

## WWC Review of the Report “Improving Reading Comprehension and Social Studies Knowledge in Middle School”<sup>1</sup>

The findings from this review do not reflect the full body of research evidence on Promoting Acceleration of Comprehension and Content Through Text (PACT).

### What is this study about?

The study examined the effects of the instructional practice *Promoting Acceleration of Comprehension and Content Through Text (PACT)*, an approach that aims to improve social studies content knowledge and reading comprehension. This study took place in two middle schools in a near-urban district in Texas.

Study authors conducted random assignment in two stages. First, eighth-grade students were randomly assigned to 27 social studies classes taught by five teachers. Then, each teacher’s classes were randomly assigned to either the intervention or comparison condition, such that each teacher taught intervention and comparison classrooms. A total of 16 classes were assigned to the intervention condition and 11 classes to the comparison condition—all of which were included in the analysis. The analysis sample contained 203 to 218 students in the intervention condition and 119 to 126 students in the comparison condition, depending on the outcome.

In teachers’ intervention classrooms, they implemented the five components of *PACT* during three distinct 10-day text-based instructional units (Colonial America, Road to Revolution, and Revolutionary War). In teachers’ comparison classrooms, they provided the same social studies content as in their intervention classrooms but did not explicitly use the *PACT* components (though there were some elements of the *PACT* intervention that were observed in the comparison classrooms as part of typical teaching practice).

The study assessed the effectiveness of *PACT* by comparing the general reading comprehension, social studies reading comprehension, and social studies knowledge of students in the intervention and comparison groups at the end of three instructional units.

### Features of *Promoting Acceleration of Comprehension and Content Through Text (PACT)*

*PACT* is an instructional practice that includes five interrelated components that teachers use over the course of a 10-day unit:

- **Comprehension Canopy:** An overarching question is introduced on day one and reviewed each day as new knowledge is gained.
- **Essential Words:** Four to five key terms are introduced and then reviewed throughout the unit.
- **Knowledge Acquisition:** Each day, students read in various settings (whole class, small group, paired, and individually) and record notes from their readings and teacher presentations in a log.
- **Team Based Learning (TBL) Comprehension Check:** Students complete regular multiple choice and open-ended knowledge checks. Students complete the questions on their own and then verify their answers in groups, using resource materials to answer questions, when necessary.
- **TBL Knowledge Acquisition:** At the end of a unit, students engage in debate, requiring students to use textual evidence, think critically, evaluate team member’s contributions, synthesize perspectives, present a final written product to entire class, and respond to feedback.

### What did the study find?

The study reported, and the WWC confirmed, that students in the classrooms where teachers used *PACT* for social studies instruction performed significantly better than students in comparison classrooms on the three outcome measures assessed by the authors. Students in the *PACT* classrooms scored higher than students in the comparison conditions in the reading and social studies comprehension and social studies knowledge domains.

### WWC Rating

***The research described in this report meets WWC evidence standards without reservations***

**Strengths:** This study is a well-implemented randomized controlled trial.

### Appendix A: Study details

Vaughn, S., Swanson, E. A., Roberts, G., Wanzek, J., Stillman-Spisak, S. J., Solis, M., & Simmons, D. (2013). Improving reading comprehension and social studies knowledge in middle school. *Reading Research Quarterly, 48*(1) 77–93.

**Setting** The study was conducted in two middle schools in Texas in a near-urban district with a diverse student population.

**Study sample** Study authors conducted random assignment in two stages. First, eighth-grade students were randomly assigned to 27 social studies classes taught by five teachers. Then, each teacher's classes were randomly assigned to either the intervention or comparison condition, such that each teacher taught intervention and comparison classrooms. A total of 16 classes (containing 261 students) were assigned to the intervention condition and 11 classes (containing 158 students) to the comparison condition—all of which were included in the analysis. The analysis sample contained 203 to 218 students in the intervention condition and 119 to 126 students in the comparison condition, depending on the outcome. Of the students participating, 47.5% were male, and 23.2% received free or reduced-price lunch. Approximately 52.7% were Caucasian, 29.8% were Hispanic, 8.8% were African American, 5% were Asian, and 3.6% were two or more races.

**Intervention group** Teachers implemented *PACT* during three distinct 10-day text-based instructional units (Colonial America, Road to Revolution, and Revolutionary War) over a period of 6–8 weeks. During each unit, the teachers used these five components to deliver the content material: Comprehension Canopy, Essential Words, Knowledge Acquisition, Team Based Learning (TBL) Comprehension Check, and TBL Knowledge Acquisition.

- **Comprehension Canopy:** An overarching question is introduced on day one and reviewed each day as new knowledge is gained.
- **Essential Words:** Four to five key terms are introduced and then reviewed throughout the unit.
- **Knowledge Acquisition:** Each day, students read in various settings (whole class, small group, paired, and individually) and record notes from their readings and teacher presentations in a log.
- **Team Based Learning (TBL) Comprehension Check:** Students complete regular multiple choice and open-ended knowledge checks. Students complete the questions on their own and then verify their answers in groups, using resource materials to answer questions, when necessary.
- **TBL Knowledge Acquisition:** At the end of a unit, students engage in debate, requiring students to use textual evidence, think critically, evaluate team member's contributions, synthesize perspectives, present a final written product to entire class, and respond to feedback.

TBL uses heterogeneous groupings of students as a means to engage students in conversations about the course content and assessments. In TBL, students took on roles to work efficiently as a team: team leader (keeps team on task), text source facilitator (guides team to find the best text evidence to support an answer), synthesizer (helps team resolve problems by synthesizing ideas), and product manager (organizes materials and final products).

### **Comparison group**

Teachers provided the same social studies content as in the intervention condition but without explicit use of the *PACT* instructional practice components. Some elements of the Comprehension Canopy, Essential Words, and Knowledge Acquisition techniques may have been part of the typical teaching style, but neither TBL Comprehension Checks nor TBL Knowledge Acquisition components were typically taught in the comparison classrooms.

### **Outcomes and measurement**

Three outcome measures were administered immediately following the intervention: (a) the Gates–MacGinitie Reading Comprehension subtest, Fourth Edition, (b) the Assessment of Social Studies Knowledge (ASK) Knowledge Acquisition subtest, and (c) the ASK Reading Comprehension in Social Studies subtest. For a more detailed description of these outcome measures, see Appendix B.

### **Support for implementation**

Prior to the intervention, participating teachers received 10 hours of professional development over the course of 2 days. Topics included how to implement the intervention and how to prevent cross contamination, since teachers taught both intervention and comparison classes. Researchers also visited classes and teacher planning sessions to offer additional support. In-class visits occurred at least four times during the first unit, two times during the second unit, and once during the last unit.

### **Reason for review**

This study was identified for review by the WWC because it was supported by a grant to The University of Texas at Austin’s Meadows Center for Preventing Educational Risk (Principal Investigator: Sharon Vaughn) from the National Center for Education Research (NCER) at the Institute of Education Sciences (IES).

### Appendix B: Outcome measures for each domain

Reading comprehension	
<i>Gates–MacGinitie Reading Comprehension subtest, Fourth Edition</i>	This Gates–MacGinitie subtest is a 35-minute group-administered assessment of reading comprehension. It contains narrative and expository passages of 3–15 sentences. Students read each passage silently, and then answer 3–6 multiple-choice questions about the passage. The items increase in difficulty as the student progresses through the assessment. Internal consistency for this assessment ranged from 0.91 to 0.93.
<i>ASK Reading Comprehension in Social Studies subtest</i>	This researcher-developed assessment is an untimed, 21-item, four-option multiple-choice test consisting of three short passages (312–349 words) related to the content covered in the units. Students read each passage silently, and then answer seven multiple-choice questions about the passage. It measures students' reading comprehension, including their ability to identify main ideas, understand vocabulary in context, identify cause and effect, and summarize. Internal consistency for this assessment was 0.85.
Social studies	
<i>ASK Knowledge Acquisition subtest</i>	This researcher-developed assessment is an untimed, 46-item, four-option multiple-choice test that measures content knowledge on each of the three units. For this study, items were taken from released questions from the Texas Assessment of Knowledge and Skills (TAKS) social studies tests, the Massachusetts Comprehensive Assessment System (MCAS) social studies tests, and advanced placement tests. Internal consistency for this assessment was 0.89.

**Table Notes:** The study authors also presented impacts on a researcher-developed follow-up measure administered 4 weeks after the end of the intervention. However, there was no information on the reliability of this long-term follow-up assessment, and therefore, it was not included in this WWC report.

Appendix C: Study findings for each domain

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			p-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
<b>Reading comprehension</b>								
<i>Gates–MacGinitie Reading Comprehension subtest, Fourth Edition</i>	Grade 8	322 students	0.16 (1.08)	–0.07 (1.09)	0.23	0.21	+8	0.01
<i>ASK Reading Comprehension in Social Studies subtest</i>	Grade 8	339 students	0.51 (1.21)	0.09 (1.20)	0.43	0.35	+14	< 0.01
<b>Domain average for reading comprehension</b>						<b>0.28</b>	<b>+11</b>	<b>Statistically significant</b>
<b>Social studies</b>								
<i>ASK Knowledge Acquisition subtest</i>	Grade 8	339 students	2.28 (1.90)	1.71 (1.73)	0.57	0.31	+12	0.02
<b>Domain average for social studies</b>						<b>0.31</b>	<b>+12</b>	<b>Statistically significant</b>

**Table Notes:** Positive results for mean difference, effect size, and improvement index favor the intervention group; negative results favor the comparison group. The effect size is a standardized measure of the effect of an intervention on student outcomes, representing the change (measured in standard deviations) in an average student’s outcome that can be expected if the student is given the intervention. The improvement index is an alternate presentation of the effect size, reflecting the change in an average student’s percentile rank that can be expected if the student is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size.

**Study Notes:** A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. The p-values presented here were reported in the original study. The intervention and comparison group means, variances (which were then transformed to standard deviations), and p-values presented here were reported in the original study, based on an analysis of a multilevel, multiple-group structural equation model.<sup>2</sup>

The statistical significance of the study’s domain average was determined by the WWC; the study is characterized as having a statistically significant positive effect for both the reading comprehension and social studies domains because univariate statistical tests are reported for each outcome measure, the effect for all measures within the domain are positive and statistically significant, and no effects are negative and statistically significant.

### Endnotes

<sup>1</sup> Single study reviews examine evidence published in a study (supplemented, if necessary, by information obtained directly from the author[s]) to assess whether the study design meets WWC evidence standards. The review reports the WWC's assessment of whether the study meets WWC evidence standards and summarizes the study findings following WWC conventions for reporting evidence on effectiveness. This study was reviewed using the single study review protocol, version 2.0.

<sup>2</sup> These WWC-computed effect sizes are based on author-reported analyses of latent variables, rather than observed scores typically reported in studies reviewed by the WWC.

### Recommended Citation

U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2013, August).

*WWC review of the report: Improving reading comprehension and social studies knowledge in middle school.*

Retrieved from <http://whatworks.ed.gov>

### Glossary of Terms

<b>Attrition</b>	Attrition occurs when an outcome variable is not available for all participants initially assigned to the intervention and comparison groups. The WWC considers the total attrition rate and the difference in attrition rates across groups within a study.
<b>Clustering adjustment</b>	If intervention assignment is made at a cluster level and the analysis is conducted at the student level, the WWC will adjust the statistical significance to account for this mismatch, if necessary.
<b>Confounding factor</b>	A confounding factor is a component of a study that is completely aligned with one of the study conditions, making it impossible to separate how much of the observed effect was due to the intervention and how much was due to the factor.
<b>Design</b>	The design of a study is the method by which intervention and comparison groups were assigned.
<b>Domain</b>	A domain is a group of closely related outcomes.
<b>Effect size</b>	The effect size is a measure of the magnitude of an effect. The WWC uses a standardized measure to facilitate comparisons across studies and outcomes.
<b>Eligibility</b>	A study is eligible for review if it falls within the scope of the review protocol and uses either an experimental or matched comparison group design.
<b>Equivalence</b>	A demonstration that the analysis sample groups are similar on observed characteristics defined in the review area protocol.
<b>Improvement index</b>	Along a percentile distribution of students, the improvement index represents the gain or loss of the average student due to the intervention. As the average student starts at the 50th percentile, the measure ranges from -50 to +50.
<b>Multiple comparison adjustment</b>	When a study includes multiple outcomes or comparison groups, the WWC will adjust the statistical significance to account for the multiple comparisons, if necessary.
<b>Quasi-experimental design (QED)</b>	A quasi-experimental design (QED) is a research design in which subjects are assigned to intervention and comparison groups through a process that is not random.
<b>Randomized controlled trial (RCT)</b>	A randomized controlled trial (RCT) is an experiment in which investigators randomly assign eligible participants into intervention and comparison groups.
<b>Single-case design (SCD)</b>	A research approach in which an outcome variable is measured repeatedly within and across different conditions that are defined by the presence or absence of an intervention.
<b>Standard deviation</b>	The standard deviation of a measure shows how much variation exists across observations in the sample. A low standard deviation indicates that the observations in the sample tend to be very close to the mean; a high standard deviation indicates that the observations in the sample are spread out over a large range of values.
<b>Statistical significance</b>	Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups. The WWC labels a finding statistically significant if the likelihood that the difference is due to chance is less than 5% ( $p < 0.05$ ).
<b>Substantively important</b>	A substantively important finding is one that has an effect size of 0.25 or greater, regardless of statistical significance.

Please see the [WWC Procedures and Standards Handbook \(version 2.1\)](#) for additional details.