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https://doi.org/10.33015/dominican.edu/2013.edu.26

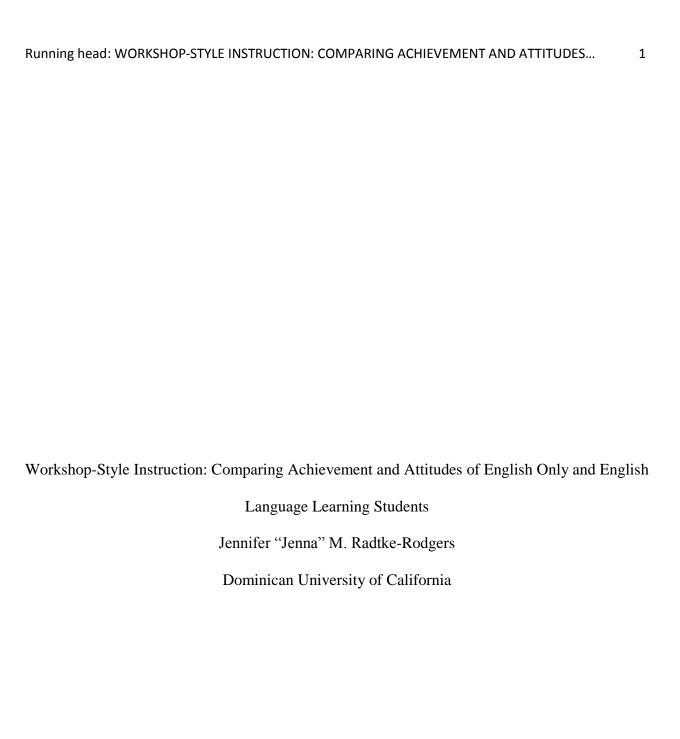Jennifer Marie Radtke-Rodgers
Dominican University of California

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Workshop-Style Instruction: Comparing Achievement and Attitudes of English Only and English

Language Learning Students

Jennifer "Jenna" M. Radtke-Rodgers

Dominican University of California

This thesis, written under the direction of the candidate's thesis advisor and approved by the Chair of the Master's program, has been presented to and accepted by the Faculty of Education in partial fulfillment of the requirements for the degree of Masters of Science in Education. The content and research methodologies presented in this work represent the work of the candidate alone.

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Jennifer "Jenna" Radtke-Rodgers, Candidate   Date

_____   _____

Lisa Ray, Chair   Date

_____   _____

Debra Polak, Thesis Advisor   Date

Acknowledgement

Gratitude to Debra Polak, Lisa Ray, and Phillip Warf, for all of the support, editing, and kindness offered. I'd like to give a thank you to Debra Polak, who had to read several drafts of this work and offered insight and corrections. This research would have never formed into a thesis that allowed me to reach my educational goals without Polak, Ray, and Warf.

A note of thanks to Jeanné Colson, Lori Kincaid, and Christy Smith. Saturday classes and deadlines were so much more fun with my favorite people.

I'd also like to thank my father, Richard Radtke, and my uncle, Tom Radtke, who always encouraged me towards educational goals that would fulfill my dreams and give me control of my life. Finally, I'd like to thank my husband (as of June 28, 2014,) David Rodgers, for all of his understanding of necessary lonely nights and weekends while I pursued my degree.

I may have written this thesis, I might have done the research on my own, but it was the kindness, support, and love of all aforementioned that allowed me to complete this work.

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Introduction

This study analyzed the effectiveness of the Reader's Workshop style of instruction, its effect on students' reading comprehension, students' attitudes about reading, and whether the effect differentiated between students who speak English as a native or second language.

Background and Need

Reading comprehension is a skill that allows a reader to understand what he or she has read. It allows a reader to learn from reading. Fewer than 50% of the students in the United States score proficient on the national reading tests (Peterson, Woessmann, Hanushek, & Lastra-Anadon, 2011). Not only are fewer students achieving reading proficiency scores, they also encounter less rigor in their reading instruction than once existed. The average grade level of required reading at the high school level has decreased from an average of 9.1 in 1923 to 6.2 in 2012 (Renaissance Learning, Inc., 2013). This study will evaluate the effect a Reader's Workshop will have on student achievement. If Reader's Workshop proves to be an effective method, teachers and other researchers might want to evaluate the merits of Reader's Workshop in reading instruction.

Statement of Problem

Students are performing poorly on standardized reading tests, and California's students are performing among the lowest in the United States (Peterson et al., 2011). However, Hispanic students in the United States are performing the lowest with fewer than 10% performing at proficient level in reading (Peterson et al., 2011).

Previous to the upcoming Common Core State Standards, language arts standards addressed reading comprehension skills and strategies, sentence structure, vocabulary development, and response to literature in a segmented structure (California Department of

Education, 1998). Each instructional section had a specific requirement such as ensuring students understood cause and effect, or the use of conjunctions. Textbook companies created text books and the State determined which text books schools could be purchased using state money. One such state-adopted program centers around anthologies that contain built in lessons for focusing on the different reading skills and strategies, such as cause and effect, author's point of view, and summarizing. Students demonstrate their understanding of these concepts by completing built-in worksheets from a consumable practice book.

Concern has been focused on reading instruction long before this transition. In 2001 the No Child Left behind Act initiated Reading First. This program encouraged districts to find and use instructional strategies that would improve, not only reading instruction, but the achievement gap between native and non-native English speakers (Reyhner, 2013). Since then instruction has focused on phonics and skills practice and mastery. Although this meant more required time for reading instruction, it hasn't meant higher scores for students. (Manzo, 2008)

In light of more hours and less progress in reading instruction and achievement, new strategies began to emerge. Some strategies included literature circles, guided reading groups, the Daily 5 Café, and others. With Common Core implementation around the corner many of these strategies are becoming more popular. One such strategy is Reader's Workshop. But, does Reader's Workshop produce better readers? Will allowing students to make their own reading choices and partner discussions lead to higher achievement of attitudes of students, no matter their primary language? Teachers need to know the most effective strategy for reading instruction that gives their students understanding, but also an appreciation for reading since reading habits can be used as a predictor for future academic success (Anderson, Wilson, & Fielding, 1988).

Reader's Workshop refers to an instructional strategy that has a predictable pattern with several components: mini-lessons, teaching points, active engagement, the task, daily individual reading time, small group instruction, guided reading, conferring, assessment, partner work, and closing. Mini-lessons are 10-15 minute lessons that focus on specific skill (McCormick Calkins & Harwayne, 1991). This skill can be a comprehension skill such as summarizing, or a literature response activity, such as "talking back" to the book. These are done as a whole group with the teacher modeling the strategy or skill. The teacher can read a short picture book, or section of a book, that illustrates how to use the specific strategy or skill. After the teacher has shown the students how to use the strategy they apply it to the active engagement task. This task may be comprised of partner discussion, class discussion, or the students can complete a chart or task as a class that is similar to the one they will be expected to do on their own during individual reading time. Individual reading time is a daily part of Reader's Workshop in which students use reading materials they have chosen (sometimes with guidance on reading level from the teacher,) to individually practice the teaching point for the day by completing the task (Newingham, 2013).

Tasks are varied, but usually involve writing. These assignments produce artifacts the teacher and student can analyze together during conferences to assess and evaluate the student's progress and achievement. The task is usually completed at the end of individual reading time (Newingham, 2013).

During this reading time the teacher can do one of, or a combination of, several things. The teacher can choose to lead guided reading groups, lead remediation groups, or conference with individual students. Guided reading groups include a teacher and a small group of students. Students read a specific book together, and the teacher leads conversations that focus on

comprehension. Remediation groups are similar to guided reading groups in that the teacher leads a small group of students, but instead of reading a single text, the teacher uses the time to give reinstruction to students who are having difficulty with a particular skill. This skill can be reading, vocabulary, or grammar focused. A conference occurs when the teacher meets with individual students. These meetings focus on the evidence that determines how successful a student has been. Pages read, notes taken during mini-lessons, written tasks, and quality of work are all pieces of evidence that the teacher can review with the student during these individual conferences. Conferences can also be used as a time to gather evidence which can be used as assessment. Assessment can include tasks that students have completed during individual reading time, written work, and can focus on skills such as comprehension and fluency (Newingham, 2013).

After individual reading time, students engage in partner work to discuss what they learned related to the specific teaching point. This student collaboration reinforces what students have learned and gives students time to practice collaboration in a low-anxiety environment. After partner work the class reconvenes as a group and the teacher leads the closing. The closing can be partner discussion or class discussion (Newingham, 2013).

For the purpose of this research *achievement* will refer to students' scores on a district wide benchmark. This is a test that is common to every grade level in the district. This assessment counts for half of each students' grade and students can score a percentage (from 0%-100 %). According to the district an "advanced" score is any score between 90% and 100%. A "proficient" score is any score between 80% and 89%. Although proficiency is a key objective, another component monitored and compared between English only and English language

learners' students is attitude. "Attitude" is defined within the parameters of this research as self-beliefs, and will be measured through an online anonymous survey.

Although students may speak a variety of languages other than English, such as Spanish, Cambodian, or Thai, they all fall under two language designations. English-only (EO) refers to students who are designated at native English speakers. They speak English as their native and first language. English language learner (ELL) refer to students for whom English is at least a second language. Their primary, native, or first language is any language other than English. Reading comprehension rates are testing very low and this research is meant to evaluate the effectiveness of workshops in improving reading comprehension in students

Purpose Statement

The purpose of this study was to determine whether reading comprehension can improve when students engage in Reader's Workshop. This research evaluated the effect of Reader's Workshop on student achievement, self-efficacy, and attitudes towards reading, and how those results compared between English Only and English language learners. Will Reader's Workshop help students to better wrestle with deeper thinking through debate and discussion? Can a change in reading instruction strategy improve student reading achievement and attitudes? If it does, will the improvement be the same for students who speak English as a native language, or as a second language?

Research Question and Hypothesis

Does Reader's Workshop instruction improve student achievement? Does Reader's Workshop improve a reader's attitude towards reading? If Reader's Workshop demonstrates some improvement, the study also asks if the improvement is the same for English native speakers, and students who speak English as a second language. It is the researcher's hypothesis

that Reader's Workshop will improve both reading comprehension and students' attitudes about reading and themselves as readers. It is also the researcher's hypothesis that any improvement will be the same for EO and ELL students.

Theoretical Rational

Students aren't meeting the benchmark for reading proficiency on the state or national level (Peterson, et al., 2011).. It is widely believed that monitoring student work and providing genuine feedback improves student achievement, and could even help close the achievement gap (Nicol & Macfarlane-Dick, 2007). Some research has suggested that a Reader's Workshop style of differentiated instruction frees higher end readers from tedious direct instruction while enriching struggling students' experiences by giving them choice (Lausé, 2004).

Reader's Workshop is one strategy that provides students with specific instruction, feedback, differentiated instruction, and gives students daily practice with collaboration. It gives students daily experience with specific skills. Students also get the opportunity to work together, think their logic out aloud, and share their ideas.

While research doesn't show a strong correlation between students' freedom to make choices in books and their academic achievement, it does support that collaborative, feedback-rich strategies like Reader's Workshop improves achievement and students' attitudes toward reading and themselves as readers. It is also assumed that every classroom is different and that school success can be affected by non-school components such as home-life and socioeconomic status. Although a single test on a single day, such as the district wide benchmarks and state tests, are not the most accurate reflection of student achievement, these assessments can be used to measure growth from one trimester, or year, to the next. Despite the fact that these assessments are a single snap-shot into students' abilities to demonstrate competency, improved

instruction can affect the outcomes of these assessments and improve student achievement. The researcher has also assumed that as students succeed as readers, their attitudes towards specific subjects and their abilities improve.

Review of Literature

Reader's Workshop is a type of reading instruction that is based on mini-lessons, practice time, guided reading, teacher conferences, and silent reading time (McCormick Calkins & Harwayne, 1991). As Common Core State Standards become a more centralized theme in classroom instruction, reading is expected to be integrated into all academic subjects. One way to meet the reading standards is through Reader's Workshop.

The workshop-style instruction benefits students because it ensures that instruction time is not wasted. In a Reader's Workshop format of writing instruction, students engage in a self-paced process. They do not have to waste time waiting for their peers to complete their work. It allows students to move through reading at their own pace, and to choose books that interest them. It also develops a student's ability to become an independent reader. Independent readers can choose their own topics and practice important reading skills on their own. The workshop also allows students to learn how to read by actively reading. They can also learn content related to social studies and science. However, does workshop-style instruction improve student comprehension and attitudes about reading? If it does, is there a difference in this improvement between EO and ELL Students?

Review of Previous Research

In her thesis "Improving reading comprehension in a resource classroom for students with learning disabilities using a Reader's Workshop" Knoll (2011) asked if Reader's Workshop could improve student achievement in oral reading skills, silent reading skills, or reading levels for students with learning disabilities. The study was done in a resource classroom with students who had documented learning disabilities. The workshop was introduced at the beginning of the year and data was collected in September, August, and December (Knoll, 2011).

Knoll (2011) used an informal reading inventory, pre- and post-questionnaires, and students' scores on oral and silent reading classroom assessments to monitor student skill and attitudes. Although the study didn't demonstrate a significant growth in oral reading, the data did demonstrate growth. In order to test students' ability to comprehend what they read silently, Knoll (2011) created a pre- and post-test. These tests focused on asking questions about reading samples that students were asked to read silently. The pre- and post-test were comparable, and the researcher measured the number of correct responses on both the pre- and post-test. The results showed no significant difference in the number of accurate responses. However, the results do show a significant growth in students' reading levels over the months. Although the scores on the oral and silent reading assessments did not demonstrate a significant growth in student achievement, student reading levels (the grade level students can independently read at) did improve (Knoll, 2011).

Another project, aimed at improving literacy in Native Hawaiian students, documented change in student achievement over two years in The KEEP Demonstration Classroom Project. It was named KEEP for the school at which the research took place and the program that developed there, Kamehameha Elementary Education Program. Kamehameha's student population included nearly 60% Native Hawaiians. The first year the project was comprised of 13 teachers. Nine of those teachers were joined by 20 new teachers for the second year. One key difference to the Knoll research is the preparedness of teachers. Unlike the teacher in Knoll's study, every teacher in this study was considered proficient in the practice of what the authors call whole-language instruction (Au & Carroll, 1997).

Whole-language instruction is a theory that centers on using entire books and other entire works of literature in instruction. It doesn't use anthologies, nor does is segment literacy into

phonics, vocabulary, spelling, and grammar. An entire piece of literature is used to model all of the different parts of literacy (Krashen, 2002).

Whole language style of instruction included what the researchers refer to as the six aspects of literacy. These aspects are named as "(1) ownership of reading and writing, (2) reading comprehension, (3) the writing process, (4) language and vocabulary knowledge, (5) word-reading strategies and spelling, and (6) voluntary reading" (Au & Carroll, 1997, p. 204-205). In order to meet curriculum goal of student ownership of his or her reading and writing, the KEEP project school used Writing and Reader's Workshop. To measure student achievement the researchers looked at benchmarks and student portfolios. The first year of the study yielded results that were both exciting and insufficient. In the first year the program's focus on student ownership of literature resulted in most students being either on or above their grade in their reading level. Student interest in reading was documented as improving, and students were reading more voluntarily. Not only were students reading more frequently, but they were reading for longer intervals of time. While this trend was attributed to the improvement in word-reading strategies and decoding, the results in reading comprehension remained nearly unchanged (Au & Carroll, 1997).

In the second year the program looked at evidence of teacher implementation of the curriculum and whether the benchmarks were a sufficient method of measuring student achievement. The researchers wondered if one possible reason for the unchanged student achievement in the more complex aspects of literacy could have been the teachers. For the second year they decided to focus on the teachers and their instruction. They used observation and checklists as evidence that teachers were focusing on the different items necessary to project implementation. The researchers measured the percentage of participating (new and veteran,)

teachers' rates of implementing the different components of the curriculum. This percentage of veteran teachers implementing the curriculum reached 100% in March while new teachers hit 100% implementation a month later in April. The second year data suggested that the constructivist curriculum was improving students' achievement in language across the board. However, the researchers centered their conclusion on not just the improvement that students made during the second year, but the correlation between that improvement and the higher percentage of teachers fully implementing the program. The authors suggest that if a project, like the KEEP, were to work in a public school district, teachers would need support and training (Au & Carroll, 1997).

While the curriculum developers in the KEEP project focused on creating curriculum, or reconstructing current curriculum, another study focused on a school that used a prescribed method of school reform for literacy, the America's Choice Comprehensive School Reform Design (Au & Carroll, 1997).

The America's Choice Comprehensive School Reform Design is a non-profit organization created by the National Center on Education and the Economy. The organization focuses on research-based school reform strategies. One of its many focuses is on using mini-lessons to measurably improve academic success in students. In a first-year implementation study of the program it boasted both teacher support and student achievement improvement (Corcoran, Hoppe, Luhm, & Supovitz, 2000).

One of the authors for the evaluative summary went on to do further study of the school reform. Supovitz's study focused on the implementation of the literacy workshop aspect of the reform design. The authors of this study used surveys of teachers and administrators, visits to the

schools, interviews, document review, and numerous pieces of data to measure student performance (Supovitz, Poglinco, & Bach, 2002).

In the first stage there was zero implementation of the literacy workshops based on the America's Choice Literacy Workshops. In the second stage, some of the aspects of the reform design were implemented such as the content of a lesson, but the lesson did not adhere to the strict time constraints of a mini-lesson. Also, the lesson did not contain the other aspects of the Reader's Workshop such as conferences and independent practice. The following stage demanded a fuller implementation of the Reader's Workshop-style of instruction which led to the fourth stage that expected teachers to be skilled and practiced at the implementation. The study found that where teachers adhered to the program students reported back that the time they spent reading had increased (Supovitz, et al., 2022).

One of the alleged benefits of the Reader's Workshop model is that it allowed teachers to meet the reading needs on a more individual level. One study asked whether that benefit could be measured in middle-school students. Two teachers implemented the Reader's Workshop model in their 7th and 8th grade classrooms. The data that was collected included observation check lists that the researchers used to measure to what extend the teachers were implementing the model. The data also focused on measuring student motivation through interviews with teachers. The research was conducted over eight months and reported that teachers were noticing a higher level of student engagement and motivation. This study was less focused on student achievement and more focused on how the two participating teachers responded to using the workshop-style model (Thomas, 2012).

In the interviews, Thomas asked how effective the two teachers though the style of instruction was, how they were implementing the style of instruction, how students were taught

with the method of instruction, how the method was working, and Thomas also recorded

concerns the teachers might have about the instruction style. Upon examining the interviews

Thomas found emerging themes, words that both teachers were using freely and frequently. Such

words included "engaged readers," "questions," "making connections," "motivation,

conferencing," and "authentic experiences" (Thomas, 2012, p. 7). Of these themes, Thomas

focused on increased motivation, increased comprehension, and increased authentic learning

experiences to further expand what the teacher's had discussed during interviews. For increased

comprehension the teachers cited the individual reading task as evidence for increased

comprehension. Both teachers discussed the improvement of student ability to complete the task

correctly (Thomas, 2012).

Summary of Major Themes

Reader's Workshop benefits students because it ensures that instruction time is not

wasted. In a Reader's Workshop format of reading instruction, students engage in a self-paced

process. They do not have to wait for their peers to complete their work. It allows students to

practice skills while reading books at a variety of reading levels that are differentiated for their

ability. It also develops a student's ability to become an independent reader. Independent readers

can choose their own books and engage in practice of important reading skills on their own. The

workshop also allows students to learn how to read by actively reading.

Although a Reader's Workshop can be difficult to manage because of the student-

directed pacing, the nature of different students achieving different levels could outline benefits

that might out-weigh the challenges. A Reader's Workshop teaches students independence and

supports the development of thinking and communication skills. Effective Reader's Workshops

can attribute to higher student achievement in reading comprehension (Knoll, 2011). This is

extremely important as no more than a third of students who take the National Assessment of
Educational Progress assessment demonstrate proficient or advanced abilities in reading
(Peterson, et al., 2011).

How Present Study Will Extend Literature

ELL students acquire English through classroom learning as well as social interaction.
The difference between academic and social use is differentiated by two different names. Basic
Interpersonal Communication Skills (BICS) refers to language used in order to function socially.
Cognitive Academic Language Proficiency (CALP) refers to vocabulary that is found in
academic areas such as math, science, and social studies.

Although the research suggested that Reader's Workshop was an effective teaching
strategy, and inspired improvement in student attitudes and achievement in reading, very little
research was found that differentiated between students who are EO and students who are ELL.
In fact, none of the research reviewed how to make mini-lessons more accessible to ELL
students, or even mentioned Structured Instruction Observation Protocol (SIOP) strategies.

The SIOP model was the result of seven years of research and is comprised of 30
teaching strategies, including activating previous knowledge, and purposeful academic
vocabulary. These research based strategies proved to be beneficial to English language learners
(Echevarria, Short, & Powers, 2004). While this research has been integrated into professional
development opportunities for teachers, such as Teaching American History (TAH) cohorts, they
haven't been fully integrated into any Reader's Workshop format.

Methodology

Comparing EO and ELL achievement and attitudes was done by comparing test scores and survey responses. The participants in this study were students in a fifth-grade classroom. The methods used for measurement of the study came from strategies already used in the classroom by the teacher.

Site and Participants

The school in which the study took place serviced over 550 students with 19 general education teachers and three specialized-field teachers (resource specialists, physical education, and English language development.) The school is a neighborhood school, one of three K-8 schools in the district, and is the designated over-flow school. This means that when new students comes to the district, they are directed to the district's over-flow school. Participants included 32 fifth-graders, including 17 boys (53% of participants) and 15 girls (47% of participants.)

The participating classroom's roster include students who face many challenges. Some students have documented learning disabilities and have individual education plans (IEP). Some students do quality for free or reduced lunch. Some students are socioeconomically disadvantaged, and others, still, are English Language Learners.

Of these students three have Individual Education Plans and receive extra instruction with a resource specialist outside of the classroom for at least 45 minutes a day. Of these participants, ten were English language learners. Within the population of students one was classified as homeless, and 16 students lived with one or more unemployed parent or guardian, exactly 50% of the classroom population.

Being the over-flow school is difficult on both students and teachers because less than one-third of the study participants were native to the area and no less than 20% of the students were added to the participating classroom's roster in the third trimester. These students were chosen as the sample because they were enrolled in the participating classroom, and all of the data-gathering procedures were used to direct instruction.

Access and Permissions

Because all of the data collected was part of the usual data collected by the school to drive instruction, there was no need for special permission. The survey that measured student attitude was an anonymous online survey and made on www.surveymonkey.com. To measure student achievement a district-wide benchmark that constitutes 50% of the students' overall grade was used.

Data Gathering Strategies

The participants were all enrolled in a single classroom in which the teacher used anonymous surveys to measure student attitudes towards reading, and district-wide benchmarks to measure student achievement in reading comprehension. Four identical surveys were created on surveymonkey.com. One was given to EO students at the beginning of the third trimester before the workshop-style instruction. The second was given to ELL students, also at the beginning of the third trimester. The same surveys were given to both EO and ELL students at the end of the third trimester. The purpose of having four duplicate surveys was to separate responses between EO and ELL students, as well as determine the students' attitudes about reading before and after the workshop instruction. The survey was completed online to ensure anonymity. Students were made aware of the anonymity to encourage honesty in responses.

This online survey asked questions about their attitudes toward reading and their attitudes toward themselves as readers. In order to compare EO and ELL students, two identical quizzes were created. EO students were given the link to one quiz, while the ELL students were given the link to another quiz. The survey information was gathered as part of the classroom data to guide instruction for the teacher. All of the methods used for this research were part of the on-going data analysis the classroom teacher used to measure growth and achievement.

The researcher used district-wide trimester benchmark assessments to measure participants' achievement. These benchmarks were created by teachers in the district.

For the first and second trimesters, participants were given instruction using a whole-book instruction strategy. Participants practiced reading comprehension strategies using one book that the entire class read together. Students completed trimester benchmarks as measurement for reading comprehension. Students also completed the online anonymous survey that asked questions about their reading habits and attitudes. Questions asked how many books students have read during the trimester, and if they feel they are a good reader.

During the third trimester the teacher used workshop-style instruction to teach students reading comprehension strategies. Students also completed a district-wide benchmark and an exact replica of the online survey that asked the same questions.

Data Analysis Approach

The first, second, and third trimester benchmarks were divided into different reading standards. The researcher focused on the reading comprehension standards. Scores from all three trimesters were compared for each student to determine if there was either an increase or decrease in the scores for these strands. The researcher drew conclusions about the trends found

in the data. If there was an increase in correct answers in these sections, the conclusion could be drawn that the workshop-style instruction improved student achievement in reading comprehension.

The survey asked questions with qualitative answers, such as a scale with values from 1 to 5 to correspond with the degree in which students agreed or disagreed with statements like "I am a good reader," and "I enjoy reading." The survey also gave students the opportunities to choose genres of books that they enjoy reading. The assumption was that the diversity of a students' reading habit could say something about the students' reading habits.

Both pieces of data were compared as a pre and post-test. Students completed the benchmarks and survey before the workshop-style instruction and after the workshop-style instruction in a classic AB design. The results of the test were split according to the standards that each section of the benchmark assessed. The benchmark divided the standards into Reading 1.0, Reading 2.0, and Reading 3.0. Other standards were addressed but not used in this study. Reading 1.0 deals with vocabulary, Reading 2.0 deals with reading comprehension, and Reading 3.0 deals with the students' ability to respond to literature. These results were compared as pretest and post-test in a *t-test* to determine the *p* value. This analysis determined whether or not there was a statistically significant difference in students' achievement of the language arts standards.

While the benchmark test measured student achievement, the survey results measured student attitudes. Each question was compared before and after the treatment and conclusions were drawn from the differences.

The survey was broken into ten questions, and each question had several response options. Each response was given a code to help the researcher tally the responses of individual respondents.

Ethical Standards

This study adheres to Ethical Standards in Human Subjects Research of the American Psychological Association (Publication Manual of the American Psychological Association, 2009). Additionally, the project was reviewed and approved by the Dominican University of California Institutional Review Board.

Results

The researcher collected all of the data and compared all sets through a *t-test*. The data included numeric codes for survey respondents. The higher the numeric value was interpreted as a more positive attitude. The only statistically significant improvement in student achievement was found in the trimester assessment questions which measured the reading standard related to vocabulary. The survey results suggested the Reader's Workshop style of instruction did significantly improve student attitudes, but the improvement was not equal between the two respondent groups. Although the statistical significance was not as hypothesized, there was some improvement in both student achievement in reading and students' attitudes about themselves as readers.

Description of Site, Individuals, and Data

The survey included 21 EO respondents and 8 ELL respondents. In a few surveys questions were left unanswered. Although there were 30-34 students enrolled in the participating classroom the population had an amount of transient students that left only 29 students remaining who participated in both the pre- and post-surveys and the two trimester benchmarks.

The intervention included the aforementioned characteristics of a traditional Reader's Workshop. Every day started with a mini-lesson centered on a standards-based skill-specific teaching point. This lesson consisted of the statement of the objective, namely, the teaching point of the day. Examples were given to students in the form of PowerPoint presentations, poetry examples, or picture book examples. Students participated in lessons during the student engagement part of the mini-lesson. During student engagement, participants of the study responded using hand-signals, electronic voting clickers, or classroom discussions. After the mini-lesson students were given at least 20 minutes to read a text of their choice. During this

individual reading time students practiced the teaching point using post-its, graphic organizers, and reading journals. After the students practiced the skill on their own, the class gathered together again and students shared their new understanding, summaries, and other insights during closing and classroom discussion.

Student Achievement. The data gathered consisted of a district-wide benchmark and online surveys. The results of the benchmark exam were broken down according to standards. Different questions addressed different standards. The researcher focused on questions that measured the 5th grade standards related to reading1.0, 2.0, and 3.0. The reading 1.0 standard measures the vocabulary and fluency a student needs to accomplish in the fifth grade. The reading 2.0 standard measures how successful a student comprehends what is read. The reading 3.0 standard measures a student's ability to effectively respond to literature.

The trimester benchmarks were compared by standard. The researcher focused on the reading standards because part of the hypothesis of this study was that reading workshop will improve student achievement in reading achievement. The following paragraphs break down the percentage of achievement, found by dividing the number of correct responses on the benchmark addressing the reading standards assessed by the total possible correct responses.

The percentages of achievement for each student before and after the use of workshop-style instruction were compared with a *t-test*. For reading standard 1.0, vocabulary, the overall p-value was calculated at 0.000674 and the t-value was +3.88. It appears that the workshop style instruction resulted in a significant increase in correct responses on reading standard 1.0, vocabulary. There was a statistical significance in both the EO and ELL group. The *p* value for

the EO group was 0.41925 and the *t* value was +2.2. The *p* value for the ELL group was 0.003119 and the *t* value was +4.41.

Although there was a statistically significant increase in reading standard 1.0, vocabulary, there was no statistically significant change in the scores for reading standard 2.0, the standard that measure reading comprehension. The *p* value is 0.515289 and the *t* value was +0.66. There was no statistically significant change for either the EO or the ELL groups. The *p* value for the EO group was 0.775324 and the *t* value was -0.29. The p value for the ELL group was 0.083130 and the *t* value was +2.02.

Reading 3.0 evaluated a student's ability to write appropriate responses to literature. The overall *p* value was 0.090640 and he overall *t* value was +1.76. There was no statistical significant difference in either EO or ELL groups. The EO *p* value was 0.370444 and the *t* value was +0.92. The *p* value for the ELL group was 0.134875 and the *t* value was +1.69.

Student Attitude. The second part of this research asked about student attitude. This was measured by an anonymous survey. The survey asked ten questions with a variety of response options. Most options were coded with a numerical value, and those values were compared through a *t-test* to determine if the differences between the responses were statistically significant.

The first question asked whether or not students were currently reading a book for pleasure. The question had only two responses, yes and no. Before the implementation of the Reader's Workshop style of instruction twelve EO and nine ELL respondents replied yes, and after the implementation nine EO and twelve ELL respondents replied no.

The second question of the survey asked respondents how many books they had read during the academic trimester. The response options ranged from 0-7 or more books. Table 1 shows the responses. The responses are broken into EO respondents and ELL respondents. The p value for EO respondents was 0.17522 and the t value was +1.38. There was no statistically significant increase in the books EO students reported to read after the Reader's Workshop style instruction was implemented. The p value for ELL respondents was 0.450003 and the t value was +0.8, also not statistically significant increase between the trimesters.

Table 1

Number of Books Read During the Trimester

Response	EO pre	EO post	ELL pre	ELL post
0 books	1	0	0	0
1 books	4	3	0	0
2 books	8	5	2	1
3 books	4	5	2	2
4 books	0	1	3	4
5 books	1	3	1	1
6 books	2	2	0	0
7 or more books	7	2	0	0

The third question asked how many AR points they earned during the trimester. There was no statistical significance after the implementation for EO respondents with a p value of

0.205044 and the *t* value was +1.31. However, the *p* value for the ELL respondents did show a statistical significant with a *p* value of 0.045421 and the *t* value was -2.43.

The fourth question asked respondents to choose the types of genres they enjoyed reading. The response choices included fantasy, realistic fiction, historical fiction, and traditional literature (such as folk tales, legends, fables, fairy tales, tall tales, and myths.) Other choices included informational text, autobiography/biography, and poetry. Before the implementation of the Reader's Workshop EO respondents chose a total of 30 genres. After the implementation EO respondents chose a total of 41 genres. ELL respondents chose 16 genres before the implementation and 14 genres after the implementation. The number of responses were compared through a *t-test* and the EO *p* value was 0.165338 and the *t* value was +1.44. The ELL *p* value was 0.68707 and the *t* value was -0.42. None of the values demonstrated any difference that might be statistically significant.

The fifth question asked respondents to choose the number of days they read for thirty minutes or more through the trimester. The trimester before the Reader's Workshop style of instruction EO respondents reported reading for 99 days. After the implementation, EO respondents reported reading for 73 days. ELL respondents reported reading for 27 days for both trimesters. There was no statically significant change in the respondents for either the EO or the ELL group. The *p* value for the EO group was 0.175252 and the *t* value was +1.38. The ELL *p* value was 0.450003 and the *t* value +0.8. Although there was no statistically significant increase in the number of books read, both *t* values increased.

The sixth question asked respondents to choose the statement that was most true for them and regarded how much they enjoyed reading. Table 2 shows the difference response options

available and the number value the researcher used to quantify the information. The lower the

value, the lower the students' enjoyment of reading.

Table 2

Student Attitudes about Enjoying Reading

Response Option	Number Value
I hate reading	1
I dislike reading	2
I only like to read some things	3
I like to read most things	4
I love to read some things	5
I love to read most things	6
I love reading	7

The EO respondents with a *p* value of 0.003744 and the *t* value was +3.28. Although

there was an increase in EO respondents, there was not a statistically significant increase in ELL

respondents. The *p* value for the ELL respondents was 0.687077 the *t* value was +0.8.

The seventh question asked respondents choose a statement that best reflected their belief

about how hard reading. Table 3 shows the response options and the value assigned to each

response. The numerical values were used to compare the data.

Table 3

Response Options	Value

Reading is always hard for me and/or I hate to read	1
Reading is usually hard for me and/or I don't like to read	2
Reading can be hard for me, but I like to read some things	3
Reading can be hard for me, but I like to read most things	4
Reading can be hard for me, but I still love to read	5
Reading is always hard for me and/or I hate to read	6
Reading isn't hard for me, but I only like to read some things	7
Reading isn't hard for me, and I usually like to read	8
Reading is easy for me and I love to read	9

There was not a statistically significant increase in the value of responses from either EO or ELL responses. Although there was no significant change, the *p* values indicated that there was closer to a statistical significance for the ELL respondents since the *p* value of the EO was 0.8435000 and the *t* value -0.2. The *p* value for the ELL was 0.129117 and the *t* value was +1.72. There was an 84% chance that the Reader's Workshop style instruction had no effect on the EO while there was only 13% chance that the same was true for the ELL.

The eighth question asked respondents to choose a statement that was most true for them regarding how much they understood what they read both in and out of the classroom. Table 4 shows the different response choices and the value assigned to the responses. The lower the value the lower the respondent's attitude about being able to understand what is read. There was no statistical significance for EO or ELL students. The *p* value for EO respondents was 0.288672 and the *t* value was +1.09.The *p* value for ELL was 0.599421 and the *t* value was -0.55. There

was no statistical significance between the two trimesters before and after the implementation of

the Reader's Workshop style of instruction between EO and ELL students.

Table 4

Response Options	Value
I almost never understand what I read	1
I only understand what I read sometimes, or if the text is easy	2
I usually understand what I read	3
I almost always understand what I read	4
I always understand what I read	5

The ninth question asked respondents to answer how frequently they saw their "Mental

TV," which referred to their ability for visualization during reading. There was a statistically

significant increase of EO respondents who believed they were skilled in their ability to visualize

during reading with a *p* value of 0.003576 the *t* value was +3.3. There was no statistical

significance in ELL respondents with a *p* value of 0.450003 and the *t* value was +0.8. Table 5

shows the response options and the values assigned to the responses.

Table 5

Response Options	Value
Never	1
Sometimes	2
Usually	3
Almost always	4
Always	5

The tenth question asked respondents to choose a response that best represented their abilities as readers. There was a statistical significance for both EO and ELL. The p value for the EO respondents was 0.025702 and the t value was +2.41. The ELL respondents had a p value of 0.048159 and a t value of +4.41. Table 6 shows the response options and the value assigned to each response.

Table 6

Response Options	Value
I can't read	1
I am not a good reader	2
I am an okay reader	3
I am a good reader	4
I am an above average reader	5
I am a great reader	6

Analysis of Themes and/or Inferential Analysis

In both groups student achievement increased in vocabulary achievement. This may be attributed to the experience students had using academic vocabulary during the student engagement section of the mini-lessons such as cause and effect, sequence, and fact and opinion. Students also had many opportunities to discuss their reading with peers. These opportunities also gave students the chance to share their understanding of different words.

Although the number of AR points reported increased after the implementation (although not a statistically significant increase except for the ELL respondents) the number of books decreased for EO students and stayed the same for the ELL students. This could be because students were reading more difficult books that yielded higher AR points. Another explanation

could be that the survey responses were completed at the end of the school year. There were no assignments for book reports or requirements for AR point completion at time the responses were collected.

The number of genres may not have increased with statistical significance because students chose to continue reading the types of books they liked. The higher number of genres chosen for the EO respondents could suggest that EO students broadened the types of books they read.

The only survey question that yielded a statistically significant increase for both EO and ELL respondents was the question regarding student attitudes about themselves as skilled readers. More students had a higher opinion of themselves as readers after the implementation of the Reader's Workshop style of instruction.

Discussion

Statement of Support/Non-support of Hypothesis

This research asked if Reader's Workshop style of instruction would improve student achievement and student attitude. The research also asked that if there was an overall statistically significant different in achievement and attitude, would the statistical significance be the same for both EO and ELL groups of students? The data suggests that the only statistically significant increase in student achievement was for vocabulary.

There was no statistical significance between the two trimester benchmarks in the reading standard 2.0 for reading comprehension. Although there was no statistical significance, the *p* values suggest a nearly statistical significant increase in student achievement for reading comprehension in the ELL group. The *p* value was only 0.03313 away from being statistically significant for the ELL group.

Student attitudes seemed to universally increase, but there was only a statistically significant increase for both EO and ELL groups in relation to their attitudes about themselves as skilled readers. More students thought of themselves as more skilled readers after the implementation than before.

Although there was no other category in which both EO and ELL respondents' responses suggested an increase in positive attitudes, there were several categories in which there was statistical significance in either one group or the other. There was a statistically significant increase in AR points ELL students reported in the trimester after the implementation of the Reader's Workshop style of instruction.

Although there was no statistically significant increase in ELL students' attitudes about themselves as readers who enjoy reading, there was a statistically significant increase in EO students according to their survey responses. The average score, using the numeric code, for the EO group increased from 55.0265% before implementation to 73.545% after implementation. The ELL percentage increased from 48.6111% to 54.1667% after the implementation.

Comparison of Findings with Existing Studies

Although many of the studies suggested that student achievement increased significantly in reading comprehension, this study showed no evidence that achievement in reading comprehension for either EO or ELL students was significantly impacted.

Limitations of the Study

This study reflected the change in academic achievement and student attitudes in one classroom over a single academic year. The students who participated were given instruction by a single teacher who was a student in the Reading Workshop style of instruction. The sample included fewer than thirty students.

Implications for Future Research

Other studies could focus solely on reading vocabulary, reading comprehension, and students' ability to respond appropriately to literature. During the course of this study the participating district's curriculum moved from focusing on State standards to Common Core State Standards. Future studies might want to concentrate on standards centered current common core curriculum. Future studies might want to also focus on the difference between results in a classroom led by a teacher with more mastery of the instruction style.

Overall Significance of the Study

In nearly every category for both assessment and achievement both the EO and ELL groups' *t* values increased. Sometimes the increase was nominal, and in others the increase was statistically significant. This may suggest that Reader's Workshop style of instruction, with a teacher who has mastered the style, could increase both student achievement and student assessment.

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Appendix

Trimester Benchmark Percentages

This data was the overall compilation of all student scores. The numeric scores were converted into percentages to create a baseline for comparison. These percentages were compared through a two-tailed *t-test* to determine the p and t values. The data was then broken down into two categories, EO and ELL. Each category's percentages were also ran through a two-tailed *t-test* to determine the p and t values.

Overall Percentage Scores

Trimester 1	Trimester 3	Trimester 1	Trimester 3	Trimester 1	Trimester 3
R1.0%	R1.0%	R2.0%	R2.0%	R3.0%	R3.0%
0.727273	1	0.875	0.75	0.833333	0.909091
0.818182	0.727273	0.75	0.75	0.666667	0.8
0	0.181818	0.25	0.125	0.333333	0.4
0.454545	0.727273	0.75	0.25	0.333333	0.2
0.454545	0.090909	0.625	0.625	0.5	0.8
0.727273	0.545455	0.75	0.625	0.333333	0.6
0.272727	0.636364	0.75	0.75	0.666667	0.6
0.363636	0.818182	0.375	0.5	1	0.8
0.454545	0.636364	0.875	0.625	0.666667	0.8
0.181818	0.636364	0.25	0.625	0.5	0.8
0.090909	0.727273	0.25	0.125	0.166667	0.8
0.272727	0.545455	0.75	0.875	1	1

0.454545	0.727273	0.375	0.625	0.666667	0.8
0.454545	0.545455	0.625	0.375	0.5	0.6
0.272727	0.272727	0.375	0.25	0.333333	0.4
0.636364	0.636364	0.125	0.125	0.166667	0.2
0.454545	0.272727	0	0.75	0.5	0.6
0.363636	0.454545	0.125	0.75	0.333333	0.2
0.363636	0.363636	0.125	0.375	0.333333	0.6
0.545455	0.545455	0.5	1	0.833333	0.2
0.272727	0.727273	0.625	0.5	0.666667	0.4
0.727273	0.818182	0.875	0.375	0.666667	0.6
0.272727	0.545455	0.25	0.375	0.166667	0.4
0.454545	0.818182	0.25	0.375	0.5	0.8
0.454545	0.909091	0.375	0.375	0.333333	0.6
0.272727	0.727273	0.5	0.5	0.333333	0.6

English Only Percentage Scores					
Trimester 1	Trimester 3	Trimester 1	Trimester 3	Trimester 1	Trimester 3
R1.0%	R1.0%	R2.0%	R2.0%	R3.0%	R3.0%
0.727273	1	0.875	0.75	0.833333	0.909091
0.818182	0.727273	0.75	0.75	0.666667	0.8
0	0.181818	0.25	0.125	0.333333	0.4
0.454545	0.727273	0.75	0.25	0.333333	0.2
0.454545	0.090909	0.625	0.625	0.5	0.8
0.727273	0.545455	0.75	0.625	0.333333	0.6

0.272727	0.636364	0.75	0.75	0.666667	0.6
0.454545	0.636364	0.875	0.625	0.666667	0.8
0.272727	0.545455	0.75	0.875	1	1
0.454545	0.545455	0.625	0.375	0.5	0.6
0.272727	0.272727	0.375	0.25	0.333333	0.4
0.454545	0.272727	0	0.75	0.5	0.6
0.363636	0.363636	0.125	0.375	0.333333	0.6
0.545455	0.545455	0.5	1	0.833333	0.2
0.272727	0.727273	0.625	0.5	0.666667	0.4
0.727273	0.818182	0.875	0.375	0.666667	0.6
0.454545	0.818182	0.25	0.375	0.5	0.8
0.454545	0.909091	0.375	0.375	0.333333	0.6

English Language Learner Percentage Scores

Trimester 1	Trimester 3	Trimester 1	Trimester 3	Trimester 1	Trimester 3
R1.0%	R1.0%	R2.0%	R2.0%	R3.0%	R3.0%
0.363636364	0.818181818	0.375	0.5	1	0.8
0.181818182	0.636363636	0.25	0.625	0.5	0.8
0.090909091	0.727272727	0.25	0.125	0.166666667	0.8
0.454545455	0.727272727	0.375	0.625	0.666666667	0.8
0.636363636	0.636363636	0.125	0.125	0.166666667	0.2
0.363636364	0.454545455	0.125	0.75	0.333333333	0.2
0.272727273	0.545454545	0.25	0.375	0.166666667	0.4

0.272727273   0.727272727   0.5   0.5   0.333333333   0.6

Statistical Tables

Overall Reading 1.0, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	26	26	52
ΣX	15.6363636	10.8181818	26.4545454
ΣX^2	10.6446280	5.49586777	16.1404958
SS	1.2409	0.9946	2.682
mean	0.6014	0.4161	0.5087

Results

$Mean_a - Mean_b$	t	df			
0.1853	+3.88	25	P	one-tailed	0.000337
				two-tailed	0.000674

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df			
---	---	---	P	one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	0.6014	± 0.09	± 0.1219	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	0.4161	± 0.0806	± 0.1091	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.1853	± 0.0983	± 0.1331	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

EO Reading 1.0, , the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	18	18	36
ΣX	10.3636363	8.18181818	18.5454545
ΣX^2	7.07438016	4.42975206	11.5041322
SS	1.1074	0.7107	1.9504
mean	0.5758	0.4545	0.5152

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.0209625
0.1212	+2.2	17		two-tailed	0.041925

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	0.5758	± 0.1269	± 0.1745	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	0.4545	± 0.1017	± 0.1398	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.1212	± 0.116	± 0.1595	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

ELL Reading 1.0 , the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	5.27272727	2.63636363	7.90909090
ΣX^2	3.57024793	1.06611570	4.63636363
SS	0.095	0.1973	0.7268
mean	0.6591	0.3295	0.4943

Results

$Mean_a - Mean_b$	t	df	P		
0.3295	+4.41	7		one-tailed	0.0015595
				two-tailed	0.003119

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	0.6591	± 0.0972	± 0.1442	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	0.3295	± 0.1401	± 0.2078	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.3295	± 0.1764	± 0.2617	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

Overall Reading 2.0, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	26	26	52
ΣX	13.375	12.375	25.75
ΣX^2	8.296875	7.703125	16
SS	1.4165	1.8131	3.2488
mean	0.5144	0.476	0.4952

Results

$Mean_a - Mean_b$	t	df	P		
0.0385	+0.66	25		one-tailed	0.2576445
				two-tailed	0.515289

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

	Observed	Confidence Intervals		
		0.95	0.99	
$Mean_a$	0.5144	± 0.0962	± 0.1302	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	0.476	± 0.1088	± 0.1474	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.0385	± 0.1202	± 0.1627	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
	Correlated Samples			

EO Reading 2.0, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	18	18	36
ΣX	9.75	10.125	19.875
ΣX^2	6.28125	6.953125	13.234375
SS	1	1.2578	2.2617
mean	0.5417	0.5625	0.5521

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.387662
-0.0208	-0.29	17		two-tailed	0.775324

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

	Observed	Confidence Intervals	
		0.95	0.99
$Mean_a$	0.5417	± 0.1206	± 0.1658
$Mean_b$	0.5625	± 0.1353	± 0.1859
$Mean_a - Mean_b$ [Assuming equal sample variances.]	-0.0208	± 0.1526	± 0.2098
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---
	Correlated Samples		

For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.

ELL Reading 2.0, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	3.625	2.25	5.875
ΣX^2	2.015625	0.75	2.765625
SS	0.373	0.1172	0.6084
mean	0.4531	0.2813	0.3672

Results

$Mean_a - Mean_b$	t	df	P		
0.1719	+2.02	7		one-tailed	0.041565
				two-tailed	0.083130

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals	
	Observed	0.95	0.99
$Mean_a$	0.4531	± 0.1926	± 0.2857
$Mean_b$	0.2813	± 0.108	± 0.1601
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.1719	± 0.2005	± 0.2974
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---
		Correlated Samples	

For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.

Overall Reading 3.0, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	26	26	52
ΣX	15.5090909	13.3333333	28.8424242
ΣX^2	10.6264462	8.27777777	18.9042240
SS	1.3752	1.4402	2.9064
mean	0.5965	0.5128	0.5547

Results

$Mean_a - Mean_b$	t	df	P		
0.0837	+1.76	25		one-tailed	0.04532
				two-tailed	0.090640

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

	Observed	Confidence Intervals	
		0.95	0.99
$Mean_a$	0.5965	± 0.0948	± 0.1283
$Mean_b$	0.5128	± 0.097	± 0.1313
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.0837	± 0.0981	± 0.1328
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---
	Correlated Samples		

For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.

EO Reading 3.0, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	18	18	36
ΣX	10.9090909	9.99999999	20.9090909
ΣX^2	7.46644628	6.27777777	13.7442240
SS	0.8549	0.7222	1.6001
mean	0.6061	0.5556	0.5808

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.185222
0.0505	+0.92	17		two-tailed	0.370444

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

	Observed	Confidence Intervals		
		0.95	0.99	
$Mean_a$	0.6061	± 0.1115	± 0.1533	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	0.5556	± 0.1025	± 0.1409	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.0505	± 0.1155	± 0.1587	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
	Correlated Samples			

ELL Reading 3.0, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	4.60000000	3.33333333	7.93333333
ΣX^2	3.16000000	2.00000000	5.16000000
SS	0.515	0.6111	1.2264
mean	0.575	0.4167	0.4958

Results

$Mean_a - Mean_b$	t	df	P		
0.1583	+1.69	7		one-tailed	0.0674375
				two-tailed	0.134875

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	0.575	± 0.2263	± 0.3356	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	0.4167	± 0.2465	± 0.3656	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.1583	± 0.2214	± 0.3283	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

# of Books EO – Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	21	21	42
ΣX	73	56	129
ΣX^2	329	218	547
SS	75.2381	68.6667	150.7857
mean	3.4762	2.6667	3.0714

Results

$Mean_a - Mean_b$	t	df	P		
0.8095	+1.38	40		one-tailed	0.087626
				two-tailed	0.175252

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
20	20	1.1	0.416664

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
0.8095	1.38	39.92		one-tailed	0.087171
				two-tailed	0.174342

		Confidence Intervals	
	Observed	0.95	0.99
$Mean_a$	3.4762	± 0.8846	± 1.2063
$Mean_b$	2.6667	± 0.8451	± 1.1524
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.8095	± 1.1824	± 1.5804
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	0.8095	± 1.1824	± 1.5804
	Independent Samples		

For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.

# of Books – ELL Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	29	27	56
ΣX^2	111	99	210
SS	5.875	7.875	14
mean	3.625	3.375	3.5

Results

$Mean_a - Mean_b$	t	df	P		
0.25	+0.8	7		one-tailed	0.2250015
				two-tailed	0.450003

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

	Observed	Confidence Intervals		
		0.95	0.99	
$Mean_a$	3.625	± 0.7644	± 1.1336	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	3.375	± 0.885	± 1.3125	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.25	± 0.7396	± 1.0969	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

# of AR Points – EO Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	21	21	42
ΣX	37	26	63
ΣX^2	153	94	247
SS	87.8095	61.8095	152.5
mean	1.7619	1.2381	1.5

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.102522
0.5238	+1.31	20		two-tailed	0.205044

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

	Observed	Confidence Intervals 0.95	Confidence Intervals 0.99
$Mean_a$	1.7619	± 0.9556	± 1.3031
$Mean_b$	1.2381	± 0.8018	± 1.0933
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.5238	± 0.8362	± 1.1403
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---
	Correlated Samples		

For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.

# of AR Points – ELL Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	6	31	37
ΣX^2	26	253	279
SS	21.5	132.875	193.4375
mean	0.75	3.875	2.3125

Results

$Mean_a - Mean_b$	t	df	P		
-3.125	-2.43	7		one-tailed	0.0227105
				two-tailed	0.045421

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	0.75	± 1.4623	± 2.1687	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	3.875	± 3.6353	± 5.3913	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	-3.125	± 3.0393	± 4.5074	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

# of Genres - EO Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	21	21	42
ΣX	41	30	71
ΣX^2	115	56	171
SS	34.9524	13.1429	50.9762
mean	1.9524	1.4286	1.6905

Results

$Mean_a - Mean_b$	t	df	P		
0.5238	+1.44	20		one-tailed	0.082669
				two-tailed	0.165338

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	1.9524	± 0.6029	± 0.8222	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	1.4286	± 0.3697	± 0.5042	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.5238	± 0.758	± 1.0336	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

# of Genres - ELL Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	14	16	30
ΣX^2	32	40	72
SS	7.5	8	15.75
mean	1.75	2	1.875

Results

$Mean_a - Mean_b$	t	df	P		
-0.25	-0.42	7		one-tailed	0.3435385
				two-tailed	0.687077

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	1.75	± 0.8637	± 1.2809	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	2	± 0.892	± 1.3229	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	-0.25	± 1.3926	± 2.0653	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

Like - EO Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	21	21	42
ΣX	139	104	243
ΣX^2	967	584	1551
SS	46.9524	68.9524	145.0714
mean	6.619	4.9524	5.7857

Results

Mean$_a$—Mean$_b$	t	df		P	
1.6667	+3.28	20		one-tailed	0.001872
				two-tailed	0.003744

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df$_1$	df$_2$	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

Mean$_a$—Mean$_b$	t	df		P	
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
Mean$_a$	6.619	± 0.6988	± 0.9529	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
Mean$_b$	4.9524	± 0.8468	± 1.1548	
Mean$_a$—Mean$_b$ [Assuming equal sample variances.]	1.6667	± 1.0631	± 1.4497	
Mean$_a$—Mean$_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

Like - ELL Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	39	35	74
ΣX^2	205	159	364
SS	14.875	5.875	21.75
mean	4.875	4.375	4.625

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.2250015
0.5	+0.8	7		two-tailed	0.450003

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

	Observed	Confidence Intervals		
		0.95	0.99	
$Mean_a$	4.875	± 1.2163	± 1.8039	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	4.375	± 0.7644	± 1.1336	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.5	± 1.4792	± 2.1937	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
	Correlated Samples			

Hard - EO Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	21	21	42
ΣX	117	120	237
ΣX^2	773	792	1565
SS	121.1429	106.2857	227.6429
mean	5.5714	5.7143	5.6429

Results

$Mean_a - Mean_b$	t	df	P		
-0.1429	-0.2	20		one-tailed	0.42175
				two-tailed	0.843500

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	5.5714	± 1.1225	± 1.5306	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	5.7143	± 1.0514	± 1.4337	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	-0.1429	± 1.4657	± 1.9987	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

Hard - ELL Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	51	41	92
ΣX^2	359	239	598
SS	33.875	28.875	69
mean	6.375	5.125	5.75

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.0645585
1.25	+1.72	7		two-tailed	0.129117

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	6.375	± 1.8355	± 2.7222	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	5.125	± 1.6946	± 2.5132	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	1.25	± 1.7129	± 2.5403	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

Understand - EO Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	21	21	42
ΣX	80	71	151
ΣX^2	324	271	595
SS	19.2381	30.9524	52.119
mean	3.8095	3.381	3.5952

Results

Mean$_a$—Mean$_b$	t	df	P		
0.4286	+1.09	20		one-tailed	0.144336
				two-tailed	0.288672

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df$_1$	df$_2$	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

Mean$_a$—Mean$_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
Mean$_a$	3.8095	± 0.4473	± 0.61	
Mean$_b$	3.381	± 0.5674	± 0.7737	
Mean$_a$—Mean$_b$ [Assuming equal sample variances.]	0.4286	± 0.8231	± 1.1224	
Mean$_a$—Mean$_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.

Understand – ELL Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	25	27	52
ΣX^2	81	97	178
SS	2.875	5.875	9
mean	3.125	3.375	3.25

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.2997105
-0.25	-0.55	7		two-tailed	0.599421

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

	Observed	Confidence Intervals		For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
		0.95	0.99	
$Mean_a$	3.125	± 0.5347	± 0.793	
$Mean_b$	3.375	± 0.7644	± 1.1336	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	-0.25	± 1.0695	± 1.5861	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
	Correlated Samples			

Ability to see the "Mental TV" – EO Data, the following is an image taken from

www.vassar.net.

Data Summary

	A	B	Total
n	21	21	42
ΣX	69	52	121
ΣX^2	249	146	395
SS	22.2857	17.2381	46.4048
mean	3.2857	2.4762	2.881

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.001788
0.8095	+3.3	20		two-tailed	0.003576

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

	Observed	Confidence Intervals		
		0.95	0.99	
$Mean_a$	3.2857	± 0.4814	± 0.6565	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	2.4762	± 0.4234	± 0.5774	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.8095	± 0.5123	± 0.6986	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
	Correlated Samples			

Ability to see "Mental TV" – ELL Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	27	25	52
ΣX^2	95	81	176
SS	3.875	2.875	7
mean	3.375	3.125	3.25

Results

$Mean_a - Mean_b$	t	df	P		
0.25	+0.8	7		one-tailed	0.2250015
				two-tailed	0.450003

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	3.375	± 0.6208	± 0.9207	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	3.125	± 0.5347	± 0.793	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.25	± 0.7396	± 1.0969	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

Attitudes about Skill – EO Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	21	21	42
ΣX	89	73	162
ΣX^2	403	275	678
SS	25.8095	21.2381	53.1429
mean	4.2381	3.4762	3.8571

Results

$Mean_a - Mean_b$	t	df	P		
0.7619	+2.41	20		one-tailed	0.012851
				two-tailed	0.025702

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P		
---	---	---		one-tailed	not applicable
				two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	4.2381	± 0.5181	± 0.7065	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	3.4762	± 0.47	± 0.6409	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.7619	± 0.6594	± 0.8992	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		

Attitudes about Skill – ELL Data, the following is an image taken from www.vassar.net.

Data Summary

	A	B	Total
n	8	8	16
ΣX	32	26	58
ΣX^2	134	90	224
SS	6	5.5	13.75
mean	4	3.25	3.625

Results

$Mean_a - Mean_b$	t	df	P	one-tailed	0.0240845
0.75	+2.39	7		two-tailed	0.048169

For independent samples, these results pertain to the "usual" t-test, which assumes that the two samples have equal variances.

F-Test for the Significance of the Difference between the Variances of the Two Samples

df_1	df_2	F	P
---	---	---	not applicable

[Applicable only to independent samples.]
P>.05 indicates no significant difference detected between the variances of the two samples.

t-Test Assuming Unequal Sample Variances
[Applicable only to independent samples.]

$Mean_a - Mean_b$	t	df	P	one-tailed	not applicable
---	---	---		two-tailed	not applicable

		Confidence Intervals		
	Observed	0.95	0.99	
$Mean_a$	4	± 0.7725	± 1.1456	For purposes of significance tests and calculation of confidence intervals, values of df associated with the unequal-variance condition are rounded to the nearest integer.
$Mean_b$	3.25	± 0.7396	± 1.0969	
$Mean_a - Mean_b$ [Assuming equal sample variances.]	0.75	± 0.7396	± 1.0969	
$Mean_a - Mean_b$ [Assuming unequal sample variances.]	---	± ---	± ---	
		Correlated Samples		