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# Exploring the Relationship Between Entry-Level Master's Program Class Size and the Number of Graduate Credits Offered and Aggregate NBCOT Pass Rates

## **Abstract**

The AOTA and ACOTE have discussed a transition to a mandated entry-level clinical doctorate degree (Harvison, 2013). Following the move to the entry-level master's degree in 2007, the overall national pass rate on the national certification examination fell from 88% in 2006 to 77% by 2009 (Harvison, 2011; Harvison, 2012). This study sought to determine if the number of graduate credits offered or the class size of an entry-level master's program impacts student outcomes on the national certification examination. Publicly available data was mined from all accredited entry-level master's programs. Data were imported into the SPSS for statistical analysis. The results indicated no significant relationship between the number of graduate credits offered and pass rates ( $p = 0.919$ ) or between average class size and pass rates ( $p = 0.640$ ). Further study is warranted to determine if there are any curricular characteristics that can be used to predict student performance on the national certification examination.

## **Keywords**

certification exam, curricular design, occupational therapy, pass rates, student outcomes

## **Cover Page Footnote**

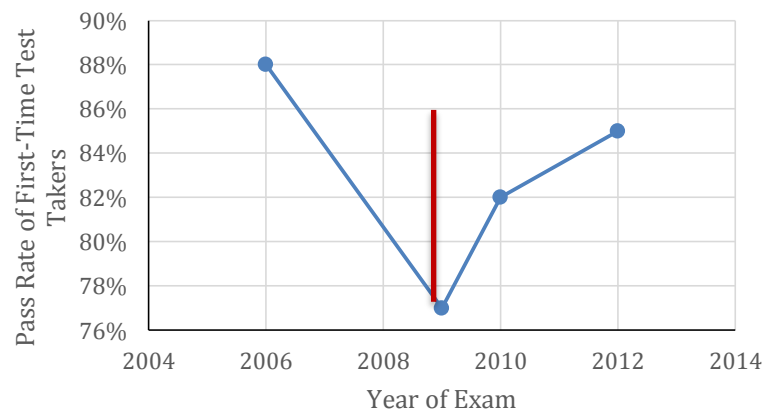
This manuscript is based on a poster presentation given at the 2014 American Occupational Therapy Association Annual Conference and Expo held in Baltimore, MD. The author would like to thank Dr. Wendy Stav for her thorough reviews of this work through its various stages, and Diana Comstock for her assistance with data management and statistical analysis. This manuscript was completed in partial fulfillment of the author's requirements for a PhD in occupational therapy at Nova Southeastern University.

## Background

The process of accreditation involves academic programs examining their goals, activities, and achievements in relation to the most current version of accreditation standards as a means of determining educational quality. The Accreditation Council for Occupational Therapy Education (ACOTE) is responsible for overseeing this process in the United States (American Occupational Therapy Association [AOTA], 2016b). AOTA and ACOTE are considering a mandated transition to an entry-level clinical doctorate degree by 2025 (Harvison & Graves, 2014). The current requirement for all admitted occupational therapy (OT) students to earn an entry-level master's degree took effect in 2007 (ACOTE, 2013b). The ACOTE accreditation standards do not mandate how OT programs are structured; therefore, the organization and layout of each academic program is individualized. In a similar manner, the OT Model Curriculum (AOTA, 2009b) espouses suggested general elements that comprise curricular design and measurement of student outcomes.

Following the mandated move to the entry-level master's degree in 2007, the national average for the past rate of first-time test takers on the OT board exam dropped slightly from 88% in 2006 to 77% in 2009 (Harvison, 2012; National Board for Certification in Occupational Therapy [NBCOT], 2013a). While this trend occurred as the entry-level requirements for occupational therapists changed, the makeup of the certification exam also changed in 2009 to include simulation questions. The first year of the current testing format (2009) led to a

national decline in the pass rate of first-time test taking candidates to 77% (NBCOT, 2013a). This number rose slightly in 2010 to 82%, and the most recent national data indicates that 85% of first-time test takers passed the exam in 2012, which closely aligns with pass rates prior to the exam structure change (see Figure 1) (NBCOT, 2013b, 2013c).



*Figure 1.* NBCOT certification exam pass rates for first-time test takers. Simulation questions were added to the certification exam format in 2009. From the NBCOT Comparison Data, 2013a, 2013b, 2013c.

To coincide with the new exam format that is focused on higher levels of thinking and application of knowledge to real work scenarios, academic programs could have benefitted from an evolution of their educational philosophies and pedagogies from a developmental approach to a more constructivist or transformative learning approach (Baxter-Magolda, 2001; Palmer & Zajonc, 2010). From an educational standpoint, a developmental approach would include courses and programs where a bulk of the content is delivered in a lecture-based format. Constructivist approaches to learning, specifically transactional constructivism, foster learning through the viewpoint that learning is predicated on the

interaction between a person's previous knowledge and experience and the learning environment (Sutinen, 2008). This view of learning aligns with the modern, holistic approach set forth by OT models of practice, such as the Person-Environment-Occupation Model (Law et al., 1996). Transformative learning refers to a gradual shift in perspective that takes place as learners are confronted with situations and ideas that challenge or refute previously held assumptions, values, and beliefs (Nemec, 2012). The previous change in test scores brings into question the need for a curriculum transition process that moves programs into more rigorous constructivist or transformational structures as they transition to the doctorate level.

The aforementioned lack of standardization for program organization can be confusing to prospective students as OT programs begin at different times based on their structure. Some OT programs begin in the third undergraduate year and continue through one or two years of graduate school, while others begin in the final undergraduate year and continue through one or two years of graduate school, and others operate fully at the graduate level. To date, there has been no study exploring if a relationship exists between the structure of graduate programming and student outcomes, such as pass rates on the national board exam.

To aid the OT profession in transitioning to a required entry-level doctorate, evidence of the potential impact that aspects of curricular design has on student outcomes should be explored.

Current OT literature is lacking in established

connections between specific elements of curricula and student outcomes. A search for "occupational therapy" and "curriculum" yielded results that addressed service learning ethics (DeMars, Fleming, & Benham, 1991), clinical reasoning (Liu, Chan, & Hui-Chan, 2000), service learning (Baum, 2007), application of the OT Model Curriculum Guide (Hooper, Atler, & Wood, 2011), and curricular evaluation (Merritt, Blake, McIntyre, & Packer, 2012). Empirical study focused on the effect of various curricular elements on student outcomes has the potential to bolster current entry-level master's programs and to aid in the proposed curricular transition to the entry-level doctorate degree.

Currently, there is no real means for comparing OT education programs. Among the principal stakeholders who use program data are prospective students seeking to make decisions about where to obtain their professional education. At the time of application to OT programs, the only program information universally available to these prospective students is the average class size, the number of graduate credits offered by each program, and the most recent 3 years of graduate performance on the NBCOT certification exam (ACOTE, 2013a). ACOTE mandates the reporting of pass rate data. These numbers are intended to elucidate that each program meets the minimum passing standard and therefore is in compliance with national accreditation standards (ACOTE, 2013a). Pass rate data is not intended to serve as a program outcome or a means for comparison between programs, but without such an outcome measure, prospective students and even OT faculty

often use the most recent 3-year pass rate data as a means of comparison.

Another publicly used comparison is the US News & World Report's rankings of top OT programs (US News & World Report, 2014b). While this list constitutes a ranking, it is based anecdotally on the opinions of deans, administrators, and faculty and has no scientific merit supporting true program outcomes (US News & World Report, 2014a). These rankings are not categorized based on type of institution; therefore, research-intensive schools are included in the same list as smaller state schools that are teaching focused (Carnegie Foundation, 2014). For example, in the most recent rankings completed in 2012, twenty-two of the top twenty-five programs are considered doctorate-granting institutions (US News & World Report, 2014b). These rankings do not speak directly to the quality or length of OT education and can thus be confusing to prospective OT students seeking to identify the best fit for their professional education needs.

Currently, national accreditation standards mandate that all programs report the number of students in each graduating class as well as the percent of those graduates who pass the certification exam (ACOTE, 2013a). Although current accreditation standards provide no supporting rationale for reporting class size, evidence of the effect of class size in other fields of study and at different levels of education exists (ACOTE, 2013a). In primary education, Finn, Pannozzo, and Achilles (2003) determined significant differences in student engagement and behavior in classes with fewer than 20 students. Managers and leaders in the

field of business have reported that smaller numbers of subordinates led to heightened employee satisfaction, skill development, and complex problem solving (McKiel, 2011). Each of these outcomes can be readily linked to OT practice and the development of confident and competent entry-level practitioners. Therefore, this study sought to address the relationship between the class size of entry-level master's programs and student outcomes on the national certification exam. It is hypothesized that as class size increases, student pass rates will decrease.

It is additionally hypothesized that as the number of graduate credits offered increases, student pass rates will increase. The development of this hypothesis originated with multiple prospective students inquiring about various OT programs in the researcher's state and surrounding region; regional graduate OT programs ranged from 52 to 81 credits while providing the same academic degree. Due to the fact that ACOTE does not specify how many graduate credits are required for an entry-level degree, the determination of credits for each OT education program rests in the hands of each academic institution (Council of Graduate Schools, personal communication, May 29, 2015). Based on this graduate credit disparity, the expectation of similar levels of competence as judged by the certification exam, and the differences in length and cost of graduate programs, this study explored the relationship between the number of graduate credits offered by entry-level master's programs and student outcomes on the national certification exam.

## **Method**

### **Participants and Procedure**

**Participants.** The participants of this study included every entry-level master's OT program accredited by ACOTE as of November 2013. At the time of data collection, 140 academic programs had all three variables readily available. Due to the information being publicly available and the type of approval granted by the researcher's Institutional Review Board, all data collected was publicly available on OT academic program or university websites. The researcher collected data between November 2013 and January 2014 intentionally to ensure that all pass rate data was indicative of first-time test takers rather than the overall yearly pass rate reporting that began in April of 2014.

**Procedure.** This study used a non-experimental correlational research design in order to determine if a relationship exists between class size and student pass rates and between the number of graduate credits offered and pass rates. This design establishes a presence or absence of a relationship and is unable to determine causation (Christensen, Burke-Johnson, & Turner, 2011). In order to answer the correlational research question as completely as possible, a number of steps were completed. The researcher sequentially collected and entered data into a Microsoft Excel spreadsheet using the state-by-state listing available through the AOTA website, which included URLs for each accredited program (AOTA, 2016a). At the time of data collection, ACOTE required the most recent 3 years of program information to be reported. For this study, that information included the years 2010-2012.

Average class size was identified by calculating the mean class size from the 3 years of enrollment reported by each program. Next, the overall number of graduate credits offered by each program was tabulated. For this study, that included all courses listed at the 500 or the 5000 level or higher. For many programs this was easily identifiable, whereas others required further searching of program and university websites to identify the curricular structure and numbering of courses. The final point of data collected included the 3-year aggregate pass rate on the NBCOT certification exam that all OT academic programs are mandated to report.

Once all data were entered, the researcher visually inspected the spreadsheet for any entries that appeared to be incorrect. The visual inspection revealed a number of programs that had a much greater number of graduate credits offered; however, further exploration of these program websites indicated that these programs all use quarter hours rather than semester hours. The data for these programs was transformed from quarter hours into semester hours by dividing the initial total by four and then multiplying the result by three. This transformation was completed to ensure that all credits being reported used the same scale. Once all of the corrections were made on the spreadsheet, the data were imported into IBM's Statistical Package for the Social Sciences (SPSS Statistics 20).

For statistical analysis, the variables of average class size and the number of graduate credits offered were directly entered into SPSS as ratio scale data for normality testing, the Pearson

correlation coefficient, and a simple linear regression to determine if either variable could be used to predict pass rates. Figure 2 provides a visual representation of the pass rates for each program based on the number of graduate credits offered. Figure 3 provides a visual representation of the pass rates for each program based on the average class size. The data were then recoded into ordinal variables representing a range of values to

allow for comparison of means with an ANOVA. The division of data into groups for both variables was completed in a manner that sought to divide evenly the number of data points in each grouping. The data for average class size and the total number of graduate credits offered were distributed in units of 10; the specific ranges are listed in Table 1. Table 2 provides the range, mean, and standard deviation for each of these variables.

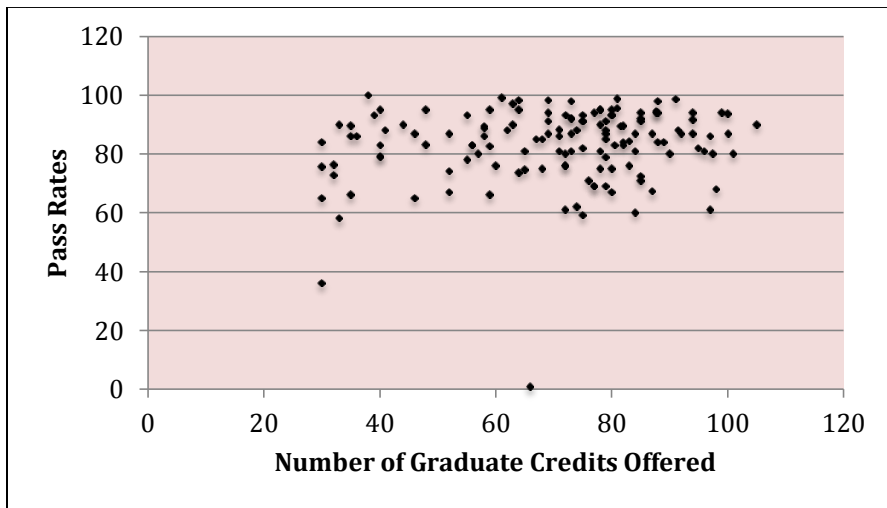


Figure 2. Pass rates for each program based on the number of graduate credits offered.

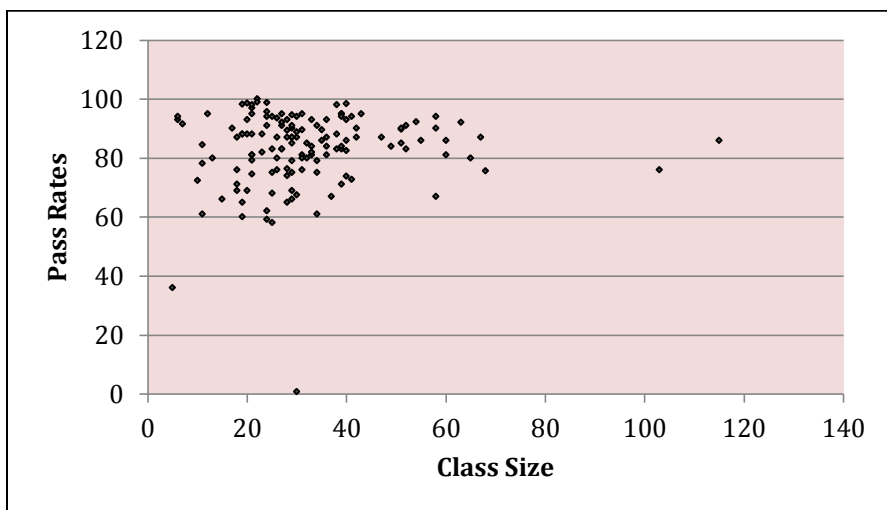


Figure 3. Pass rates for each program based on the average class size.



**Table 1**  
*Average Class Size and the Total Number of Graduate Credits Offered*

Average Class Size	Group	Number of Graduate Credits Offered
<20	1	<39
21-29	2	40-49
30-39	3	50-59
40-49	4	60-69
>50	5	70-79
-	6	80-89
-	7	>90

**Table 2**  
*The Range, Mean, and Standard Deviation for Class Size and the Number of Graduate Credits Offered*

	Range		Mean	SD
	Min	Max		
Class Size	5	115	32.02	16.08
Number of Graduate Credits Offered	30	105	70.22	18.89

The data collected is deemed to be reliable, as each program updates the reported data yearly and it is checked for accuracy by ACOTE (2013b). Population validity for this data is represented based on the inclusion of all OT programs that were accredited at the time of data collection. Face validity was established for the variables used in this study by discussing common elements of OT academic programs with an occupational therapist with experience developing OT curricula and additional OT practitioners and educators. It is important to note that the data collected have low temporal validity, as the results of this study are only reflective of the 3 years of reported data and not long-term program or student success.

**Results**

The Pearson product moment correlation was used to determine the relationship between

class size and student pass rates and between the number of graduate credits offered and student pass rates. Due to the directional hypotheses used, a one-tailed test for significance was completed for both class size and the number of graduate credits offered. There was a statistically significant weak correlation between the number of graduate credits offered and student pass rates ( $p = 0.032$ ;  $r = 0.157$ ), meaning the variables are associated by more than mere chance. The relationship between average class size and student pass rates was also weak but was not significant ( $p = 0.176$ ;  $r = 0.079$ ) (see Table 3).

**Table 3**  
*The Relationship Between Average Class Size and the Number of Graduate Credits Offered*

	Class Size	Number of Graduate Credits Offered
Pearson Correlation	0.079	0.157
Significance	0.176	0.032*

*Note.* \*Significant at the 0.05 level (one-tailed).

Next, an ANOVA was used to analyze the difference between groups for the class size data. The results indicate that there were no significant differences in the NBCOT pass rates between the groups based on class size ( $F = 1.388$ ;  $p = 0.241$ ) (see Figure 4). A second ANOVA was used to analyze the difference between groups on the graduate credits offered data. The results of this ANOVA yielded similar results ( $F = 0.234$ ;  $p = 0.612$ ), which indicates that there were no significant differences in the NBCOT pass rates between groups based on the number of graduate credits offered (see Figure 5).

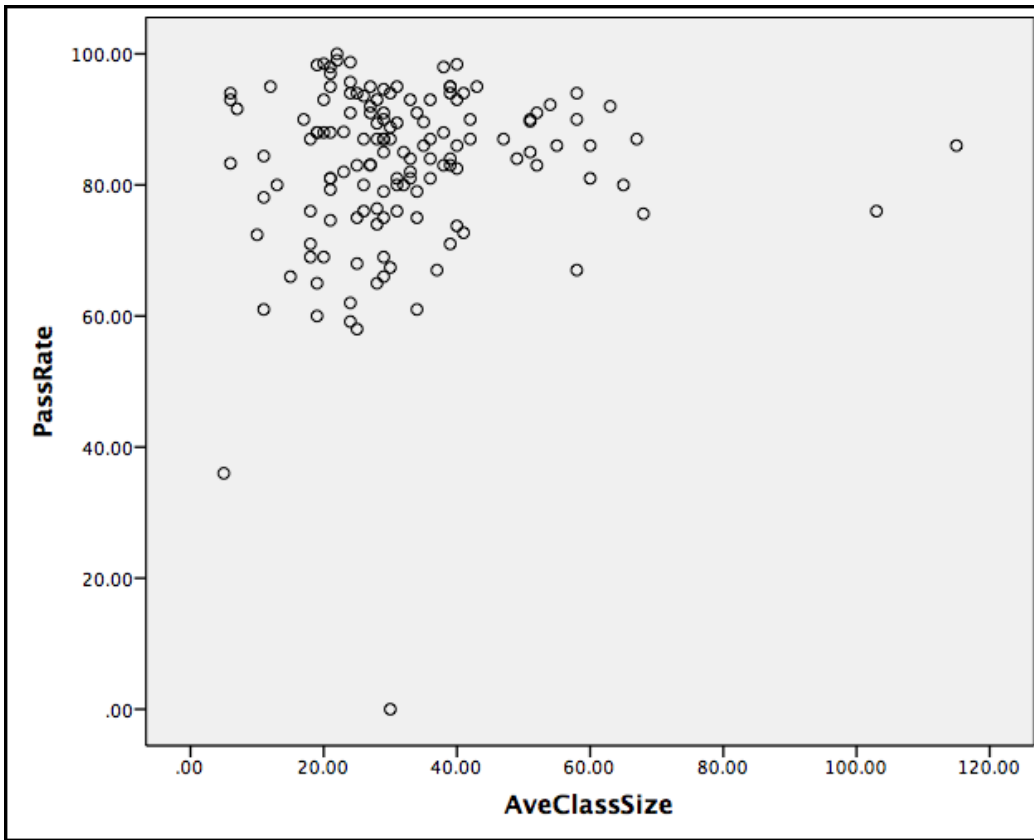


Figure 4. NBCOT pass rates between the groups based on class size.

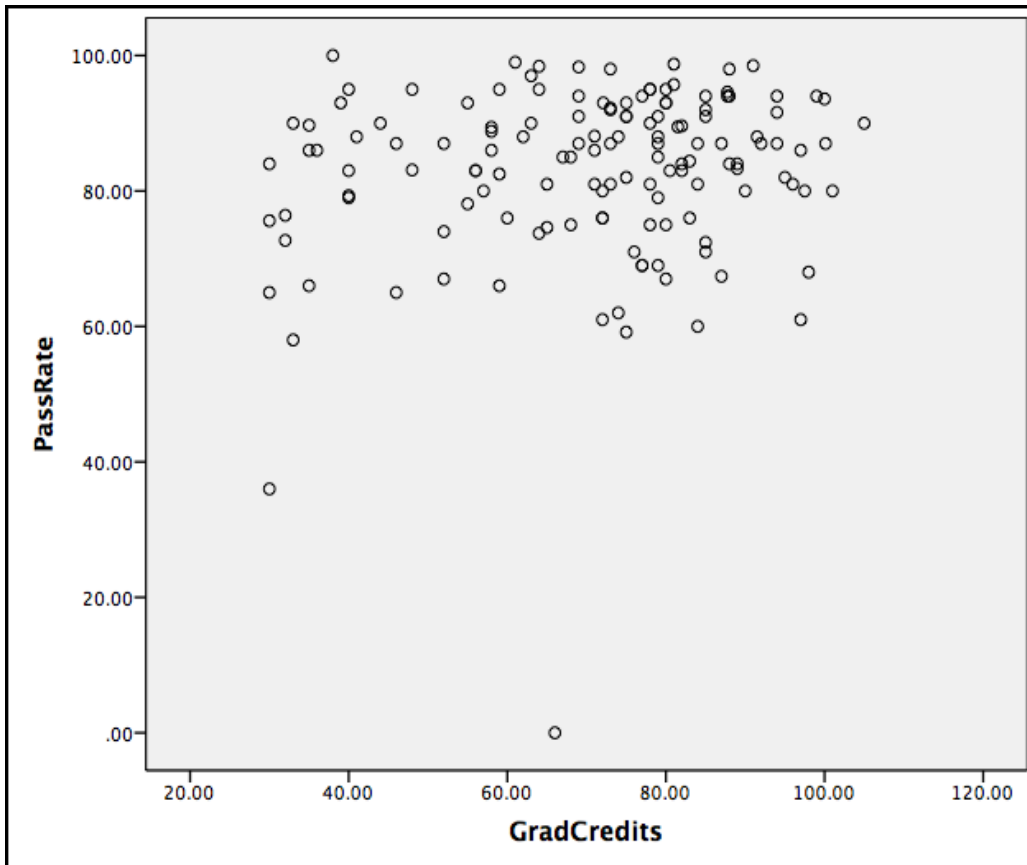


Figure 5. NBCOT pass rates between groups based on the number of graduate credits offered.

The regression model used for this study was only able to explain 3.1% of the results, with 2.5% explained by the number of graduate credits offered alone. The results of the individual statistical tests as well as the more robust regression model reveal that this combination of variables does not significantly predict pass rates. This indicates that factors beyond class size and the number of graduate credits offered are likely influencing the performance of students on this exam.

### **Discussion**

This study contributes an initial element to the discussion regarding graduate success on the NBCOT certification exam and is an extension of the conversation related to student outcomes for OT education programs. The variables for this study were intentionally selected because of the reporting mandate by ACOTE, which makes these three variables the only available and universal means of comparison among OT programs. The independent variables of class size and the number of graduate credits offered each have a statistically weak correlation with student pass rates on the NBCOT certification exam. Similarly, the regression model used for this study only explained a portion of the variance in pass rates; these results indicate that there are additional factors that influence success on the board exam.

There are a number of potential rationales for the weak correlation that was established in this study. This program considered two broad variables that allowed for grouping of programs: the implementation of OT curricula is unique in regard to the layout of required content, the day-to-day teaching processes used, the organizational cultures,

and the requirements for prospective students. Further exploration of these and other aspects of academic programs may help to connect a combination of variables with graduate pass rates.

Currently, there is a wide range of curricular designs being offered. Some are structured in a developmental sequence that begins with pediatrics and progresses through adulthood and into productive aging while others are divided based on types of dysfunction, such as neurologic, orthopedic, or congenital. This variety can make comparison across multiple programs difficult. The pedagogical practices used to convey course content and assess learning are another aspect of academic programs with the potential to impact student learning. Some courses or entire programs may be delivered in a lecture-based format, problem-based learning, small and large group discussion, or a combination of teaching methods.

Another factor that may influence student learning is the organizational culture of each department. Organizational culture can be thought of as a set of “shared basic assumptions learned by a group. . . and. . . taught to new members as the correct way to perceive, think, and feel” (Schein, 2010, p. 18). The culture of an OT program can include the type of relationship the faculty have with the students, the level of collegiality among the faculty, as well as delineated roles in a classroom.

An additional factor that may influence student learning would be the student qualifications at the start of the OT program. Since there are such a variety of program layouts, no national OT admission criteria exist. Some programs may rank applicants by cumulative grade point average

(GPA), others by GPA in the last 30 to 60 credit hours, and others by the GPA in specific prerequisite courses. As all OT students are expected to have the same degree of competency following their program, it would be interesting to explore how different admission requirements relate to student outcomes.

This study had a number of limitations, the first being that as a retrospective study there is no ability to determine a cause and effect relationship between either of the variables and student outcomes. The level of approval granted by the researcher's Institutional Review Board limited the data to only publicly available information. Despite overall class size being a variable that was considered, not all program websites indicated specific faculty to student ratios in courses and labs. Therefore, this information had to be excluded from all programs leaving only the overall cohort size to be reported. The data that were collected were only representative of the 3 specific years of reported data and are not representative of long-term program outcomes. Another limitation is related to the scant amount of OT literature related to the construct of curriculum.

Educators, researchers, and prospective students should exercise caution when seeking to base real world decisions on the current findings. This study was intended as a preliminary step in the exploration of curricular elements and not as a seminal work. Not enough information is available to consider significant curricular changes, such as eliminating credits or adding additional students, based solely on this study's results.

Despite the inherent limitations, the results of this study lead to related areas of research. The first suggested area of ongoing study would be to contact each entry-level OT program to ascertain program data related to additional variables that may be able to predict student success on the NBCOT board exam more accurately than the current regression model. Examples could include curricular design, faculty to student ratio, admission requirements, or student relationships with faculty. An additional area to explore would be to contact the accreditation bodies of various allied health professions (e.g., physical therapy) to determine if an immediate decrease in student pass rates is common following a curricular transition to the clinical doctorate level. Additional studies are also needed to explore the effects of specific teaching practices in the field of OT at both the programmatic and student levels. These further studies would be beneficial in developing a more uniform transition plan for curricula that could be added to future revisions of the AOTA Blueprint for Entry-Level Education and the AOTA Occupational Therapy Model Curriculum (2009a, 2009b). Further exploration of curricular design has the potential to aid the profession on two fronts. This form of data can serve to guide current master's level programs in transitioning their curricula to the doctoral level. Curricular data can also be used as an element of curricular outcomes that are reported during the reaccreditation process.

Studies related to this line of inquiry would be well served to align with a growing form of inquiry known as the scholarship of teaching and learning (SoTL). SoTL inquiry allows instructors

and administrators not only to compare specific teaching practices, but also to connect these teaching practices to student and program outcomes. Following the recommendation of Hooper, King, Wood, Bilics, and Gupta (2013), future studies should move beyond a focus of student scores and perceptions of individual learning experiences and begin to explore comparisons of teaching practices in various contexts and programs. A benefit of contributing to and using SoTL research in a field of study such as OT is that the body of research and those connected with it begin to form a community of practice (Lave & Wenger, 1991). This network of OT educators, and the knowledge that it shares, can serve to connect predominant descriptive OT education studies with the “‘big’ educational issues” (Hooper et al., 2013, p. 15) in order to meet the needs of both OT students and the field now and in the future.

## Conclusion

Because OT education is a “high stakes endeavour” (Hooper et al., 2013, p. 16), it is important for current and prospective students, educators, administrators, and professional organizations to continue to examine the relationship between a variety of factors and student outcomes on the NBCOT exam. This study provides an indication of a weak correlation between the number of graduate credits offered and student pass rates on the NBCOT exam. These results can serve as a starting point for the ongoing conversation related to student outcomes. Further variables related to curricular design, faculty to student ratio, admission requirements, or student relationships with faculty should be similarly

explored for their relationship with or ability to predict student pass rates on the NBCOT exam. These lines of inquiry may yield empirical data that include a more complete list of variables that have a statistical correlation with pass rates. An additional benefit of this level of detail would be increased clarity and a means of comparison for prospective students when applying to OT programs.

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