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Abstract

Clinical reasoning is crucial for the occupational therapy profession to thrive in an ever-changing healthcare environment but is seldom isolated for explicit instruction and outcome measurement in educational course curricula. A single-factor repeated measures design study was conducted to compare the impact of didactic case-based learning and experiential service-learning on the development of the clinical reasoning of students at a midwestern public university's entry-level Master of Occupational Therapy program. The participants were sixteen graduate occupational therapy students who had completed their foundation-level courses. Participants explored modes of clinical reasoning in occupational therapy for eight weeks (the first half of the semester), using didactic case-based learning, and then participated in an eight-week (the second half of the semester), experiential service-learning practicum engaging uninsured and underinsured adult clients in occupational therapy evaluation and intervention. The dependent variable of clinical reasoning was measured using the Self-Assessment of Clinical Reflection and Reasoning (SACRR) survey which was administered at the start and end of both phases of the study. SACCR scores generally increased and were significant during the experiential phase *(MD =7.384, t (12) = 2.27, p = .042, d = 0.63, 95% CI [0.02, 1.22])* An analysis of changes in individual SACRR items provided insights into the development of clinical reasoning modes of practice in novice clinicians. The comparison of didactic case-based learning and experiential service-learning supports the use of either or both approaches. The sequence and weightage of each strategy could be individually adjusted in course syllabi and curricula to fit student learning needs.

Keywords

Clinical reasoning, professional reasoning, experiential-learning, service-learning, case-based learning

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ABSTRACT

Clinical reasoning is crucial for the occupational therapy profession to thrive in an ever-changing healthcare environment but is seldom isolated for explicit instruction and outcome measurement in educational course curricula. A single-factor repeated measures design study was conducted to compare the impact of didactic case-based learning and experiential service-learning on the development of the clinical reasoning of students at a midwestern public university's entry-level Master of Occupational Therapy program. The participants were sixteen graduate occupational therapy students who had completed their foundation-level courses. Participants explored modes of clinical reasoning in occupational therapy for eight weeks (the first half of the semester), using didactic case-based learning, and then participated in an eight-week (the second half of the semester), experiential service-learning practicum engaging uninsured and underinsured adult clients in occupational therapy evaluation and intervention. The dependent variable of clinical reasoning was measured using the Self-Assessment of Clinical Reflection and Reasoning (SACRR) survey which was administered at the start and end of both phases of the study. SACCR scores generally increased and were significant during the experiential phase *(MD =7.384, t (12) = 2.27, p = .042, d = 0.63, 95% CI [0.02, 1.22])* An analysis of changes in individual SACRR items provided insights into the development of clinical reasoning modes of practice in novice clinicians. The comparison of didactic case-based learning and experiential service-learning supports the use of either or both approaches. The sequence and weightage of each strategy could be individually adjusted in course syllabi and curricula to fit student learning needs.

Introduction

Schell and Cervero (2003) defined clinical reasoning as “the process used by clinicians to plan, direct, perform, and reflect on client care” (p. 131). Occupational therapy scholars have long postulated that this multifaceted process involves many modes of reasoning including scientific, narrative, and pragmatic reasoning (Mattingly & Fleming, 1994; Rogers & Masagatani, 1982; Schell & Schell, 2008). Strong clinical reasoning skills have been identified as crucial for occupational therapists to thrive in an ever-changing healthcare environment (Mattingly & Fleming, 1994; Rogers, 1983). Entry-level occupational therapy education programs place high regard on the development of students' clinical reasoning to prepare students for the dynamic nature of future practice (Henderson & Coppard, 2018). However, clinical reasoning is seldom isolated for learning outcome measurement in course curricula, and it is unclear how novice clinicians acquire clinical reasoning (Benson et al., 2013).

Experiential Learning Theory

Epistemologically, the instruction of clinical reasoning lends itself to progressive and pragmatic educational philosophies whose proponents emphasized problem-based learning and learning through experience (Schell & Schell, 2008). Kolb’s (1984) integrative theory of experiential learning outlines six characteristics of a normative experiential learning process. These include learning as a process (rather than outcome); learning as an active integrative process; and learning as requiring the interplay between the person and the environment. Kolb posited that learning occurs in a four-stage cycle of experience, reflection, abstraction, and action.

Service-learning is based on experiential learning philosophy and proposes that genuine education occurs through inquiry, experience, and reflection. Service-learning proponents argue that the experience must be rich (that is, situated in 'real-life' and 'real-world' contexts) and must promote growth particularly in the areas of citizenship, community, and democracy (Conway et al., 2009). In service-learning, there is an "interdependence of learning processes and outcomes with community processes and outcomes that renders service-learning powerful as a vehicle for learning and social change" (Felten & Clayton, 2011, p. 77).

Unsworth and Baker’s (2015) systematic review of professional reasoning literature in occupational therapy revealed a gap in the identification of educational approaches that promote clinical reasoning. Henderson and Coppard (2018) found that while occupational therapy educators recognize experiential learning as the most effective clinical reasoning teaching and learning strategy in healthcare professional education, it is not always incorporated into their pedagogical repertoire. Experiential learning can encompass both in and out-of-class learning activities that focus on cognitive, social, and personal learning outcomes (Johnson et al., 2017). Traditionally, the bulk of experiential clinical reasoning instruction in occupational therapy has been through fieldwork experiences, laboratory coursework, simulations, and case-based learning (Murphy & Stav, 2018; Murphy & Radloff, 2019; Nielsen et al., 2020; Reichl et al., 2019; Serwe & Bowman, 2018).

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In occupational therapy, several scholars have studied the impact of service-learning on learning outcomes including civic responsibility, professional competence, cultural responsiveness, and clinical reasoning (Bolton & Dean, 2018; Nielsen et al.,2020; Talero et al., 2019). Neilsen et al. (2020), for example, compared the effect of traditional and non-traditional Level I fieldwork experiences on the development of the critical thinking skills of occupational therapy students. In this study, the intervention, a 16-week nontraditional fieldwork experience involving service-learning, was more efficacious than traditional fieldwork. Further, pro bono clinics offering services to individuals who are uninsured and underinsured while offering students an opportunity to engage and learn are increasingly commonplace in occupational therapy (Delahunt et al, 2018; Rogers et al., 2017; Serwe & Bowman, 2018; Zylstra & Doyle, 2020).

Case-based Learning

Case-based learning allows students to acquire knowledge and skills by exploring and interpreting expert situations and experiences in the form of cases. Learners attempt to understand and interpret those expert situations, reflect critically on what can be learned from the case, and then recall the information to use it intentionally in new situations (Jonassen & Hernandoz-Serrano, 2002; Kolodner & Guzdial, 2000). Jonassen and Hernandoz-Serrano (2002) observed that since experts often infuse their stories with relevant contextual factors and practical strategies for solving problems, novices in the discipline can learn effective problem-solving strategies based on those expert experiences. They identified the important components of effective cases to be authenticity or realism, relevance to the needs or goals of the learner, richness in content and context, and connections between theory and practice.

Allen and Toth-Cohen (2019) evaluated the effect of progressively independent engagement in case-based learning on student performance, confidence, and anxiety in applying critical thinking skills in the clinical setting and reported significant improvements in all outcomes. Murphy and Stav (2018) compared the effect of case-based learning using video cases and text case on the development of clinical reasoning in entry-level occupational therapy students and found video cases to be more efficacious than text cases. This study contributes to the knowledge and improvement of clinical reasoning instruction methods by comparing the impact of two pedagogical approaches – didactic case-based learning and experiential service learning– on the development of the clinical reasoning of entry-level occupational therapy students.

Method

Research Design

In this single-factor repeated measures design, the students worked through cases for eight weeks (the first half of the semester), using case-based learning activities, to improve their knowledge and application of the various modes of clinical reasoning as part of a newly designed adult clinical seminar course. The students then participated in an eight-week (the second half of the semester), service-learning practicum to engage uninsured and underinsured adult clients in occupational therapy evaluation and intervention.

Participants
A cohort of graduate students in an entry-level Master of Occupational Therapy program (*N*=27) were eligible for inclusion. The cohort consisted of 26 females and one male. The students, at this stage, had completed foundation level courses including, but not limited to, Foundations and Theory in Occupational Therapy, Occupational Therapy through the Lifespan, Psychosocial Perspectives in Occupational Therapy, and Evidence-Based Practice.

Assessment Instruments
The participants completed the Self-Assessment of Clinical Reflection and Reasoning (SACRR) survey developed by Royeen et al. (2001) at the start and end of both the didactic and practicum phases of the study. The SACRR has demonstrable pre- and post-internal consistency and test-retest reliability. It consists of 26 items that are rated on a five-point scale with a rating of “5” indicating “strongly agree” and a rating of “1” indicating “strongly disagree.”

Procedures
This study was carried out in the fall semester following Institutional Review Board approval. The participants were educated on the research study process and risks involved prior to consent. The course in which both the didactic and practicum phases were integrated was delivered in a blended format. The didactic phase was delivered entirely online with care taken to design authentic learning experiences using an epistemological approach that emphasized a constructivist learning paradigm, problem-solving, collaborative knowledge production, and reflection. Learning activities included weekly recorded lectures on various modes of clinical reasoning in occupational therapy; significant learning activities (case texts, simulations, videos, etc.); engagement in online discussion forums; and interviewing of community occupational therapy practitioners in various practice settings.

During the practicum phase, students, under the supervision of a licensed clinician, worked with a client once a week. They completed the following assignments: an evaluation including the occupational profile and administration of client-centered assessments, weekly session treatment planning forms, weekly progress note documentation, creation of educational materials, creation of a data collection system for progress monitoring, a discharge plan, and a weekly reflective journal entry.

Data Collection
The SACRR instrument was added to the Qualtrics system. A link to the survey was generated and made available to students in the learning management system content area of the course in the first, eighth, and sixteenth week of the semester. The participants completed the SACRR digitally and anonymously.

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Data Analysis

The dependent variable was clinical reasoning as measured using the SACRR instrument. Controlled variables including the complexity of cases, and extraneous variables including GPA and undergraduate major that could influence the outcomes of the study were tracked to determine their influence on outcomes and for future research consideration.

A statistician was consulted, and various data analysis methods were explored. A priori power analysis was not possible due to the paucity of studies rendering estimation of effect size difficult. The Friedman test and Bonferroni correction were not used for two main reasons: 1) the data was not matched as only a Qualtrics link was sent anonymously, and no method of tracking/connecting participants were utilized. Thus, participant “1” on the pretest was not participant “1” on post-test 1 or post-test 2. We used aggregate scores at each repeated measure interval instead. 2) The aggregate scores would be considered interval data so a Friedman’s test would not be justified with the summary scores as the summary scores were continuous data and normality was met. The paired sample t-test to compare the pre and pot test SACRR scores of a cohort and the independent sample t-test to compare aggregate scores of two different cohorts was justified (Murphy & Radloff, 2019).

The one-sample t-test was used to compare means and the minimum level of significance required to reject the non-directional null hypothesis ($H_0; \mu 1 \neq \mu 2$) was set at $\alpha = 0.05$. Descriptive data were subjected to statistical analysis using SPSS and JASP software to better describe the sample population (distribution and homogeneity of variance) and determine the appropriateness and applicability of inferential statistics.

Results

The average age of the sixteen occupational therapy students who consented to participate was 23.94 years (*SD* 1.53) and the average GPA from the preceding semester was 3.90 (*SD* 0.17). All the consenting participants were female. Of these, 31.3% (5/16) had an undergraduate major in psychology, 25% (4/16) had an exercise and movement science major, and 12.5% (2/16) were health promotion majors.

The means of aggregate scores on the SACCR at Pre-test, Post-test 1, and Post-test 2 were determined and compared. All the mean scores increased gradually but the change from Pre-test to Post-test 1 was not significant (mean difference = 6.236, *t (10) = 1.56, p = 0.150, d = 0.47, 95% CI [-0.17, 1.08]*). The changes between Post-test 1 and Post-test 2 *(MD =7.384, t (12) = 2.27, p = .042, d = 0.63, 95% CI [0.02, 1.22])* and from Pre-test to Post-test 2 *(MD =13.621, t (12) = 3.70, p = 0.003, d = 1.03, 95% CI [0.33, 1.69])* were significant.

An analysis of individual SACRR items was completed by comparing changes in mean scores for each item at Pre-test, Post-test 1, and Post-test 2. The Shapiro-Wilk test of normality was used with an alpha level of *p=0.001*.

Table 1

Comparison in SACRR Items Means between Pre-test and Post-test

Item	Mean Pre-test	*SD*	Mean Post-test 1	*SD*	Mean Difference	*t*	*df*	*p*	Cohen's *d*
1	4.000	0.632	3.818	0.751	- 0.182	- 0.96	10	0.362	- 0.29
2	4.363	0.506	4.182	0.405	- 0.182	-1.19	10	0.263	0.36
3	3.454	0.934	4.000	0.447	0.546	1.94	10	0.081	0.58
4	3.818	0.874	4.182	0.603	0.364	1.38	10	0.197	0.42
5	3.909	0.302	4.182	0.404	0.273	3.00	10	**0.013***	0.90
6	3.367	0.809	3.546	0.688	0.182	0.73	10	0.480	0.22
7	3.091	0.944	2.909	0.831	- 0.182	- 0.64	10	0.537	0.19
8	3.091	0.831	3.091	0.831	0.000	0.00	10	1.000	0.00
9	3.000	1.000	3.273	0.905	0.273	0.91	10	0.387	0.27
10	3.364	1.120	3.546	1.214	0.182	0.54	10	0.602	0.16
11	3.273	1.009	3.818	0.982	0.545	1.79	10	0.103	0.54
12	3.546	1.128	3.818	0.603	0.273	0.80	10	0.442	0.24
13	4.546	0.522	4.364	0.506	- 0.182	-1.16	10	0.274	- 0.35
14	3.727	0.786	3.909	0.701	0.182	0.77	10	0.460	0.23
15	3.455	0.934	3.546	0.934	0.091	0.32	10	0.753	0.10
16	3.364	0.674	3.546	0.820	0.182	0.90	10	0.392	0.27
17	3.909	0.944	3.727	0.786	- 0.182	-0.64	10	0.537	-0.19
18	3.273	0.905	3.546	0.934	0.273	1.00	10	0.341	0.30
19	3.491	0.807	3.909	0.701	0.418	1.72	10	0.117	0.52
20	3.456	1.036	4.000	0.447	0.546	1.74	10	0.112	0.53
21	2.909	1.044	3.818	0.603	0.909	2.89	10	**0.016***	0.87
22	3.182	1.079	3.818	0.603	0.636	1.95	10	0.079	0.59
23	3.455	1.036	3.909	0.701	0.455	1.45	10	0.177	0.44
24	3.091	1.044	3.546	0.522	0.455	1.45	10	0.179	0.44
25	3.636	1.120	3.818	0.603	0.182	0.54	10	0.602	0.16
26	3.000	1.000	3.182	1.079	0.182	0.60	10	0.560	0.18

Note: This table shows changes in each of the SACRR survey items during the didactic phase of the study. The one-sample t-tests showed significant increases in 2/26 survey test items. Several test items demonstrated medium effect sizes (*Cohen's d>0.5*) though they did not achieve statistical significance. There were decreases in scores on several test items, but these were not statistically significant. Key: **p=0.05

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Table 2

Comparison in SACRR Items Means between Post-test 1 and Post-test 2

Item	Mean Post-test 1	*SD*	Mean Post-test 2	*SD*	Mean Difference	*t*	*df*	*p*	Cohen's *d*
1	3.818	0.751	4.308	0.480	0.489	2.35	12	**0.037***	0.65
2	4.182	0.405	4.536	0.519	0.357	3.15	12	**0.008***	0.87
3	4.000	0.447	3.923	0.494	-0.077	-0.62	12	0.546	-0.17
4	4.182	0.603	4.000	0.408	-0.429	-1.09	12	0.298	-0.30
5	4.182	0.404	4.231	0.439	-0.049	0.44	12	0.670	0.12
6	3.546	0.688	4.077	0.494	0.531	2.78	12	**0.017***	0.77
7	2.909	0.831	3.692	0.751	0.783	3.40	12	**0.005***	0.94
8	3.091	0.831	3.692	0.751	0.601	2.61	12	**0.023***	0.72
9	3.273	0.905	3.539	0.776	0.266	1.06	12	0.301	0.29
10	3.546	1.214	4.077	0.760	0.531	1.58	12	0.141	0.44
11	3.818	0.982	4.000	0.707	0.182	0.67	12	0.517	0.19
12	3.818	0.603	4.231	0.599	0.413	2.47	12	**0.030***	0.68
13	4.364	0.506	4.615	0.506	0.252	1.79	12	0.099	0.50
14	3.909	0.701	4.231	0.599	0.322	1.66	12	0.124	0.46
15	3.546	0.934	3.923	0.494	0.378	1.46	12	0.171	0.40
16	3.546	0.820	3.692	0.630	0.147	0.64	12	0.533	0.18
17	3.727	0.786	4.000	0.817	0.272	1.25	12	0.234	0.35
18	3.546	0.934	3.536	0.967	-0.007	-0.04	12	0.970	-0.01
19	3.909	0.701	4.154	0.689	0.245	1.26	12	0.232	0.35
20	4.000	0.447	4.231	0.439	0.231	1.86	12	0.087	0.52
21	3.818	0.603	4.077	0.760	0.259	1.55	12	0.148	0.43
22	3.818	0.603	4.077	0.641	0.259	1.55	12	0.148	0.43
23	3.909	0.701	4.385	0.506	0.476	2.45	12	**0.031***	0.68
24	3.546	0.522	3.769	0.725	0.224	1.42	12	0.182	0.39
25	3.818	0.603	3.769	0.927	-0.049	-0.29	12	0.775	0.08
26	3.182	1.079	3.615	0.768	0.434	1.45	12	0.174	0.40

Note: This table shows changes in each of the SACRR survey items during the experiential phase of the study. The one-sample t-tests showed significant increases in 7/26 survey items. Most of the test item means that achieved statistical significance also demonstrated medium effect sizes *(Cohen's d >0.5).* There were decreases in mean scores on several test items, but these were not statistically significant. Key: **p=0.05

Table 3

Comparison in SACRR Items Means between Pre-test and Post-test 2

Item	Mean Pre-test	*SD*	Mean Post-test 2	*SD*	Mean Difference	*t*	*Df*	*p*	Cohen's *d*
1	4.000	0.632	4.308	0.480	0.308	1.76	12	0.079	0.49
2	4.363	0.506	4.536	0.519	0.175	1.23	12	0.241	0.34
3	3.455	0.934	3.923	0.494	0.469	1.81	12	0.096	0.50
4	3.818	0.874	4.000	0.408	0.818	0.75	12	0.467	0.21
5	3.909	0.302	4.231	0.439	0.322	3.16	12	**0.002***	1.07
6	3.367	0.809	4.077	0.494	0.713	5.211	12	**0.008***	0.88
7	3.091	0.944	3.692	0.751	0.601	2.30	12	**0.041***	0.64
8	3.091	0.831	3.692	0.751	0.601	2.61	12	**0.023***	0.72
9	3.000	1.000	3.539	0.776	0.538	1.94	12	0.076	0.54
10	3.364	1.120	4.077	0.760	0.713	2.30	12	**0.041***	0.64
11	3.273	1.009	4.000	0.707	0.727	2.60	12	**0.023***	0.72
12	3.546	1.128	4.231	0.599	0.265	2.19	12	**0.049***	0.61
13	4.546	0.522	4.615	0.506	0.070	0.48	12	0.642	0.13
14	3.727	0.786	4.231	0.599	0.503	2.31	12	**0.039***	0.64
15	3.455	0.934	3.923	0.494	0.469	1.81	12	0.096	0.50
16	3.364	0.674	3.692	0.630	0.329	1.75	12	0.105	0.49
17	3.909	0.944	4.000	0.817	0.091	0.35	12	0.734	0.10
18	3.273	0.905	3.536	0.967	0.266	1.05	12	0.315	0.29
19	3.491	0.807	4.154	0.689	0.663	2.96	12	**0.012***	0.82
20	3.455	1.036	4.231	0.439	0.776	2.70	12	**0.019***	0.75
21	2.909	1.044	4.077	0.760	1.168	4.03	12	**0.002***	1.12
22	3.182	1.079	4.077	0.641	0.895	2.99	12	**0.011***	0.83
23	3.455	1.036	4.385	0.506	0.930	3.24	12	**0.007***	0.90
24	3.091	1.044	3.769	0.725	0.678	2.34	12	**0.037***	0.65
25	3.636	1.120	3.769	0.927	0.133	0.43	12	0.676	0.12
26	3.000	1.000	3.615	0.768	0.615	2.22	12	**0.047***	0.62

Note: This table shows changes in each of the SACRR survey items over the entire course of the study. The one-sample t-tests showed significant increases in 15/26 survey items. There were no aggregate decreases in mean scores on any of the survey items. Key **p=0.05

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Discussion

This study suggests that the development of clinical reasoning skills can be supported by the explicit integration of clinical reasoning evaluation and instruction in course curricula of graduate students in an entry-level occupational therapy program. Further, the comparison of didactic case-based learning and experiential service-learning supports the use of either or both approaches. The sequence and weightage of each strategy could be individually adjusted in course syllabi and curricula to best match available resources and student learning needs.

Following the didactic case-based learning phase of the study, students reported gains specifically in two out of twenty-six SACRR survey items. Of these, one survey item mean met normalcy and variance assumptions – Item 21, “Regarding a proposed intervention strategy, I think, “What makes it work?” align closely with the inductive reasoning and procedural reasoning mode of clinical reasoning in occupational therapy which seem to be among the first to develop in novice clinicians (Benson et al., 2013; Liu et al., 2000).

Allen and Toth-Cohen (2019) found that following case-based learning, students reported an improvement in their ability to tailor interventions to a client and situation as well as finding evidence to support the intervention. Murphy and Stav (2018) found that students demonstrated an improvement in inductive reasoning following case-based learning. Inductive reasoning entails the practitioner’s ability to gather information from multiple sources to inform treatment planning.

Following the experiential service-learning phase of the study, students reported gains in seven out of twenty-six SACCR survey items. Of these, three survey item means met normalcy and variance assumptions; Item 7 - “I look to theory for understanding a client’s problems”, Item 8 - “I look to frames of reference for planning my intervention strategy,” and Item 12 - “When planning intervention strategies, I ask “What if” for a variety of options.” These findings were like those from several other studies that concluded that an experiential learning pedagogy facilitated the students’ ability to connect theory to practice as well as increase the propensity for the conditional mode of reasoning in occupational therapy (Benson et al., 2013; Seif et al., 2014). Connecting theory to practice through experiential learning facilitates deep learning. Students can connect specific new information to deeper principles and knowledge schemas and consequently transfer this knowledge to novel contexts where the principles apply.

Limitations

There are several limitations to this study. The first is a possible maturation effect as students could have continued to develop their clinical reasoning as they progressed through the course and program. Second, the SACRR is a tool that measures self-perceived improvement in clinical reasoning and not actual objective changes in clinical reasoning. Finally, the convenience sampling, limited number of participants, lack of randomization, and lack of pairing of pre- and post-scores increase the risk of a type-1 error.

Future research could use a more rigorous design to reduce the potential for type-1 errors. A standardized tool that objectively measures clinical reasoning as opposed to subjective self-perceived development of clinical reasoning could also be developed. An analysis of the development of each component mode of clinical reasoning in occupational therapy could be useful as these might develop at differing rates. The development of a mode of reasoning might rely on the development of another. Further, the students' self-perceived enactment of some of the clinical reasoning processes seemed to fluctuate over the course of the study. Though these mean decreases were not significant, they would be worth investigating in a study with greater power.

Implications for Occupational Therapy Education

Clinical reasoning in occupational therapy was first intently studied following a 1983 Eleanor Slagle Lecture by Joan Rogers. Rogers and Masagatani (1982) had studied how clinical decisions were made in occupational therapy and found that practitioners could not describe the reasoning process underlying their therapy actions. This inability to explain the actions, they postulated, would hinder the systematic teaching and improvement of clinical reasoning. This study contributes to the profession's knowledge base on clinical reasoning instruction by demonstrating a systematic process explicitly teaching and evaluating clinical reasoning in an entry-level Master of Occupational Therapy Education program that could be replicated.

Conclusion

The intentional instruction and evaluation of clinical reasoning through integration in course curricula is vital. Due consideration of the sequence and weightage of case-based learning and experiential service-learning pedagogy facilitates the development of graduate students' clinical reasoning in an entry-level occupational therapy program.

References

Allen, D. D., & Toth-Cohen, S. (2019). Use of case studies to promote critical thinking in occupational therapy students. *Journal of Occupational Therapy Education*, *3*(3). https://doi.org/10.26681/jote.2019.030309

Benson, J., Provident, I., & Szucs, K. (2013). An experiential learning lab embedded in a didactic course: Outcomes from a pediatric intervention course. *Occupational Therapy in Health Care*, 27(1), 46-57. https://doi.org/10.3109/07380577.2012.756599

Bolton, T., & Dean, E. (2018). Self-determination theory and professional reasoning in occupational therapy students: A mixed methods study. *Journal of Occupational Therapy Education*, *2*(3). https://doi.org/10.26681/jote.2018.020304

Conway, J. M., Amel, E. L., & Gerwien, D. P. (2009). Teaching and learning in the social context: A meta-analysis of service learning's effects on academic, personal, social, and citizenship outcomes. *Teaching of Psychology*, *36*(4), 233–245. https://doi.org/10.1080/00986280903172969

Delahunt, J. V., Wisdom, C. M., Swift, M., & Siscos, M. (2018). A pro-bono therapy clinic: Valuable and viable? *Journal of Case Studies*, *36*(3), 12-20.

Felten, P., & Clayton, P. H. (2011). Service-learning*. New Directions for Teaching and Learning*,*128,* 75-84. https://doi.org/10.1002/tl.470

Henderson, W., & Coppard, B. (2018). Identifying instructional methods for development of clinical reasoning in entry-level occupational therapy education. *American Journal of Occupational Therapy*, *72*(4_Supplement_1), 7211505146. https://doi.org/10.5014/ajot.2018.72S1-PO7010

Johnson, E., Seif, G., Coker-Bolt, P., & Kraft, S. (2017). Measuring clinical reasoning and interprofessional attitudes. *Journal of Student-Run Clinics*, *3*(1), 1-6. http://journalsrc.org/index.php/jsrc/article/view/24

Jonassen, D. H., & Hernandez-Serrano, J. (2002). Case-based reasoning and instructional design: Using stories to support problem solving. *Educational Technology Research and Development*, *50*(2),65–77. https://doi.org/10.1007/BF02504994

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

Kolodner, J.L., & Guzdial, M. (2000). Theory and practice of case-based learning aids. In D.H. Jonassen & S.M. Land (Eds.), *Theoretical foundations of learning environments*. Lawrence Erlbaum Associates.

Liu, K. P. Y., Chan, C. C. H., & Hui-Chan, C. W. Y. (2000). Clinical reasoning and the occupational therapy curriculum. *Occupational Therapy International*, *7*(3), 173–183. https://doi.org/10.1002/oti.118

Mattingly, C. & Fleming, M. H. (1994). *Clinical reasoning forms of inquiry in therapeutic practice*. F.A. Davis.

Murphy, L. F., & Stav, W. B. (2018). The impact of online video cases on clinical reasoning in occupational therapy education: A quantitative analysis. *Open Journal of Occupational Therapy*, *6*(3). https://doi.org/10.15453/2168-6408.1494

Murphy, L., & Radloff, J. (2019). Facilitation of clinical reasoning through case-based learning in occupational therapy education. *American Journal of Occupational Therapy*,*73*(4_Supplement_1), 7311505141. https://doi.org/10.5014/ajot.2019.73S1-PO5003

Nielsen, S., Klug, M., & Fox, L. (2020). Impact of nontraditional level I fieldwork on critical thinking. *American Journal Occupational Therapy*, *74*(3), 7306205090–7306205098. https://doi.org/10.5014/ajot.2020.036350

Reichl, K., Baird, J. M., Chisholm, D., & Terhorst, L. (2019). Measuring and describing occupational therapists' perceptions of the impact of high-fidelity, high-technology stimulation experiences on performance. *American Journal Occupational Therapy,* 73(6). https://doi.org/10.5014/ajot.2019.034694

Rogers, J. C. (1983). Clinical reasoning: The ethics, science, and art. *American Journal of Occupational Therapy*, *37*(9), 601–616. https://doi.org/10.5014/ajot.37.9.601

Rogers, O., Heck, A., Kohnert, L., Paode, P., & Harell, L. (2017). Occupational therapy's role in an interprofessional student-run clinic: Challenges and opportunities identified*. Open Journal of Occupational Therapy*, *5*(3). https://doi.org/10.15453/2168-6408.1387

Rogers, J. C., & Masagatani, G. (1982). Clinical reasoning of occupational therapists during the initial assessment of physically disabled patients. *Occupational Therapy Journal of Research*, *2*(4), 195–219. https://doi.org/10.1177/153944928200200401

Royeen, C., Mu, K., Barrett, K., & Luebben, A.J. (2001). Pilot investigation: Evaluation of clinical reflection and reasoning before and after workshop intervention. In P. Crist (Ed.), *Innovations in occupational therapy education* (pp. 107-114). American Occupational Therapy Association.

Seif, G., Coker-Bolt, P., Kraft, S., Gonsalves, W., Simpson, K., & Johnson, E. (2014). The development of clinical reasoning and interprofessional behaviors: Service-learning at a student-run free clinic. *Journal of Interprofessional Care*, 28(6), 559–564. https://doi.org/10.3109/13561820.2014.921899

Serwe, K. M., & Bowman, C. (2018). Telehealth experiential learning: A pilot study of the client's experience. *Journal of Occupational Therapy Education*, *2*(2), 1-16. https://doi.org/10.26681/jote.2018.020205

Schell, B. A., & Cervero, R. M. (1993). Clinical reasoning in occupational therapy: An integrative review. *American Journal of Occupational Therapy, 47*(7), 605-610. https://doi.org/10.5014/ajot.47.7.605

Schell, B. A., & Schell, J. W. (2008). *Clinical and professional reasoning in occupational therapy*. Lippincott Williams & Wilkins.

Talero, P. C., Kern, S., & Tupe', D. (2019) Culturally responsive care in occupational therapy: An entry-level educational model embedded in service-learning, *Scandinavian Journal of Occupational Therapy*, *22*, 95-102. https://doi.org/10.3109/11038128.2014.997287

Unsworth, C., & Baker, A. (2015). A systematic review of professional reasoning literature in occupational therapy. *British Journal of Occupational Therapy*, *79*(1), 5–16. https://doi.org/10.1177/0308022615599994

Zylstra, S., & Doyle, S. (2020). Student use of standardized measures and reported client outcomes in a university-based occupational therapy student learning clinic. *American Journal of Occupational Therapy*, *72*(4_Supplement_1), 7211510168. https://doi.org/10.5014/ajot.2018.72S1-PO2019

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