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Interteaching: Its effects on exam scores in a compressed-schedule format

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Abstract: Although previous research has found interteaching to be an effective form of instruction, all of the currently published data have been collected in courses that have allowed for a minimum of 48 hours between class sessions. In the current study, we examined the effectiveness of interteaching compared to traditional lecture during a six week summer session of a behavior modification course. Two non-concurrent sections of the behavior modification course were taught during which the instructor alternated between interteaching and traditional lecture. These courses were counterbalanced, such that when material from one section was covered using an interteaching approach, the same material in the other section was presented using a traditional lecture. Unlike previous studies, students did not score higher on exams following interteaching sessions. Additionally, students indicated a preference for lecture-based instruction as opposed to interteaching. Interpretations of these results, the social validity responses, practical implications, and recommendations for additional research are discussed.

Keywords: interteaching, college instruction, active learning, pedagogy, behavior analysis

Introduction

Effective classroom instruction that capitalizes on well-established behavioral principles has been well-documented (e.g., Moran & Malott, 2004). Approaches such as reciprocal peer tutoring (e.g., Pigott, Fantuzzo, & Clement, 1986), Just-in-Time Teaching (Benedict & Anderton, 2004), direct instruction and precision teaching (Binder & Watkins, 1990), and Keller's (1968) Personalized System of Instruction have all demonstrated to be effective alternatives to traditional (e.g., lecture format) instructional approaches. Nevertheless, these approaches have not been systematically adopted by instructors for various reasons (see Saville, Zinn, Neef, Van Norman, & Ferreri, 2006). Recently, a behavioral method to classroom instruction called interteaching has begun to gather interest due to a more flexible approach when utilizing behavior-analytic principles (Boyce & Hineline, 2002).

Interteaching sessions first require students to complete a preparation (prep) guide before each class session that has been developed by the instructor. The type of questions on the prep guide vary depending upon the assigned reading for that class period, but generally consist of questions that are designed to require students to select basic concepts from the assigned reading and then apply that information to additional questions that assess higher level comprehension of the material. During class, the students are divided into dyads and discuss their answers to the

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prep guide questions in "a mutually probing, mutually informing conversation between two people" (Boyce & Hineline, 2002, pg. 20). While this occurs, the instructor moves from group to group and provides clarification and helps to facilitate discussion between the students. Once the students finish their discussion, they are asked to complete an interteaching record that asks them to identify any topic from that class session that they found difficult. The instructor compiles these responses and creates a brief lecture for the following class session that focuses on the material that students found difficult. After the lecture is completed, the students are divided into dyads and the process begins again (see Boyce & Hineline, 2002 for a more detailed description of interteaching sessions).

The effectiveness of interteaching has been empirically demonstrated across a variety of courses, including nutrition (Goto & Schneider, 2009, 2010), special education (Cannella-Malone, Axe, & Parker, 2009; Saville et al., 2006), computer programming (Emurian & Zheng, 2010), business (Edwards, 2005), and psychology (Saville, Zinn, & Elliott, 2005; Saville, et al., 2006; Scoboria & Pascual-Leone, 2009); with additional instructors also anecdotally describing the advantages of this approach in their classrooms (e.g., sociology – Tsui, 2010; religious studies – Zeller, 2010). One of the first studies to demonstrate the effectiveness of interteaching as compared to traditional approaches (e.g., lecture) in a classroom setting was Saville et al. (2006). In study 2 of their paper, students in two sections of an undergraduate research methods course were taught material using both an interteaching approach and traditional lecture format (i.e., summarize previous material, introduce new topics, present relevant examples, etc.). The authors counterbalanced the sections, such that while the first section was receiving information using an interteaching approach, the second section was taught using a lecture format. Results from this study showed that students who were taught the material using an interteaching approach, performed better on exams than students who were taught the same material using a lecture format. Additionally, the majority of students in both sections reported a preference for the interteaching approach to instruction.

Additional research has been conducted examining the various components of interteaching. Saville and Zinn (2009) examined the effect of quality points on student exam scores. Quality points are assigned when students who worked as partners during a specific interteaching session both correctly answer a question (i.e., short answer or essay) on the exam related to the interteaching material. For example, if Chelsea and Nicole are partners during a class session where they interteach material about extinction and both of them answer the question on the exam about extinction correctly, they would receive additional bonus points. However, if only Chelsea answered the question correctly, no additional points would be provided. Thus, engaging in high-quality interteaching is beneficial for both students. Saville and Zinn (2009) used an alternating treatments design to assess the effects of quality points on exam score. Two sections of an introductory psychology course were taught using an interteaching approach, with the sections being counterbalanced, such that when one section was receiving quality points for interteaching the other section was not. Results of the study showed that quality points did not appear to play a significant role in improving students' exam scores, which supports an earlier study that found a significant difference between interteaching and other forms of instruction even though no quality points were provided (Saville et al., 2005). Researchers have also examined the influence of interteaching prep guides on student quiz scores. Cannella et al. (2009) taught a special education course using interteaching and varied the composition of the prep guide by either requiring students to create their own or to answer questions that were developed by the instructor. Having students write their own prep guide

questions led to slightly higher quiz scores than answering instructor-prepared questions; however, the difference in quiz scores was not substantial. Social validity measures indicated that students preferred a standard lecture approach instead of interteaching, which the authors believe may have been due to the students' previous experience of taking classes with the instructor in which interteaching was not used, as well as additional work (e.g., prep guides, more quizzes, etc.) that is not required in typical lecture-based courses. While this research is helpful in identifying the influence of student-written versus instructor-written prep guide questions, the lack of a control group limited the conclusions on what effect prep guides actually have on student quiz scores in an interteaching-based course.

Although the increasing amount of research on interteaching has largely supported its effectiveness when compared to more traditional instructional approaches, none of the currently published research has utilized interteaching in courses that meet during a more compressed academic schedule requiring classes to meet more than three times per week (i.e., summer-session classes). Therefore, the current study was designed to examine the effectiveness of interteaching as compared to a traditional lecture-based course in a compressed-format class offered during a six-week summer session. Based on the previous research demonstrating the efficacy of interteaching, the authors anticipated that students' exam scores would be significantly higher during interteaching conditions, and that students would prefer that the instructor use the interteaching format as opposed to the traditional lecture format when presenting course content.

Method

Participants

Participants were 21 undergraduate students (14 women and 7 men) in two non-concurrent sections of a six-week summer-session, introduction to behavior modification course. The participants' median age was 20 years-old (range 19 to 60) and were classified as either sophomores (n = 2), juniors (n = 12), or seniors (n = 7) in college. There were 9 participants (6 women and 3 men) in the first section (SEC 1) and 12 participants (8 women and 4 men) in the second section (SEC 2). Both sections were taught by the first author and met on Mondays, Tuesdays, Thursdays, and Fridays for 85 minutes per class.

Materials and Procedure

A multi-crossover, counterbalanced design was used to compare the effects of interteaching to traditional lecture on students' exam scores. The instructor would alternate between presenting material using lecture and interteaching over the course of the summer-session. Additionally, the format of instruction was counterbalanced across sections, such that while SEC 1 received information using interteaching, SEC 2 was taught the same material using lecture.

Lecture. Lectures consisted of the instructor presenting material over the assigned readings (Martin & Pear, 2007) using PowerPoint® presentations. Outlines of the notes were posted online (i.e., Blackboard) prior to the class meetings so that students could print them off and take additional notes on relevant information discussed during class. Lectures lasted approximately 85 minutes and included examples and questions designed to demonstrate

comprehension, analysis, and synthesis by the students (Bloom, 1956). Students were also provided with a brief study guide for each exam that contained similar (but less detailed) questions as those on the prep guides used during interteaching sessions.

Interteaching. Interteaching class sessions followed the description outlined earlier in this article. Prior to class, students were presented with a prep guide that was created by the instructor. Each prep guide contained approximately 7-10 questions (range 5-14) designed to highlight the key concepts from their reading assignment and to provide them with an opportunity to apply the information. For example, a sample question from the prep guide associated with operant extinction read:

> Paul hits his little sister in order to get his mother's attention. When this happens, Paul's Mom sets him aside and gives him a long explanation of why he shouldn't hit his sister. Paul continues to hit his sister. Is extinction a good procedure to use in this case? If not, what approach could you take to decrease Paul's hitting behavior?

At the beginning of class, students were divided into dyads, or occasionally triads if student attendance required this arrangement. Students were allowed to pick their own partners; however, they had to have a different partner each day during the week. Students spent approximately 45-50 minutes discussing items on the prep guide while the instructor moved from group to group and helped to facilitate the discussions. Following the discussions, the students spent approximately 5 minutes completing the interteaching record sheet (for a template, see Boyce and Hineline, 2002). The instructor compiled the sheets and designed a brief lecture (25-30 minutes) for the beginning of the next class to clarify any of the material that the students found difficult. Similar to the lecture condition, an outline of the brief lecture was posted online prior to the next class meeting so that students could print off the slides and take additional notes during class. Upon completion of the lecture, the students were divided into their groups and the discussion over the prep guide for that day's reading assignment began. For completing the prep guide and participating in the discussion, students received points that accounted for approximately 9% of their overall grade. Due to previous research, the authors decided not to use quality points (Saville & Zinn, 2009).

Tests

Students in both sections completed four exams (two following interteaching sessions and two following lecture sessions) over the course of the summer-session. Tests consisted of multiple choice questions (70 points total) and six essay questions (five points each). Multiple choice and essay questions were directly related to questions taken from the prep guide. For example, one of the prep guide questions asked students to "Describe how tokens are used in a token economy and the initial steps in setting up a token economy." One of the essay questions on the following test required students to "Describe why it is important for individuals to earn enough tokens to exchange for back-up reinforcers in the early phases of a token economy." Similarly, a multiple choice question related to the prep guide question was: "A researcher plans to implement a token economy with a group of juvenile offenders in a treatment program. What is the first step in planning a token economy?" with the correct answer (defining the target behavior) provided along with three other distracters.

Interobserver Agreement (IOA)

The instructor and a graduate teaching assistant who was naïve to the purpose of the study independently graded each exam. Answers to essay questions were scored on separate data sheets to limit the possibility of influencing the score provided by the other grader. An agreement was scored if the two graders assigned the same score to an answer. To determine IOA the following formula was used: (agreements/ (agreements+disagreements)) x 100%. Mean agreement scores were 90% for interteaching (range 84% to 100%), and 89% for lecture (range 82% to 98%).

Social Validity

Following the completion of the course, each participant anonymously completed a six-item questionnaire to assess students' preferences for instructional format (see Table 1). Additional open-ended comments were collected during the final course evaluation.

Statistical Analyses

Participant demographics. Because the authors could not randomly assign participants to sections, we collected self-reported demographic data on variables including: (a) gender; (b) major; (c) cumulative grade point average; (d) number of psychology credits taken; (e) number of credit hours they were currently enrolled; (f) how many credits they had taken from the instructor previously; (g) if they were employed; (h) if they participated in extracurricular activities; (i) if they had significant others; and (j) whether they had children. These data were used to help determine how similar students in the two sections were prior to introducing the independent variable. Chi-square tests and independent samples *t* tests were conducted to assess participant demographics, with a significance level of $p<0.05$.

Test scores. Independent-samples *t* tests were conducted to examine differences between the lecture and interteaching conditions on each of the four exams, with a significance level of $p<0.05$.

Box plots of test scores. Given the small number of students in each section, and the possibility of outliers affecting the overall mean, exam scores were also analyzed using box plots. Box plots were created in Excel 2010® by determining the minimum value, first quartile (25^{th} percentile), median (50^{th} percentile), third quartile (75^{th} percentile), and maximum value of exam scores for each test administered to both sections.

Results

Participant Demographics

Six chi-square tests (gender, major, employment status, extracurricular activity, significant others, and children) and four independent-samples *t* tests (GPA, number of psychology courses, credit hours, and credit hours from instructor) found no significant differences between the two sections on any of the demographic data (all *p*s >.20).

Tests

The mean scores on each of the four exams for participants in both SEC 1 and SEC 2 are displayed in Figure 1. Statistically significant effects were found on Exam 2 $t(19) = .723$, $p = .001$ and Exam 3 $t(19) = -.826$, $p = .026$; with students performing significantly better during the lecture condition on Exam 2, and students performing better during the interteaching condition on Exam 3. No significant differences were found for Exam 1 $t(19) = .429$, $p = .08$ or Exam 4 $t(19) = -.321$, $p = .839$. Although both methods of instruction produced acceptable averages for the instructor, unlike previous studies (e.g. Saville et al., 2006), students' overall mean scores were not higher on exams following interteaching ($M = 78.48$, $SD = 4.74$) as compared to exams following lecture ($M = 78.67$, $SD = 1.01$).

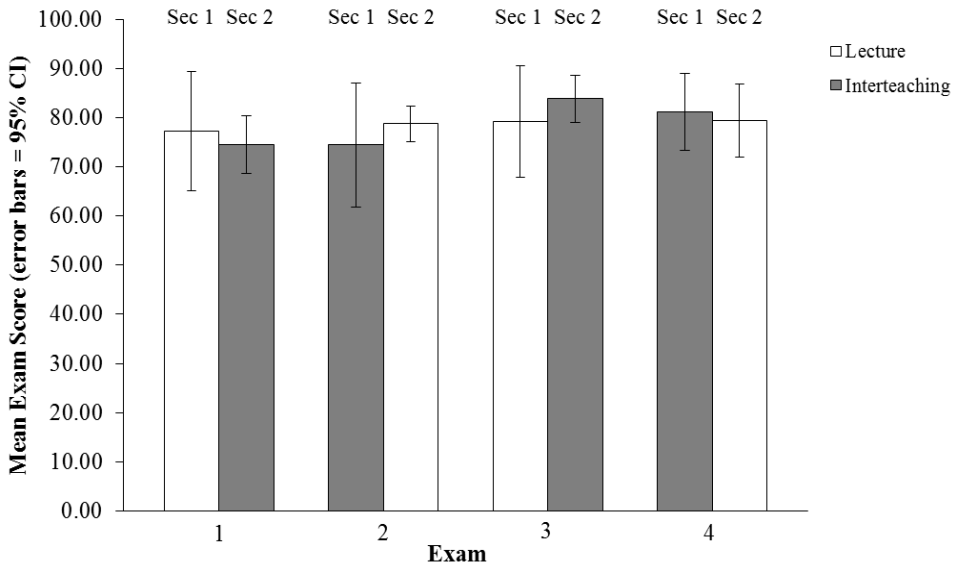

Figure 1. Overall mean percent correct across four exams. Mean exam scores and 95% confidence intervals are displayed for each section and across the four exams administered during the compressed six-week summer sessions.

Figure 2 shows box plots for the four exams administered to each section. In a box plot, lines are drawn at the 25th, 50th, and 75th percentiles. The capped vertical bars extend to the lowest and highest exam scores in that section, with a maximum of 1.5 interquartile ranges. When comparing the median exam scores (50th percentile) across interteaching and lecture conditions, the results indicate no consistent pattern or difference between conditions, which are similar to the findings displayed in Figure 1.

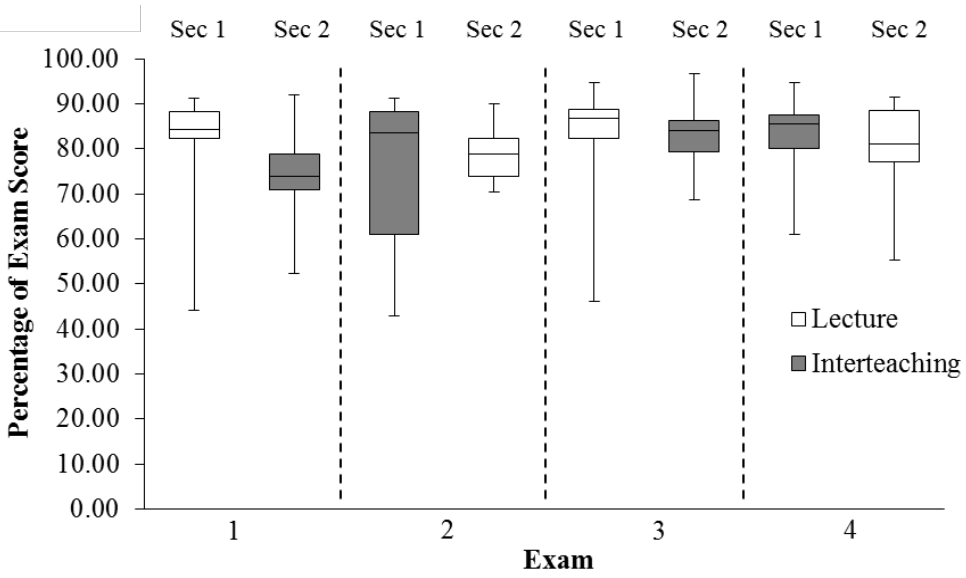

Figure 2. Boxplots of exam scores across sections and teaching conditions. Box plots displaying the minimum exam value, 25th, 50th, and 75th percentile scores, and maximum exam value are displayed.

Social Validity

Based on responses to the social validity questionnaire (see Table 1), and contrary to previous studies (e.g., Saville et al., 2005, 2006), a majority of the students preferred lecture-based classes (52.4%) as opposed to interteaching (38.1%).

Discussion

Although previous studies have suggested that interteaching is a beneficial and student-preferred alternative to traditional instructional formats (e.g., Saville et al., 2005, 2006), the results from the present study demonstrate that interteaching may not be as effective when used in courses that have a compressed format (e.g., summer sessions or quarter system). Given the abundant amount of research on the effects of distributed practice on learning (see Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006; Donovan & Radosevich, 1999; Janiszewski, Noel, & Sawyer, 2003 for reviews) these results are not unexpected. During interteaching sessions, students had less than 24 hours to complete the assigned reading (usually 12-15 pages), answer the 7-10 prep guide questions, and comprehend the material at a level that would allow them to discuss it with their classmates the following day. While this may be a reasonable expectation for courses on a semester system, when students are taking two or three additional courses, working a job, and engaging in extracurricular activities, one can see that interteaching requirements may become overwhelming for students taking classes in a compressed-format. In contrast, previous research on interteaching has been conducted in settings that have 48 hours (or more) between class sessions. This not only allows students more time to complete the assignments, but as the research on spacing effects suggests, they are more likely to retain this information (Cepeda et al., 2006).

Table 1

Social Validity Data Assessing Student Preference for Interteaching or Lecture

	Not at all	Somewhat	Neutral	Mostly	Always
1. How beneficial were class periods that used a lecture-based teaching approach?	0% (0)	0% (0)	14.3% (3)	76.2% (16)	9.5% (2)
2. How beneficial were class periods that used an interteaching approach?	0% (0)	4.8% (1)	4.8% (1)	71.4% (15)	19% (4)
3. How useful was it to discuss the assigned readings with another student?	4.8% (1)	9.5% (2)	9.5% (2)	71.4% (15)	4.8% (1)
4. Please rate the extent to which you thought interteaching prep guides were helpful in obtaining higher exam scores.	4.8% (1)	4.8% (1)	28.6% (6)	57% (12)	4.8% (1)
5. Overall, which form of instruction did you prefer?					
Lecture	52.4% (11)				
Interteaching	38.1% (8)				
No preference	9.5% (2)				
6. From which type of instruction do you think you learned most efficiently?					
Lecture	47.6% (10)				
Interteaching	42.9% (9)				
No difference	9.5% (2)				

Note. The number of student responses is in parentheses.

The findings from the social validity questionnaire also suggest that the amount of time between class sessions and the time dedicated to interteaching (45-50 minutes, four days a week), was overwhelming. Although, over 90% of the students did report that they found interteaching sessions to be beneficial. Additional written comments on the course evaluation indicated that students thought interteaching had the potential to be useful, but was extremely challenging due to the amount of work that was required (i.e., reading assignments and prep guide questions) on a near daily basis. Nevertheless, it should be noted that the instructor checked for prep guide completion on interteaching days and over 95% of the students had completed the prep guides prior to coming to class.

In addition to the differences in the amount of time between class sessions, there are several other factors that could have contributed to the findings. First, interteaching sessions were not conducted exactly as outlined by Boyce and Hineline (2002). Based on previous research suggesting that quality points do not play a significant role in improving exam scores

(Saville & Zinn, 2009), the current investigators did not use this approach. Additionally, no "probes" were used to evaluate student progress. As described by Boyce and Hineline (2002), a probe is similar to a quiz, except that students are aware of the possible questions prior to being tested. It is recommended that probes be provided regularly and frequently (i.e., a minimum of five during a semester) to assess student progress. Due to the limited amount of time during these summer sessions, the investigators opted to only use exams and worksheets to evaluate student learning. Based on the previous data on interteaching (e.g., Saville & Zinn, 2009; Saville et al., 2006), it is unlikely that the omission of these components contributed to the effects of interteaching in the current study; however, this possibility cannot be entirely dismissed.

A second factor that may have influenced the results is the number of interteaching sessions completed by students. Prior studies that found interteaching to be effective reported that students engaged in interteaching sessions from a low of 10 (Study 1, Saville et al., 2006) to a high of 13 (Goto & Schneider, 2010; Study 2, Saville et al., 2006), with another study falling within this range (Scoboria & Pascual-Leone, 2009). In the current study, the students participated in nine interteaching sessions. While this number is not substantially lower than previous studies, it is possible that students may benefit from interteaching more as they become increasingly comfortable with this new instructional approach. However, only one statistically significant difference was found as the summer session progressed – Section 2 students improved significantly on their exam scores following their second exposure to the interteaching condition (Exam 1 to Exam 3) $t(20) = -2.55$, $p = .01$. All other comparisons between earlier exams and later exams were not significant (all ps > .19). Additional research may be needed to examine the effects of the number of interteaching sessions by varying how many sessions are used in the course or by evaluating how students who have had previous interteaching-based courses compare to students for whom this is a novel instructional format.

Finally, the inclusion of a study/prep guide for students during the lecture condition may have contributed to an increase in exam scores in the absence of the other interteaching components. Saville et al. (2005) conducted a preliminary analysis on the effects of interteaching compared to other forms of instruction (e.g., lecture, reading assignments, etc.), and additional studies have examined other components including lecture (Saville, Cox, O'Brien, & Vanderveldt, 2011), group size (Truelove, Saville, & Van Patten, 2013), and quality points (Saville & Zinn, 2009); however, a full component analysis of interteaching has yet to be published. Based on previous research examining the effects of study guides on exam scores (e.g., Cannella-Malone et al., 2009; Dickson, Miller, & Devoley, 2005; Flora & Logan, 1996), it is possible that the prep guide is the most critical feature of interteaching and is sufficient enough to improve exam scores irrespective of the additional interteaching components (i.e., dyadic discussions, quality points, clarifying lectures). As Saville et al. (2006) note, by creating a prep guide that clearly creates a link between course information and test items, students are more likely to focus their studying efforts on relevant material and experience additional reinforcement contingencies (e.g., decreased test anxiety, increased motivation, etc.) that help to facilitate learning. Additional research is needed to determine if prep guides are sufficient to improve student performance in the absence of the other components of interteaching or if their effectiveness can be enhanced by including specific features (e.g., clarifying lectures or discussion groups).

Although our results suggest that interteaching was an equally effective form of instruction for use in classes on a compressed-schedule format – as opposed to previous research that found it to be more effective than a traditional lecture approach – there are limitations to the

present study. First, the authors did not control for or assess the type of studying students engaged in outside of the classroom. After first experiencing interteaching, it is possible that students may have met outside of classroom hours and studied exam material following lecture sessions using techniques (e.g., going over the study guide and asking each other questions, etc.) similar to interteaching. Second, due to the amount of time available for class meetings, students were only tested four times during the class; although recent research on interteaching and the testing effect suggests additional testing may not enhance the efficacy of this instructional method (Lambert & Saville, 2012; Saville, Pope, Lovaas, & Williams, 2012). A final limitation of the present study was a small sample size. Due to the limited number of students enrolled in the two sections, outliers on exam scores could have shifted the mean exam scores significantly and influenced the interpretation of the effects of interteaching or lecture; although the data displayed in the box plots in Figure 2 suggest that outliers were not influential in this study. However, additional studies in compressed-format schedules with larger sample sizes would be beneficial.

Despite the perceived benefits of interteaching, including cooperative learning and active participation (Griffin & Griffin, 1998; Yoder & Hochevar, 2005), the present findings on the effects of interteaching in compressed-format based courses were minimal. Unlike prior research (e.g., Saville et al., 2005, 2006) that has indicated interteaching to be a student-preferred pedagogical approach capable of enhancing student academic performance, the current study found that students favored lecture-based instruction, and that there was no difference on exam scores between interteaching and a traditional lecture-based instructional approach. Additional research examining interteaching is needed to determine whether this approach is beneficial for instructors and students in classes that meet on a more frequent basis.

References

Benedict, J. O., & Anderton, J. B. (2004). Applying the Just-in-Time Teaching approach to teaching statistics. *Teaching of Psychology, 31,* 197-199. doi: 10.1207/s15328023top3103_5

Binder, C., & Watkins, C. L. (1990). Precision teaching and direct instruction: Measurably superior instructional technology in schools. *Performance Improvement Quarterly, 3,* 74-96. doi: 10.1111/j.1937-8327.1990.tb00478.x

Bloom, B. S. (Ed.). (1956). *Taxonomy of educational objectives, Vol. 1: Cognitive domain.* New York, New York: Longmans Green.

Boyce, T. E., & Hineline, P. N. (2002). Interteaching: A strategy for enhancing the user-friendliness of behavioral arrangements in the college classroom. *The Behavior Analyst, 25,* 215-226.

Cannella-Malone, H. I., Axe, J. B., & Parker, E. D. (2009). Interteach preparation: A comparison of the effects of answering versus generating study guide questions on quiz scores. *Journal of the Scholarship of Teaching and Learning, 9*(2)*,* 22-35.

Cepeda, N. J., Pashler, H., Vul, E., Wixted, J. T., & Rohrer, D. (2006). Distributed practice in verbal recall tasks: A review and quantitative synthesis. *Psychological Bulletin, 132,* 354-380. doi: 10.1037/0033-2909.132.3.354

Dickson, K. L., Miller, M. D., & Devoley, M. S. (2005). Effect of textbook study guides on student performance in introductory psychology. *Teaching of Psychology, 32,* 34-39. doi: 10.1207/s15328023top3201_8

Donovan, J. J., & Radosevich, D. J., (1999). A meta-analytic review of the distribution of practice effect: Now you see it, now you don't. *Journal of Applied Psychology, 84,* 795-805. doi: 10.1037/0021-9010.84.5.795

Edwards, J. R. (2005). *Effect of various teaching approaches on business ethics instruction.* (Master's thesis). Available from Dissertation Express database. (UMI No. 1427603)

Emurian, H. H., & Zheng, P. (2010). Programmed instruction and interteaching applications to teaching JAVA: A systematic replication. *Computers in Human Behavior, 26,* 1166-1175. doi: 10.1016/j.chb.2010.03.026

Flora, S. R., & Logan, R. E. (1996). Using computerized study guides to increase performance on general psychology examinations: An experimental analysis. *Psychological Reports, 79,* 235-241. doi: 10.2466/pr0.1996.79.1.235

Goto, K., & Schneider, J. (2009). Interteaching: An innovative approach to facilitate university student learning in the field of nutrition. *Journal of Nutrition Education and Behavior, 41,* 303-304. doi: 10.1016/j.jneb.2009.02.003

Goto, K., & Schneider, J. (2010). Learning through teaching: Challenges and opportunities in facilitating student learning in food science and nutrition by using the interteaching approach. *Journal of Food Science Education, 9,* 31-35. doi: 10.1111/j.1541-4329.2009.00087.x

Griffin, M. M., & Griffin, B. W. (1998). An investigation of the effects of reciprocal peer tutoring on achievement, self-efficacy, and test anxiety. *Contemporary Educational Psychology, 23,* 298-311. doi: 10.1006/ceps.1998.0971

Janiszewski, C., Noel, H., & Sawyer, A. G. (2003). A meta-analysis of the spacing effect in verbal learning: Implications for research on advertising repetition and consumer memory. *Journal of Consumer Research, 30,* 138-149. doi: 10.1086/374692

Keller, F.S. (1968). Good-bye teacher … *Journal of Applied Behavior Analysis, 1,* 79-89. doi: 10.1901/jaba.1968.1-79

Lambert, T., & Saville, B. K., (2012). Interteaching and the testing effect: A preliminary analysis. *Teaching of Psychology, 39,* 194-198. doi: 10.1177/0098628312450435

Martin, G., & Pear, J. (2007). *Behavior modification: What it is and how to do it* (8th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall Publishers.

Moran, D. J., & Malott, R. W., (Eds.). (2004). *Evidence-based educational methods: Advances from the behavioral sciences*. New York, New York: Academic Press.

Pigott, H. E., Fantuzzo, J. W., & Clement, P. W. (1986). The effect of reciprocal peer tutoring and group contingencies on the academic performance of elementary school children. *Journal of Applied Behavior Analysis, 19,* 93-98. doi: 10.1901/jaba.1986.19-93

Saville, B. K., Cox, T., O'Brien, S., & Vanderveldt, A. (2011). Interteaching: The impact of lectures on student performance. *Journal of Applied Behavior Analysis, 44,* 937-941. doi: 10.1901/jaba.2011.44-937

Saville, B. K., Pope, D. Lovaas, P., & Williams, J. (2012). Interteaching and the testing effect: A systematic replication. *Teaching of Psychology, 39,* 280-283. doi: 10.1177/0098628312456628

Saville, B. K., & Zinn, T. E. (2009). Interteaching: The effects of quality points on exam scores. *Journal of Applied Behavior Analysis, 42,* 369-374. doi: 10.1901/jaba.2009.42-369

Saville, B. K., Zinn, T. E., & Elliott, M. P. (2005). Interteaching versus traditional methods of instruction: A preliminary analysis. *Teaching of Psychology, 32,* 161-163. doi: 10.1207/s15328023top3203_6

Saville, B. K., Zinn, T. E., Neef, N. A., Van Norman, R., & Ferreri, S. J. (2006). A comparison of interteaching and lecture in the college classroom. *Journal of Applied Behavior Analysis, 39,* 49-61. doi: 10.1901/jaba.2006.42-05

Scoboria, A., & Pascual-Leone, A. (2009). An 'interteaching' informed approach to instructing large undergraduate classes. *Journal of the Scholarship of Teaching and Learning, 9(3),* 29-37.

Truelove, J. C., Saville, B. K., & Van Patten, R. (2013). Interteaching: Discussion group size and course performance. *Journal of the Scholarship of Teaching and Learning, 13(2)*, 23-30.

Tsui, M. (2010). Interteaching: Students as teachers in lower-division sociology courses. *Teaching Sociology, 38,* 28-34. doi: 10.1177/0092055X09353887

Yoder, J. D., & Hochevar, C. M. (2005). Encouraging active learning can improve students' performance on examinations. *Teaching of Psychology, 32,* 91-95. doi: 10.1207/s15328023top3202_2

Zeller, B. E. (2010). "We learned so much when you weren't there!": Reflections on the interteach method and the a cephalous classroom. *Teaching Theology and Religion, 13,* 270-271. doi: 10.1111/j.1467-9647.2010.00628.x