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading and analyzing literature about disability experiences (Crepeau, 1991;</td>
<td>Reading and analyzing literature about disability experiences (Crepeau, 1991;</td>
<td>Case study exams (Schwartz, 1991)</td>
<td>Ethical case scenarios (Neuhaus, 1988)</td>
<td>Systems treatment plans</td>
</tr>
<tr>
<td>Writing narratives about clients met (Mastingly &amp; Fleming, 1994)</td>
<td>Writing journals and reflective papers (Crepeau, 1991; Tryssenaar, 1995)</td>
<td>Formal debates (Field, 1992; Higgs, 1992)</td>
<td>Systems treatment plans</td>
<td>Level I fieldwork</td>
</tr>
<tr>
<td></td>
<td>Level I fieldwork (Redeen, Kautzmann, Cowan, &amp; Benzing, 1995)</td>
<td>What and why questions (Cohn, 1989)</td>
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<tr>
<td></td>
<td>Methods of collaborative goal setting (Payton, Nelson, &amp; Ozer, 1990)</td>
<td>Metacognitive questions (Perutz &amp; Herman, 1992)</td>
<td></td>
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</tbody>
</table>

1993)—into concrete clinical procedures for building that narrative.

**Interactive Reasoning**

The strategies listed in Table 1 for interactive reasoning are meant to either heighten students’ awareness of illness experiences, promote insights about their interactional styles and therapeutic qualities, or provide opportunities for them to practice therapeutic interactions with actual clients. Reading literature on disability experiences (Crepeau, 1991; Peloquin, 1989, 1995; Peloquin & Davidson, 1993) can help students understand how different persons experience illness. Additionally, Peloquin (1989) suggested that by reading this type of literature, students can "reflect on and affirm the importance of relationships and caring in practice by comparing and contrasting those various characteristics most conducive to helping" (p. 225).

Students can use journals and reflective papers to become more aware of their feelings, their therapeutic capacities, and the feelings of clients (Crepeau, 1991; Neistadt, 1987; Peloquin & Davidson, 1993; Tryssenaar, 1995). They also can use self-evaluations of their interactive styles, such as the ones suggested by Peloquin and Davidson (1993) and the one presented in Appendix A, to become aware of their therapeutic capacities.

Faculty feedback about clinically related behaviors can augment students’ awareness of their behavioral styles. Sands (1995), for example, described the use of a Personal and Academic Performance Summary (PAPS) in Orange County Community College’s Certified Occupational Therapy Assistant Program in New York state. Faculty members (two full time, two part time) use the PAPS to reach consensus on each first-year student’s clinically related attitudes, interpersonal skills, and behaviors, and each student meets with two faculty members to review the completed PAPS. Sands has used this process for 5 years with more than 100 students and “found that making a connection between students’ behaviors and attitudes and their potential performance in a therapeutic environment has given students an incentive to engage in a realistic form of self-evaluation that has produced beneficial results” (p. 151).

Interaction with actual clients, in either classroom or Level I fieldwork settings, has also been found to facilitate students’ interactive reasoning skills. For example,
Rydeen, Kautzmann, Cowan, and Benzing (1995) of Eastern Kentucky University found that students involved in a faculty-supervised Level I experience in an Alzheimer’s day-care and respite program “developed an awareness of the personal, familial, and social ramifications of Alzheimer’s disease and of the individuality of each program participant” (p. 117).

Ideally, interactive reasoning in occupational therapy is used to form a partnership with clients (Fleming, 1991b; Peloquin, 1990). Students are helped to implement this collaboration in practice if they are given instruction about exactly how to involve clients and their caregivers in goal setting and treatment planning. Payton et al. (1990) delineated specific guidelines on client interviewing for the purpose of collaborative goal setting. Payton and Nelson have been using this system successfully at the University of Virginia for 5 years to teach physical therapy and occupational therapy students how to collaborate with clients (C. E. Nelson, personal communication, July 17, 1995).

Procedural Reasoning

Much of the occupational therapy curricula is focused on teaching students procedural reasoning (i.e., the evaluation and treatment skills occupational therapists use in practice). The teaching strategies listed in Table 1 for procedural reasoning are meant to increase the effectiveness of that teaching by making it more directly related to clinical practice. A continuum of practice-related experiences is represented in this list, from paper case studies (Field, 1992; Higgs, 1990, Schwartz, 1991), to simulated clinical experiences (Neistadt, 1987, 1992; VanLeit, 1995), to actual clinical experiences (Levine & Gitlin, 1990; Neistadt & Cohn, 1990; Zimmerman, 1995).

Schwartz (1991), for example, has suggested that case study exams are a more effective way to promote clinical thinking than multiple-choice tests aimed at testing students’ recall of course content. Case study exams are a way to help students apply procedural information to clinical situations. Appendix B provides an example of a case study exam format that I developed for the Rehabilitation of the Upper Extremity course at the University of New Hampshire. This format combines case studies and multiple-choice questions, a practical format for large lecture courses. Students are given the case studies and study questions before the exam to guide their studying toward clinical problem solving and away from straight memorization.

Higgs (1990) described an interesting use of paper case studies in a physical therapy curriculum at the University of Sydney in Australia. This learning experience requires students to work in groups of three to prepare hypothetical case studies about clients who seek physical therapy services. These case studies are then presented to two groups of three to four students who are responsible for making diagnostic, treatment, and evaluation decisions about the case presented. The creation of these case studies requires students to research the signs and symptoms of particular diagnoses and accurately depict a possible set of physical therapy problems that might be associated with those diagnoses, a more active process than having a typical case presented and explained by an instructor. Higgs found this case study assignment and ensuing discussions to be very effective in promoting students’ diagnostic and procedural reasoning skills. Field (1992) has used a similar format in the physical therapy program at the University of Miami where two teams of two students each formally debate treatment options for paper case studies provided by the instructor.

Relative to simulated clinical experiences, I have found a classroom-as-clinic methodology to be effective in promoting students’ diagnostic reasoning skills. In these experiences, students are asked to (a) generate tentative occupational therapy problem lists from preliminary diagnostic and social information about guest speakers with disabilities and (b) revise those lists after actually meeting and interviewing the guest speakers. Students are graded on the accuracy of their problem lists relative to those of an experienced therapist. Both lists relate directly to clinical practice—the first represents the mental hypotheses a therapist might generate after an initial chart review, and the second represents the summary problem list from an initial evaluation. This same format could be used with actors posing as clients (VanLeit, 1995) or with videotapes of clients being evaluated by experienced occupational therapists.

Level I fieldwork can provide an opportunity for students to learn hands-on techniques with actual clients. For example, Zimmerman (1995) described a cooperative education model for Level I fieldwork where occupational therapy students mostly function as paid occupational therapy aides.

Cohn (1989) suggested that videotaping students’ interactions with actual clients and later discussing their clinical reasoning in those sessions, with reference to the videotapes, is an effective way to improve their procedural reasoning abilities. Cohn also suggested that asking students what and why questions about their clinical decisions can help them develop and articulate their reasoning processes. Similarly, Pesut and Herman (1992) suggested that nursing students can be helped to develop their reasoning by answering metacognitive questions about their
The teaching strategies listed in Table 1 for pragmatic reasoning seek to sensitize students to some of the practical issues of clinical practice (e.g., reimbursement, documentation, staffing and equipment resources) and their ethical implications (Neuhaus, 1988). The systems treatment plan, for example, is an assignment developed by Ruth Smith at the University of New Hampshire for the senior-level occupational therapy course, Systems of Therapeutic Intervention in Physical Dysfunction. Through a series of field trips and guest lectures, this course orients students to many of the settings in which they might work as physical dysfunction therapists. On their field trips, students meet and interview an actual client for whom they need to write a systems treatment plan. The guidelines for the systems treatment plan are as follows:

1. Describe how the system affects the client and his or her family members or caregivers. Be sure to comment on the appropriateness of the system for this client.
2. Describe the system factors that guide occupational therapy intervention (i.e., regulations, reimbursement, institutional or departmental policies).
3. Describe precautions you consider important for this client in this setting.
4. List the problems you would address with this particular client in this setting.
5. Describe for each problem the types of treatment activities you would use for this client in this particular setting (types = broad categories of activities such as activities of daily living) and the level of client performance you would expect at the time of discharge from this setting.
6. Describe how the system aids and hinders the occupational therapist responsible for this client's program.

This assignment helps students expand their notion of a treatment plan to include consideration of the practical factors that can affect their work with clients.

Conditional Reasoning

The teaching strategies listed in Table 1 for conditional reasoning are meant to give students experience with integrating narrative, interactive, procedural, and pragmatic reasoning in the planning or implementation of treatment. Level I experiences that allow students to work with some of the same clients for several weeks so that they can develop an appreciation for client change over time are particularly effective for promoting conditional reasoning. Levine and Gitlin (1990), for example, described a teaching model where occupational therapy students work individually with community-based clients with chronic disabilities over the course of a semester (6-10 visits averaging 1 hour or more). The students used a participant-observer approach to data collection to identify the client's world, functional performance, social interactions and networks, and environment. That information was used as the basis for collaborative problem solving with clients about adaptive equipment or activity modifications to meet the client's identified needs. This fieldwork model forces students to use all types of clinical reasoning in a real clinical situation. Faculty members can also help students pull the different aspects of clinical reasoning together by modeling conditional reasoning through "professional self-talk" (Rogers, 1982, p. 29), that is, through explaining their thought processes during videotaped or recalled exemplar clinical incidents (Farrell & Bramadat, 1990).

Conclusion

In the current health care climate, occupational therapists need to be effective and efficient enough in their clinical thinking to deliver quality client services in the context of constantly changing organizational structures. To function well in this environment, entry-level practitioners need to progress quickly to the competent therapist stage of clinical reasoning, be able to alter their procedures as needed for specific situations, and prioritize client problems. Teaching strategies that are explicitly aimed at improving the clinical reasoning skills of occupational therapy students may speed their ultimate progression through the stages of clinical reasoning by helping them learn about their thinking and doing simultaneously during their clinical experience.

Many of the clinical reasoning teaching strategies suggested in this article will sound familiar to faculty members in occupational therapy educational programs. What may not sound familiar is the description of these learning experiences in terms of the types of clinical reasoning they are likely to facilitate. By specifically naming the types of reasoning they are trying to help students develop, occupational therapy educators can help them become aware of their own clinical reasoning skills and lay the foundation for the continued development of
Appendix A
Analysis of Therapeutic Self Assignment

One of the most important tools that you bring to the therapeutic situation is your self. The purpose of this paper is to help you start thinking about that self in a focused way so that you become more aware of the personal resources that you can bring to therapeutic relationships.

In an 8- to 10-page paper:

1. Describe your personal style, referencing the following qualities. In your descriptions, include examples of illustrative behaviors that you have demonstrated in clinical helping relationships. (You may want to reflect on your Level I experiences.) The following qualities are in alphabetical order—you do not have to follow this order in your paper. Rather, we would like you to choose whatever organization works best for you. The comments after each quality are meant simply to give you some ideas or to clarify the concepts.
   a. Affect, emotional tone (enthusiastic, energetic, serious, low key)
   b. Atending and listening (including your ability to reflect back on and add to what the speaker has said)
   c. Cognitive style (detail or gestalt oriented, abstract or concrete, ability to understand diverse points of view)
   d. Confidence (not only what you feel, but also what you think you show to others)
   e. Confrontation (can you do it and with whom?)
   f. Empathy (for what emotions, in what situations?)
   g. Humor (do you use it, and if so, how?)
   h. Leadership style (directive, facilitative, follower)
   i. Nonverbal communication (facial expressiveness, eye contact, voice tone and volume, gestures)
   j. Power sharing (need to control, comfortable with chaos)
   k. Probing (when are you comfortable doing it, with whom, and about what?)
   l. Touch (do you use it automatically or consciously, when, where, and with whom?)
   m. Verbal communication (vocabulary, use of vernacular, ease of speaking)

2. Summarize what you see as your strengths and weaknesses relative to establishing therapeutic relationships.

3. In anticipation of your upcoming Level II fieldwork experience, delineate areas or skills that you would like to improve and suggest strategies for doing so.

You will be graded on your organization, the clarity of your writing (including how well your examples illustrate your descriptions), and your thoroughness in completing the assignment. Content here is personal and, therefore, not gradable.

Note: Developed by Maureen E. Neistadt, SIO, OTR/RL, FAOTA, for the Interactive Reasoning Seminar at Tufts University, Medford, Massachusetts, 1989.

Appendix B
Case Study Exam Example

Case Study

M. G. is a 24-year-old woman who is a right-handed, married, computer programmer with no children. For the past few months, she has been working a lot of overtime and has often worked 70 hours per week. She has gone to her physician complaining of intermittent numbness in her wrists and hands and pain in her upper arm. When she first started having problems with her hands about 2 weeks ago, she was experiencing intermittent pins and needles in her wrists and hands and pain in her upper arm. Her hands are now swollen, particularly over their dorsal surfaces. She is experiencing more symptoms in her right hand than in her left. She has been referred to occupational therapy as an outpatient for splinting.

Study Question

What is M. G.'s medical diagnosis? What sensory and motor problems would you expect to find in M. G.'s hand as a result of the diagnosis? What types of grasps would she be likely to have trouble with? List five activities that might be difficult for her and explain why those particular activities would be hard.

Test Questions

1. M. G.'s most likely medical diagnosis is:
   a. Reflex Sympathetic Dystrophy
   b. cumulative trauma disorder in her wrists
   c. Thoracic Outlet Syndrome
   d. compression of her cervical nerve roots

2. M. G.’s pattern of swelling indicates:
   a. damage to the dorsal structures in her hands
   b. inflammation in the dorsum of her hands
   c. poor posture at her workstation
   d. the inflammation at the site of her diagnosis has overtaxed the lymphatic drainage and venous return systems

Appendix C
Metacognitive Questions for Students to Ask Themselves During Evaluation and Reassessment

Data Search

"What decisions have I made to narrow my data search?"
"Have I used all available types and sources of data?"
"Have I collected all the data I need?"
"Am I clear on the meaning of the data?"

Cue Clustering

"What are some possibilities for clustering of cues?"
"What experiences have I had before with these cues and how did I cluster them?"
"Is there a logic to the cue clusters?"
"Have I distinguished relevant from irrelevant cues?"
"What diagnostic hypotheses am I generating based on cues clustered?"
"Are the diagnostic hypotheses within the domain of occupational therapy practice?"
Planning

“How do I plan to turn the problem into an outcome?”
“What [occupational therapy] interventions do I plan to influence the [problem]?”
“Creatively, what [occupational therapy] interventions can I develop to influence the [problem]?”
“Are my plans useful, effective, and efficient?”

Renovation

“Do the [occupational therapy] interventions need to be revised?”
“Does the patient outcome need to be revised?”
“Does the problem/etiology need to be revised?”
“Do the cues clusters need to be revised?”
“Does the data search field need to be reshaped?”

(Pesut & Herman, 1992, pp. 152-153)

References


1See reference list at the end of article for additional reading sources.


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2See reference list at the end of article for additional reading sources.