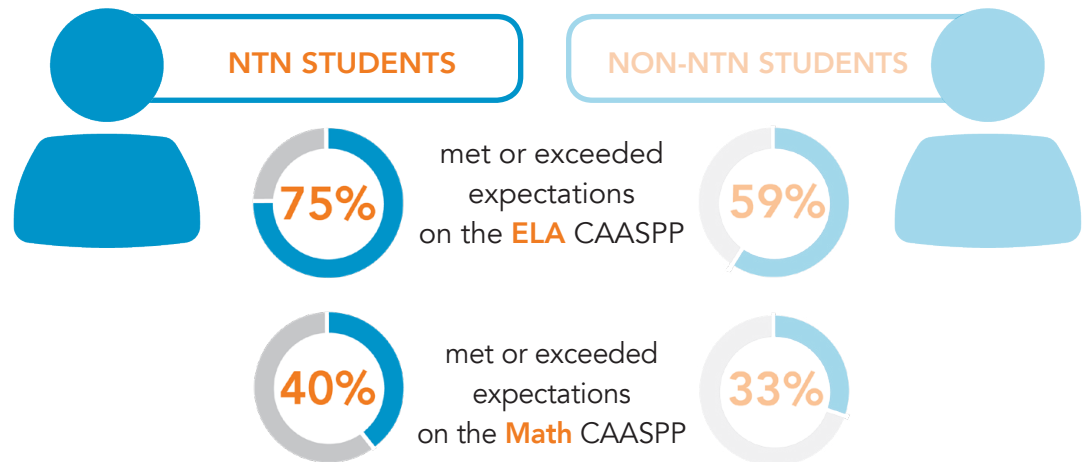




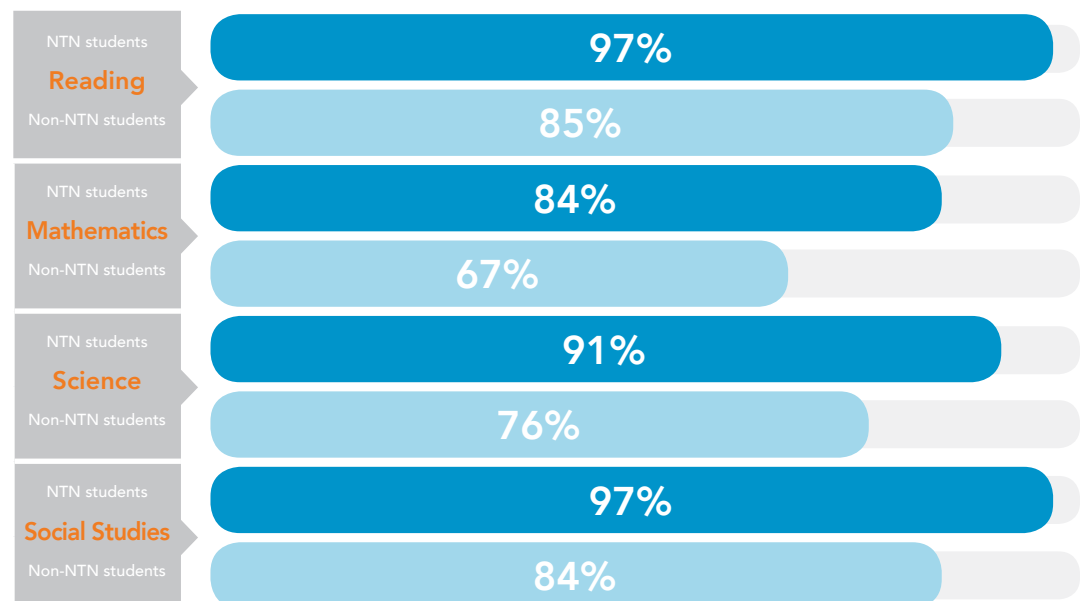
THE PEER-REVIEWED EVIDENCE OF NTN IMPACT

NTN STUDENTS OUTPERFORM ON STATE EXAMS, EXTERNAL ASSESSMENTS, AND ACT/SAT

Students in a New Tech case study school in CA performed better than the statewide average on both the Math and ELA CAASPP exams. Scores were compared for 11th grade students during the 2015-2016 school year and 56% of the NTN students receive free or reduced lunch.⁵



In another case study site in Texas the percentage of students “Meeting Standard” on the 2010-2011 TAKS assessments for all grades was **higher for the NTN students** compared to the non-NTN students in all subjects:⁷



Academic year (AY) 2017-18 end of course (EOC) data from four high schools in Texas offering NTN as a school-within-school (SWS) was used to compare NTN students to non-NTN students.² **Significantly more NTN students** compared to similar non-NTN students **met the “approaches performance band” criteria for all subject areas** (Algebra, Biology, English Language Arts). Chi-squared results suggest that the students in SWS outperform their counterparts on the host campus. A total of 51 statistical comparisons were performed, with 41 being statistically significant. Of these 41 statistically significant comparisons 39 document that the SWS outperforms the host campus, 95% of statistically significant comparisons favor the SWS (Figure 1). All four schools were compared on algebra 1, biology, English I, and English II. US history was available in two of the schools and included sufficient sample in one of the two and was therefore analyzed for one school. In the APPROACHES performance band SWS outperformed host campus in all courses, with statistically significant results in all except 2 comparisons. In the MEETS performance band SWS outperformed the host campus in all courses except Algebra 1 at one school. In the MASTERS performance band, the SWS outperformed the host campus in three of the four schools in all subjects. (See Figure 1.)

	Sub-ject	Approaches							Meets				Masters					
		Total	Did Not Meet Standard		Met Standard			Did Not Meet Standard		Met Standard		Did Not Meet Standard		Met Standard				
HS1	Non-New Tech	A1	276	85	31%	191	69%	*	186	67%	90	33%	*	246	89%	30	11%	*
		B1	306	78	25%	228	75%	*	208	68%	98	32%	*	286	93%	20	7%	ns
		E1	418	268	64%	150	36%	*	336	80%	82	20%	*	414	99%	4	1%	*
		E2	363	205	56%	158	44%	*	270	74%	93	26%	*	358	99%	5	1%	*
	New Tech	A1	81	12	15%	69	85%		37	46%	44	54%		63	78%	18	22%	
		B1	104	10	10%	94	90%		46	44%	58	56%		94	90%	10	10%	
		E1	117	31	26%	86	74%		66	56%	51	44%		110	94%	7	6%	
		E2	103	27	26%	76	74%		43	42%	60	58%		98	95%	5	5%	
HS2	Non-New Tech	A1	213	55	26%	158	74%	*	121	57%	92	43%	*	164	77%	49	23%	*
		B1	402	179	45%	223	55%	*	348	87%	54	13%	*	399	99%	3	1%	*
		E1	560	443	79%	117	21%	*	509	91%	51	9%	*	559	100%	1	0%	*
		E2	413	311	75%	102	25%	*	363	88%	50	12%	*	413	100%	0	0%	*
	New Tech	A1	89	6	7%	83	93%		21	24%	68	76%		55	62%	34	38%	
		B1	119	37	31%	82	69%		88	74%	31	26%		115	97%	4	3%	
		E1	145	89	61%	56	39%		118	81%	27	19%		143	99%	2	1%	
		E2	104	41	39%	63	61%		70	67%	34	33%		102	98%	2	2%	
HS3	Non-New Tech	A1	521	53	10%	468	90%	ns	140	27%	381	73%	*	43	86%	7	52%	*
		B1	736	110	15%	626	85%	*	319	43%	417	57%	ns	626	85%	110	15%	ns
		E1	859	300	35%	559	65%	*	471	55%	388	45%	*	791	92%	68	8%	ns
		E2	744	225	30%	519	70%	*	350	47%	394	53%	*	686	92%	58	8%	ns
		US	600	28	5%	572	95%	ns	128	21%	472	79%	*	294	49%	306	51%	ns
	New Tech	A1	50	5	10%	45	90%		25	50%	35	50%		43	86%	7	14%	
		B1	87	5	6%	82	94%		31	36%	56	64%		74	85%	13	15%	
		E1	90	17	19%	73	81%		32	36%	58	64%		83	92%	7	8%	
		E2	94	12	13%	82	87%		19	20%	75	80%		83	88%	11	12%	
		US	92	1	1%	91	99%		11	12%	81	88%		48	52%	44	48%	
HS4	Non-New Tech	A1	290	74	26%	216	74%	*	198	68%	92	32%	ns	256	88%	34	12%	ns
		B1	356	134	38%	222	62%	*	258	72%	98	28%	*	342	96%	14	4%	*
		E1	483	313	65%	170	35%	*	397	82%	86	18%	*	479	99%	4	1%	*
		E2	397	236	59%	161	41%	*	317	80%	80	20%	*	396	100%	1	0%	*
		US	118	59	50%	59	50%	N/A	96	81%	22	19%	N/A	108	92%	10	8%	N/A
	New Tech	A1	50	5	10%	45	90%		37	74%	13	26%		47	94%	3	6%	
		B1	75	0	0%	75	100%		25	33%	50	67%		57	76%	18	24%	
		E1	84	17	20%	67	80%		42	50%	42	50%		76	90%	8	10%	
		E2	77	17	22%	60	78%		33	43%	44	57%		75	97%	2	3%	
		US	1	0	0%	1	100%		1	100%	0	0%		1	100%	0	0%	

*Significant at $p < .05$
 ns: Not Significant at $p < .05$

Figure 1. Percent met/did not meet standard compared between New Tech and non-New Tech within each performance band for algebra 1 (A1), biology (BI), English language arts 1 (E1), English language arts 2 (E2), and US history (US).



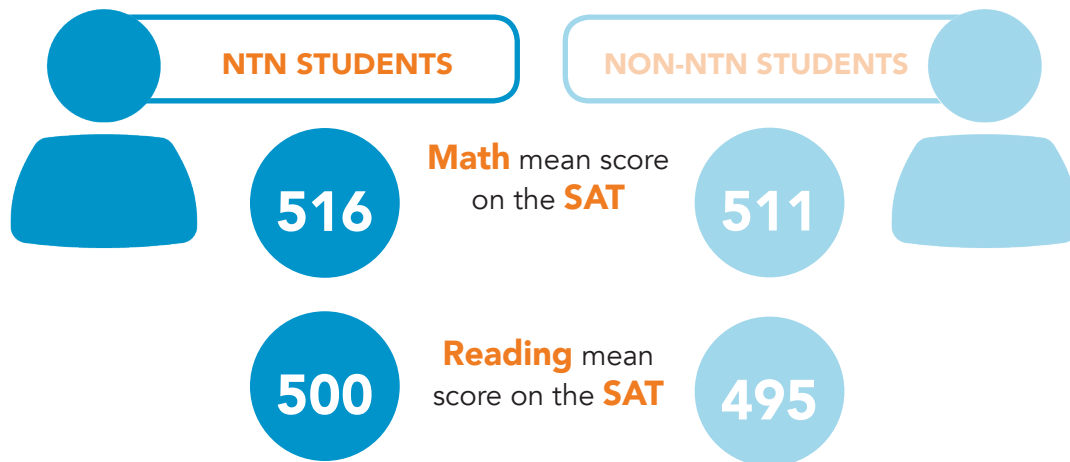
NTN STUDENTS OUTPERFORM ON STATE EXAMS, EXTERNAL ASSESSMENTS, AND ACT/SAT

NEW TECH SCHOOLS OUTPERFORMED

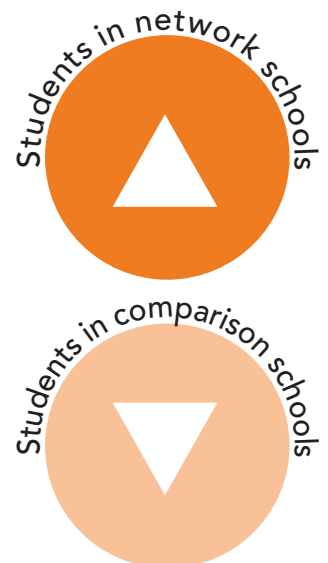
A quasi-experimental design⁸ using academic year (AY) 2015-16 data was used to measure the efficacy of the NTN model on students' academic and workforce skills in the southeastern US. The results of a single-level model analysis and multi-level model both document that New Tech schools outperformed control schools with statistical significance on:

- » **ACT composite scores percent** (NTN Mean = 37.95, SE = 1.55, non-NTN Mean = 31.77, SE = .60)
- » **ACT WorkKeys Mathematics scores** (NTN Mean = 77.71, SE = .37, non-NTN Mean = 76.77, SE = .14)
- In the same study using ANCOVA tests 9th graders outperformed comparison students on:
 - » **End of Course (EOC) math** (NTN Mean = 79.05, SE = .68, non-NTN Mean = 74.46, SE = .44)
 - » **English Language Arts (ELA) exams** (NTN Mean = 78.56, SE = .76, non-NTN Mean = 74.08, SE = .43)

SAT scores were available for 81 out of 116 high school seniors at the CA case study site in 2017. **NTN students performed better** than the national average on both the Math and Reading components of the SAT.⁵

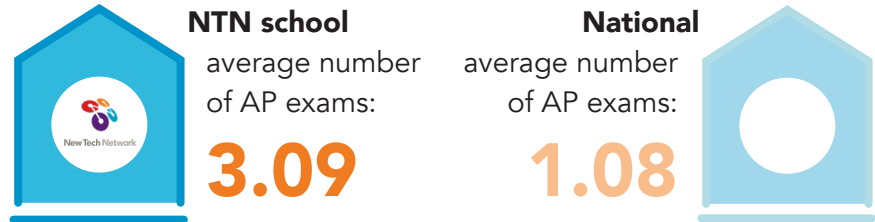


From approximately 2010 to 2017, the Hewlett Foundation sponsored a Deeper Learning Community of Practice, which included New Tech Network and nine other school networks. A quasi-experimental design (Rickles, Zeiser, Yang, O'Day, & Garet, 2019) with a matched comparison group compared deeper learning network schools to non-deeper learning network. **Students in network schools scored 0.10 to 0.12 standard deviations higher on the three OECD PISA-Based Test for Schools (PBTs) reading, mathematics, and science assessments than students in the comparison schools. Similar results were documented on state standardized assessments in ELA (0.05 standard deviations) and mathematics (0.10 standard deviations).**



NTN STUDENTS ARE COLLEGE AND CAREER READY

NTN students exceeded the number of AP exams compared to the national average.⁵ **In the NTN school 69% took at least one AP exam** and of those, **81.25% took two or more AP exams**. National average number of AP exams is 1.80. Of all students who take AP exams nationwide, 56% only took one.



Findings from the quasi-experimental deeper learning network study (Rickles, Zeiser, Yang, O’Day, & Garet, 2019) document **65% of students in network schools graduated within 4 years** from a high school in the same district, compared with **58% of similar students who attended comparison high schools**. Overall, 53% of the students who attended network schools enrolled in a postsecondary institution compared with 50% of the students who attended comparison schools. Higher 4-year college enrollment rates among network school students than comparison school students were documented (22% vs. 18%). (See Figure 2.)

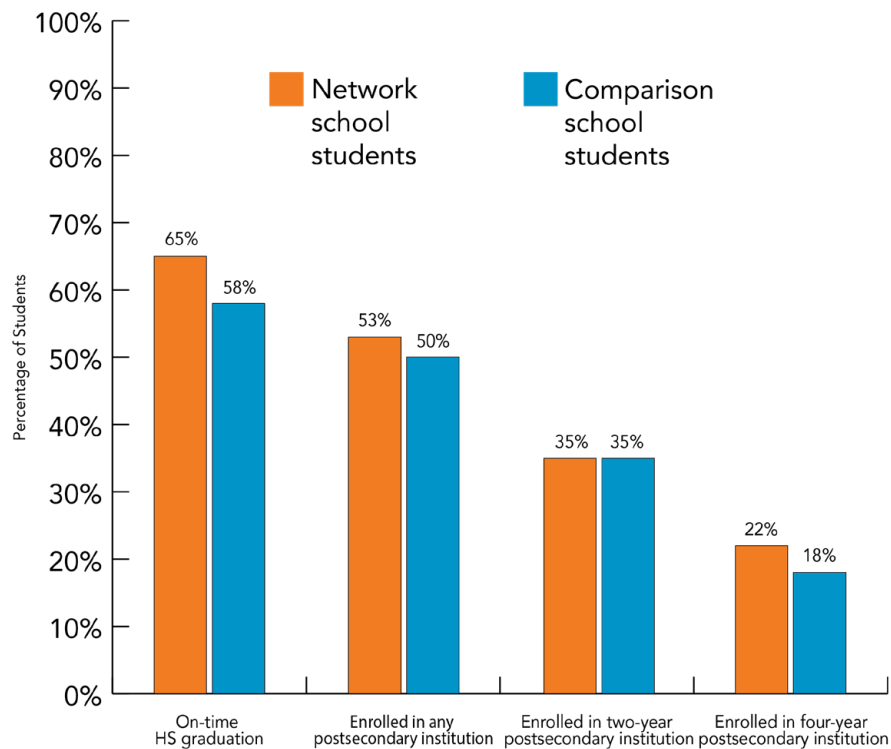


Figure 2. High school graduation and postsecondary enrollment rates for Deeper Learning Network school students and comparison school students.

* Difference between Network and comparison is statistically significant at .05 level.



**THE NTN
MODEL HAS
DOCUMENTED
SUCCESS
SUPPORTING
TRADITIONALLY
UNDERSERVED
STUDENTS**

NTN schools serving high poverty student populations (40% or more FRL) have **higher high school graduation rates** (93%) than the national average for similar schools (75%). For every 100 NTN students, 93 graduate and 55 enroll in college. Nationally, for every 100 students, 75 graduate and only 44 enroll in college.¹



NTN high school
graduation rates:

93%

Similar high school
graduation rates:

75%



For every **100 NTN students**

55

enroll in college



For every **100 US students**

44

enroll in college



The majority of students at the CA case study site receive free or reduced lunch (56%). 98.3% of NTN students graduated high school on time compared to 83% nationwide for the most recent year. Applying to a four-year college was independent of income status and race, NTN students who received free or reduced lunch were equally likely to apply to a four-year college as those who did not ($p > .05$). Nearly all (93.9%) of students who applied to a four-year college were accepted to one, and all accepted elected to attend.

**NEW TECH SCHOOLS
OUTPERFORMED**

A National Science Foundation funded qualitative research study documented **exemplar STEM schools creating new opportunity structures** for students underrepresented in STEM. Opportunity structures are “the formation of inter-relationships between family origins, education, labor market processes, and employers’ recruitment practices that influence, if not determine, a young person’s job or career trajectory”. **NTN PBL implementation enabled access for traditionally underrepresented students to high quality STEM curriculum, instruction, and learning environments** designed to build STEM social capital, dispositions, knowledge, and skills necessary for success in STEM study and careers. **Four critical components were identified:**

“ a flexible and autonomous administrative structure; a college-preparatory, STEM-focused curriculum for all; well-prepared STEM teachers and professionalized teaching staffs; and supports for students in underrepresented groups ”⁷



NTN PBL IS A PATHWAY FOR DEVELOPING PROBLEM SOLVING, CRITICAL THINKING, GRIT, AND INTERPERSONAL/INTRAPERSONAL COMPETENCIES

STRONGER INSTRUCTIONAL METHODS

NTN students reported stronger “instructional methods”, the extent the teacher uses techniques that probe for understanding and provide effective supports, **than non-NTN students on the Youth Truth Survey** (Bergeron, Dugan-Knight, Kamdar, Vorse Wilka, Boesche-Taylor, 2019, April). A stratified sample t-test was used to compare data from NTN schools to a random sample from comparable non-PBL schools based on school characteristics of student population size, geographic locale, and poverty level. The stratified sample analysis found that the factor “Instructional Methods” was rated higher by students at NTN schools than by their peers at non-PBL schools with statistical significance at the 99 percent confidence level. Therefore, holding school demographic variables constant, students at NTN schools rated the group of four items that make up the “Instructional Methods” factor higher than do students at non-PBL schools. Ordinal regression was also used to evaluate differences between NTN and non-NTN schools and yielded results that are largely consistent with the results from the stratified sample approach. The two items reported in the previous section as likely to be rated higher due to the “PBL effect” were associated with higher scores in the regression approach as well.³



NTN elementary students made significant gains in critical thinking as measured by the Insight

Assessment Educate Series (formerly the California Critically Thinking Skills Test) developed by Facione (1990) for 4th grade.³ Change over time was evaluated for statistical significance using the GLM function in SPSS for Repeated Measures comparing pre- and post-test scores.

The **observed average gain** (71.93 (SD=4.838) to 74.18 (SD=5.508) **from pretest to posttest was statistically significant** [$F(1,192) = 27.865, p<.000$].

Rickles, Zeiser, Yang, O’Day, and Garet’s (2019) quasi-experimental design found that **students in network schools reported higher levels of interpersonal and intrapersonal competencies** with effect sizes ranging from .12 to .20 on:





REFERENCES

1. Bergeron, L. (2017, February). Examining Student Outcomes in New Tech Network Title 1 Eligible Schools. Paper presentation at the annual conference of the Eastern Educational Research Association, Richmond, VA.
2. Bergeron, L. (2019, February). Reconsidering research paradigms: using Texas End of Course performance to evaluate innovation in EPISD. Paper presented at the annual meeting of the Southwest Educational Research Association, San Antonio, TX.
3. Bergeron, L., Boesche-Taylor, B., Gehrke, A., Dugan-Knight, M., Kamdar, S., Vorse Wilka, J., & Gittens, C. (2019, March). A multifaceted examination of deeper learning in PBL elementary schools: school culture, critical thinking, and access to opportunity. Paper presented at the annual meeting of the Society for Research on Educational Effectiveness, Washington, DC.
4. Bergeron, L., Dugan-Knight, M., Kamdar, S., Vorse Wilka, J., Boesche-Taylor, B. (2019, April). An Exploration of the Role of Likert Items in School-Based Survey Analysis. Paper presentation at the annual conference of the American Educational Research Association, Toronto, Canada.
5. Gordon, M. & Bergeron, L. (2018, November). Using Different Data Sources to Address the Same Research Questions: Evaluating the Effectiveness of New Curriculum on Student Outcomes. Presentation at the California Education Research Association annual meeting, Anaheim, CA.
6. Hinnant-Crawford, B., Virtue, E., & Bergeron, L. (2019, April). Equity Pedagogy and Project-based Learning as Instructional Weapons in a Post-Truth Era. Paper presentation at the annual conference of the American Educational Research Association, Toronto, Canada.
7. Lynch, S. J., Peters Burton, E., Behrend, T. House, A., Ford, M. Spillane, N., Matray, S., Han, E., Means, B. (2018). Understanding Inclusive STEM High Schools as Opportunity Structures for Underrepresented Students: Critical Components. *Journal of Research in Science Teaching*, 55, 712-748.
8. Stocks, E., Odell, M., & Culclasure, B. (2019, April). The Effect of the New Tech Network Design on Students' Academic Achievement and Workforce Skills. Paper presentation at the annual conference of the American Educational Research Association, Toronto, Canada.



NOTES



NewTech Network