

An investigation of the effects of peer feedback on cognitive understanding during game play situations in a 7th grade volleyball unit.

by

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The University of Wisconsin-Whitewater, 2019  
Under the Supervision of Dr. Jay Cameron

## **Abstract**

The purpose of this study was to determine if peer feedback during game situations affected the cognitive understanding of concepts during a volleyball unit in Physical Education. Physical Education can be an incredibly valuable course in a student's educational career. Research about peer feedback and cognitive understanding have been conducted within various content areas of education, however there is a limit to the results as they apply to the physical education discipline. The participants were broken into two groups balanced on skill, knowledge and experience with volleyball. Both groups received the same skill work before game play started in the volleyball unit. When game play started, both groups received teaching cards, but the cards were different with the experimental group receiving peer feedback specific information. There was an overall change in post test average scores between the control group and experimental group. The experimental group average post test score was 6.53, an improvement of 0.86. The control group average post test score was 4.64, a decrease of 0.22.

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# Table of Contents

Abstract	iii
Acknowledgements	iv
Table of Contents	v
List of Tables	vii
List of Figures	viii
Introduction	1
Statement of the Problem	2
Research Question	2
Research Hypothesis	2
Definition of Terms	3
Limitations	3
Literature Review	5
Introduction	5
Action Research / Reflective Practices in PE	5
Cognitive Understanding	6
Peer Motivation	7
Peer Feedback	8
Methods	10
Design	10
Sample	11
Instruments	12
Data Analysis	13
Results	14
Introduction	14
Data Analysis	14
Descriptive statistics	14

Instrument Reliability and Correlations	15
Cronbach's alpha	15
Correlations	16
Inferential Statistics	18
Independent samples t-tests	18
ANOVA for opinion of physical education	18
ANOVA for outside volleyball experience	19
Conclusions	20
Introduction	20
Interpretation of Findings	20
Summary of Future Implications	21
References	23
Appendix	25
Experimental Group Cue Sheet	25
Control Group Cue Sheet	25
Volleyball Assessment	26

# List of Tables

Table 1 - Cronbach's Alpha ..... 16  
Table 2 - Correlations ..... 16  
Table 3 - Independent Samples t-test..... 18  
Table 4 - ANOVA for Opinion of Physical Education..... 18  
Table 5 - ANOVA for Outside Volleyball Experience..... 19

# List of Figures

Figure 1 - Pre and Post Test Histograms ..... 15  
Figure 2 - Control and Experimental Group Scatter Plots ..... 17

# Introduction

Physical Education can be an incredibly valuable course in a student's educational career. Research shows that during adolescence there is a decline in motivation toward physical activity (Lodewyk & Bracco, 2018). This happens for many reasons, but one considerable impact is peer influence. Students that receive support from their peers benefit in the educational environment (Song, Bong, Lee & Kim, 2015). Peers are an integral part of the learning process (Ryan, 2011). Peer feedback encourages positive student engagement (Sackstein, 2017). These are a few of the many reasons that this study was developed to examine action research in Physical Education, peer feedback, and cognitive understanding.

Research about peer feedback and cognitive understanding have been conducted within various content areas of education, however there is a limit to the results as they apply to the physical education discipline. Sometimes there is a gap that needs to be bridged with further research in the area. There are many different ways to conduct research to reflect on current best practices. Action research is a credible, worthwhile model for collecting data. Teachers constantly ask students to reflect and improve their work. The educators themselves need to reflect on their work as well (Boud, Keogh & Walker, 2015). The action research study targets this exact thought of reflecting on one's own work as an educator.

Physical education teachers and students could benefit from this research study because it specifically examines their content area. The value and impact of peer feedback in physical education does not have a significant presence in the research which is one reason this study was performed. Additionally, it was of interest to one PE teacher, as an action research project, to see if a targeted approach to having students provide peer feedback would impact students' learning.

## **Statement of the Problem**

The purpose of this study was to determine if peer feedback during game situations affected the cognitive understanding of concepts during a volleyball unit in Physical Education.

## **Research Question**

Do middle school students' cognitive understanding of concepts during a volleyball unit in Physical Education differ as a result of increased peer feedback during game situations?

## **Research Hypothesis**

Middle school students will have a higher cognitive understanding of concepts during a volleyball unit in Physical Education as a result of increased peer feedback during game situations.

## Definition of Terms

*Concepts* are the different areas of learning in which students were being assessed. These concepts covered three SHAPE America Standards (1,2,4). The concepts covered were the serving skills, understanding proper movement techniques and strategies, and the rules of the game.

*Peer Feedback* is feedback that is given from one student to another based on skills or performance. The focus is on student-to-student engagement to foster learning (Careless, 2006).

*Game Situation* is when students are competing against other students during the unit.

*Game play* is when students are actively competing against other students in the class.

*Cognitive Understanding* is the ability to construct meaning from instructional messages, including oral, written, and graphic communication (Anderson, et al., 2001).

*Google Classroom* is a website for Teachers and students. Teachers can create classes, distribute assignments, send feedback, and see everything in one place. Students can take assessments and collaborate with others while using the software (Google, 2019).

## Limitations

1. This study may be most accurately seen as action research that used a pilot tested instrument to collect students' content knowledge on volleyball. The instrument used underwent preliminary content validity assessments but would require further vetting for future use.

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2. A convenience sample may not be large or diverse enough to be representative of all middle school students. Therefore, the results may not be generalizable.

# Literature Review

## Introduction

The purpose of this study was to determine if students that received an increased amount of peer feedback has a higher cognitive understanding than their peers that did not receive that increased feedback. The review of literature explains the different areas of previous research that led to this study being conducted. The first category considered is action research and reflective practices of teachers in physical education. The second category is students' cognitive knowledge and how assessments of that knowledge may play a role in determining the amount of learning they have achieved. The third category is peer motivation and its influences in education. The final category relates to peer feedback in the educational setting.

## Action Research / Reflective Practices in PE

An extremely important part of teaching is being a reflective practitioner. According to Boud, Keogh, and Walker (2015), "Reflection is an important human activity in which people recapture their experience, think about it, mull it over, and evaluate it" (p.19). Experiences are things that teachers can learn from. The desire from reflection typically arises due to the out of normal occurrences [or experiences], positive or negative (Boud, Keogh, & Walker, 2015). Action research is one way to effectively reflect on teaching experiences. Action researchers do not attempt to answer all questions

or create harmony, but to seek more understanding. Action research asks and answers questions that help to explain and hold people accountable for their choices (McNiff, 2013). Action research has a long history, dating back to the early 20<sup>th</sup> century. There are many different types of action research, but two main conditions consistently apply: recognizing the capacity of people, and the research is oriented to making improvements in practice (Kemmis, McTaggart, & Nixon, 2014). Action research has been explored in educational settings before. “Classroom action research typically includes the use of qualitative, interpretive modes of enquire and data collection by teachers (often with help from academic partners) with a view to teachers making judgments about how to improve their own practices” (Kemmis, McTaggart, & Nixon, 2014, p.11). This may also imply that teachers in physical education will need to use data to make judgments about how to improve their own practices.

## **Cognitive Understanding**

Cognitive understanding content is related to the close alignment of curriculum and assessment. However, education has lacked in the area of valid and reliable assessments (Dinanthompson & Penny, 2015). The cognitive understanding of students directly relates to the amount and quality of learning in the educational setting. Many of these issues relate to the lack of emphasis of the teachers on the role of the assessment. Teachers need to build assessments that measure and evaluate student improvement rather than assign a grade for the report card (Dinanthompson & Penny, 2015). There are teaching methods, such as Teaching Games for Understanding (TGFU), that emphasize

very specific areas of understanding throughout units of instruction (Lodewyk & Bracco, 2018). These teaching methods use a combination of many different teaching styles that include peer input throughout the learning process. According to Ryan (2011), peers are an integral part of the academic learning process. Utilizing peers to improve the cognitive understanding in the classroom would benefit all students.

## **Peer Motivation**

Adolescence is an age in which a decrease in motivation and enrollment in Physical Education is common. Some of the main factors include the perception that the content is boring, irrelevant, and too focused on traditional sports (Lodewyk & Bracco, 2018). There are very strong influences around adolescent students all day, mainly peers. Previous research spent most of the focus on the teacher and parent influence of motivation (Ryan, 2011). Recently a study by Ryan (2011) concluded that there are three distinct types of peer relationships to affect motivation: reciprocated friendship, frequent friendship, and shared group membership. These relationships all affect peer motivation in different ways. “Adolescent students who perceived stronger support from their peers reported stronger mastery goals, weaker performance-avoidance skills, and lower test anxiety” (Song, Bong, Lee, & Kim, 2015, p. 835). The most important positive benefit from peer support is that it acts as a buffer to stress (Song, Bong, Lee, Kim, 2015). The buffer to stress directly correlates to the weaker performance-avoidance skills, which increase participation in activity during physical education courses.

## Peer Feedback

A great deal of research has been done relating to peer feedback in education. The feedback, however, lacks specificity in physical education settings. In a study of high school students, students placed less emphasis on peer feedback than on expert (teacher) feedback. The two main reasons for the peer feedback lacking validity were (a) the amount of negative and critical feedback that lacked evidence and (b) the overwhelming amount of positive feedback without constructive criticism (Hovordas, Tsivitanidou, & Zacharia, 2014). According to Hovordas, Tsivitanidou, & Zacharia (2014), the majority of the changes proposed by peers were scientifically accurate. This shows that the knowledge of peers was valid and reliable, but the delivery of the knowledge and feedback was lacking. The type of feedback given also plays a significant role in the likelihood of students to implement that feedback. A writing study was conducted analyzing types of feedback and its effectiveness in student's writings. Students only gave feedback by describing a problem or offering a solution, called implementable comments, 41% of the time. Only 33% of the implementable comments were used, which means only approximately 13% of feedback was implemented from the first to second draft (Patchan, Schunn, & Correnti, 2016). Students seem to put a very low value in the feedback from their peers when compiling their feedback for their final project.

According to *Peer Feedback in the Classroom* by Starr Sackstein (2017), the rationale for teaching students to provide feedback is important. Students can give feedback to each other quicker than a teacher would be able to give each student feedback. Typically, students must wait for the teacher to give individual feedback

(Sackstein, 2017). This is at a very poor ratio of 20:1 or worse. Every student has the potential to be an expert. Students need to be able to “fall forward” (Sackstein, 2017). This mindset lets students’ see mistakes as opportunities to grow rather than failures. It also increases engagement and awareness of the student’s strengths and weaknesses (Sackstein, 2017).

# Methods

## Design

One purpose of this research was to have the ability of one teacher to examine pedagogical practices. The methods chosen were influenced by the teacher researcher's desire to understand the impact of peer feedback on students' knowledge. The methods also needed to be able to be implemented in a middle school PE environment.

The participants were broken into two groups balanced on skill, knowledge and experience with volleyball. Both groups received the same skill work before game play started in the volleyball unit. When game play started, both groups received teaching cards, but the cards were different with the experimental group receiving peer feedback specific information.

The experimental group was given cards designed to increase peer feedback during game play. The control group's cue cards had reminders with rules during the game. The experimental group also had cue cards; each card had a different reminder relating to the passing and setting skills and game strategies, such as where to hit the ball. Instruction from the teacher for the control group and experimental groups was the same except for the peer feedback. The experimental group used the cue cards to encourage a broader range of peer feedback on volleyball skill, strategy and rule concepts. The control group had a placebo card that had only a list of the rules for gameplay. During the game, participants of the experimental group gave feedback to their peers every 3 points, which

was approximately 30% of the time during the game. The control group and experimental group played on two different courts.

## **Sample**

The subjects of this study are a convenience sample of 7th grade students in a 4th hour class on an every other day schedule. The students have Physical Education for 45 minutes every other day. They are given the opportunity to change at the beginning and end of each class, leaving approximately 37 minutes for activity. There were a total of 15 students that were part of the experimental group and 14 students that were part of the control group. The experimental group consisted of 6 males and 9 females. The control group consisted of 7 males and 7 females. The teacher conducting this research has taught at this school for three years and has 16 years of volleyball experience as a player, coach, and official.

The school in which the study was conducted resides in an urban setting, with a population of 78,860. The school has a total enrollment of 1,615, 52% male and 48% female. Of the 1,615 students, most are Caucasian, 72.9%, followed by Hispanic, 14.6%, and Black, 6.1%. The rest of the population is comprised of two or more ethnicities, 5.1%, Asian, 1.1%, and American Indian. The population consists of 89.3% of students without disabilities and 10.7% students with disabilities. The attendance rate of students is 95.2%. The economic status of the student body is highly non-economically disadvantaged, 73.1%, while only 26.9% are considered economically disadvantaged (Wisconsin Department of Public Instruction, 2019).

## **Instruments**

Data was collected using a variety of means. Chromebooks were used to collect student data with the pre and post-test. The school information system, Infinite Campus, was used to collect data related to the demographics and participants. Attendance records were an additional form of collected information on Infinite Campus. Data was recorded using Google Classroom. The assessments were given on the Chromebook, but securely stored on the University of Wisconsin - Whitewater electronic cloud storage system. All data from assessments were moved to spreadsheets before analysis. Student information was removed and replaced with a unique non-identifiable number. The system settings provided by the school district erase the content of each teacher's Google Classroom each academic year. This process allowed the analysis of all research data without the possibility of losing anything.

This research study helped to serve as the pilot test for the volleyball assessment. The researcher, whom has a background in teaching and volleyball, created the assessment. The researcher has a background in volleyball in multiple categories such as a player, coach, and certified referee. Pre-existing tools for increasing the application of or for assessing peer feedback in Physical Education did not exist prior to this study. In the interest of having valid scores the instrument was considered by a university pedagogy instructor regarding the assessment content, questions and structure, as well as with a 20-year Physical Education teacher.

## **Data Analysis**

The data will be analyzed using the statistical program, SPSS version 26.0.

Analysis will include descriptive stats of age, gender, personal view of Physical Education, participation of volleyball outside of school, and attendance during the study and pre and post assessment score. Relationships between the following variables were examined by comparing to the pre and post test score: students' gender, students' age, students' opinion on physical education, and students' outside participation in volleyball. Finally, t-tests were used to examine differences between the means on the assessments. An ANOVA was used to examine the groups created by participation levels on post-test scores.

# Results

## Introduction

Purpose of this study was to determine if student's cognitive understanding improves with the use of peer feedback during game situations. Students were given an eight-question pre and post-test to assess cognitive understanding relating to volleyball. The students were divided into two groups, the experimental and control group. The control group received the appropriate instruction and was given the post-test. The experimental group was given cards designed to increase peer feedback during game play. At the end of game play in the unit a post-test assessment was given to determine if the intervention affected the scores.

## Data Analysis

**Descriptive statistics.** Students in the experimental group scored an average of 5.67 on the pretest compared to the control group, which scored an average of 4.86 on the pretest out of 8.0. Both groups showed a substantial range in scores. The experimental groups had a standard deviation of 1.799, while the control group had a standard deviation of 1.468. The post-test of the experimental group averaged 6.53, an improvement of 0.86. The post-test of the control group averaged 4.64, a decrease of 0.22. The post-test standard deviation of the experimental group was 0.743, while the standard deviation of the control group was 1.865. The combination of the average post-test score of the control group, and the increase of the standard deviation may suggest

that students never truly understood the content. This suggests that the students in the control group were guessing due to lack of confirmation from the teacher and/or peers. The decrease in variation in the experimental group may indicate that a more accurate measure of their understandings occurred on the post-test. The students in the experimental group were able to confirm their previous knowledge and additional pieces of information.

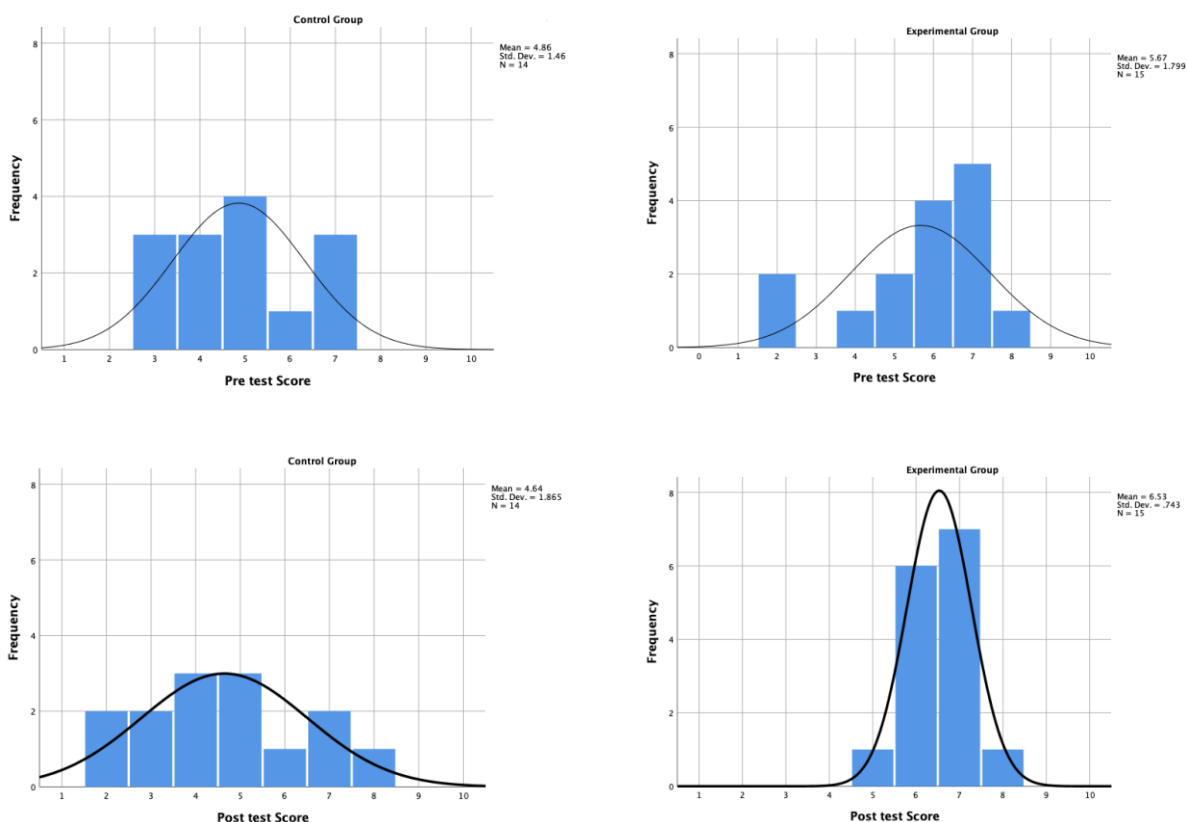


Figure 1 - Pre and Post Test Histograms

### Instrument Reliability and Correlations.

*Cronbach's alpha.* The Cronbach's alpha test was used to check for the reliability of the volleyball assessment from the pre to the post test. The volleyball assessment

showed a moderate reliability ( $r=.730$ ). This indicates that the volleyball assessment does reliably test the cognitive understanding of the content.

Table 1 - Cronbach's Alpha

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.730	.730	2

*Correlations.* The scores of the pretest and post test show a strong indication that the overall pretest and post scores show a correlation ( $r=.575$ ;  $p=.001$ ). This seems to indicate good reliability for test-retest on this measure.

Table 2 - Correlations

		Pre test Score	Post test Score
Pre test Score	Pearson Correlation	1	.575**
	Sig. (2-tailed)		.001
	N	29	29
Post test Score	Pearson Correlation	.575**	1
	Sig. (2-tailed)	.001	
	N	29	29

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The two scatter plots show the comparison of pre and post test scores for both the experimental group and the control group. The experimental group shows all scores staying the same or improving from pretest to post test, while the control group shows scores staying the same or declining from pretest to post test. As shown in figure 2, the line of best fit is clearly different between the control and experimental group.

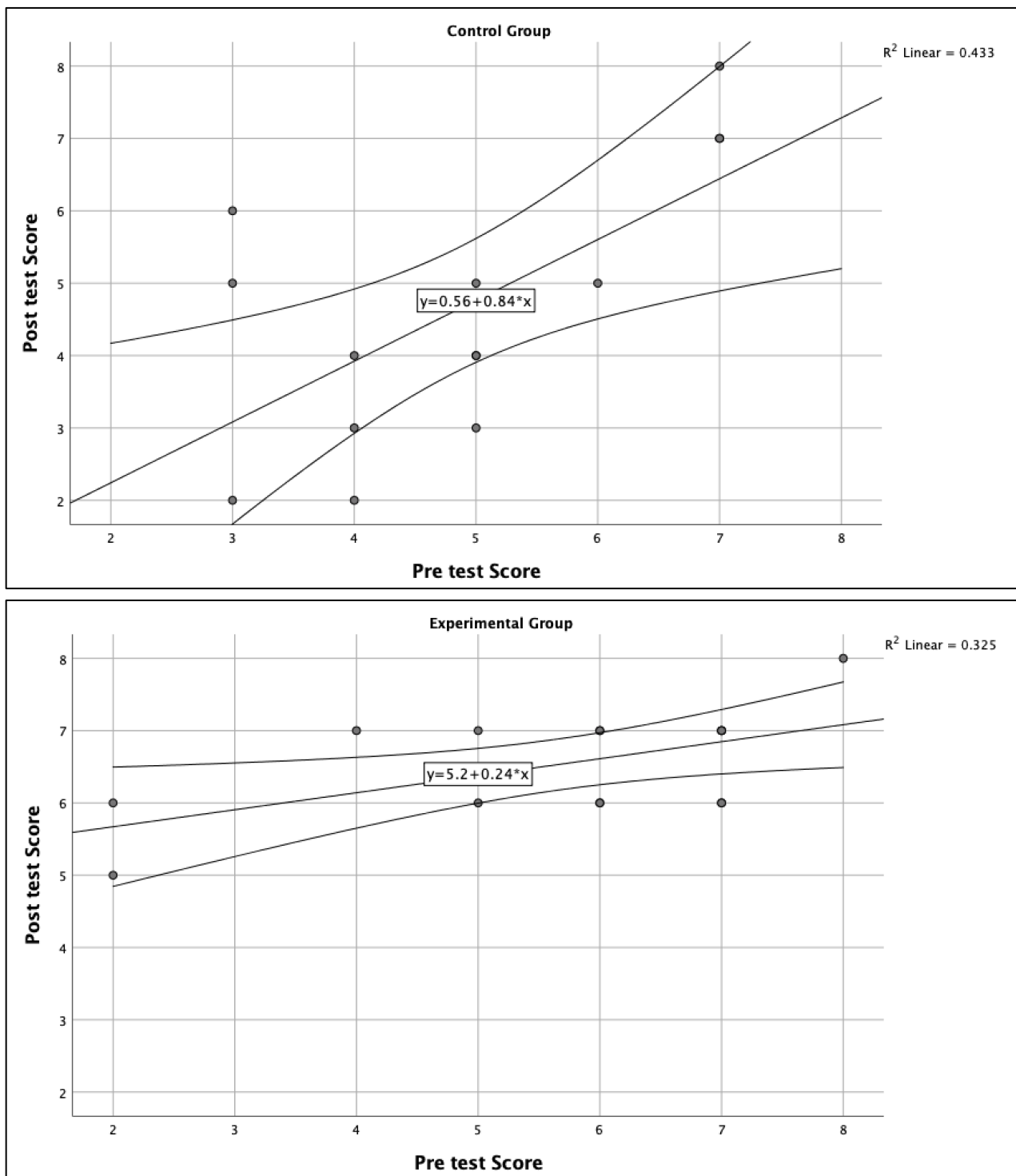


Figure 2 - Control and Experimental Group Scatter Plots

### Inferential Statistics.

*Independent samples t-tests.* When comparing the experimental and control group pretest scores there was no significant difference ( $t=1.324$ ;  $p=.196$ ), however when comparing the post-test between the two groups there was a significant difference ( $t=3.633$ ;  $p=.001$ ).

Table 3 - Independent Samples t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pre test Score	Equal variances assumed	.351	.558	1.324	27	.196	.810	.611	-.445	2.064
	Equal variances not assumed			1.334	26.511	.193	.810	.607	-.437	2.056
Post test Score	Equal variances assumed	9.540	.005	3.633	27	.001	1.890	.520	.823	2.958
	Equal variances not assumed			3.540	16.797	.003	1.890	.534	.763	3.018

*ANOVA for opinion of physical education.* The overall opinion of physical education did not show significant differences with the test scores. The pretest  $F=.610$  (.615) and the post test  $F=.399$  (.755). This confirms that there is no significant correlation between students that had a high overall opinion of physical education.

Table 4 - ANOVA for Opinion of Physical Education

		Sum of Squares	df	Mean Square	F	Sig.
Pre test Score	Between Groups	5.310	3	1.770	.610	.615
	Within Groups	72.483	25	2.899		
	Total	77.793	28			
Post test Score	Between Groups	3.605	3	1.202	.399	.755
	Within Groups	75.222	25	3.009		
	Total	78.828	28			

*ANOVA for outside volleyball experience.* Students that had volleyball experience outside of physical education showed no correlation with test scores on the pretest (.837) or the post test (.658). This confirms that there is no significant correlation between students that had a high overall opinion of physical education or those that had volleyball experience outside of physical education.

Table 5 - ANOVA for Outside Volleyball Experience

		Sum of Squares	df	Mean Square	F	Sig.
Pre test Score	Between Groups	3.816	4	.954	.309	.869
	Within Groups	73.977	24	3.082		
	Total	77.793	28			
Post test Score	Between Groups	9.418	4	2.355	.814	.529
	Within Groups	69.409	24	2.892		
	Total	78.828	28			

# Conclusions

## Introduction

The purpose of this study was to determine if students that received an increased amount of peer feedback has a higher cognitive understanding than their peers that did not receive that increased feedback. Students were broken into two groups, experimental and control. The experimental and control groups showed a change in average test scores from the pre to the post test.

## Interpretation of Findings

There was an overall change in post test average scores between the control group and experimental group. The experimental group average post test score was 6.53, an improvement of 0.86. The control group average post test score was 4.64, a decrease of 0.22. The scores of the experimental group may have went up due to the consistent confirmation of correct content knowledge. The decrease in the average test score of the control group may have been because the students never had correct content reinforcement. Students may have guessed during the pretest and never learned the correct knowledge due to lack of peer feedback. These students then may have guessed and chose a different, incorrect, answer on the post test causing their overall score to decrease.

As a teacher researcher, many interactions between peers were vastly improved. The students took a very positive approach to working with each other while giving peer feedback. The students now had a common goal and helped their peers improve in an effort to reach that goal together. The overall team attitude improved as teammates improved their volleyball skills and became successful during gameplay. This encouragement fostered a very positive team environment.

The volleyball assessment that was created and piloted during this test was created using a variety of knowledge from different sources. The assessment was created using the standards intertwined within the unit. The assessment was then broken into three different categories: movement, rules, and serving. These were the three main concept areas that students were learning throughout the unit. The assessment was created using an assortment of questions to allow for questions of diverse difficulty throughout the test. The difficulty of the questions was based on bloom's taxonomy of cognitive understanding (Anderson, et al., 2001). The assessment showed a moderate level reliability ( $r=.730$ ).

## **Summary of Future Implications**

The student test score decreasing could help to guide teachers to confirm content knowledge with their students before moving on to a new topic or concept. This may help to inform teachers that the students never truly understood the information on the pre test, but guessed and were able to select the correct answer. This may give the teacher a false assessment of the students cognitive understanding on that specific content. By assessing

after the learning segment of the unit it could help to show if there was successful cognitive understanding in the new concept or topic.

This study may help to encourage additional physical education teachers to pursue action research in their teaching. The reflection to content, methods, cognitive understanding may help the teacher to improve overall instruction. The results were impacted greatly by peer feedback. Other educators may see the benefit of using peer feedback to improve cognitive understanding in their courses.

## References

- Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., ... Wittrock, M. C. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing a revision of Blooms Taxonomy of educational objectives*. New York: Longman.
- Boud, D., Keogh, R., & Walker, D. (2015). *Reflection Turning Experience into Learning*. London: Taylor & Francis Ltd.
- Carless, D, Liu, N-F. 2006. Peer feedback: the learning element of peer assessment. *Teaching in Higher Education* 11, 279-290.
- Dinanthompson, M., & Penney, D. (2015). Assessment literacy in primary physical education. *European Physical Education Review*, 21(4), 485-503.
- Google. (2019). About Classroom - Classroom Help. Retrieved October 21, 2019, from <https://support.google.com/edu/classroom/answer/6020279?hl=en>.
- Hovardas, T., Tsivitanidou, O., & Zacharia, Z. (2014). Peer versus expert feedback: An investigation of the quality of peer feedback among secondary school students. *Computers & Education*, 71, 133-152.
- Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The action research planner: doing critical participatory action research*. Singapore: Springer.
- Lodewyk, K., & Bracco, E. (2018). Differences in Adaptive Outcomes between Previous Physical Education and a Teaching Games for Understanding Games Unit in Adolescent Girls. *ICHPER-SD Journal of Research*, 10(1), 12-20.
- McNiff, J. (2013). *Action research: principles and practice* (3rd ed.). Milton Park, Abingdon, Oxon: Routledge.
- Patchan, Melissa M., Schunn, Christian D., & Correnti, Richard J. (2016). The Nature of Feedback: How Peer Feedback Features Affect Students' Implementation Rate and Quality of Revisions. *Journal of Educational Psychology*, 108(8), 1098-1120.

- Ryan, A. (2011). Peer Relationships and Academic Adjustment During Early Adolescence. *The Journal of Early Adolescence*, 31(1), 5-12.
- Sackstein, S. (2017). *Peer feedback in the classroom: Empowering students to be the experts*. Alexandria, Virginia, USA: ASCD.
- Song, J., Bong, M., Lee, K., & Kim, S. (2015). Longitudinal Investigation into the Role of Perceived Social Support in Adolescents' Academic Motivation and Achievement. *Journal of Educational Psychology*, 107(3), 821-841.
- Wisconsin Department of Public Instruction. (2019) 2018-2019 School Data. Retrieved August 4, 2019, from <https://wisedash.dpi.wi.gov/Dashboard/portalHome.jsp>.

## Appendix

### Experimental Group Cue Sheet

<b>Volleyball Cues</b>		
<b>Passing</b>	<b>Setting</b>	<b>Strategy</b>
Thumbs down Sit down/stand up Flat arms	Curled hands Look through window Touch the sky	Hit to open space

### Control Group Cue Sheet

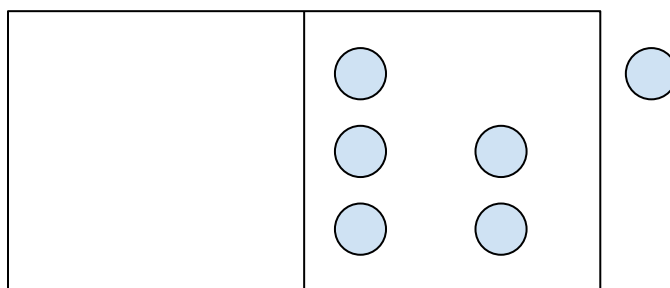
<b>Volleyball Rules</b>		
<b>Serving</b>	<b>Passing</b>	<b>Playing area</b>
-Behind blue service line -Overhand or Underhand are both legal	-3 contacts allowed per side -Ball cannot be caught - Players must avoid touching the net	-If the ball hits the line it is considered “in” -If the ball hits the ceiling and stays on your side you can continue

## Volleyball Assessment

1. Points can only be only be scored when a team is serving.
  - a. True
  - b. False
  
2. A ball landing on the boundary line is in.”
  - a. True
  - b. False
  
3. If a served ball hits the net and goes over, it is no good.
  - a. True
  - b. False
  
4. The team must rotate:
  - a. Each time they earn a point.
  - b. Every 5 points
  - c. When the coach tells them to rotate
  - d. After the opposing team loses the point after a serve.
  
5. What is the general rule to follow when hitting the ball to the other team?
  - a. Hit the ball high in the air.
  - b. Hit the ball as hard as possible.
  - c. Hit the ball where the opponent is not.
  - d. Hit the ball down.
  
6. All of the following are types of a serve, EXCEPT:
  - a. Overhand
  - b. Double
  - c. Underhand
  - d. Jump
  
7. Which player is the “Quarterback”, or “Leader” on the court?
  - a. Setter
  - b. Libero
  - c. Hitter
  - d. Anyone

8. Explain why each player has a spot, or position, on the court.

9. Use a X to label the positions when the opponent is serving.



10. Use an X to label the positions for defense based on the diagram below:

