
**CLINICAL BOTTOM LINE**

This quasi-experimental, nonrandomized design used a convenience sample of 25 occupational therapy students to research the acquisition of critical thinking and clinical reasoning skills after the students’ participation in a 1-week experiential learning program. This program required students to provide hands-on therapy to children with hemiplegic cerebral palsy (CP), using constraint-induced movement therapy. Students were responsible for “planning daily treatment interventions, implementing treatment each day of camp, and writing reflective notes on their child’s progress at the end of each camp day” (p. 282).

Students’ perceptions of critical thinking and clinical reasoning skills were evaluated with the Self-Assessment of Clinical Reflection and Reasoning (SACRR) and California Critical Thinking Skills Test (CCTST). These assessments were administered by a faculty member to all students 3 days before the beginning of the program and 3 days after completion of the program. Results from these assessments showed statistically significant ($p < .05$) improvements in both clinical reasoning and critical thinking.

A convenience sample at one university was used for this research, which makes generalizing the results of this study difficult. Students’ clinical reasoning and critical thinking skills might have been influenced by experiences of the specific course, and results may not transition to other programs. Explicit information regarding biases that affected outcomes was not reported, so the reader must infer about outside influences. The impact of this opportunity on course grades was not stated in the article, which causes skepticism regarding the integrity of students rating their clinical reasoning and critical thinking skills.

The authors concluded that an experiential learning approach is beneficial for master’s-level occupational therapy programs to increase clinical reasoning and critical thinking of students and prepare competent, entry-level practitioners in an ever-changing health care system.

**RESEARCH OBJECTIVE(S)**
To evaluate the clinical reasoning and critical thinking skills of occupational therapy students before and after their participation in a 1-week, hands-on, experiential learning program for children with hemiplegic CP. The data were used in conjunction with previous qualitative studies on experience-based learning programs to provide conclusions regarding clinical reasoning and critical thinking skills.

**DESIGN TYPE AND LEVEL OF EVIDENCE**

Level III, quasi-experimental, nonrandomized, pre- and posttest design with a sample of 25 students

**PARTICIPANT SELECTION**

How were participants recruited and selected to participate?

Participants were recruited and selected to participate through the use of a convenience sample of the 25 occupational therapy students who decided to enroll in this particular course. Students were “self-selected and not randomized into experimental and control groups” (p. 285). All students enrolled in the course were invited to participate in the study.

**Inclusion criteria:**

Students enrolled in the master’s-level occupational therapy program who had completed three semesters (1 year) of lecture and laboratory coursework

**Exclusion criteria:**

Students who had not completed the required coursework to take this course

**PARTICIPANT CHARACTERISTICS**

N= 25

# / % Male: 1/4%  # / % Female: 24/96%

Ethnicity: Not reported

Disease/disability diagnosis: Not applicable

**INTERVENTION AND CONTROL GROUPS**

Group 1: Intervention group
### Brief description of the intervention

Students completed at least three semesters of coursework, which included principles of pediatric intervention, before participating in a 1-week experiential learning program. This program involved students providing constraint-induced movement therapy to children diagnosed with hemiplegic CP to assess whether involvement in the program had an effect on students’ critical thinking and clinical reasoning skills.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many participants in the group?</td>
<td>25 students</td>
</tr>
<tr>
<td>Where did the intervention take place?</td>
<td>The program required students to participate in the experiential learning opportunity at a day camp geared toward children with hemiplegic CP.</td>
</tr>
<tr>
<td>Who delivered?</td>
<td>Occupational therapy students participated in the experiential learning program after coursework and training and under supervision of a licensed occupational therapist.</td>
</tr>
<tr>
<td>How often?</td>
<td>Students participated in the learning experience for 5 consecutive days.</td>
</tr>
<tr>
<td>For how long?</td>
<td>Students participated in the learning experience 6 hours a day.</td>
</tr>
</tbody>
</table>

### INTERVENTION BIASES

#### Contamination:

- **YES □**
- **NO ☑**

No contamination was reported.

#### Co-intervention:

- **YES □**
- **NO ☑**

No cointerventions were reported; however, it is unknown whether students were in class during their experience.

### Timing of intervention:
Students were required to have finished 1 year of school to be included in this study. The authors did not reported whether students were in lecture in conjunction with their experience.

Site of intervention:

| YES ☑ | Site of intervention bias was not reported. |
| NO ☐  |                                           |

Use of different therapists to provide intervention:

| YES ☐ | Other therapist–student involvement in providing the intervention was not reported, but students could collaborate with other students for intervention ideas. Faculty were present during the experiential learning process, but the extent of involvement was not reported. |
| NO ☑  |                                                                                                         |

Baseline equality:

| YES ☐ | Baseline equality bias was not reported. |
| NO ☑  |                                                                 |

MEASURES AND OUTCOMES *(Only on measures relevant to occupational therapy practice)*

**Measure 1: SACRR**

<table>
<thead>
<tr>
<th>Name/type of measure used:</th>
<th>SACRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>What outcome is measured?</td>
<td>Clinical reasoning skills</td>
</tr>
<tr>
<td>Is the measure reliable (as reported in the article)?</td>
<td>YES ☐ NO ☑ Not Reported ☐</td>
</tr>
</tbody>
</table>

Spearman rank order correlation coefficient for test–retest reliability = .60
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Not Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the measure valid (as reported in the article)?</td>
<td>☑</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Cronbach’s $\alpha$ (internal consistency) = .87 pretest and .92 posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When is the measure used?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To evaluate clinical reasoning with different teaching methods</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measure 2: CCTST**

<table>
<thead>
<tr>
<th>Name/type of measure used:</th>
<th>CCTST</th>
</tr>
</thead>
<tbody>
<tr>
<td>What outcome is measured?</td>
<td>Critical thinking skills</td>
</tr>
<tr>
<td>Is the measure reliable as reported in the article?</td>
<td>YES ☑ NO ☐ Not Reported ☐</td>
</tr>
<tr>
<td>Kuder–Richardson Formula 20 = .78–.84</td>
<td></td>
</tr>
<tr>
<td>Forms A and B have had Kuder–Richardson Formula 20 values ranging from .70 to .75 in various studies.</td>
<td></td>
</tr>
<tr>
<td>Is the measure valid as reported in the article?</td>
<td>YES ☐ NO ☐ Not Reported ☑</td>
</tr>
<tr>
<td>When is the measure used?</td>
<td>To obtain data on critical thinking skills of college-age and adult individuals or groups</td>
</tr>
</tbody>
</table>

**MEASUREMENT BIASES**

**Were the evaluators blind to treatment status?**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No ☑</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty were involved in gathering data on students’ critical thinking and clinical reasoning skills by administering pre- and posttests and supervising students during their interventions.</td>
<td></td>
</tr>
</tbody>
</table>

**Was there recall or memory bias?**
Students were assessed with the SACRR and CCTST by the same faculty member 3 days before the start of the program and 3 days after completion of the program, with parallel forms of each test, to reduce the effects of pre- and posttesting.

RESULTS

Overall, students’ clinical reasoning and critical thinking skills were statistically improved after they used an experiential learning method, on the basis of results from the SACRR ($p = .000$) and the CCTST ($p = .006$). In particular, 22 out of 26 items on the SACRR (significance ranging from .000 to .033) and three out of five items on the CCTST (significance ranging from .015 to .046) statistically improved after students engaged in a hands-on learning experience. This study supports the theory that occupational therapy master’s-level programs should have students participate in experiential learning opportunities to transition them into entry-level practitioners.

Was this study adequately powered (large enough to show a difference)?

- **YES □**
- **NO ✔**

This study was a convenience sample of 25 occupational therapy students at one university.

Were the analysis methods appropriate?

- **YES ✔**
- **NO □**

The authors used significance values to compare pre- and posttest results and to assess the significance of change in clinical reasoning and critical thinking on individual questions and the overall score.

Were statistics appropriately reported (in written or table format)?

- **YES ✔**
- **NO □**

Statistics were reported in written, table, and graph format.

Was participant dropout less than 20% in total sample and balanced between groups?

- **YES ✔**
- **NO □**

Only one group was used in this study, and there were no reported participant dropouts.

What are the overall study limitations?
Limitations of this study resulted from the fact that participants came from a convenience sample, which makes generalizing the results of the study to other populations difficult. Students volunteered to participate in the program and were not randomized into groups. As a result, these results were not compared with other learning approaches.

Another limitation could be that the observed changes in students’ clinical reasoning and critical thinking skills were a result of their specific experience in this program or course. Biases were not explicitly reported, so the reader must infer some conclusions about outside influences. It is unclear how this experiential learning opportunity affected students’ grades in the course; students might have provided more favorable answers to prove their competence and as a means to achieve a higher grade.

CONCLUSIONS

Results from this study provide data that support the use of experiential learning in occupational therapy programs as a means to improve students’ clinical reasoning and critical thinking skills. These results support the use of hands-on learning approaches to develop these skills. Faculty in other master’s-level programs should use these results to develop their own experiential-based learning opportunities to support the educational experience of their students so they can be successful on entering the workforce. This study also warrants continued qualitative and quantitative studies about the use and implications of experiential learning in master’s-level occupational therapy programs.

This work is based on the evidence-based literature review completed by Matt Montaño, Danielle Marshall, and Faculty Advisor Dawnn Thomas, OTD, MS, OTR, Wesley College.


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