The Classroom as Clinic: Applications for a Method of Teaching Clinical Reasoning

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This study examined the efficacy of one method for teaching diagnostic reasoning to occupational therapy students. During a clinical reasoning seminar in their first academic year, 80 entry-level occupational therapy master's degree students in three successive classes were given three different levels of exposure to classroom-as-clinic or in-class evaluations of adults with physical or psychosocial disabilities. During the following summer, most students completed their first Level II fieldwork experience. Students' grades for a second-year classroom-as-clinic experience with adults with physical disabilities were then compared across groups to determine the relative effect of the different seminar formats and fieldwork experiences. Students who had experienced in-class evaluations during their first academic year wrote significantly more accurate second-year evaluations than those who had not. Students who had completed psychosocial Level II fieldwork experiences were as accurate on their evaluations as students who had had physical dysfunction fieldwork experiences. The results suggest that in-class evaluations improve students' diagnostic reasoning skills.

Skill in clinical reasoning is essential for effective occupational therapy practice (Fleming, 1991; Parham, 1987; Rogers, 1983; Slater & Cohn, 1991). "Clinical reasoning is a dynamic process of inquiry in action that takes place in the context of occupational therapy evaluation and treatment" (Tufts University–Boston School of Occupational Therapy [BSOT], 1990, p. 3). Schwartz (1991) recently highlighted the need for occupational therapy education programs to develop and implement teaching methodologies that encourage the development of students' clinical reasoning abilities.

In 1987, I described a classroom-as-clinic method designed to teach occupational therapy students the clinical reasoning process associated with evaluation and treatment planning. A previous study demonstrated that this method improved occupational therapy students' abilities to accurately analyze preassessment data and formulate appropriate treatment plans (Neistadt, 1987). Students in that study engaged in classroom-based evaluations of adults with physical disabilities at the end of an occupational therapy curriculum, after they had taken all of their nonselective course work and before they had begun their Level II fieldwork experiences. One question raised by that study was whether in-class evaluations of adults with physical or psychosocial disabilities would effectively teach clinical reasoning earlier in an occupational therapy curriculum. The present study addressed this question.

Literature Review

Rogers and Masagatani (1982) and Rogers (1983) originally described therapists' thought processes during initial evaluations as involving a sequence of deduction, induction, dialectical reasoning, and ethical reasoning. Therapists, said these authors, begin their evaluations with a review of clients' charts or other preassessment information that might be available or both. From this review, therapists form hypotheses about possible problems of clients through a process of deduction. Therapists evaluate their clients, then modify their preassessment hypotheses by considering the specific details of clients' cases (induction) and deciding between different interpretations for clients' behaviors (dialectical reasoning). Therapists then work with their clients to establish treatment priorities consistent with the clients' value systems (ethical reasoning).

More recently, Rogers and Holm (1991) referred to the thought processes that occupational therapists use during initial evaluation as diagnostic reasoning. Diagnostic reasoning "is the sequence of decisions that leads to occupational therapy diagnosis" and "is one component of the clinical reasoning involved in the occupational therapy process" (Rogers & Holm, 1991, p. 1045). The occupational therapy diagnosis "describes the actual or potential effects of disease, trauma, developmental disor-
okers, age-associated changes, environmental deprivation, and other etiologic agents on occupational status" (Rogers & Holm, 1991, p. 1045). This occupational therapy diagnosis becomes the foundation for collaborative treatment planning with the client.

According to Rogers and Holm (1991), the diagnostic reasoning process involves both problem sensing and problem definition. "A therapist senses a problem by framing it, that is, by deciding what will be included in the picture. The picture inside that frame is the clinical image" (Rogers & Holm, 1991, p. 1045). This formation of clinical images begins during the chart review stage of assessment and is influenced by the reason for occupational therapy referral, the practice setting, the experience and frames of reference of the therapist, and the client's condition, age, and sex. The severity of the client's condition will also influence the clinical image (Rogers & Holm, 1991). This clinical image would include mental assumptions on problem definitions. "A therapist senses a problem by thinking about the client's future, 'given the constraints of the physical condition within the client's personal and social context' (Fleming, 1991, p. 1013).

During chart review, therapists use primarily procedural (diagnostic) reasoning. Experienced clinicians might also use conditional reasoning at this stage to begin forming an image of the client's future, given the diagnostic, prognosis, and social and vocational history. During client evaluation, therapists combine procedural (diagnostic), interactive, and conditional reasoning to observe, elicit, and interpret cues so they can develop a treatment plan that is meaningful to the client.

Cohn (1991) stated that occupational therapy clinicians and clinical educators frequently complain "that academic programs do not adequately prepare students for the uncertainties inherent in the challenges of practice" (p. 969). Perhaps these complaints arise because the traditional teaching and testing methodologies of higher education cannot foster the complex array of reasoning skills that occupational therapists must use in practice. More experiential teaching modes that use testing methods linked to clinical practice might teach clinical reasoning better (Schwartz, 1991). The primary purpose of the present experimental study was to see whether a modified classroom-as-clinic method in the first year of an entry-level master's degree program would improve the clinical reasoning skills of students by the second year of their program, as measured by performance in a classroom-as-clinic experience at the beginning of the second academic year. A secondary purpose was to assess the effects of Level II fieldwork experiences on these students' second-year classroom-as-clinic performances.

Method

Design

A post hoc experimental design was used to compare the second year classroom-as-clinic performances of three independent groups of students. As a result of ongoing curriculum development, three successive groups of students were given three different levels of exposure to classroom-as-clinic or in-class evaluations of adults with physical or psychosocial disabilities during a clinical reasoning seminar in the second semester of their first academic year.

Subjects

The subjects in this study were 80 entry-level master's degree students at Tufts University-Boston School of Oc-
Subjects were members of three successive groups of students attending the university between the years 1989 and 1992 (for Group 1, n = 21; Group 2, n = 31; Group 3, n = 28). Their ages ranged from 22 years (±40 years). Five subjects were men and 75 were women. The average predmission grade point average was 3.1 for all three groups of students.

All subjects took their basic science, pathology, and introductory occupational therapy course work in their first academic year. As part of the first academic year's work, all subjects participated in clinical reasoning seminars on observation skills and interactive reasoning during their first and second semesters, respectively. Subjects also took either a psychosocial or physical dysfunction course in the second semester of their first year, to prepare them for a first summer Level II fieldwork corresponding to the dysfunction course they had taken. Some subjects elected not to do a Level II fieldwork that first summer for personal or financial reasons. In the first semester of the second year, all subjects participated in an advanced occupational therapy course that used the classroom-as-clinic teaching method. The second-year course work included clinical reasoning seminars on procedural and conditional reasoning in the first and second semesters, respectively. Additional course work in pediatrics and in the major dysfunction course not taken in the first year was also offered. Most subjects completed their second Level II fieldwork in the summer after the second academic year, with the remaining subjects completing their first and second Level II fieldwork at this time.

For Group 1, the interactive reasoning seminar did not include contact with persons with physical or psychosocial disabilities. The goal in this first seminar was to improve subjects' self-awareness so that they would be able to interact as therapeutic agents with future clients. Lectures and small group exercises about interviewing, empathy, and nonverbal communication were used. Subjects expressed dissatisfaction with the lack of client contact in this seminar. Consequently, the interactive seminar for Group 2 included in-class student group interviews with persons with physical or psychosocial disabilities. Faculty thought that this interview experience helped students develop their interactive reasoning skills, but that it did not force students to use interactive reasoning in conjunction with procedural and conditional reasoning, as would be required in clinical evaluations and treatment. Therefore, the interactive seminar for Group 3 included modified classroom-as-clinic experiences.

Course outlines, testing methods, and Level I fieldwork for all courses but the interactive seminar remained constant during the study period. Group 3 had a different instructor than Groups 1 and 2 for two psychosocial courses and one pathology course. Otherwise, course instructors remained constant throughout the study period.

Procedure

The format of the classroom-as-clinic experience was based on Rogers' model of clinical reasoning during initial evaluation (Rogers, 1983) and has already been described in detail (Neistadt, 1987). During these experiences, the subjects were expected to write a problem-goal-plan list after reviewing limited preassessment information (i.e., diagnosis and social situation) and to revise that list after interviewing a guest participant with a physical or psychosocial disability. In the original classroom-as-clinic method, which was used in the advanced occupational therapy course at the beginning of the subjects' second year, subjects did not receive any information on the diagnosis of the guest participant before the day of the in-class evaluation and were expected to write their first problem-goal-plan list in the 30 to 40 min immediately preceding their meeting with the guest participant. For this first second-year evaluation, the guest participants all had conditions diagnosed as central nervous system dysfunction. In the modified in-class evaluation used in the first-year interactive reasoning seminar for subjects in Group 3, subjects received preassessment information about the guest participants 1 week in advance and were given 1 week to work on their initial problem-goal-plan lists at home, using their books and class notes as references. For all in-class evaluations, subjects met in small groups with one guest participant for 90 min and then wrote revised problem-goal-plan lists which they then handed in at the end of class.

The grades on the problem-goal-plan lists represented the percentage of correct problems that the subjects recorded from a list of expected problems for a given diagnosis or guest participant. The preassessment or chart review correct problems lists were derived from the Uniform Occupational Therapy Evaluation Checklist (American Occupational Therapy Association, 1981). Problem areas specific to particular diagnoses were selected from this list according to the occupational therapy literature and the instructor's clinical experience. The postassessment or evaluation correct problems lists were also derived from the uniform checklist and were based on the clinical experience of the instructor and the clinical observations of the faculty co-leaders in the guest participants' groups. The grading procedure, course instructor, and guest participants were the same for all three subject groups.

Results

Subjects' grades on the chart review and evaluation problem-goal-plan lists for the first classroom-as-clinic experience in the second year were analyzed with two-way analyses of variance and Tukey pairwise comparisons (Cody & Smith, 1987). Subject group during the first year and Level II fieldwork during the first summer were the inde-
pended variables, and grades on the second-year problem-goal-plan lists were the dependent variables in these analyses. A significance level of .05 was used.

**Chart Review Lists**

For the chart review lists, there was no significant effect for either subject group \( F(2, 71) = 2.47, p = .0919 \) or type of Level II fieldwork \( F(2, 71) = 0.60, p = .5495 \). Tukey pairwise comparisons showed no significant differences in chart review grades among any of the three subject groups (see Tables 1 and 2).

There was a significant group by Level II fieldwork interaction \( F(2, 71) = 3.05, p = .0224 \) in the chart review analysis of variance. When the sample was sorted by groups, one-way analyses of variance with Level II fieldwork as the independent variable and chart review grades as the dependent variable showed a significant Level II fieldwork effect only for Group 1 \( F(2, 18) = 4.36, p = .0286 \). Tukey pairwise comparisons for this group showed significant differences in chart review grades between subjects who had had physical dysfunction Level II fieldwork and those who had had psychosocial Level II fieldwork. The former scored an average of 90.7%; the latter, an average of 79.7%.

**Evaluation Lists**

For the evaluation lists, there were significant effects for both group \( F(2, 71) = 11.74, p = .0001 \) and Level II fieldwork \( F(2, 71) = 4.27, p = .0177 \). There was no significant group by Level II fieldwork interaction \( F(2, 71) = 1.12, p = .5558 \). Tukey pairwise comparisons showed significant differences in evaluation list grades among all three groups (see Table 1) and between those subjects who had had physical dysfunction Level II fieldwork and those who had not done any Level II fieldwork in the preceding summer (see Table 2). Paired t-test comparisons showed that only Group 3, with the in-class evaluation experience, improved significantly from the chart review to the evaluation list grades (see Table 2).

### Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Chart Review Lists</th>
<th>Evaluation Lists</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M(%) )</td>
<td>( SD )</td>
</tr>
<tr>
<td>1 ((n = 21))</td>
<td>87.1</td>
<td>9.4</td>
</tr>
<tr>
<td>2 ((n = 31))</td>
<td>90.4</td>
<td>9.9</td>
</tr>
<tr>
<td>3 ((n = 28))</td>
<td>92.8</td>
<td>6.5</td>
</tr>
</tbody>
</table>

*Note*. For Group 1, the interactive reasoning seminar did not include contact with persons with physical or psychosocial disabilities. For Group 2, the interactive seminar included in-class student group interviews with persons with physical or psychosocial disabilities. For Group 3, the interactive seminar included modified classroom-as-clinic experiences.

### Table 2

Tukey Pairwise Comparison of Average Grades for Level II Fieldwork Experiences

<table>
<thead>
<tr>
<th>Level II Fieldwork</th>
<th>Chart Review Lists</th>
<th>Evaluation Lists</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M(%) )</td>
<td>( SD )</td>
</tr>
<tr>
<td>Physical dysfunction ((n = 34))</td>
<td>90.9</td>
<td>8.2</td>
</tr>
<tr>
<td>Psychosocial dysfunction ((n = 34))</td>
<td>90.5</td>
<td>9.2</td>
</tr>
<tr>
<td>None ((n = 14))</td>
<td>89.1</td>
<td>10.1</td>
</tr>
</tbody>
</table>

*Note*. Preadmission grade point average was comparable for all Level II fieldwork groups.

### Discussion

Results suggest that the use of in-class evaluations of adults with physical or psychosocial dysfunction during the first year of an entry-level master's program helps students to develop their clinical reasoning skills. The general consistency of instructors, content, and teaching and testing methods for other courses in the curriculum during the study period strongly suggests that the results are related to the in-class evaluation variable. Subjects who had experienced in-class evaluations during their first academic year were significantly more accurate than those who had not experienced in-class evaluations in writing evaluation problem-goal-plan lists for an in-class evaluation experience in the second academic year. Results for both the chart review and evaluation lists are discussed below.

**Chart Review Lists**

Subject groups. The lack of significant differences between the three different subject groups on the second-year chart review lists suggests that skill with this part of the evaluation process is not strongly affected by interaction with adults with physical or psychosocial disabilities in the first academic year. Although not statistically significant, a trend emerged showing that subjects with interview experience in the first year did better than those with no interview experience and that those with a modified classroom-as-clinic experience did better than those with only interview experience (see Table 1).

In my previous classroom-as-clinic study, I reported that students had repeatedly said that “meeting adults with disabilities helps them to make sense of and ‘picture' the theoretical information they have learned in the classroom” (Neistadt, 1987, p. 634). The interview experiences may have given subjects some beginning clinical images (Rogers & Holm, 1991) of people with particular disabilities, and retrieving these images may have helped them write more accurate chart review lists in the second academic year. Subjects who were forced to contrast their preassessment and postassessment images in the modified classroom-as-clinic experience may have had more vivid and accurate clinical images to draw on in the second year of their program.
Fieldwork experiences. The lack of significant differences among the three different Level II fieldwork experiences (physical dysfunction, psychosocial dysfunction, none) on the second-year chart review lists suggests that skill with this part of the evaluation process is also not strongly affected by interaction with adults with physical or psychosocial disabilities during fieldwork. However, there was a trend for subjects with psychosocial Level II fieldwork to do better than those without Level II fieldwork experience and for those with physical dysfunction Level II fieldwork to do better than those with psychosocial experience (see Table 2).

The preassessment list is primarily an exercise in problem sensing (Rogers & Holm, 1991). Subjects without Level II fieldwork would have missed intensive practice with the problem-sensing process. The psychosocial Level II fieldwork would have given subjects practice with problem sensing for adults with psychosocial dysfunction, whereas the physical dysfunction Level II fieldwork would have provided practice with problem sensing for adults with physical disabilities. Because the guest participants in the second-year classroom-as-clinic examined here all had physical disabilities, one would expect the physical disability Level II fieldwork problem-sensing experience to be more applicable; however, the differences between the performances of all subjects who had done psychosocial and physical dysfunction Level II fieldwork were not significant. The significant difference in chart review accuracy between subjects with different Level II fieldwork experiences within Group 1 is most likely related to a few weak subjects in the psychosocial group whose grades lowered the entire psychosocial average. Rogers and Holm have said that "diagnostic reasoning is generic to all practice areas" (Rogers & Holm, 1991, p. 1047). These chart review results suggest that the problem-sensing part of diagnostic reasoning, in particular, can be generalized across treatment settings.

Evaluation Lists

Subject groups. The significant differences among the three subject groups on the second-year evaluation lists suggests that students' skill with this part of the evaluation process is strongly affected by interaction with adults with physical or psychosocial disabilities in the first academic year. Subjects with interview experience in the first year did significantly better than those without interview experience, and those with a modified classroom-as-clinic experience did significantly better than those with either no interview or only interview experience (see Table 1).

This result suggests that the classroom-as-clinic experience provided subjects with practice in using the combination of interactive, procedural, and conditional reasoning that Fleming (1991) has said is essential to clinical evaluation. Practice in constantly switching from one type of reasoning to the other during a time-pressured meeting with an adult with a disability may help students to hone their problem-definition skills (Rogers & Holm, 1991). That is, the first year in-class evaluations seemed to make subjects more proficient at observing, eliciting, and interpreting cues during an initial interview. Consequently, in their second year, subjects could describe guest participant problems more accurately than could subjects who had not experienced the classroom-as-clinic method. The finding that only the subjects who had the classroom-as-clinic experience in their first year improved significantly from the chart review to evaluation lists in their second year further supports the notion that this teaching method improves students' reasoning abilities during the client evaluation process.

Fieldwork experiences. The lack of significant differences between the subjects with physical dysfunction Level II fieldwork and psychosocial Level II fieldwork experiences on the second-year evaluation lists suggests that Level II fieldwork in either practice setting provides students with generalizable experience in combining procedural, interactive, and conditional reasoning to yield accurate client-specific problem definitions. The trend for subjects with physical dysfunction Level II fieldwork to do better than those with psychosocial Level II fieldwork (see Table 2) may relate, again, to practice with the population seen in the second-year classroom-as-clinic experience. Rogers & Holm (1991) have suggested that recency, intensity, and frequency of practice with particular populations will influence the accuracy of problem definition, even though the general process of diagnostic reasoning can be applied across practice settings.

The significant difference between subjects with physical dysfunction Level II fieldwork and those without Level II fieldwork on the second-year evaluation lists probably also relates to the Level II fieldwork practice the former had with the population seen in second-year classroom-as-clinic experience. The lack of significant differences in evaluation list scores between subjects with psychosocial dysfunction Level II fieldwork and those without Level II fieldwork may relate to the lack of Level II fieldwork practice for either group in evaluating a physical dysfunction population, but the trend was for the subjects with psychosocial Level II fieldwork to score better than those without Level II fieldwork. This trend probably reflects the former's Level II fieldwork practice with diagnostic and interactive reasoning.

Conclusion

The results of this study suggest that the use of the classroom-as-clinic teaching method in the first year of an entry-level master's program helps to improve students' clinical reasoning during the clinical evaluation process. The use of this method early in an occupational therapy curriculum may also give students an experiential base for
their concurrent and subsequent didactic and theoretical
suggested that providing experience as a base for theoretical
learning is an important part of what they called connected
teaching. The small student group interview component of the classroom-as-clinic experience and the
processing of the experiences in subsequent classes (Neis­
tadt, 1987) allow for collaboration and evolution of personal
knowledge through open discussion, which is another as­
pect of connected teaching (Schwartz, 1991).
Research on the effect of the classroom-as-clinic
method on Level II fieldwork and early practice perform­
ance would be helpful in further validating this teaching
method. Additional research on the relative effect of dif­
ferent aspects of the method might help refine the meth­
od and provide guidelines on modifications needed for
different groups of students at different points in occupa­
tional therapy curricula.
Provision of training in clinical reasoning may be the
best educational strategy for preparing clinicians to meet
the complex demands of modern practice. This study has
examined the relative efficacy of one method for provid­
ing that training. Other methods for teaching clinical rea­
soning need to be developed, tested, and shared so that
occupational therapy can continue to evolve to meet the
ongoing challenges of health care provision. ▲

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Perhaps our readers have noticed that beginning with the June issue of AJOT, the cover of the journal has looked or
felt slightly different. This is because in the interest of the environment we have switched from catalyst (solvent­
based) coating to aqueous (water-based) coating for our cover stock. As catalyst coating dries, it emits chemicals
that harm the ozone. Aqueous coating, however, does not harm the ozone and is easily repulped for entry into the
recyclable waste stream. We are pleased that as we are informing our readers, we are also being kind to the Earth.