A Comparison of Interteaching and Classroom Lecture in Rehabilitation Education

James L. Soldner, University of Massachusetts Boston
Rocio Rosales, University of Massachusetts at Lowell
William Crimando, Southern Illinois University Carbondale

Available at: https://works.bepress.com/james_soldner/15/
A Comparison of Interteaching and Classroom Lecture in Rehabilitation Education

James L. Soldner  
*University of Massachusetts Boston*

Rocio Rosales  
*University of Massachusetts Lowell*

William Crimando  
*Southern Illinois University Carbondale*

Teaching techniques that capitalize on well-established behavior-analytic principles have been available for over 50 years (Skinner, 1954). Examples of these behavioral approaches to classroom instruction include precision teaching (Lindsey, 1964), programmed instruction (Holland & Skinner, 1961), direct instruction (Engelmann & Carnine, 1982), and personalized system of instruction (Keller, 1968). In 2002, Boyce and Hineline introduced *interteaching* as an alternative teaching paradigm that includes an “interteach” or pair discussion component and was defined as a “mutually probing, mutually informing conversation between two people,” pp. 220. Interteaching typically maintains certain components of previously introduced behavioral approaches, as well as other empirically-supported teaching methods, such as reciprocal peer-tutoring (Griffin & Griffin, 1998), cooperative learning (Halpern, 2004), and problem-based learning (Duch, Groh, & Allen, 2001). Interteaching, as an alternative to traditional classroom lecture, has been shown to offer more flexibility for teachers and students (Dunn, Saville, Baker, & Marek, 2013; Saville, Lambert, & Robertson, 2011; Saville, Zinn, Neef, Van Norman, & Ferreri, 2006).

Components of interteaching typically include the following: (1) preparation guides or “prep guides” which consist of 10-12 questions that cover roughly 10-15 pages of reading material, (2) pair discussions, conducted in class following the completion of each prep guide, (3) record sheets completed by students to provide feedback to the instructor and rate the overall quality of the pair discussion, (4) clarifying lectures designed to cover the most challenging topics based on feedback provided on the record sheets, (5) frequent test probes based on material from the prep guides to assess student learning, and (6) quality points, an explicit cooperative contingency whereby additional points are added to a student’s grade only if both students in a pair perform to a certain pre-determined criterion on a selected test probe (see Saville, Lambert, & Robertson, 2011 for a more detailed description of the key components of interteaching).

Since Boyce and Hineline (2002) first introduced interteaching as a method of instruction, a growing body of research continues to demonstrate the effectiveness of interteaching in the college classroom. However, to date, no studies have been published on the use of interteaching in rehabilitation education. The purpose of the present study was to systematically replicate previous research by comparing interteaching to traditional classroom lecture in two sections of an undergraduate medical aspects of disability course. Findings indicate students performed better on post-discussion quizzes following the interteaching condition. Social validity findings also indicate the majority of students preferred interteaching and reported learning more when interteaching was in effect. The implications of these results are discussed along with a summary of future directions in this line of research.

**Keywords:** interteaching, lecture, rehabilitation education
there has been a growing body of empirical support for its efficacy in the college classroom (Arntzen & Hoium, 2011; Saville et al., 2006). Saville and colleagues (2006) were the first to systematically examine the effectiveness of interteaching relative to classroom lecture through two experimental studies. The first study included students in a graduate special education course who were administered quizzes following alternating conditions of interteaching and lecture. Results showed that quiz scores following the interteaching conditions were higher than quiz scores following lecture. The second study recruited students in two sections of an undergraduate research methods course in which interteaching and lecture were alternated and counterbalanced. Following each method of instruction, participants from both sections were administered the same test. Results also indicated quiz scores following interteaching were higher than quiz scores following lecture. Additionally, both studies found the majority of students reported a preference for interteaching relative to traditional lecture.

To date, interteaching studies have been empirically demonstrated across a wide variety of academic disciplines, including behavior analysis (Filipiak, Rehfeldt, Heal, & Baker, 2010; Rehfeldt, Walker, Garcia, Lovett, & Filipiak, 2010; Saville, Pope, Lovaas, & Williams, 2012); computer programming (Emurian & Zheng, 2010); political science (Slagter & Scribner, 2014); nutrition (Goto & Schneider, 2010); social welfare (Arntzen & Hoium, 2010); sociology (Tsui, 2010); special education (Mason, 2012), and psychology (Saville & Zinn, 2009; Scoboria & Pascual-Leone, 2009).

Although the empirical demonstration of interteaching across these academic disciplines is encouraging, additional direct and systematic replications across varied academic disciplines and courses are needed to continue to promote the generality and effectiveness of this paradigm in higher education. Specifically, no studies have been published on the impact of interteaching for courses in rehabilitation education. Therefore, the purpose of the present study was to systematically replicate and extend results of Saville and colleagues (2006) by evaluating the impact of interteaching when compared to traditional lecture in two sections of an undergraduate rehabilitation course.

**Method**

**Participants, Setting, and Materials**

Undergraduate students (N = 38) enrolled in two sections of a course on Medical Aspects of Disability served as participants. There were 15 participants (4 male, 11 female) in the first section (SEC 1) classified as either freshman (n = 3), sophomores (n = 9), juniors (n = 2), or seniors (n = 1); and 23 participants (3 male, 20 female) in the second section (SEC 2) classified as either freshman (n = 4), sophomores (n = 5), juniors (n = 12), or seniors (n = 2). Both sections met face-to-face for 75 minutes on Tuesdays and Thursdays (i.e., SEC 1 from 8:30 to 9:45 a.m.; SEC 2 from 2:30 to 3:45 p.m.). The course was web-enhanced (i.e., incorporated the use of Blackboard Learn to distribute materials to the students throughout the semester) and was a requirement for successful completion of the bachelor’s degree in Human Services and Rehabilitation Studies at the university. The first author was the instructor for both sections.

Students were not informed of the purpose of the study until the last day of the semester. On this day, they were asked to review and sign a consent form. The completed consent forms were placed in a sealed envelope, and students were given the assurance that the instructor would not review the consent forms until final grades were submitted for the term.

The textbook adopted for the course was *Medical and Psychosocial Aspects of Chronic Illness and Disability* (Falvo, 2009). Preparation guides were created by the instructor of the course and made available to students via Blackboard Learn at least one week before they were expected to discuss the material with a classmate during class time. The prep guide reviewed 10-15 pages of material and included 15-20 questions drawn directly from the assigned reading (see Appendix A for a sample preparation guide used in this study).
All quizzes included questions based on information drawn directly from each prep guide and created from a test bank included part of the textbook resources (Falvo, 2009). Questions included multiple-choice, true-false, fill-in-the-blank, and short-answer (see Appendix B for an example post-discussion quiz used in this study). Post discussion quizzes were worth a total of 150 points (37.5% of total course grade).

**Experimental Design and Dependent Measure**

An alternating treatments design (Richards, Taylor, & Ramasamy, 2014) was used, such that the type of classroom instruction, interteaching or lecture, were alternated several times throughout the semester. The order of presentation was decided at the beginning of the semester in a quasi-random fashion (i.e., coin flip) with the constraint that each condition could occur for no more than three consecutive class sessions. In addition, the type of instruction was counterbalanced across the two sections. Therefore, in every class meeting in which the interteaching condition was in effect for SEC 1, the lecture condition was implemented for SEC 2. The teaching method for each class was depicted on the course syllabus and the schedule was made available to students at the start of the semester. The same post-discussion quizzes were made available to participants in both sections on the same day. The primary dependent measure was average performance on 10-point quizzes administered immediately following each interteaching or lecture condition. A total of 15 quizzes were administered throughout the semester.

**Procedure**

The general procedure for this study was similar to that reported by Saville et al. (2006).

**Interteaching.** The following is a description of the procedures when interteaching was used for classroom instruction:

1. **Prep guides:** Students were provided with prep guides at least one week before the due date, at which time they were expected to have the prep guide completed and to discuss their responses with a peer during class time.

2. **Participation points:** Students received 2 participation points for each class period in which they were present and prepared to discuss their completed prep guides with a classmate. Overall, class participation points for both interteaching and lecture conditions comprised 8% of the students’ final grade.

3. **Pair discussions:** Pair discussions that lasted 30-35 minutes were held for each prep guide. Students worked with one partner of their choosing. Students were required to select a different partner for each pair discussion. During this time, the instructor walked around the room to answer questions and monitor discussions to ensure students stayed on topic.

4. **Record sheets:** Following each pair discussion, students were provided with approximately 5 minutes to complete a record sheet intended to provide feedback on the quality of the discussion, and to list topics they found most difficult (see Appendix C for a sample record sheet used in this study).

5. **Clarifying lectures:** During each subsequent class meeting, a 15–25-minute clarifying lecture was provided by the instructor in the form of PowerPoint® slides and based directly on the student feedback from the record sheets.

6. **Post-discussion quiz:** A 10-point quiz comprised of multiple-choice, fill-in-the-blank, and short answer questions was administered following the completion of record sheets. Students were provided with approximately 10-15 min. to complete the quiz.

7. **Quality points:** Students had the opportunity to earn an additional point on each quiz in which both students in a dyad earned a score of 80% or better (e.g., 8 out of 10 correct responses). These points were referred to as ‘quality points’ and were calculated as bonus or extra credit points only. There were no other opportunities to earn extra credit in the course. The course syllabus explained the quality-point contingency and the instructor reviewed the policy with students.
at the beginning of the semester. A total of 15 quality points could be earned as extra credit throughout the included semester.

**Lecture.** For class sessions designated as lecture, no prep guides were made available to students before class. Instead, PowerPoint® slides based on the assigned reading were made available as handouts via Blackboard Learn at least one day before class. The instructor suggested students print out these handouts and bring them to class as a note-taking aid during lecture, but no requirement was in place. Each lecture lasted 45 to 60 minutes and covered the reading and class topics assigned for that class session. Following each lecture, students completed a post-lecture quiz. In contrast to the interteaching condition, no record sheets were completed following each lecture session and no clarifying lecture was provided during the next class session. Class participant points were provided during the lecture contingent on successful completion of the post-lecture quiz.

**Social Validity**

At the conclusion of the course, all students were asked to individually and voluntarily complete an anonymous questionnaire containing two multiple-choice questions. The first question asked students to indicate their preference for a teaching method: 1) Interteaching, 2) Traditional Lecture, or 3) No preference, as well as the reason for their preference. The second question asked students to indicate which teaching method they learned more with: 1) Interteaching, 2) Traditional Lecture, or 3) No preference, as well as the reason for their preference.

**Results**

Data analysis includes only scores for students that provided consent for participation, and only for quizzes that were administered during class time. That is, if students missed class and subsequently received a score of ‘0’ for the quiz, these grades were omitted for the purpose of the present study. If students missed class, but took a make-up quiz at a later time, these scores were also omitted. The interteaching condition was in effect for a total of eight class meetings in SEC 1 and seven class meetings in SEC 2. Alternatively, the lecture condition was in effect during a total of seven class meetings for SEC 1 and eight class meetings for SEC 2.

Results of average quiz performance for SEC 1 are depicted in Figure 1. These results indicate that average quiz performance was higher with interteaching ($M = 9.10$, $SD = 0.39$) when compared to lecture ($M = 8.09$, $SD = 0.61$).

![Figure 1. Average quiz scores across interteaching (closed squares) and lecture (open squares) conditions for SEC 1.](image1)

Results of average quiz performance for SEC 2 are depicted in Figure 2. These results indicate that average quiz performance was slightly higher with lecture ($M = 8.84$, $SD = 0.54$) when compared to interteaching ($M = 8.57$, $SD = 0.65$).

![Figure 2. Average quiz scores across interteaching (closed squares) and lecture (open squares) conditions for SEC 2.](image2)

Figure 3 depicts the percentage of total quiz questions answered correctly for both sections when interteaching and lecture were in effect. These results reveal that a higher percentage of total quiz questions were answered correctly during the interteaching condition, but only for SEC 1.

![Figure 3. Average percent of quiz questions answered correctly across interteaching (closed squares) and lecture (open squares) conditions for SEC 1 and SEC 2.](image3)
Results of the social validity questionnaire administered at the end of the semester indicate the majority of students preferred interteaching over lecture, regardless of their performance on quizzes, and also indicated they learned more when the interteaching condition was in place.

Discussion

Overall, these results provide some additional support for the efficacy and generality of interteaching in rehabilitation education. However, only one of the two sections (i.e., SEC 1) performed better when interteaching was in effect. There were some differences in the class sections that may help account for these differences. Most notably, SEC 1 was comprised of only 15 students, while SEC 2 was comprised of 23 students. For the smaller class section, students may have received more individual attention from the instructor during pair discussions, whereas in the larger section due to time constraints, it may have been more difficult for the instructor to effectively traverse the room and provide individual attention to each pair of students. In addition, students of junior and senior class standing may have had a longer history with courses structured using a traditional lecture, which may have further impacted their performance during the lecture condition. Future studies should collect additional demographic information such as grade point average and prior relevant coursework to investigate the possibility of personal characteristics of the students that may influence performance in an interteaching course.

For this group of students, we found that, despite their performance on quizzes, the majority reported preference for the interteaching format. Other studies (e.g., Felderman, 2014; Rosales, Soldner, & Crimando, 2014; Saville & Zinn, 2009) have evaluated components of interteaching in isolation (i.e., preparation guides, pair discussion, clarifying lecture). It may be the case that students appreciated the availability of preparation guides during interteaching sessions; and if these guides were available during all class sessions, the social validity responses would differ. Future studies should continue to evaluate the relative effectiveness of each component of interteaching in order to provide students with optimal learning experiences and the instructor with information on the most important components to include in a course structured to follow an interteaching format.

<table>
<thead>
<tr>
<th>Table 1. Social Validity Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
</tr>
<tr>
<td>1. Which teaching method did you prefer?</td>
</tr>
<tr>
<td>a. Interteaching</td>
</tr>
<tr>
<td>b. Lecture</td>
</tr>
<tr>
<td>c. No preference</td>
</tr>
<tr>
<td>2. With which teaching method did you learn more?</td>
</tr>
<tr>
<td>a. Interteaching</td>
</tr>
<tr>
<td>b. Lecture</td>
</tr>
<tr>
<td>c. No difference</td>
</tr>
</tbody>
</table>
An important limitation to note is that students were informed of the instructional method for each class meeting at the beginning of the semester. For this reason, it is possible that students prepared differently for class meetings in which an expectation for participation and discussion was made explicit (i.e., during interteaching sessions). In follow-up studies, we have made no indication of the type of teaching method to be implemented until the students arrive at class each day. This has resulted in a greater likelihood that students prepare for class in a similar fashion throughout the semester, regardless of the planned teaching method.

Despite the noted limitations of this study, these results provide a starting point for educators in the field of rehabilitation to consider the use of an interteaching format in their classroom. This is the first study to systematically compare the impact of interteaching when compared to traditional lecture in a course focused on rehabilitation. Hence, these results provide an additional empirically supported evidence-based practice in rehabilitation at a time when the promotion of evidence-based practice and knowledge translation is of critical importance to the field (Leahy & Arokiasamy, 2010).

Given the limited implementation of interteaching research and practice reported to date in rehabilitation education, future studies should continue to evaluate and compare interteaching to classroom lecture, as well as other teaching methods on a variety of dependent measures of interest, such as long-term retention and generalization of skills to applied settings. In addition, direct and systematic replications of these procedures in distance education and online courses will help to provide further evidence for the robustness of interteaching methods more generally.

References


APPENDIX A
Sample Preparation Guide

PREPARATION GUIDE #1

Based on: Falvo: Chapter 1, pp. 1-7

1. What is the medical model, and what are its key components? What is the underlying philosophy of the medical model and what are its implications for individuals with chronic illness or disability?

2. What is meant by the experience of disability? Describe how EACH of the various factors could influence a person's experience with disability: (a) physical environment, (b) social environment, and (c) development (life stages).

3. Do you think the medical model is compatible with the experience of disability described in Chapter 1? Why or why not? How could diagnostic labels complicate this issue? Provide support for your answer.

4. What is the International Classification of Functioning, Disability, and Health (ICF)? What is the purpose of the ICF? Why was the ICF developed in the first place? What was in place before the ICF?

5. Compare and contrast the traditional medical model of chronic illness and disability to the current ICF? How is health portrayed by the ICF? What are the implications for individuals with disabilities?

6. Compare and contrast optimal and maximum functional capacity. Make sure to discuss the importance of objective and subjective viewpoints. How is the experience of disability relevant to the functional limitations of chronic illness and disability?

7. How does the current ICF define: (a) health, (b) function, (c) disability, and (d) impairment? Why are the terms impairment and handicap no longer as prevalent in professional and everyday discourse?

8. How might reconceptualizing chronic illness and disability in the context of health and function help decrease discrimination and prejudice for individuals with disabilities? In your answer, make sure to incorporate the ICF, as well as provide examples for support.

9. From a legal and financial perspective, why might health and human service agencies continue to operate using the traditional medical model? What are the various benefits for these agencies for using the new ICF? Provide support with information from the chapter.
APPENDIX B
Sample Post-Discussion Quiz

Name: ___________________________ Date: ___________________________

CHAPTER QUIZ #2
(10 POINTS)

Based on: Falvo: Chapter 2-ALL

1. _______________ _______________ involves individual's mental view of their body with regard to appearance, sexuality, and ability to perform various physical tasks. (2 POINTS)

2. The course of the condition refers to the nature or stages of the chronic illness or disability. (2 POINTS)
   TRUE     FALSE

3. Functional aspects of chronic illness and disability include all of the following BUT: (2 POINTS)
   Vocational issues
   a. Biological issues
   b. Personal and psychological issues
   c. Lifestyle activities issues
   d. Social participation issues

4. What are coping strategies? Define AND provide an example of TWO of the following coping strategies: 1) Denial, 2) Regression, 3) Compensation, 4) Rationalization, and 5) Diversion of feelings. (4 POINTS)
APPENDIX C
Sample Record Sheet

PAIR DISCUSSION RECORD SHEET

Preparation Guide # ________                  Date of discussion ________
Participants  ______________________________
  ______________________________
  ______________________________
Duration of discussion ____________  Sufficient time provided?  Yes  No
Quality of pair discussion (circle one)  1  2  3  4  5  6  7
 poor  OK  superb

If “poor” or “superb,” what contributed to the quality?

Topics/questions that were difficult, and why they were difficult.

TOP THREE questions (if any) that you would like reviewed in lecture.

Something interesting you learned in class today (you must list something).

List at least one reason why you are glad you came to Medical Aspects of Disability today.

Other comments and/or suggestions? Please give me feedback.