

Pemberton Township School District

Pemberton, New Jersey

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EXECUTIVE SUMMARY

New Jersey Assessment of Skills and Knowledge (ASK) performance data from 2004 (3rd grade) and 2005 (4th grade) in language arts literacy (e.g., reading and writing) and mathematics for students in seven schools in the district was analyzed and compared to the CompassLearning software implementation at each school. All schools used the software lessons to supplement instruction and for targeted remediation with selected students. Typically, lessons were selected by the teacher to align with the content required in the state standards. Access was provided 2-to-3 times per week through classroom computers at a ratio of approximately five students per computer. In addition, one school (Alexander Denbo) provided one-to-one access in a computer lab setting. For the total group of 4th graders considered in this report, there was a positive relationship between the number of CompassLearning lessons completed and ASK gain (from 2004 to 2005). It is recommended that access time on CompassLearning lessons be increased and that teachers and principals utilize CompassLearning performance reports more frequently for data-driven decision making.

COMPASSLEARNING SOFTWARE

Table 1. Average number of CompassLearning lessons completed at each school sorted by number of lessons completed.

| School | Minutes per week | Math CL lessons | Reading CL lessons |
|--|------------------|------------------------|------------------------|
| J. S. Stackhouse (n = 48 & 20) | 60-90 | 23.4 (12.6) | 5.9 (9.7) |
| Fort Dix (n = 31 & 28) | 30-60 | 22.4 (20.4) | 29.2 (19.7) |
| H. L. Emmons (n = 34 & 31) | 30-60 | 35.6 (21.0) | 17.4 (10.8) |
| A. Denbo (n = 64 & 59) | 30-60 | 48.0 (30.2) | 31.5 (32.3) |
| Harker-Wylie (n = 36 & 28) | 30-60 | 45.4 (61.4) | 40.9 (84.1) |
| I. Haine (n = 56 & 56) | 30-60 | 72.9 (28.3) | 15.0 (13.5) |
| S. T. Busansky (n = 43 & 42) | 60-90 | 54.6 (58.0) | 51.0 (41.8) |
| Weighted Totals (n = 312 & 264) | | 45.4 (40.0) | 26.8 (30.8) |

* Standard deviation shown in parentheses

IMPLEMENTATION

CompassLearning software implementation data was gathered using the Education Consultant Implementation Survey (ECIS). The ECIS items and response tallies are shown in Appendix A and the ECIS summary by school is shown in Appendix B. In general, the ECIS (item #14) indicates that all schools used the software lessons to supplement instruction. In addition, the software was used occasionally for targeted remediation with select students, and less often for diagnosis and prescriptive use. The ECIS (item #16) indicates that CompassLearning lessons were often selected by the teachers to align with the content required by the state standards. Student access was provided through several computers within the classroom at a ratio of approximately five students per computer (ECIS item #3). In addition, one school (Alexander Denbo) provided one-to-one access in a computer lab setting (ECIS item #4). Typically, the ECIS indicates that students spent about 15 minutes in CompassLearning reading and/or mathematics software lessons (ECIS items #8-12) about 2-to-3 times per week (ECIS item #6), though one school used the software daily (Busansky). Five schools are reported as providing 30-60 minutes of access each week (ECIS item #7), which falls below the company recommended usage of 90 minutes per subject per week. Two schools (Stackhouse and Busansky) reported providing 60-90 minutes of access each week (see Table 1. Note.)

The average number of CompassLearning lessons completed at each school during the 2004-2005 school years are provided in Table 1. In general, students completed more math lessons (total weighted mean = 45.4) than reading lessons (total weighted mean = 26.8). On average, S. T. Busansky students completed the most CompassLearning lessons (54.6 math lessons and 51.0 reading lessons) while J. S. Stackhouse students completed the least lessons (23.4 math lessons and 5.9 reading lessons). Although Stackhouse and Busansky are reported in the ECIS (item #7) as providing 30 minutes **more** CompassLearning instruction per week than the other five schools, Stackhouse students completed the least number of CompassLearning lessons of all schools.

The ECIS reports that schools **balanced** the amount of time spent on CompassLearning mathematics and reading lessons (items #10 and #12). However, examination of the CompassLearning reading versus mathematics lesson completion data in Table 1 indicates that (a) Fort Dix students focused more on CompassLearning reading lessons, (b) Busansky and Harker-Wylie students focused equally on CompassLearning reading and mathematics, and (c) Haine, Denbo, Emmons, and Stackhouse students focused more on mathematics.

Histograms of the number of CompassLearning lessons completed for the entire sample of students ($n = 312$ in math and $n = 264$ in reading) are shown in Figure 1. The histograms show that a few students completed a substantial number of lessons during the school year (over 100 lessons), but most students completed fewer than 30 reading and fewer than 50 math lessons.

Examination of the standard deviations in the number of CompassLearning lessons completed (see the values in parentheses in Table 1) suggests that students are not equally accessing CompassLearning lessons in some schools (especially Harker-Wylie and Busansky). These CompassLearning lesson completion means and standard deviation differences are consistent with targeting individual instruction for some students based on individual student's needs and teacher preferences.

ASK TRENDS IN EACH SCHOOL

A note about ASK scaled scores and gain scores is necessary to understand the data provided. The ASK raw score data from each grade level test are converted by the state examiners to a scaled score where Proficient (e.g., Level 2) is set between 200 and 250 (ASK, 2005). Scaled scores **below** 200 are categorized as Partially Proficient (e.g., Level 3) and scaled scores **above** 250 are categorized as Advanced Proficient (e.g., Level 1). Gain scores in this report were calculated for each student by subtracting the 2004 scaled score from the 2005 scaled score (pp. 12 & 50, ASK, 2005). Based on this approach, a student who has a scaled score of 250 in math in 2004 and a scaled score of 250 in 2005 obtains a gain score of **zero**, but the student has actually **improved** by an amount equal to that of the total group of test takers in the state. Based on this interpretation:

- (a) schools with zero gain scores have grown by 1 year relative to the total group of test takers in the state,
- (b) schools with positive gain scores are improving faster (year to year) than the total group of test takers in the state, and
- (c) schools with negative gain scores are not keeping up with the total group of test takers in the state.

Thus, **a zero gain is not necessarily a bad result**, though schools and parents always want their students to perform better than the average. Note that raw gain scores provide some information, but can be misleading and difficult to compare and interpret (Braun, 2005), thus a standardized measure of gain called effect size was also calculated. Effect sizes were calculated for each school by subtracting the average 2004 scaled score from the average 2005 scaled score, and then dividing by the standard deviation for the entire sample. Effect sizes are a valuable measure for showing difference: an effect size of .25 is a small effect, .50 is a medium-sized effect, and .75 is a large effect (Cohen, 1962). ASK scores, gain scores, and effect sizes are shown in Tables 2 and 3.

Haine students (4th grade, 2005) were the top performing school group in both language arts literacy and mathematics in both 2004 and 2005 (see Tables 2 and 3). In addition, Haine students obtained the largest mathematics gain from 2004 to 2005 (i.e., +11.5; effect size = 0.49).

Figure 1. Frequency distribution of the number of CompassLearning lessons completed during the year in Mathematics ($n = 312$) and Reading ($n = 264$).

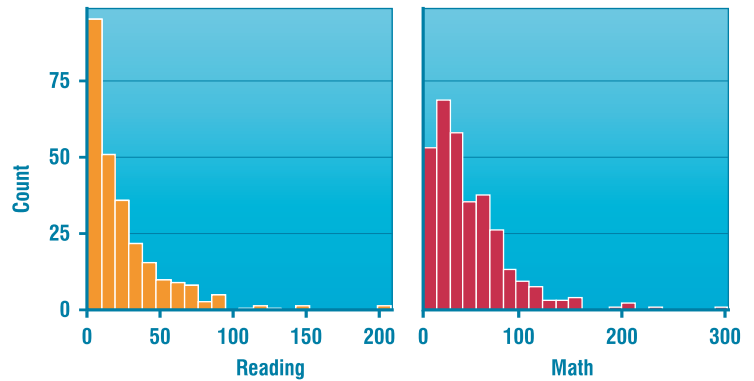


Table 2. NJ ASK Mathematics descriptive data for each school sorted by average number of CompassLearning lessons completed.

| School | CL Lessons | 3 rd Grade ASK ¹ | 4 th Grade ASK ² | ASK s.d. ² | Gain | Effect Size |
|-------------------------------|------------|--|--|-----------------------|------|-------------|
| Below Average Use | | | | | | |
| Fort Dix ($n = 31$) | 22.4 | 207.5 | 209.3 | (24.2) | 1.7 | 0.07 |
| J. S. Stackhouse ($n = 48$) | 23.4 | 216.0 | 225.0 | (27.2) | 9.0 | 0.33 |
| H. L. Emmons ($n = 34$) | 35.6 | 217.8 | 213.2 | (59.8) | -4.6 | -0.08 |
| Above Average Use | | | | | | |
| Harker-Wylie ($n = 36$) | 45.4 | 220.1 | 224.5 | (26.1) | 4.4 | 0.17 |
| A. Denbo ($n = 64$) | 48.0 | 209.9 | 214.1 | (34.2) | 4.2 | 0.12 |
| S. T. Busansky ($n = 43$) | 54.6 | 214.5 | 223.3 | (33.9) | 8.8 | 0.26 |
| I. Haine ($n = 56$) | 72.9 | 230.0 | 241.6 | (23.4) | 11.5 | 0.49 |
| Totals ($n = 312$) | 45.4 | 216.9 | 222.6 | (35.0) | 5.7 | 0.16 |

¹2004, ²2005, note: Aletta Crichton data not available

Table 3. NJ ASK Language Arts Literacy descriptive data for each school sorted by average number of CompassLearning lessons completed.

| School | CL Lessons | 3 rd Grade ASK ¹ | 4 th Grade ASK ² | ASK s.d. ² | Gain | Effect Size |
|-------------------------------|------------|--|--|-----------------------|------|-------------|
| Below Average Use | | | | | | |
| J. S. Stackhouse ($n = 20$) | 5.9 | 209.4 | 205.6 | (20.0) | -3.9 | -0.20 |
| I. Haine ($n = 56$) | 15.0 | 222.9 | 223.8 | (13.3) | 0.8 | 0.06 |
| H. L. Emmons ($n = 31$) | 17.4 | 210.3 | 217.1 | (16.5) | 6.9 | 0.42 |
| Above Average Use | | | | | | |
| Fort Dix ($n = 28$) | 29.2 | 199.3 | 203.5 | (17.3) | 4.2 | 0.24 |
| A. Denbo ($n = 59$) | 31.5 | 202.4 | 207.5 | (19.4) | 5.1 | 0.26 |
| Harker-Wylie ($n = 28$) | 40.9 | 210.3 | 210.8 | (16.9) | 0.5 | 0.03 |
| S. T. Busansky ($n = 42$) | 51.0 | 206.0 | 206.5 | (17.6) | 0.6 | 0.03 |
| Totals ($n = 264$) | 26.8 | 209.3 | 211.7 | (18.5) | 2.4 | 0.13 |

¹2004, ²2005, note: Aletta Crichton data not available

Emmons students obtained the largest language arts literacy gain from 2004 to 2005 (i.e., +6.9; effect size = 0.42). Fort Dix students improved in language arts literacy from 199.3 (Partially Proficient, Level 3) in 2004 to 203.5 (Proficient, Level 2) in 2005, a +4.2 gain with an effect size of 0.24 (see Table 3). Several schools obtained negative gains.

Examination of ASK mathematics standard deviations (2005 data) indicates that students at Emmons and to a lesser degree at Denbo and Busansky, were heterogeneous by ability, while students in the other four schools were more homogenous in their math ability. ASK language arts literacy standard deviations (2005 data) indicate that all schools were fairly homogenous in their reading ability. This data supports the need for a follow-up of students' mathematics performance at Emmons to more fully account for these results.

RELATIONSHIP BETWEEN COMPASSLEARNING AND ASK

Important questions involve the relationship between the CompassLearning software implementation and ASK gains. To address this, correlation between ASK gain scores (gain = 2005 score – 2004 score) were correlated with the number of CompassLearning lessons completed in mathematics and reading. Because sample sizes for each school were less than 100 (i.e., correlation analysis typically requires a sample of at least 100 students), students' data from all schools was combined into one large sample (math n = 312 and language arts literacy n = 264). Forty-nine students have both math and language arts literacy scores, while the remainder have either math or language arts scores.

For **mathematics** there are 312 data points. The mean number of CompassLearning mathematics lessons completed is 45.4. The linear equation (see Figure 1) that describes the relationship between mathematics lessons completed and ASK mathematics gain is:

Equation 1

$$\text{ASK math gain} = 0.0807 * (\text{CL math lessons}) + 2.0437$$

This equation means that, on average, students gained 1 ASK scaled-score point for every 12.4 CompassLearning mathematics lessons completed.

For **reading** there are 264 data points. The mean number of CompassLearning reading lessons completed is 26.8. The equation that describes the relationship between reading lessons completed and ASK language arts literacy gain is:

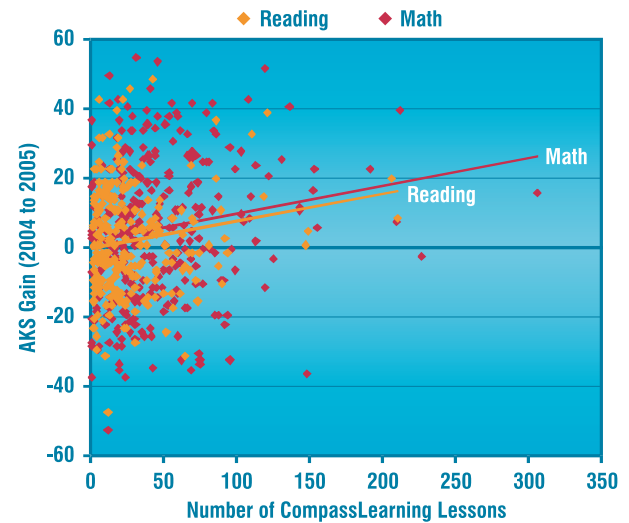
Equation 2

$$\text{ASK language arts literacy gain} = 0.0768 * (\text{CL reading lessons}) + 0.3915$$

This equation means that, on average, students gained 1 ASK scaled-score point for every 13.0 CompassLearning reading lessons completed.

To determine if CompassLearning lesson completion data was significantly related to performance improvement from 2004 to 2005, step-wise multiple regression analyses were conducted separately for the mathematics and language arts literacy data (with stepwise criteria probability-of-F-to-enter \leq .050 and probability-of-F-to-remove \geq .100). The 2005 ASK data served as the dependent variable and the 2004 ASK data and the CompassLearning lesson completion data served as the independent variables, thus controlling for student achievement. For mathematics, 2004 ASK scores contributed 38.8% of the variance in 2005 ASK scores and CompassLearning mathematics lesson

Figure 1. Scatter plot and trend lines showing the relationship between Mathematics (red) and Reading (yellow) ASK gains and number of CompassLearning lessons completed.



completion data entered ($p < .001$) accounting for an additional 2.2% of the variance (total 41%). For language arts literacy, 2004 ASK scores contributed 45.9% of the variance in 2005 ASK scores, but CompassLearning reading lesson completion data did not enter the equation ($p = .225$). In summary, CompassLearning lesson completion data were significantly related to 2005 ASK math performance ($p < .001$) but were not significantly related to 2005 ASK language arts literacy performance ($p = .225$).

SUMMARY RECOMMENDATIONS

The positive slopes of the trend lines displayed in Figure 1 indicate a positive relationship between the number of CompassLearning lessons completed and ASK gain in language arts literacy and especially in mathematics. The ECIS survey (see Appendix A, Qs 3-8, 10, and 12) reports that all schools are providing about the same amount of access in terms of student-to-computer ratio and time-on-task; however, this is not reflected in the lesson completion data. Teachers should certainly be allowed the flexibility to decide how much time individual students spend in any instructional activity based on both the students' needs and the teachers' approach and comfort zone. However, the data indicates that most students would benefit from more time on the software, especially in mathematics. The recommendation is that teachers receive a summary of these findings so that they are aware of the instructional potential and as so may choose to take greater advantage of the instructional resource. In addition, the ECIS survey (see Appendix A, Q15) reports that teachers and principals only occasionally print and use CompassLearning lesson progress reports. An additional recommendation is that teachers and principals utilize the software report features more frequently and more systematically.

REFERENCES

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APPENDIX A.

EDUCATIONAL CONSULTANT IMPLEMENTATION SURVEY (ECIS)

Directions: This survey only takes about 5 minutes to complete. Based on your observations, visits, training and discussions with other educators at this school site, please complete this questionnaire as accurately as possible. This data will be used for research purposes only.

1. School Name: ALL SCHOOLS .
2. a.) Date CompassLearning Implementation began (month/year): **9/2004**
b.) Date teachers began using CompassLearning (month/year): **10/2004**
3. When teachers are using CompassLearning software in the **classroom**, how many computers are available for students?
 - One computer for each student
 - One computer for every two students
 - One computer for every three students
 - One computer for every four students
 - 8 One computer for every five or more students (All schools)**
 - (does not apply)
4. When teachers are using CompassLearning software in the **computer lab**, how many computers are available for students?
 - 1 One computer for each student (Denbo)**
 - One computer for every two students
 - One computer for every three students
 - One computer for every four students
 - One computer for every five or more students
 - 7 Does not apply (All remaining schools)**
5. When using CompassLearning software, which of the following situations typically apply?
 - 8 Each student works *individually* at a computer (All schools)**
 - Students work in **pairs** at a computer
 - Students work in **small groups** at a computer
 - Students work in **large groups** at a computer
6. In general, how often do students use CompassLearning software at school (both during and after class)?
 - 1 Daily (Busansky)**
 - 7 A few times a week (All remaining schools)**
 - Once a week
 - A few times a month
 - Hardly ever
 - (no answer)
7. On average, what is the total number of minutes per week that students use CompassLearning software (either during or after class)?
 - More than 150 minutes per week
 - 120–150 minutes per week
 - 90–120 minutes per week
 - 60–90 minutes per week
 - 2 60–90 minutes per week (Stackhouse, Busansky)**
 - 6 30–60 minutes per week (All remaining schools)**
 - 30 minutes per week
 - Less than 30 minutes per week

8. Are some students required to work on CompassLearning software substantially more than other students?
- Yes, some students are required to work more than others
If so, please specify (at risk, enriched,...): _____
- 8 No, all students spend about the same amount of time (All schools)**
- Students are not required to use the software
 - (none of the above)
9. On average, what is the total number of minutes per day that students spend on learning **math** (include time spent using all instructional tools)?
All schools 45 minutes per day
10. On average, how many minutes per day do students use **CompassLearning math** software?
All schools 15 minutes per day
11. On average, what is the total number of minutes per day that students spend on learning **reading/language arts** (include time spent using all instructional tools)?
All schools 90 minutes per day
12. On average, how many minutes per day do students use **CompassLearning reading/language** software?
All schools 15 minutes per day
13. How many hours of professional development on CompassLearning have teachers received since the software first arrived?
- None
 - ≤ 8 hours
- 8 9–23 hours (All schools)**
- 24–47 hours
 - 48–63 hours
 - ≥ 64 hours
 - (no answer)
14. From your observations, rank the following CompassLearning implementation approaches that were used by the teacher(s) in this school (“5” most to least “1” least).
- 3 **a. Targeted Remediation/Enrichment (i.e., only a few selected students use the software for remediation/enrichment) (All schools)**
- 5 **b. Supplement (i.e., allow all students to use the software occasionally to substitute from regular instruction) (All schools)**
- ____ **c. Diagnostic use (i.e., use the online tests to collect data to help you determine what to focus on in the classroom)**
- 1 **d. Diagnostic and prescriptive use (i.e., use the online tests to automatically assign online lessons to identify and address each student’s specific areas of weakness) (All schools)**
- ____ **e. Other (enter here): _____**
15. How often do teachers printout and review CompassLearning or other reports monitoring student progress? (check the closest answer)
- Frequently (3-4 times per week)
 - Often (about once per week)
- 5 Occasionally (once per month) (All remaining schools)**
- 3 Seldom (less than once per month) (Crichton, Emmons, Stackhouse)**
- Never
 - (no answer)

16. How often do teachers align **CompassLearning** software activities and assessments to content required in the state standards?
- Frequently (almost every lesson)
- 6 Often (3-4 times per week) (All remaining schools)**
- 2 Occasionally (about once per week) (Crichton, Stackhouse)**
- Seldom (once per month)
 - Never
 - (no answer)
17. For best practices, what are your recommendations for a successful and effective implementation of CompassLearning software? (please include minimum required amount of time, student monitoring/progress reports, # of additional professional development days)
- I recommend 15–20 minutes per day, per subject of use. I also recommend teachers view reports once a week and Principals ask for printed reports once per month. I feel one professional development day per month for the first 4–6 months of an implementation where teachers have a block of time of approximately 3–4 hours with the consultant, helps insure a successful implementation.**
18. On a scale from 1 to 5, rate your overall impression concerning the school implementation of CompassLearning (“5” used all best practice recommendations; “1” not well implemented).

“4” (2 schools, Denbo and Bunsansky) and “3” (6 remaining schools)

Comments:

APPENDIX B SUMMARY OF THE ECIS DATA.

| 1. | Crichton | Emmons | Haines | Fort Dix | Harker Wylie | Denbo | Stackhouse | Busansky |
|-------|------------|------------|------------|------------|--------------|------------|------------|------------|
| 2 a. | Sep-04 | Sep-04 | Sep-04 | Sep-04 | Sep-04 | Sep-04 | Sep-04 | Sep-04 |
| 2 b. | Oct-04 | Oct-04 | Oct-04 | Oct-04 | Oct-04 | Oct-04 | Oct-04 | Oct-04 |
| 3. | 1 to 5 | 1 to 5 | 1 to 5 | 1 to 5 | 1 to 5 | 1 to 5 | 1 to 5 | 1 to 5 |
| 4. | na | na | na | na | na | 1 to 1 | na | na |
| 5. | individual | individual | individual | individual | individual | individual | individual | individual |
| 6. | 2-3 week | 2-3 week | 2-3 week | 2-3 week | 2-3 week | 2-3 week | 2-3 week | 5 week |
| 7. | 30-60 min | 30-60 min | 30-60 min | 30-60 min | 30-60 min | 30-60 min | 60-90 min | 60-90 min |
| 8. | same | same | same | same | same | same | same | same |
| 9. | 45 min | 45 min | 45 min | 45 min | 45 min | 45 min | 45 min | 45 min |
| 10. | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min |
| 11. | 90 min | 90 min | 90 min | 90 min | 90 min | 90 min | 90 min | 90 min |
| 12. | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min |
| 13. | 9-23 hours | 9-23 hours | 9-23 hours | 9-23 hours | 9-23 hours | 9-23 hours | 9-23 hours | 9-23 hours |
| 14 a. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 14 b. | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 14 c. | - | - | - | - | - | - | - | - |
| 14 d. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 14 e. | - | - | - | - | - | - | - | - |
| 15. | seldom | seldom | occasional | occasional | occasional | occasional | seldom | occasional |
| 16. | 1/week | 3-4/week | 3-4/week | 3-4/week | 3-4/week | 3-4/week | 1/week | 3-4/week |
| 17. | Comment | Comment | Comment | Comment | Comment | Comment | Comment | Comment |
| 18. | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 4 |