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### Abstract

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### Keywords

Online education, online hybrid, applied theory, content delivery

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## Online Hybrid vs. Face-to-Face Instruction in Applied OT Theory

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### ABSTRACT

Minimal evidence exists regarding online education in occupational therapy. This study explored entry-level occupational therapy (OT) student responses to two methods of instruction in an applied OT theory course. The investigator used a retrospective quasi-experimental, nonrandomized comparison group design with mixed methods to compare two cohorts of entry-level OT students. Data included midterm exam, final exam, and cumulative course grades, as well as qualitative data from a final exam essay question. Demographic data and cohort mean grade-point averages were collected at the program level. One cohort received face-to-face instruction, while the other received online hybrid and face-to-face instruction. The face-to-face cohort had statistically significantly higher summative course grades. The investigator could not factor out pre-program GPA, which may have impacted results. With qualitative analysis, the investigator found evidence for *a priori* themes of the value of theory and growth in theory application. Emergent themes included use of theory for clinical reasoning, client-centered practice, theory integration in practice, and theory in the OT process. Students in the online hybrid section perceived that the course required more busywork. Online and hybrid instruction can be an effective means of content delivery for OT applied theory.

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### BACKGROUND AND SIGNIFICANCE

Online education has become a constant in higher education (Blackington, 2013; Jonassen, 2000), but few studies examine online education in entry-level occupational therapy curricula (Barnard-Ashton, Rothberg, & McInerney, 2017; Hollis & Madill, 2006; Mathiowetz, Yu, & Quake-Rapp, 2016; Perlman, Weston, & Gisel, 2010; Reid, 2013; Schaber & Shanedling, 2012; Teeters Myers & O'Brien, 2015). Online education includes a continuum of electronically delivered content ranging from single assignments (Aldrich & Johansson, 2015) and use of computer-based learning

management systems to courses that are entirely web-based (Cummings, Foels, & Chaffin, 2013). Online platforms have been used effectively in health care education for a variety of topics including anatomy (Mathiowetz et al., 2016), musculoskeletal conditions (Murray, McCallum, & Petrosino, 2014), cultural competence (Aldrich & Johansson, 2015) and clinical reasoning (Murphy & Stav, 2018). While some authors (Cummings et al., 2013; Hollis & Madill, 2006) found that health professions student grade outcomes were similar for online vs. face-to-face instruction, Mathiowetz et al. (2016) found that students in an anatomy lab fared better in face-to-face instruction for course grades. Students reported advantages of online education to be choice, access, flexibility, global networking, efficiency, no travel time, enjoyed studying alone, benefits of asynchronous discussions, and gain of analysis and problem-solving abilities (Hollis & Madill, 2006; Mathiowetz et al., 2016; Teeters Myers & O'Brien, 2015). Students perceived the length of time required to complete assignments in online formats as a disadvantage. Some students also reported a dislike for taking courses online (Hollis & Madill, 2006; Teeters Myers & O'Brien, 2015; Telford & Senior, 2017). Instructors perceived benefits of online instruction as rich peer interactions and greater engagement with and reflection on course content (Farber, 2013; Hollis & Madill, 2006); but perceived disadvantages of significantly greater course prep time and ability of unmotivated students to disengage (Hollis & Madill, 2006). Instructors noted that careful course planning and selection of mature students have been key to success in online courses (Blackington, 2013; Doyle & Jacobs, 2013; Foster, Shurtz, & Pepper, 2014; Hollis & Madill, 2006; Mathiowetz et al., 2016; Perlman et al., 2010; Teeters Myers & O'Brien, 2015). Learners echoed that course organization was important and added that timely feedback from the instructor and active engagement with the material were critical for learning (Schaber & Shanedling, 2012). Both instructors and learners wanted quality from online learning, but instructors focused more on creating a collaborative learning environment, while learners focused on their individual learning benefits (Gomez-Rey & Fernandez-Navarro, 2016).

Current learning theory has focused on the need for active learning (Messineo, 2018). Active learning has been defined as any learning strategy in which the learner takes an active role in engaging in the learning process (Messineo, 2018). When an instructor has created active learning experiences requiring critical thinking, collaboration, and metacognition, students have demonstrated increased learning (Messineo, 2018). There has been a need to apply active learning strategies to the online learning environment. Hunt (2018) has reported that online instructors could increase active learning in online environments through requiring students' cognitive and social presence, and by establishing a teaching presence that includes moderating students' activities, providing course organization, and directly facilitating instruction.

The purpose of this study was to compare entry-level OT student responses to two methods of instruction, online hybrid and face-to-face, with regard to students' perceptions of growth in theory application and valuing of theory, and with regard to summative grades.

## **METHOD**

### **Design**

This study utilized a quasi-experimental, nonrandomized comparison group design with mixed methods to compare two cohorts of entry-level occupational therapy (OT) students enrolled in Applied OT Theory courses. These two cohorts consisted of two entry-level programs (one Doctor of Occupational Therapy [OTD] cohort, one Master of Occupational Therapy [MOT] cohort) at the same university. Course content included occupation-based models and frames of reference frequently used in OT practice, as well as theory development and role of theory in the OT process. Both courses were three credit hours and had both a lecture and lab component. The content delivered in the courses was identical; however, the delivery format differed in that the OTD program received face-to-face instruction and the MOT cohort received an online hybrid course format. The OTD program was structured as a 5 days/week program, whereas the MOT program was structured as a one day/week program, with fewer courses per semester and some courses structured in an online/hybrid format. The OTD cohort participated in a traditional 2-hour lecture with the full cohort, and two sections of 2-hour lab weekly, with learning activities including case study theory application completed in small groups, for 15 weeks. The MOT cohort participated in one hour of lecture and two hours of lab with face-to-face instruction, and one hour online instruction weekly for 15 weeks. Online components of instruction included watching and responding to videos, completing reading assignments, group work using Google Drive files, posting reflections, and responding to others' posts in an asynchronous online forum.

### **Participants**

The investigator compared retrospective data from two cohorts of entry-level OT students in an Applied OT Theory course. The OTD cohort consisted of 52 students, and the MOT cohort consisted of 22 students. As a retrospective study of data collected in the normal course of academic participation, data were collected on all class participants, with no direct recruitment. Demographic data were collected at the program level regarding age, sex, and cohort mean grade-point average (GPA) for both entry GPA (mean GPA for all courses students in each cohort had taken) and pre-requisite GPA (mean GPA for all students in each cohort, from courses that were program pre-requisites).

### **Procedures**

Data were collected retrospectively from the Winter/Spring semester of 2016, during which both OTD and MOT sections of the course ran simultaneously. Student assessment methods were identical in the two courses, and included two quizzes, two exams (midterm and final), a written paper, a group presentation, completion of a theory analysis template for all theories covered, and lab participation points. The investigator collected grades from the midterm exam, final exam, and cumulative course grades. These scores provided the data for quantitative analysis. The investigator also collected answers to an essay question on the final exam, which provided qualitative data. The essay question asked students to write a letter to the next cohort of OT students, telling them (1) three things the student would always remember from Applied Occupational

Theory class, and (2) two reasons why the student believed it was important to learn OT theory. Question responses were de-identified and typed into transcripts grouped by cohort.

### **Data Analysis**

The investigator compared grades from the two cohorts to determine if there was a significant difference in class performance with hybrid instructional delivery vs. face-to-face delivery. Midterm, final, and course grades were compared using independent samples *t*-tests and Mann-Whitney U Tests, with IBM SPSS Statistics 23 software. Nonparametric testing was needed to address the small sample size, although the data were normally distributed.

Qualitative data consisted of answers to the final exam essay question. Data were analyzed with Dedoose Version 7.5.9 (2017). Student reflections on ability to understand and apply OT theory were analyzed thematically and compared between cohorts. The investigator selected *a priori* codes based on the research question (i.e., value of OT theory application and personal growth in theory application), in order to investigate students' perceptions regarding their learning. The investigator kept an audit trail to track steps in data analysis, and used Dedoose to code data into *a priori* and emergent themes, which allowed maintenance of a coding index as it occurred. Data were coded into parent and child codes, and then later grouped into major themes. Theme counts, excerpts, and co-occurrences were compared between cohorts within the Dedoose program, to facilitate reflection on the data. Repeated readings facilitated accurate coding of data into themes.

### **Ethics**

This study was approved on November 3, 2016 by the Institutional Review Board of University of Indianapolis (UIndy Study #0794) as exempt.

## **RESULTS**

### **Participant Characteristics**

The OTD cohort consisted of mostly traditional-age (immediate post-graduate or early entry students in their final undergraduate year) students, with 50 females (96.2%) and 2 males (3.8%). The MOT cohort consisted of both traditional-age post-graduate and non-traditional-age students, with 19 females (86.4%) and 3 males (13.6%). All males were of white race (n=5). Refer to Table 1 for demographic information.

Table 1

*Participant Demographics (n=74)*

Cohort	Demographic Item	N (%)
<u>OTD</u>		52 (100)
	Gender	
	Male	2 (3.8)
	Female	50 (96.2)
	Race	
	White	50 (96.2)
	Asian/Pacific Islander	2 (3.8)
<u>MOT</u>		22 (100)
	Gender	
	Male	3 (13.6)
	Female	19 (86.4)
	Race	
	White	19 (86.4)
	African-American	1 (4.5)
	Asian/Pacific Islander	2 (9.1)
<u>Total</u>		74 (100)
	Gender	
	Male	5 (6.8)
	Female	69 (93.2)
	Race	
	White	69 (93.2)
	African-American	1 (1.4)
	Asian/Pacific Islander	4 (5.4)

**Results of Grades Comparison**

A statistically significant difference was found between the MOT and OTD cohorts on midterm exam, final exam, and cumulative course grades (see Table 2). However, comparison of means of cumulative entry GPA and prerequisite GPA demonstrated that the OTD cohort consistently performed approximately one-third letter grade higher than the MOT cohort (see Table 3). This difference in grades, with comparison to cohort mean GPA, is illustrated in Figure 1. Since individual GPA scores were not available, the investigator could not control for GPA when conducting data analysis.

Table 2

*Comparison of Summative Course Grades*

Grade	Face-to-Face (OTD) n = 52 Mean (SD)	Online Hybrid (MOT) n = 22 Mean (SD)	Independent Samples <i>t</i> -test (2-tailed)		Mann-Whitney U Test
			Equal variances assumed	Equal variances not assumed	
Midterm (max. possible: 30 pts.)	26.942 (2.081)	25.455 (2.087)	.006*	.008*	.007*
Final Exam (max. possible: 35 pts.)	28.596 (2.865)	26.500 (3.502)	.009*	.018*	.033*
Course Grade (max. possible: 100 pts.)	94.986 (2.060)	93.501 (2.636)	.011*	.025*	.029*

Note: \*=  $p \leq .05$ 

Table 3

*Entry and Prerequisite GPA by Cohort*

GPA Type	GPA in OTD Cohort (n = 52)	GPA in MOT Cohort (n = 22)
Entry GPA - Class Mean	3.61	3.36
Prerequisite GPA – Class Mean	3.57	3.44



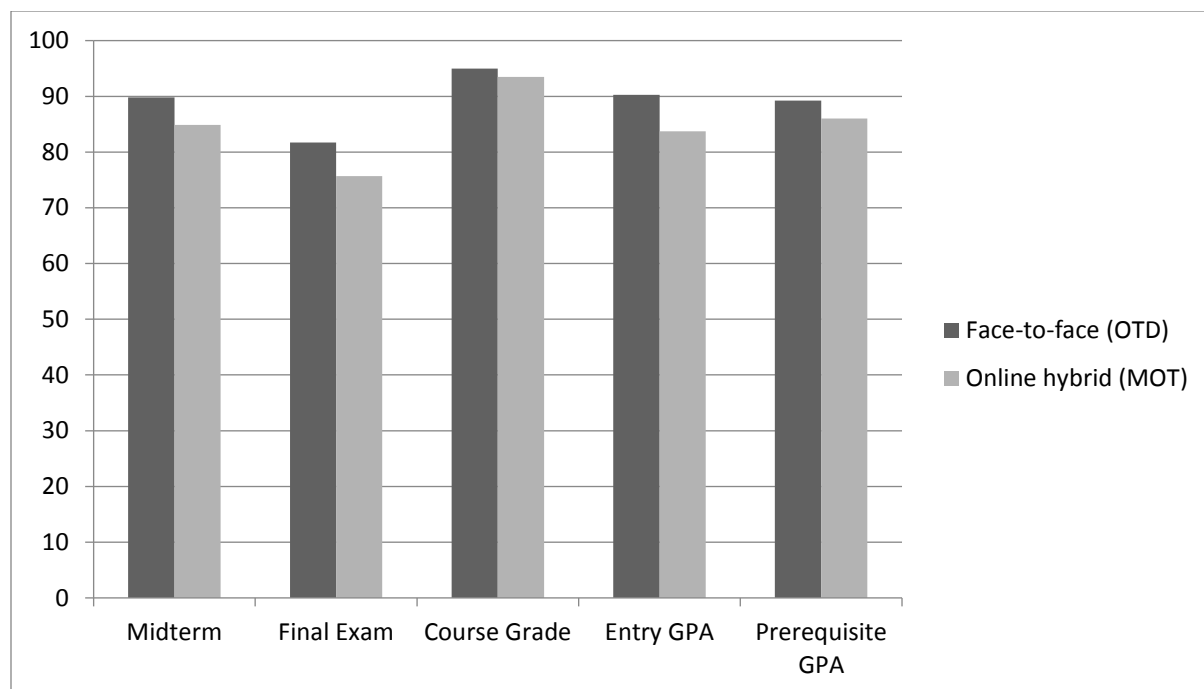


Figure 1. Performance by cohort, converted to percentages.

### Qualitative Findings

Students responded to essay questions regarding (1) three things they would remember from their applied OT theory class, and (2) two reasons why it is important to learn OT theory, written in the form of a letter to the following year's class. The investigator grouped responses into *a priori* themes of *valuing of OT theory* and *growth in theory application*. After excerpt coding, themes emerged highlighting specific ways in which students perceived they could now apply theory (illustrated in Figure 2). Themes are listed, with example excerpts from each cohort for each theme, in Table 4.

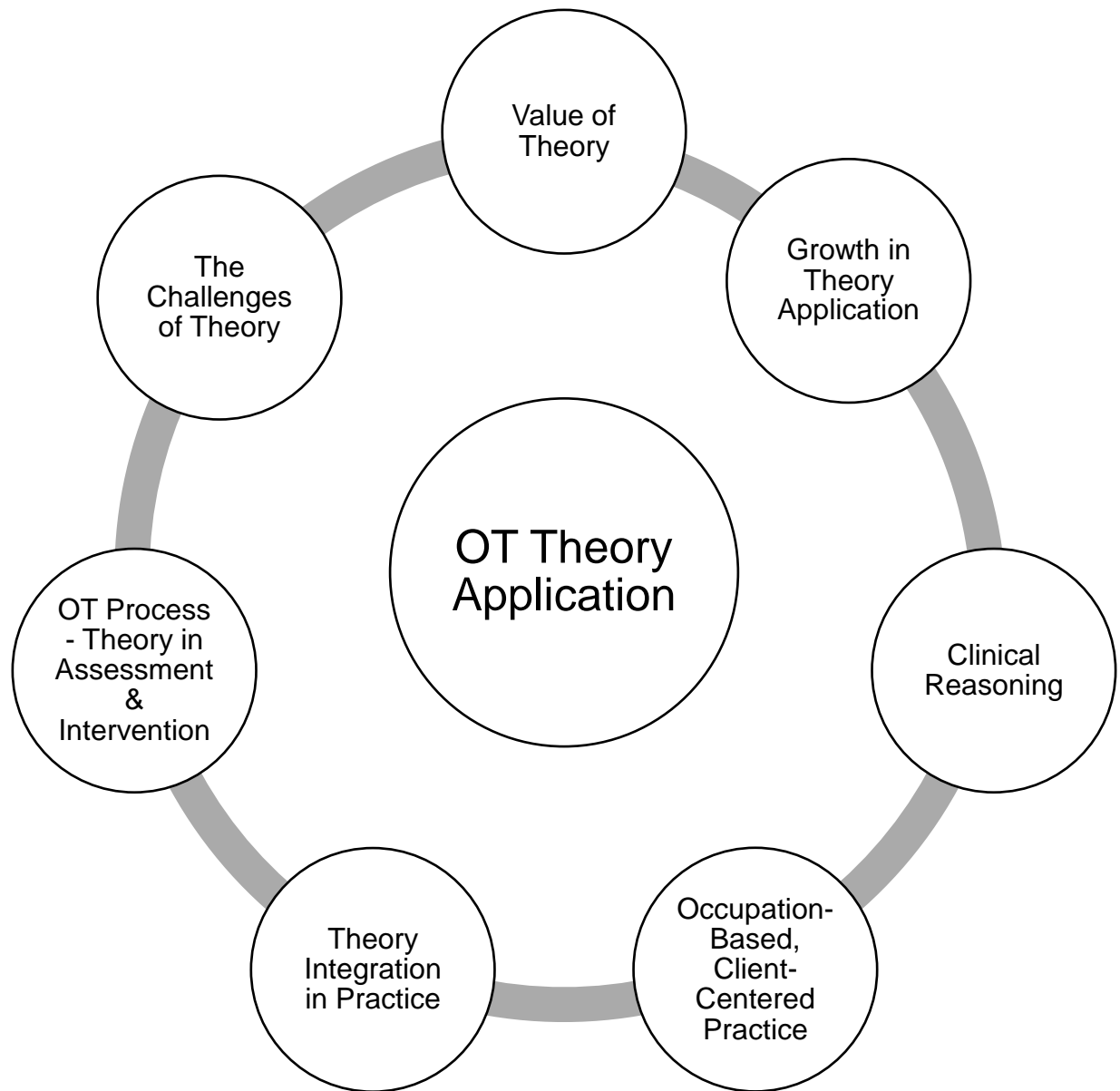


Figure 2. OT theory application themes.

Table 4

*Themes and Sample Quotes From Student Essay Question Responses*

Theme	Sample Quote – MOT Cohort	Sample Quote – OTD Cohort
Value of Theory ( <i>a priori</i> )	“Theory drives our profession & helps us be able to do what we love as OTs - so embrace it!”	“Theory is so important because it gives reasoning for the choices we make...we can use it to guide our practice. Many theorists have put in the effort to discover what works for effective OT treatment. We just have to utilize it!”
Growth in Theory Application ( <i>a priori</i> )	“You will be surprised at the end of this class by how much theory applies to everything.”	“From this experience I was able to understand and establish who I am as a professional and what areas of improvement I still need to work on. I was able to discover the way in which I think and operate the best in order to provide the most effective care.”
Clinical Reasoning	“[Theory] is important because it guides OT practice and the class helps to develop clinical reasoning and thinking like an OT from assessment [to] intervention.”	“Theory...gives you a basis for your clinical reasoning and provides you with multiple ways to examine a person and their meaningful occupations in their life.”
Occupation-based, Client-centered Practice	“The occupation-based models teach you to look at every client as unique, flourishing in a dynamic environment, and with drive to do things.”	“It will be important for you to learn theory because 1) your clients will benefit more from an intervention when it has been tailored to their specific needs and wants, and 2) because it keeps you accountable for providing occupationally driven and client centered practice!”

Theory Integration in Practice	“OT Theory will help you organize aspects of a client into a way that is easier to understand and provides you with research-based approaches to a variety of populations that will be very useful in future clinical practice.”	“This class is so interesting once you go to fieldwork and you can actually see the Frames of Reference & Occupation-based Models in use!”  “[Theory] allows for therapist and client to establish a therapeutic relationship and trust. If OT can explain why client is doing what they are doing, client will be more likely to be engaged & participate during activity.”
OT Process – Theory in Assessment and Intervention	“Learning OT theories has given me a better understanding of the entire OT process and how to choose assessments and interventions.”	“This class helped me understand how to successfully examine clients in a clinical setting during fieldwork and learn how to create effective interventions and goals that meet the needs of clients through these theories.”
The Challenges of Theory	“From first glance, Applied OT Theory is very intimidating. I never thought I’d be able to wrap my head around it.”  “Theory can seem dull at times.”	“When people hear the word “theory,” they tend to psych themselves out.”  “[Theory] seems daunting.”  “Theory can be challenging.”  “Theory may sound boring.”

**A priori themes.** In both cohorts, the *a priori* themes of *valuing of OT theory* and *growth in theory application* were the most frequently coded themes, at 21.8% and 26.3% respectively of total codes for the MOT cohort, and 29.4% and 22.9% respectively for the OTD cohort. Refer to Table 5 for theme and code occurrence frequencies and percentages by cohort. These two themes co-occurred in excerpts 84 times in the data.

**Emergent themes.** Emergent themes delved further into the nature of students' ability to apply theory and internalize how theory guides practice (see Tables 4 and 5). Students reported that they would remember theory as foundational to the profession, that they had grown in knowledge of specific types of theories, that they had learned how to apply theories that fit best to specific clients and situations, and they had learned how to combine theories. Students perceived that learning theories had improved their clinical reasoning, that theory helped them establish goals and select interventions, and that theory guides practice and the OT process, including assessment and intervention. Excerpts from both MOT and OTD cohorts supported these themes.

Both cohorts remarked that theory could be challenging. Students used words such as boring, dull, intimidating, and daunting to describe their perceptions of theory at the start of the semester. Furthermore, two students in the MOT cohort (online hybrid) remarked that the course contained "busywork."

Table 5

*Code Occurrence Frequencies and Percentages by Cohort*

Themes and Codes	MOT (n=22) Frequency (%)	OTD (n=52) Frequency (%)
1. Value of OT theory application ( <i>a priori</i> )	51 (17.9)	146 (21.6)
Foundation of the profession	11 (3.9)	24 (3.6)
Justification	0	11 (1.6)
Guides practice	0	18 (2.7)
Total Theme 1	62 (21.8)	199 (29.4)
2. Growth in theory application ( <i>a priori</i> )	47 (16.5)	93 (13.8)
Personal reflection	2 (0.7)	6 (0.9)
Applying theories that fit best	7 (2.5)	16 (2.4)
Fieldwork Educator's affirmation	0	6 (0.9)
Growth in knowledge of the theories	17 (6.0)	22 (3.3)
Analysis	0	3 (0.4)
Theory is fun	0	2 (0.3)
Tips for learning theory	8	3 (0.4)
Use of theory in other classes	2 (0.7)	4 (0.6)
Total Theme 2	75 (26.3)	155 (22.9)
3. Clinical Reasoning		
Clinical reasoning	13 (4.6)	30 (4.4)
Evidence-based practice	2 (0.7)	8 (1.2)
Provides structure	0	5 (0.7)
Increases quality of care	0	2 (0.3)
Total Theme 3	15 (5.3)	45 (6.7)

4. Occupation-based, Client-centered practice		
Client-centered practice	14 (4.9)	38 (5.6)
Multiple ways to view clients	0	10 (1.5)
Visualizing clients through theoretical lens	0	6 (0.9)
Therapeutic use of self	0	3 (0.4)
<b>Total Theme 4</b>	<b>14 (4.9)</b>	<b>57 (8.4)</b>
5. Theory integration in practice		
Using frames of reference	12 (4.2)	18 (2.7)
Using occupation-based models	17 (6.0)	35 (5.2)
Combining theories	4 (1.4)	12 (1.8)
Using theory - general	5 (1.8)	14 (2.1)
<b>Total Theme 5</b>	<b>38 (13.3)</b>	<b>79 (11.7)</b>
6. OT Process – Theory in Assessment & Intervention		
OT Process	4 (1.4)	2 (0.3)
Theory and assessment	6 (2.1)	18 (2.7)
Theory and intervention	17 (6.0)	39 (5.8)
Theory and goals	3 (1.1)	4 (0.6)
Facilitating occupational performance	3 (1.1)	12 (1.8)
<b>Total Theme 6</b>	<b>33 (11.6)</b>	<b>75 (11.1)</b>
7. The challenges of theory		
Specific assignments' value	5 (1.8)	28 (4.1)
Specific to online portion	2 (0.7)	0
Negative Aspects	10 (3.5)	7 (1.0)
Boring	1 (0.7)	2 (0.3)
Busywork	4 (1.4)	2 (0.3)
Challenging	6 (2.1)	3 (0.4)
<b>Total Theme 7</b>	<b>28 (9.8)</b>	<b>42 (6.2)</b>

## DISCUSSION

This study sought to compare online hybrid vs. face-to-face modes of content delivery in two sections of an applied OT theory course, with regard to summative grades and with regard to student perceptions as reported in qualitative data garnered from a final exam essay question. The face-to-face cohort demonstrated significantly higher results in summative grades. Qualitative results indicated that both groups of students gained an understanding of and appreciation for the course content.

Significant differences in summative grades correlated with results found by Mathiowetz et al. (2016) but differed from studies where no significant difference was found between face-to-face and online courses (Cummings et al., 2013; Hollis & Madill, 2006). However, GPA at entrance to program should be considered when interpreting results.

Figure 2 provides a visual representation of summative grade differences by cohort as well as entry and prerequisite GPA by cohort. This comparison suggests that, were the results able to be controlled for GPA, there may not have been a significant difference between the two cohorts in summative grades. Based on pre-program GPA, one would expect a third of a letter grade difference between the two cohorts in summative course grades. Other differences between the two cohorts must be considered, such as differences in program structure (daily vs. 1 day/week), student age demographics, and the fact that MOT students were observed to engage in more hours of paid employment outside of the academic environment. Additionally, students in the OTD cohort experienced their first Level 1 Fieldwork during the semester, which may have had a positive impact on their ability to integrate theory into practice and may have impacted course grades.

Despite significant differences in summative grades, qualitative findings indicated that students in both cohorts, whether experiencing online hybrid or face-to-face instruction, learned to value theory and experienced personal growth in theory application in their reflective writings (see Table 4). Percent of excerpts attributed to each theme varied from 0.5% to 7.4%, suggesting that students in each of the two cohorts acknowledged the importance of theory in regard to each theme with similar frequency (see Table 5). Based on qualitative data, content delivery method seemed to have a negligible impact on learning.

Though students were not directly asked about their experiences with the online hybrid format, two students in the MOT cohort reported that the course required substantially more work than concurrent courses. This perception has been reported previously in the literature (Perlman et al., 2010). The investigator observed that student course evaluations echoed the perception of busywork more frequently in the online hybrid section of the course than in the face-to-face section (see Table 5, Theme 7).

### **Implications for OT Education**

Online hybrid delivery of applied OT theory content is a feasible alternative to face-to-face instruction, but with some inherent challenges. When designing online content, instructors must be organized and intentional, with focus on active engagement and purposeful interactions (Mathiowetz et al., 2016; Perlman et al., 2010; Teeters Myers & O'Brien, 2015). Best practices for online education include focus on course design, interactivity with course content, usability of the online platform, and site quality (Foster et al., 2014). The courses in this study both used an online learning management system, in which the instructor provided thoroughly organized course content. For the online hybrid course, the instructor utilized online instructional content for “triggering events” (Hunt, 2018, p. 30) that prompted engagement with the content and collaborative learning experiences. Instructors in online courses must design content that requires engagement and collaboration in order to facilitate learning (Hunt, 2018). In a hybrid course, students may perceive online content as “busywork,” as was the case in this study (see Table 5). Therefore, it is important to link online content to course objectives and assessment of progress toward objectives to help the students “connect the dots” between the content with which students engage outside of face-to-

face classroom time and its importance to their educational experience and clinical application (Foster et al., 2014). Since much clinical continuing education for licensed practitioners is online (Lawn, Zhi, & Morello, 2017; Richmond, Copsey, Hall, Davies, & Lamb, 2017), entry-level educators can help make this content delivery format familiar and workable for future practitioners.

Current literature in online teaching and learning in health care professions is of poor evidence level quality (Veneri, 2011). Future studies would benefit from a greater sample size, collection of demographics, and controlling for GPA. Including focus groups in qualitative study design would allow for greater exploration of students' perceptions of online learning experiences, and would allow for member checking of findings. Repeating this study in real time, vs. a retrospective design, would improve confirmability and credibility of the qualitative data. To improve trustworthiness of qualitative analysis, future studies should incorporate a second reader.

### Limitations

This study took place with two cohorts over the course of one semester at one institution. Inherent differences between groups created flaws in comparative analysis. The sample contained limited demographic variety and was geographically limited. Therefore, the study is limited in generalizability. False significant results may have occurred due to inadequate powering of statistical analysis. Furthermore, no co-investigator participated in coding of transcripts, and no member checking occurred, due to the retrospective study design.

### CONCLUSION

Online and hybrid instruction can be an effective means of conveying OT theory content. Occupational therapy educators must continue to explore adequate instructional methods for providing collaborative and valuable learning experiences with online content delivery. Further research is needed to determine if online and hybrid content delivery is as effective a means of delivering content as face-to-face instructional design in entry-level professional health care programs.

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