

Relating ELA Classroom Activities with Reading Achievement: Evidence from the 2015 NAEP Twelfth Grade Reading Scores

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Abstract

This study presented an analysis of data generated from the National Assessment of Educational Progress (NAEP) Data Explorer. Presented in this study are findings related to twelfth-grade students reading scores on the assessment along with the relationship between those scores and classroom practices/methods of instruction such as writing about something that was read, presenting a project about something that was read, and giving a presentation about something that was read. In order to gain a closer understanding of how these classroom practices and methods of instruction impacted reading scores, quantitative data was mined from the 2015 NAEP data set and presented in this descriptive research study. The findings of this study include (1) the highest frequency of projects completed in class did not result in significantly higher reading test scores for students. (2) Students who wrote a paragraph about something they read once or twice a week had the highest reading test scores. (3) Students who made presentations in class often had higher test scores. These findings make evident that the quality of the method of instruction and classroom practice may be more important than the frequency with which students complete projects, presentations, or writings about something they have read. One major conclusion related to the type of text-based assignment students complete—summary writing may not have a significant effect on students' engagement with the text.

Keywords

NAEP, Reading Achievement, Secondary Students, Literacy Proficiency, Data Mining, Classroom Practice

1. Introduction

Literacy is traditionally defined as one's ability to read and write well, and its importance with regard to predictors of future success is undeniable. Schools and educators are tasked with ensuring that students are graduating from high school with the skills necessary to compete in the modern world. However, in the United States, national tests such as the NAEP indicate that less than 40% of high school seniors are showing proficiency in reading abilities [1, 2]. Although the NAEP test for reading does not assess students' writing or presentation skills, "reading and writing share a necessary involvement with the text" [3, 4] noted that twentieth-century literacy skills go beyond the construction of meaning with printed text only and necessitate students' ability to 'read' and produce multimodal texts.

Therefore, the purpose of this study is to examine the relationship between modes of instruction and classroom activities alongside NAEP reading scores of twelfth-grade students in public schools in the United States. At a time when reading scores are stagnating, it is vital for teachers, parents, and policy-makers to examine how instruction and activities in the classroom can affect student outcomes. NCTE [5] noted that research shows that when writing instruction coincides with reading instruction, "fluency and comprehension improve." The interrelatedness of reading and writing has been the subject of many research studies as

well as meta-analyses [6-10]. However, research examining the relationship between the products students create whether text-based or production based—and their reading scores on the NAEP test is lacking. Likewise, based on the necessary twentieth-century literacy skills, further examination of students' completing final products that may not be text-based merits examination [11]. The research questions for this study are: 1). Do students make presentations about what they have read?

2). Do students complete projects based on what they have read? 3). Do students write a paragraph about what was read (in class)? 4). Do students summarize what was read?

Our theoretical framework for this research adopts a scientific inquiry-based approach. The framework was described in great details in *The Impact of Conversations on Fourth Grade Reading Performance - What NAEP Data Explorer Tells*? [12]. In summary, the research methods combined the inquiry process with scientific knowledge, reasoning, and critical thinking. We started with an extensive exploration of the dataset, and that led to the designing of the research questions. The research questions further guided us to mine the data with great in-depth.

2. Literature Review

Examining classroom activities and modes of instruction in the high school ELA class alongside students' performance on summative assessments will help to inform instruction. The purpose of this study is to examine the 2015 NAEP twelfth-grade reading scores with activities they engaged within their ELA classroom. The 2015 NAEP twelfth-grade reading scores are not based on students' writing or presentation abilities; however, a good deal of research centered on reading and writing integration showed that students' abilities in reading are improved when they have had the opportunity to write about or actively interact in some way with what they are reading, rather than being passive vessels of the information that is transmitted from the text [1, 9]. Typically, writing about what was read or creating a project about it has been seen as a summative activity for the purpose of allowing students the opportunity to demonstrate what they have learned after reading [13]. The question arises whether this is the best approach, however.

Based on the "quiet crisis" revealed in the 2015 NAEP report that only 39% of twelfth-grade students are performing at a level of proficiency is indicative that examining the relationship between classroom activities and reading outcomes is an important issue that merits examination [1, 2]). Several studies indicate that reading and writing interconnection is vital and must be explicitly taught to help find a solution to this crisis [2, 7]. This literature review will look at four emerging themes related to a readers' connection with a text: 1) Reading and Writing as Transactional Processes; 2) The Reading and Writing Interconnection; 3) Active, Constructive Meaning Making; and 4) Best Practices in ELA Classroom Activities.

2.1. Reading and Writing as Transactional Processes

There have been several approaches to the teaching of reading to include the apprentice approach and the "real books" movement [14], which approach the reading as a process of transmission whereby the text merely transmits information to the reader. However, Zamel [9] argued that this focus on "the retrieval of information from a text" ignores the constructive and transactional process that is required for authentic comprehension of a text (p. 463). The transmission model of reading focuses on extrapolating information from a text rather than perceiving reading as an active, exploratory process as the transactional model contends. Often, when reading is supplanted with a writing activity, that writing activity occurs after the reading is completed, and in that case, the text is merely transmitting information. Viewing reading as a transactional process helps readers learn because they are actively constructing meaning [15].

However, in addition to writing activities, project-based assignments also allow students the opportunity to have transactional experience with text. Nash [16] incorporated an arts-based approach to the 10th grade ELA classroom. The experiment began with standard ELA classroom practices to include close-reading workshops, small-group discussions, and other close reading strategies to tackle a difficult text. However, the researcher added different arts-based activities such as drawings, projects, and presentations. She found that "each student's presentation provided windows into both the text and the mind of the reader in ways that words alone could not" [16]. By immersing a variety of elements through differing modes, Nash [16] found that students were able to become more aware of the transactional process and this encouraged them to embrace the challenge that difficult texts posed.

2.2. Active, Constructive Meaning Making

Similarly, in order to successfully make meaning of challenging texts, students must read actively and constructively. Some of the most notable shortfalls regarding students' preparation for the rigors of reading at the secondary level are related to their inability to "summarize a simple passage, use context to determine word meaning, and... make text-based inferences" [17]. Each of these three acts requires that students read actively and with purpose. Zamel [9] noted that "reading is a constructive act" (p. 473) and writing allows readers to converse with the author and "become actively involved in the reading" (p. 477). Thus, because of the dynamic nature of understanding and making meaning of a text, students should write about what they are reading.

Contributing to students' inability to construct meaning from a text may be tied with "their difficulty constructing meaning in text" [6]. Students oftentimes do not make connections between themselves as readers and writers, and often teachers are not prepared to see the links either [6]. Quite often, classroom educators envision literacy as a lesson that is taught, and students learn; however, as noted Goen and Gillotte-Tropp [6] "literacy is predominantly learned rather than taught and at a pace that can be very slow" (p. 91). What then is required is that students are actively involved in constructing meaning, struggling with the text, and embracing the patience needed to do so.

2.3. The Reading and Writing Interconnection

Furthermore, it is vital to recognize the interconnectedness between reading and writing, and the potential for writing to improve reading compression for students. In educational settings, quite often reading and writing are taught as separate units. Teachers are regularly trained to specialize in one discipline or the other. Corkett, Hatt, and Benevides [18] showed that teacher self-efficacy in regard to feeling skilled at teaching both reading and writing in an integrated setting directly impacted student outcomes. Collins et al. [7] acknowledged that the tradition in U.S. education has been to separate reading and writing. Goen and Gillotte-Tropp [6] argued that it is this "historic and persistent trend in literacy education to treat reading and writing as distinct and separate processes, with reading being considered the more elementary of the two" that has contributed to students' lack of proficiency in either of the disciplines (p. 91). Zamel [9] argued that it is writing that makes it possible for us to read, not the other way around. Further, writing is often done as a final activity to 'test' a reader's understanding of the text rather than used as "means for understanding the text" [9].

As noted by Graham et al. [8] the claim is often made that reading and writing should be taught together; however, they concluded that although many studies focus on whether "specific reading (e.g., phonics) or writing interventions (e.g., planning, revising) improve reading and writing performance respectively," and few studies have examined whether or not writing enhances reading performance as well as if reading enhances writing (p. 280).

Herbert et al. [19] noted that writing is a likely tool for "improving expository text comprehension" (p. 44). Collins et al. [7] maintained that there is a necessary connection between reading and writing since both "involve the active construction of meaning and draw on shared cognitive processes and knowledge representations" (p. 312). Graham et al. [8] outlined three theories that support combined reading and writing instruction: shared knowledge theory, rhetorical relations theory, functional theory of reading and writing relations. Each of these studies demonstrated the necessary connection between reading and writing, and each elucidated needed considerations of the design of classroom activities.

2.4. Best Practices in ELA Classroom Activities

There are several strategies and techniques provided in the literature that afford ELA educators with best practices for

classroom-based activities and methods of instruction. Mason [1] suggested that an explicit strategy of instruction to improve reading comprehension include the self-regulated strategy development (SRSD) for expository reading comprehension: "Think before reading, think While reading, think After reading (TWA strategy)" (p. 124). It would be in that final stage of the strategy-"think After reading"-that students would think about and summarize information from the text. Further, Mason's [1] study showed that not only should students be taught the TWA strategy for mastery before being asked to write about what they are reading but there is also the need for "explicit instruction in how to best write notes for outlining" (p. 139). Therefore, one best practice in the ELA classroom is that students receive explicit instruction on reading comprehension strategies and modeling behaviors.

Another best practice that has been offered is the use of projects and presentations overwritten assignments. Although Young and Morgan [20] focused on elementary level students, the general philosophy they expanded upon regarded students' active construction of knowledge through the project approach provided They argued that educators who use the project approach, which included "workstations, read-aloud, shared writing, guided reading, and reading and writing workshops," are better equipped to engage students with rich literary experiences. Use of projects as summative assessments based on what students have read is also recommended by the U.S. State Department [23].

Further, the What Works Clearinghouse (WWC) [21] offers educators research-based recommendations for classroom practice and methods of instruction. In their practice guide "Teaching Secondary Students to Write Effectively" they recommend that educators in the ELA classroom integrate writing and reading in order to help students understand text features such as the ability to understand a writer's main point. They argued that reading and writing both share four types of cognitive processes and knowledge: meta-knowledge, domain knowledge, knowledge of text features (format, organization, genre, spelling, and syntax), and procedural knowledge. Evidence from the studies presented by the WWC showed that students not only benefit by further understanding what they read when they write about it, but they also develop their reading skills (WWC, 2017, p. 42). [21]

3. Methodology

The National Center for Educational Statistics (NCES) administers the National Assessment of Educational Progress (NAEP) to measure students' achievement at the national level in a variety of subjects: mathematics, reading, science, and many others [22]. Students in the 4th, 8th, and 12th grades are assessed in the NAEP assessment which is a complex process and involves many phases [22]. The present study will examine the twelfth-grade reading scores of students in nation's public schools.

3.1. Participants and Sampling

The third phase of the NAEP assessment process is the selection of participants [28]. Students are chosen randomly from each of the grades to be assessed, and each is viewed as a representative of the students as a whole within the given state (4th, 8th, and 12th). Although individual participation in the assessment is voluntary, public schools that receive Title I funding must participate [23]. The NAEP 12th grade reading assessment is given about every four years. The most recent NAEP reading assessment was administered in 2015 to approximately 18,700 twelfth-grade students [23].

3.2. Sampling and Data Collection

NAEP's selection process utilizes a "probability sample design." Therefore, the entire student population is not assessed, but the sample is comparable to students in the grade who are tested. NCES [22] reported that students are provided a time limit of 90—120 minutes to complete the assessment and complete a survey. During the evaluation, there are three types of questionnaires in which data are collected: student questionnaires, teacher questionnaires, and school questionnaires. The data collected is used to inform educational improvements, and a variety of stakeholders the benefit from the results: policymakers, researchers, educators, parents, media, the general public [22].

3.3. School Selection and State Assessment Years

The U.S. Department of Education's database provides the identification of public schools, whereas a sample of nonpublic schools for 4th, 8th, and 12th grade students are selected. Schools are then classified based on location and racial/ethnic make-up. In order to make sure that NAEP has a good representation of all schools, schools are then classified according to achievement, such as results of state-mandated testing. Each state's Department of Education then confirms the list of schools provided by NCES. Reading and Mathematics assessments are completed every other year for grades 4 and 8. Students in the 12th grade are assessed in Reading and Mathematics "on a nationally representative basis" every four years [22].

3.4. Data Analysis

The NAEP Data Explorer allows users to examine the results of the NAEP assessment data. It was used to analyze the data from the 2015 results of 12^{th} grade reading scores from national public schools. Average scale scores and standard deviations for 12^{th} graders were analyzed. Four coded questions were selected through NDE:

- 1) For your English class so far this year, how many times have you made a presentation to the class about something that you have read? Options: Never; Once; 2 or 3 times; 4 or 5 times; 6 times or more [R835701]
- 2) For your English class so far this year, how many times have you done a project about something that you have

read (for example, written a play, created a web site)? Options: Never; Once, 2 or 3 times; 4 or 5 times; 6 times or more [R835801]

- 3) In your English/language arts class this year, how often does your class write a paragraph or more about what you have read? Options: Never or hardly ever; Once or twice a month; Once or twice a week; Every day or almost [R848110]
- 4) In your English/language arts class this year, when reading a story, article, or other passage, how often does your teacher ask you to summarize the passage? Options: Never or hardly ever; Once or twice a month; Once or twice a week; Every day or almost every day [R848201]

NDE calculated both descriptive results and generated significance tests. The "Effect Size Calculator" from the University of Colorado was used to calculate the value of Cohen's d [26]. Cohen's d is "one of the simplest and most popular measures of effect size... and d is the difference between two means divided by the overall standard deviation" [24]. Cohen suggested that effect sizes of .2 are small, 5 are medium, and .8 are large [25].

4. Results

Results of the examination of class activities/methods of instruction and the NAEP 2015 reading scores of twelfth-grade students in national public schools will be reported in this section. The average scale score for all students who participated in the 2015 NAEP reading assessment was 285 (scale-range from 0-500) with a standard deviation of 40.

Table 1 shows the 2015 average reading scale score for twelfth-grade national-public school students. Because NAEP does not report the number of students, that information is omitted from this and subsequent tables. Although this study examines whether or not students' reading scores are affected by active engagement with the text, either through writing or another product, only correlation not a causal relationship should be inferred.

Table 1. National average scale score $(12^{th} \text{ grade reading})$.

Year	Jurisdiction	Average Scale Score	Standard Deviation
2015	National Public	285	40

4.1. RQ 1: Students Make Presentations About What They Have Read

Table 2 shows the 2015 reading scale score for twelfthgrade national-public school students who reported the frequency of making presentations to the class about something they read. Students who reported they never made a presentation about what was read had an average scale score of 284, SD=39. The average scale score of those who reported they made presentations once was 281, SD=40. The mean score of students who reported making presentations 2 or 3 times was 288, SD=41. Students who indicated they made presentations 4 or 5 times had an average scale score of 290, SD=41, while the highest score went to those who reported they presented 6 or more times: 291, SD=43.

Table 2. How often do you make presentations about what you have read?

	Never	Once	2 or 3 times	4 or 5 times	6 times/more
М	284	281	288	290	291
SD	39	40	41	41	43

Table 3 presents differences in means and independent t-

test results. Alpha was set at 0.05 rather than 0.001 as set a priori by the researcher. The average scale score of students who reported never (M=284, SD=39) and once (M=281, SD=40) making presentations about what they read was significantly lower than other groups (p<0.001). Students reporting making a presentation 2 or 3 times (M=288, SD=41), 4 or 5 times (M=290, SD=41), and 6 or more times (M=291, SD=43) had significantly higher average scale scores than those in the never or once group (p<0.001).

Table 3. Differences in scale scores between variables for making presentations [R835701].

	Never (284)	Once (281)	2 or 3 times (288)	4 or 5 times (290)	6 or more (291)
Never (284)		x	< Diff=-4 P-value=0.0004 Family size=10	< Diff=-6 P-value=0.0001 Family size=10	< Diff=-7 P-value=0.0006 Family size=10
Once (281)	x		< Diff=-7 P-value=0.0000 Family size=10	< Diff=-9 P-value=0.0000 Family size=10	< Diff=.9 P-value=0.0000 Family size=10
2 or 3 times (288)	> Diff=4 P-value=0.0004 Family size=10	> Diff=7 P-value=0.0000 Family size=10		x	x
4 or 5 times (290)	> Diff=6 P-value=0.0001 Family size=10	> Diff=9 P-value=0.0000 Family size=10	x		x
6 or more (291)	> Diff=7 P-value=0.0006 Family size=10	> Diff=9 P-value=0.0000 Family size=10	x	x	

LEGEND:

< Significantly lower.

> Significantly higher.

X No significant difference.

NOTE: Within country comparisons on any given year are dependent with an alpha level of 0.05.

Created with NAEP Data Explorer

Table 4 reports the effect sizes of the different variables for how often students made a presentation about something they read. The Cohen's d effect size between the score of students who indicated they made presentations about something they read "2 or 3 times," "4 or 5 times," and "6 or more times" and those who reported "never" were 0.09, 0.15, and 0.17. Students who reported giving presentations about something they read "2 or 3 times," "4 or 5 times," and "6 or more times" and those who reported "once" resulted in a Cohen's d effect size of 0.17, 0.22, and 0.24 subsequently. The highest effect size (0.24) was between those students who reported making a presentation about something read 6 or more times in comparison to those who reported making a presentation about something read only once. Cohen suggested that effect sizes of .2 are small, .5 medium, and .8 large [25].

Table 4. Effect Sizes of Mean Score Differences when Making a Presentation.

		Cohen's d
2 or 3 times	Never	0.09
2 or 3 times	Once	0.17

		Cohen's d
4 or 5 times	Never	0.15
4 or 5 times	Once	0.22
6 or more times	Never	0.17
6 or more times	Once	0.24

4.2. RQ 2: Students Complete Projects Based on What They Have Read

Table 5 shows the average scale score of twelfth-grade students who reported the frequency of completing a project about something they read. The average scale score of students who reported they never completed a project about what they read was 285. 283 was the average scale-score of students who once completed a project, while 286 was the average score for those who reported they did a project 2 or 3 times. 290 was the average score of those who reported they did a project about something they read 4 or 5 times, and the average scale-score reported by those who did a project 6 or more times was 287.

Table 5. How often do you complete a project about something you read?

	Never	Once	2 or 3 times	4 or 5 times	6 times/more
М	285	283	286	290	287
SD	40	40	40	40	42

Table 6 presents differences in means and independent ttest results. Alpha was set at 0.05 rather than 0.001 as set a priori by the researcher. The average scale score of students who reported never (M=285, SD=40) and once (M=283, SD=40) completing a project about what they read was significantly lower than other groups (p<0.001). Students reporting completing a project 4 or 5 times (M=290, SD=40) had significantly higher average scale scores than those in the never or once group (p<0.001). However, the 2 or 3 times (M=286, SD=40) and 6 or more (M=287, SD=42) groups had no significant difference with any other group.

Table 6. Differences in scale scores between variables for completing projects [R835801].

	Never (285)	Once (283)	2 or 3 times (286)	4 or 5 times (290)	6 or more (287)
Never (285)		x	x	< Diff=-2 P-value=0.1622 Family size=10	x
Once (283)	x		X	< Diff=-6 P-value=0.0002 Family size=10	x
2 or 3 times (286)	Х	Х		Х	Х
4 or 5 times (290)	> Diff=5 P-value=0.0008 Family size=10	> Diff=6 P-value=0.0002 Family size=10	Х		x
6 or more (287)	Х	Х	Х	Х	

LEGEND:

< Significantly lower.

> Significantly higher.

X No significant difference.

NOTE: Within country comparisons on any given year are dependent with an alpha level of 0.05.

Created with NAEP Data Explorer

Table 7. Effect Sizes of Mean Score Differences when Completing a Project.

		Cohen's d
Never (285)	4 or 5 times (290)	-0.125
4 or 5 times (290)	Never (285)	0.125
4 or 5 times (290)	Once (283)	0.175
Once (283)	4 or 5 times (290)	-0.125

4.3. RQ 3: The Frequency in Which Your Class Writes a Paragraph About Things You Read

Table 8 shows the average scale score of twelfth-grade students who reported the frequency of writing a paragraph about something they read. The average scale score of students who reported they never or hardly ever wrote a paragraph about what they read was 273. 288 was the average scale-score of students once or twice a month wrote a paragraph about something they read, while 289 was the average score for those who reported wrote a paragraph about something they read once or twice a week. 286 was the average score of those who reported they wrote a paragraph about something they read every day or almost every day.

Table 8. How often does your class write a paragraph about something read [R848110]?

	Never or Hardly Ever	Once or Twice a Month	Once or Twice a Week	Every day or Almost
М	273	288	289	286
SD	39	39	40	41

Table 9 presents differences in means and independent ttest results. Alpha was set at 0.05 rather than 0.001 as set a priori by the researcher. The average scale score of students who reported never or hardly ever (M=273, SD=39) wrote a paragraph about something they read was significantly lower than other groups (p<0.001). Students reporting writing a paragraph about something they read once/twice a month (M=288, SD=39), once/twice a week (M=289, SD=40), and every day/almost (M=286, SD=41), had significantly higher average scale scores than those in the never (p<0.001). However, the once/twice a week (M=289, SD=40) to the everyday/almost (M=286, SD=41) had the highest significance (p=0.307).

	Never or hardly ever (273)	Once/twice a month (288)	Once/twice a week (289)	Every day or almost (286)
Never or hardly ever		< Diff=-15 P-value=0.0000 Family size=6	< Diff=.16 _P-value=0.0000 Family size=6	< Diff=-13 P-value=0.0000 Family size=6
Once/twice a month	> Diff=15 P-value=0.0000 Family size=6		x	x
Once/twice a week	> Diff=16 P-value=0.0000 Family size=6	x		> Diff=3 P-value=0.0307 Family size=6
Every day or almost	> Diff=13 P-value=0.0000 Family size=6	x	< Diff=-3 P-value=0.307 Family size=6	

Table 9. Differences in scale scores between variables for writing a paragraph about something read [R848110].

LEGEND:

< Significantly lower.

> Significantly higher.

X No significant difference.

NOTE: Within country comparisons on any given year are dependent with an alpha level of 0.05.

Created with NAEP Data Explorer

Table 10.	Effect Sizes	of Mean	Score	Differences	when	Writing a	a Parag	graph
about son	<i>iething read</i> .							

		Cohen's d
Once/twice a month (288)	Never (273)	.384
Once/twice a week (289	Never (273)	.405
Every day/almost (286)	Never (273)	.324
Once/twice a week (289)	Every day/almost (286)	.074

Table 10 reports the effect sizes of the different variables for how often students wrote a paragraph about something they read. The Cohen's *d* effect size between the score of students who indicated they wrote a paragraph about something they read "once/twice a month" and those who reported "never" were .384. Students who reported writing a paragraph about something they read "once/twice a week" and "never" resulted in a Cohen's *d* effect size of 0.405. Those who reported they wrote a paragraph 'every day/almost" and "never" resulted in an effect size of .324. And, those who reported they wrote a paragraph about something they read "once/twice a week" and "every day/almost" showed an effect size of .074. The highest effect size (0.405) was between those students who reported writing a paragraph about something they had read once/twice a week as opposed to never. Cohen suggested that effect sizes of .2 are small, .5 medium, and .8 large (Cohen, 1992).

4.4. RQ 4: The Frequency in Which Your Teachers Ask You to Summarize What You Have Read

Table 11 shows the average scale score of twelfth-grade students who reported the frequency of summarizing a passage when reading. The average scale score of 285 was shared by students who reported then never/hardly ever summarized when reading, those who did so once or twice a month, and those who did so every day or almost every day. Students who reported they summarized a passage when reading once or twice a week had an average scale-score of 287.

Table 11. How often do you summarize a passage about something you read?

	Never or hardly ever	Once/twice month	Once/twice a week	Every day/almost	
М	285	285	287	285	Ī
SD	44	41	39	39	

Table 12. Differences in scale scores between variables for summarizing a passage [R848201].

	Never or hardly ever (85)	Once/twice a month (285)	Once/twice a week (287)	Every day or almost (285)
Never or hardly ever		х	х	х
Once/twice a month	х		х	х
Once/twice a week	х	х		х
Every day or almost	Х	х	X	

LEGEND:

< Significantly lower.

> Significantly higher.

X No significant difference.

NOTE: Within country comparisons on any given year are dependent with an alpha level of 0.05.

Created with NAEP Data Explorer.

Table 12 presents differences in means and independent ttest results. Alpha was set at 0.05 rather than 0.001 as set a priori by the researcher. No significant difference was shown between any of the variables; thus, an effect size test was not administered.

5. Discussion

This current study set out to examine the relationship between twelfth-grade students scores in the NAEP reading test and classroom activities/modes of instruction. This study specifically examines the results of the NAEP twelfth-grade reading scores and activities in the classroom: writing a paragraph about something that was written, summarizing something that was written, providing a presentation about something that was written. A discussion of the findings reported in the results section is included in this section.

5.1. Production-Based Class Activities

Students who identified as having made presentations in class about something they read more often had higher test scores overall, except for students who reported only presenting once, which had the lowest results (M=281; SD=40). The highest score went to students who acknowledged having presented in class about something they read 6 or more times (M=288; SD=43). Results of the independent t-tests showed that significantly higher average scale scores went to three groups (2 or 3 times; 4 or 5 times; and 6 or more times) over students who never presented in class about something they read. Although low in terms of Cohen's suggestion of effect sizes, the Cohen's d effect size was the highest (.24) between those students who reported making presentations about something they read 6 or more times in comparison with those who reported making a presentation about something they read only once [25].

The results of these scores are consistent with previous perspectives about the importance of reading as a constructive transactional process, whereby readers would not merely be receptors of information from a text, but instead there would be a transaction of some kind between the text and the reader, and a production (in this case a presentation) would provide that necessary transaction [9]. As Alghonaim [15] pointed out when learners see the purpose, they learn; when involved in the cognitive activity of creating a presentation about something that was read, students would likely comprehend, remember, and understand those texts at a deeper level. The insignificance of the difference between scores of those who only made a presentation in class once about something that was read in contrast to all other groups may show that a onetime presentation may have no effect on improving students' reading skills.

5.2. Reading with Active Interaction with the Text

In addition to making presentations in class about

something that was read, an additional project-based class activity that was reported in the results section of this study was students' identification of having completing projects in class based on something that they read.

Students who reported that they had never (M=285; SD=40) and/or once (M=283; SD=40) completed a project in class about something that they read had significantly lower scores than the other groups (2 or 3 times; 4 or 5 times; and 6 or more times). Those who had completed class projects 4 or 5 times (M=290; SD=40) had significantly higher scores. The highest effect size of those which showed significance was .175 between those who completed a project about something read 4 or 5 times versus those who only completed a project once. Again, this is a rather low effect size according to Cohen [25].

The results of the analysis of the scores for students who completed a project about something that was read in class aligns with views about reading as an active, constructive process. When completing a project about something that the read (similarly to making presentations), students are likely to make needed connections between themselves as readers and the text so as to understand the overall meaning well [6]. It is interesting to note, however, that students who completed a project about something they read 6 or more times (M=287; SD=42) had no significant difference with any of the other groups, which might suggest that educators should limit the quantifiable number of projects assigned to assure a quality learning experience. This finding is consistent with Goen and Gillotte-Tropp's [6] assertion that "literacy is predominantly learned rather than taught and at a pace that can be very slow" (p. 91).

5.3. Text-based Versus Production-based Activities

A discussion of the results of classroom activities involving writing about something that students read will be reported in this section. Students who reported writing a paragraph about something that they read once or twice a week (M=289; SD=40) had the highest average scores on the twelfth-grade NAEP reading test. Those who reported the frequency of writing a paragraph about something that was read never or hardly ever (M=273; SD=39) had significantly lower scores than any other group. Those who had significantly higher scores than the never or hardly ever were once/twice a month (M=288; SD=39), once/twice a week (M=289; SD=40), and the every/almost daily (M=286; SD=41). The highest Cohen's d effect size (.40), and one that comes close to a medium effect according to Cohen was between those students who reported writing a paragraph about something that they read once/twice a week as opposed to never or hardly ever [25].

While it seems that writing about something that was read showed a medium effect and high significance, the question asking students to report on the frequency of summarizing a passage about something that they read in class showed no significance between any of the different rates. What may account for this difference in the two text-based activities writing a paragraph about something that was read versus summarizing what was read—may be related to the occurrence of the activity. As Zamel [9] pointed out, Students write as a "means to understand a text". These findings are also in line with Herbert et al. [19] who noted that writing can be used as a tool for improving comprehension of text-based readings.

6. Conclusions and Future Research

At a time when students are graduating from high school less than 40% are proficient in reading, classroom practices and modes of instruction need to be assessed in order to to improve identify this how outcome. The interconnectedness of reading and writing has been established, and production-based activities too might help to quell this quiet crisis. This study examined the relationship between certain classroom activities and scores on the NAEP twelfth-grade reading test. Based on this study, three conclusions are established.

6.1. Quality Versus Quantity of Assignments: More Is Not Necessarily Better

The results of the study suggested that the quantity of projects given to students to complete does not ensure that reading test scores will be improved. Students who completed a project 6 or more times showed no significant difference with any other group, and this suggests that because of the nature of literacy improvement (the idea that it is learned rather than taught), the quality of project assignments may need more attention than the quantity.

6.2. Production and Presentation-Based Activities as More Engaging

Further, the results of this study make evident that asking students to make a presentation or create a project about something they have read, at any frequency, results in higher reading test scores. Creating a project or giving a presentation about something that was read might require students to engage with the text at a deeper level than if the students were mere receptors of the information. Therefore, it can be concluded that perhaps presentations and productbased activities may be found to be more engaging by students and allow them to further participate with and understand the text.

6.3. Type of Writing Produces Different Results

As evident in this study's literature review, much research has been rooted in examining the interconnectedness of reading and writing. However, the results of this study suggested that the types of writing that students are asked to do may matter a great deal in helping them to improve their reading comprehension and thereby their scores on reading tests. Writing as a "test" after the reading has happened, such as asking students to summarize a passage, may not be as advantageous as asking students to write during the reading practice with the goal of understanding the text.

6.4. Recommendations for Future Research

Future research should consider the point that literacy in the 21st century involves more than mere reading and writing abilities. Also, writing is often privileged over production or presentation-based activities. An experiment examining the benefits of the use of technology with the goal of improving reading comprehension is justified. Collins et al. [7] devised a study that examined the idea that writing during reading might improve comprehension. The findings showed that providing "thinksheets" during the reading process and asking students to write during the process improved the reading process for students because it allowed them to see their thought process in an obvious way. However, because theirs was a paper-andpencil intervention, they suggest that future research should examine reading and writing accomplished in an electronic setting (p. 328). Technological reading interventions' benefits for improving students' scores on the NAEP reading tests can also be considered in future research.

As the authors [27] of "Reading Next" pointed out, technology is "both a facilitator of literacy and a medium of literacy" (p. 19), and this suggests that perhaps further examination with the role of technology and definition of "reading" comprehension needs advancement and change in light of the skills necessary in the 21st century. Along with that, all stakeholders should critically examine whether or not assessments such as the NAEP reading test are accurately measuring 21st century-literacy skills. Based on the findings in this descriptive study, policymakers and practitioners in the field of literacy should critically consider how classroom practices/methods of instruction benefit students' progress in reading and be ready to employ a variety of quality strategies to aid in improvement.

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