The Effects of Peer Tutoring and Cooperative Learning in Inclusive Chemistry Classrooms

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Introduction and Background

Including Students with Disabilities in High School Chemistry

For the past four years, I have worked as a special education co-teacher in high school chemistry classes. As I have worked with students with a range of abilities, I have come to find the challenges in making rigorous chemistry content accessible to all students. However, with high school science classes structured towards lab experiences and group problem solving, I have wondered how designing curriculum that is structured in a peer-supportive way would affect learning and social outcomes for students with and without disabilities.

Research Question: What affects do peer tutoring and cooperative learning strategies have for students with and without disabilities in high school chemistry?

Literature

Current science teaching methods point towards cooperative learning and peer tutoring strategies as best practice for including students with disabilities. When implemented in a strategic way, these two strategies may have positive academic and social outcomes for all students.

Methodology

Treatment:
During a unit of chemistry, two classes (*N*=44) were taught using peer tutoring and cooperative learning strategies. Each strategy was used at least three times throughout the unit.

Data Collection Pre Treatment

- Pre and post tests on content for a unit. Normalized gains measured.
- Exit ticket questions asking students what types of activities they enjoy: individual, peer, or teacher directed

Data Collection Treatment

- Pre and post test on content for unit. Normalized gains measured
- Pre and post Likert style survey on preferred learning methods analyzed with wilcoxon rank sum test.
- Six students selected for exit interviews

Data Triangulation Matrix

Research Question	Data Collection Tools		
	1	2	3
1. Does use of peer tutoring and cooperative learning strategies affect academic outcomes for students with disabilities and students without disabilities?	Bonding Pre/Post Test	Cooperative Learning and Peer Tutoring Exit Tickets	Exit Interview Questions
2. Does use of peer tutoring and cooperative learning affect social outcomes?	Peer Tutoring and Cooperative Learning Survey	Exit Tickets	Exit Interview Questions

Data and Analysis

- Results from the pre and post test for the treatment unit indicate only slightly better normalized gains. Gains from the non-treatment unit were 0.60, while gains from the treatment unit were 0.61 (Figure 1). Though both represent a significant increase in student knowledge of content, there is not a significant difference between the treatment and non-treatment unit.
- Results from the pre and post survey indicated overall positive views of peer directed learning (Figure 2). For each survey question, more students responded agree or strongly agree than those who responded disagree or strongly disagree.
- Student interview questions demonstrated a general pattern of finding peer tutoring and cooperative learning to be helpful to their learning. One student noted, “it makes you carry your own weight instead of someone else telling you the answers.”

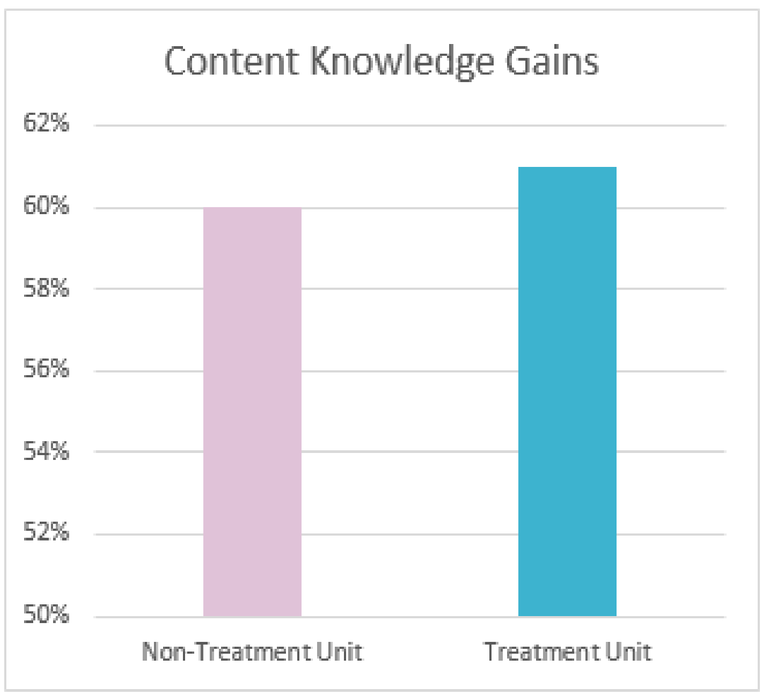

Figure 1: Content Knowledge Gains

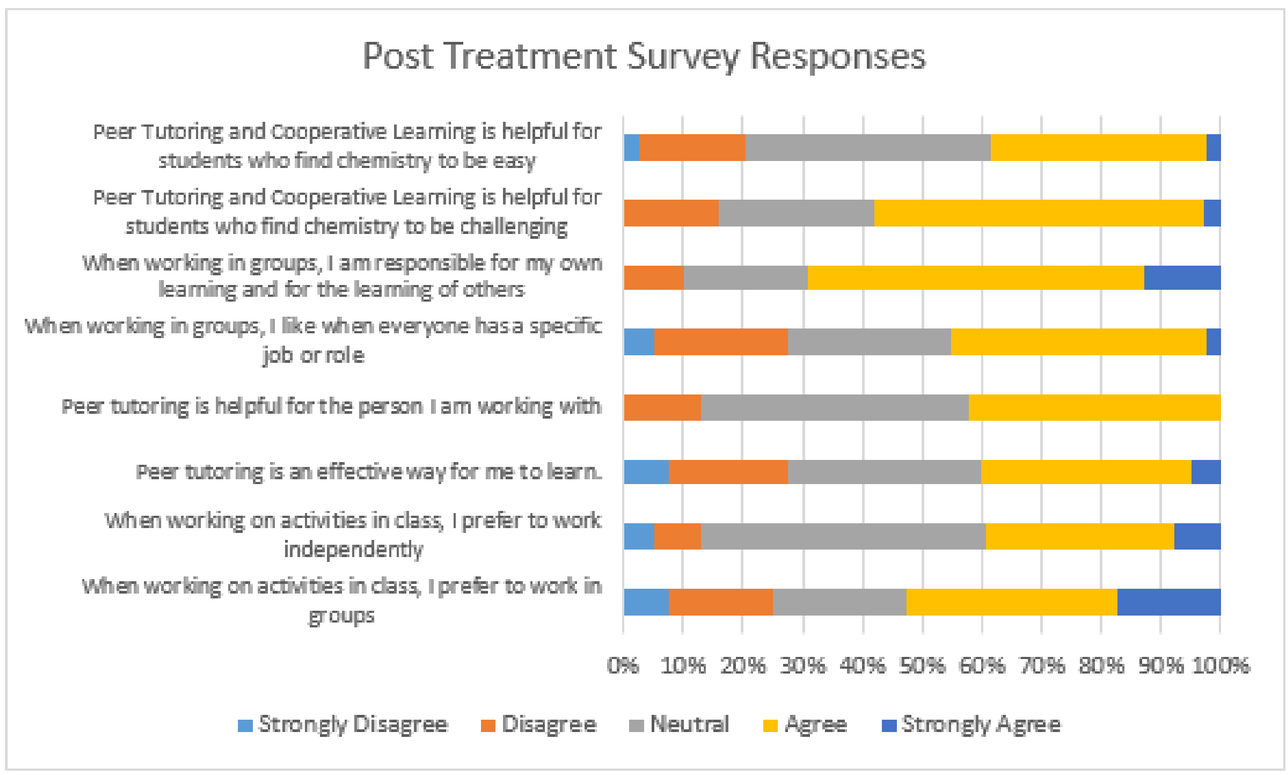

Figure 2: Post Treatment Survey

Conclusions

Though results are inconclusive on whether peer tutoring and cooperative learning were effective instructional strategies, this study does demonstrate that students have preference for peer directed learning opportunities in inclusive chemistry classrooms. Both students with and without disabilities responded favorably to learning with peers in the survey and exit interview questions. Content knowledge gains did demonstrate some improvements for students with disabilities when peer and cooperative learning strategies were employed, but the sample size was too small to determine significance. Considering the focus of this study, it is important to continue to seek and utilize inclusive strategies, such as peer tutoring and cooperative learning, that target academic and social benefits for all students.