TAPESTRIES: A Successful Elementary Science Curriculum in Metropolitan Toledo

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Foreword

The original research and program funding for TAPESTRIES was supported in part by funding from the National Science Foundation (NSF), project no. 9731306. Subsequent funding has been provided by the participating school districts—Toledo Public Schools and Springfield Public Schools. Funding for this analysis of the effectiveness of the program on students attainment was underwritten by the UT Urban Affairs Center. The views expressed here are not necessarily those of the NSF. Special thanks goes to Connie Black-Postl, Janet Struble, and Jodi Haney for their assistance on the research.

Executive Summary

The **T**oledo **A**rea **P**artnership in **E**ducation: **S**upport **T**eachers as **R**esources to **I**mprove **E**lementary **S**cience **(TAPESTRIES)** is a collaborative partnership between the fourth largest urban school district in Ohio - Toledo Public Schools (TPS), a suburban district - Springfield Local Schools (SLS), and the Colleges of Education and Arts and Sciences at two universities - The University of Toledo (UT) and Bowling Green State University (BGSU). Funded by the National Science Foundation (NSF) it is designed to achieve a comprehensive, system-wide transformation of K-6 science education and to improve science teaching and learning through sustained professional development of all K-6 teachers.

This study on the impact of the TAPESTRIES program found that for comparable schools, the more involved specific school administrators and teachers were in the TAPESTRIES program, the greater the improvement in their students' performance on the Science portion of State proficiency tests. Specifically,

- Science proficiency scores improved after the implementation of the TAPESTRIES program in Toledo Public Schools.
- Sixth grade Proficiency Scores were improved at schools highly involved in TAPESTRIES as compared to those minimally involved in the program.
- Student achievement (4th and 6th grade) differed significantly between the schools with the highest and those with the lowest percentage of teachers' professional development (PD) hours.
- The cumulative effect of TAPESTRIES trained teachers is associated with increased student achievement.
- When comparing the percent pass rate of 4^{th} and 6^{th} grade students whose teachers participated in the TAPESTRIES program, **the TPS schools outranked all other large urban school districts in Ohio (Toledo is the 4^{th} largest city) on the 2002 science proficiency tests.**
- School reform is a slow process, and school/university partners must promise long-term commitments to sustain systemic change. To improve both science education and student proficiency scores, schools and teachers must follow the lead of the Toledo and Springfield teachers, administrators, and district boards, and actively support TAPESTRIES (and/or similar) programs to help maintain and further refine these effective educational innovations.

Introduction

Both the TPS and SLS school districts face severe challenges in raising student achievement in science, and TPS is ranked as an "at risk" school district by the state's 2002 standards. TPS has a student enrollment of 37,315, including 46.73% qualifying for free or reduced lunch. Nearly one third of its students are from single-parent homes and/or living below the poverty level. Of the system's nearly 40,000 students (K-12, 45.1% are Caucasians, 46.0% are African American, 6.7% are Hispanic, 1.3% multi-racial, and .01% other cultural groups. The TAPESTRIES project (which was initially funded for 5 years by the National Science Foundation and is now funded with local district monies) has five goals:

1. To develop, support, and utilize a cadre of Support Teachers along with other sufficient support structures in order to provide local leadership for the implementation of effective science programs within their districts (evaluated by yearly questionnaires & interviews).
2. To provide effective and sustained professional development for all K-6 teachers of science in the participating school districts (evaluated by teacher and principal questionnaires and outside evaluator ratings of professional development sessions).
3. To implement quality inquiry-based science curriculum and instruction in classrooms that are consistent with local, state, and national recommendations so that all students may receive opportunities to become scientifically literate (measured by a comprehensive questionnaire provided by Horizons Research Institute, trained evaluator's observations of teachers' classrooms, and the science proficiency scores of 4^{th} and 6^{th} grade students).
4. To coordinate curriculum, classroom practice, and student assessment with the district adopted science courses of study and statewide assessments (evaluated by a comprehensive questionnaire provided by Horizons Research Institute).
5. To enhance the science content knowledge of elementary teachers in physical, earth/ space, and life science (monitored in summer courses).

Key Organizational Components

The key organizational components of the TAPESTRIES program play a critical role in the implementation of systematic reform of science education, are:

Support Teacher Development – Sixteen Support Teachers, elementary teachers who are given full time release from teaching responsibilities, provide assistance to classroom teachers implementing science inquiry, help teachers with district assessments, and execute their district action plans for improving science literacy. Support Teachers receive more than 200 contact hours of leadership training in the form of a two-week Summer Institute, 2 three-semester-hour courses, a staff retreat, and a spring conference.

Project Staff Retreat – To establish a cohesive project staff with shared philosophies, expectations, and true collaborative decision-making, the entire project staff (science educators, scientists, elementary Support Teachers, and graduate assistants) attends a two-day retreat each spring. This retreat prepares the staff for the summer institute by informing them of latest research on science teaching and learning, by reflecting on comments made by teachers'

evaluations from previous years, and by developing a plan of action in content and pedagogy for the upcoming Summer Institute and the following academic year.

Summer Institutes **–** Six, two-week-long Summer Institutes for classroom teachers have been conducted each year for the last five years at UT and BGSU. Teachers participate in sessions aligned with the *National Science Education Standards* that focus on inquiry-based instruction, science content knowledge, and science process culled from the districts' K-6 scope and sequence and adopted curriculum (FOSS, STC, and Scholastic kits). The Institutes run eight hours a day for two weeks (80 contact hours). The summer institutes are co-taught by science educators, Support Teachers from TPS and SLS, and scientists from UT and BGSU.

Local Academic Year Activities **–**Professional development is sustained during the academic year by focusing on the implementation of the curriculum and assessments. The Support Teachers visit an assigned cohort of teachers biweekly. They provide assistance with science curriculum preparation, give strategies for teaching science, supply science content background information (if necessary, with the help of the university scientists), assist with classroom and district science performance-based assessments, model science lessons, and offer peer coaching for the classroom teacher. Each teacher conducts a "research lesson" - a Japanese-style lesson study that involves the teacher writing a lesson in the inquiry style 5-E learning cycle model (Bybee & Landes, 1988). The teacher's assigned Support Teacher views the lesson, critiques its effectiveness utilizing the NSF-Horizon Research Institute "Classroom Observation Protocol," and provides written feedback to the teacher. Subsequently, the teacher writes a two-page reflective analysis of the lesson identifying specific strengths and weaknesses. The research lesson assignment gives each teacher an opportunity to analyze his or her teaching and receive constructive feedback from a peer in a nurturing environment. These academic year activities provide 24 additional hours of professional development. Nearly 1000 classroom teachers (approximately 72% of all of the district's elementary teachers) have received 104 hours of staff development in science content, pedagogy, and assessment as they implement their curriculum.

Annual Science Symposium **–** A symposium is held each year for TAPESTRIES teachers. The symposium provides professional development and support for implementing science inquiry. Topics focus on science teaching ideas, activities, and resources than can improve teaching and student learning. These sessions are facilitated by the entire project staff and invited speakers (i.e., community leaders, Center Of Science and Industry, Toledo Zoo, and MetroParks).

Retreat for Principals **–** All principals participate in a one-day retreat and follow-up sessions throughout the academic year. Model lessons are presented, and principals are made aware of science education reform research. Additionally, the TAPESTRIES leaders solicit their support for the project and their input on the challenges of implementing science reforms.

Community Involvement – Support Teachers schedule two local community meetings to involve city leaders, parents, and local principals in this science reform effort. These meetings take many forms - - i.e., family science days, PTO meetings, and proficiency test information sessions.

Newsletter –TAPESTRIES has a presence throughout the district in the form of a newsletter published fall and spring. The newsletters contain information about the program, research articles, data about the program's effectiveness, teaching tips, and anecdotal field accounts.

Web Site - A web site (http://www.tapestries.ut-bgsu.utoledo.edu) serves as a networking and information platform. The "Ask a Scientist" feature, for example, gives classroom teachers the opportunity to ask questions of the university scientists. Under "Resources" a variety of tools are provided such as lesson plans, sample assessments, teacher tested tips for implementing the science kits, and links to useful web sites related to the kit topics.

Research Questions

After five years of NSF funding, we applied for an Urban Affairs Center Research grant to study the primary question:

Is there evidence that the TAPESTRIES program had a positive impact on K-6 pupil learning in the Toledo Public Schools?

Related research questions included:

1. *Did science proficiency scores improve significantly after the implementation of the TAPESTRIES program in Toledo Public Schools?*
2. *Do proficiency scores for sixth graders in high implementation schools differ significantly from those at the low implementation schools?*
3. *Does student achievement (4th and 6th grade) differ significantly between the schools with the highest percentage of teachers' professional development (PD) hours and schools with the lowest percent of professional development (PD) hours?*
4. *What is the cumulative effect of TAPESTRIES trained teachers on student achievement?*

Methodology

We measured the impact of the TAPESTRIES program with 1) classroom observations and 2) by tracking and comparing 4th and 6th grade Ohio science proficiency score gains over 5 years. One of the most substantial measurement challenges we overcame (and one that few districts accomplish) was to collect data over multiple years that tracked students to the teachers they had over the course of their elementary experience. This oftentimes meant tracking transient students through one or more teachers in a given year and linking them through complex databases to their teachers and the records we kept regarding the teacher's accumulated TAPESTRIES professional development hours, classroom or school location, and classroom observation ratings.

Classroom Observations - The first step to making a positive impact on K-6 pupil learning is to improve the quality of classroom teaching. To measure the quality of teaching, we conducted yearly observations of classroom teacher's teaching using Horizons Classroom Observation (rating the lesson design, implementation, classroom culture, accuracy of science content, and overall effectiveness in helping students learn science). The ratings range from 1-8 with 8 being

the highest score. National Science Foundation conducted the observations, and Horizon Research, Inc. trained the observers. There were significant improvements in teaching scores for those teachers who attended the TAPESTRIES institutes. The average score for a teacher who went through TAPESTRIES was 5.17. For teachers who had not gone through TAPESTRIES, their teaching score was 3.75 on a scale of 1 to 8.

Ohio Proficiency Tests - A second means of evaluating the program's impact on K-6 pupil learning is to examine the effect on 4th and 6th grade Ohio's Proficiency Test scores. Based on the availability of both 4th and 6th grade proficiency scores in Toledo Public Schools from 1998-2002, an initial sample consisted of 21,773 students. However, after the transient students were removed from the data set, the sample was reduced to 8,060 students. For these 8,060 students, both 4th and 6th grade science proficiency scores were available, and the students could be tracked to their teachers in TPS. Therefore, this matched sample data set was used for all statistical analyses. The following findings were found:

Findings

1. **Science proficiency scores improved after the implementation of the TAPESTRIES program in Toledo Public Schools.**

Independent t-tests were performed to examine difference in achievement before and during the TAPESTRIES implementation. For 4th grade scores, 10 schools significantly increased their average test scores during the TAPESTRIES implementation. Twenty-eight schools experienced no significant changes in proficiency scores, but 15 of these schools had trends toward higher scores after the TAPESTRIES implementation. See Table 1 (Tables are Appended to this report).

Independent t-tests were performed to examine differences in achievement before and during TAPESTRIES. For 6th grade scores, 20 schools (more than 50%) significantly increased their average test scores during the TAPESTRIES implementation. Eighteen schools experienced no significant changes in proficiency scores, but 10 of these 18 schools had trends toward higher scores after the TAPESTRIES implementation. See Table 2.

2. **High implementation school's proficiency scores for sixth grade were higher than those at the low implementation schools**.

Ten elementary schools known to be similar in demographics but markedly different with respect to participation in TAPESTRIES were ranked and paired by lead TPS Support Teachers regarding level of implementation of inquiry-based science. Level of implementation was defined as level of participation in TAPESTRIES inquiry-based science program, support of science reform by the administrator in the school, and parent/community support of science. To examine differences in student achievement at high and low implementation schools in 1998 – 2001, a two-way ANOVA was performed for each pair of schools. The results revealed that significant differences existed between the five pairs of schools. Tests of between-subjects effects revealed that no significant differences existed between the pairs of schools, but in every case, the high implementation school's proficiency scores were higher than those at the low implementation school. See Table 3.

3. **Student achievement (4th and 6th grade) differed significantly between the schools with the highest percentage of teachers' professional development (PD) hours and lowest percent of professional development (PD) hours.**

The 1998-1999 student proficiency scores were matched with the 1998-1999 PD hours. The 1999-2000 student proficiency scores were matched with the total of PD hours of the teachers these students had in 1998-1999 and 1999-2000. The 2000-2001 student proficiency scores were matched with the total of PD hours of the teachers these students had in 1998-1999, 1999-2000, and 2000-2001. Finally, the 2001-2002 student proficiency scores were matched with the total of PD hours of the teachers these students had in 1998-1999, 1999-2000, 2000-2001, and 2001-2002. Computing total PD hours across years allowed for accounting for the effect of the accumulated long-term PD. A total of 10,507 fourth grade data and 9,699 sixth grade data were analyzed. Correlating student performance on the proficiency test in science and PD hours of the teachers these students had the year they took the test yielded a significant positive relationship at both 4th grade and 6th grade levels (see Tables 4 and 5).

4. **The cumulative effect of TAPESTRIES trained teachers is associated with increased student achievement.**

Student achievement scores in science were considered in terms of the TAPESTRIES training of the teachers the students had when they took the 4th or 6th grade test. A new variable was created with 0 = prior years, 1 = TAPESTRIES year but no TAPESTRIES trained teacher in either 4th or 6th grade and 2 = TAPESTRIES year and having a TAPESTRIES trained teacher.

For 4th grade, a one-way ANOVA revealed an overall significant difference among the categories of the independent variable. The post-hoc test revealed that a highly significant difference exists in the achievement during TAPESTRIES years when students had one or more TAPESTRIES trained teacher compared to student achievement during the years before TAPESTRIES – the average test score is significantly higher when students had one or more TAPESTRIES years compared to the average achievement before TAPESTRIES. A highly significant difference was also observed in student achievement during TAPESTRIES between students who had one or more TAPESTRIES trained teacher and students who had no TAPESTRIES trained teacher – the average test score is significantly higher for students who had one or more TAPESTRIES trained teachers.

For 6th grade, a one-way ANOVA also revealed an overall significant difference among the categories of the independent variable. The post hoc analyses showed that students all three groups (before TAPESTRIES, during TAPESTRIES but having no TAPESTRIES trained teacher, and during TAPESTRIES and having one or more TAPESTRIES trained teacher) differed in their science achievement. The average test score is significantly higher for those students who had one or more TAPESTRIES trained teacher compared to the two other groups.

Stated differently, **when comparing the percent pass rate of 4th and 6th grade students whose teachers participated in the TAPESTRIES program, the TPS schools outranked all other**

large urban school districts in Ohio (Toledo is the 4th largest city) on the 2002 science proficiency tests. See Chart 1 below:

Chart 1. *Percent Pass Rate for Five Largest Urban School Districts in Ohio*

School District	Percent Pass
Grade 4	
Toledo Public (students of TAPESTRIES trained teachers)	38%
Cleveland City	26%
Columbus City	35%
Cincinnati City	36%
Dayton City	21%
Grade 6	
Toledo Public (students of TAPESTRIES trained teachers)	34.5%
Cleveland City	25%
Columbus City	29%
Cincinnati City	32%
Dayton City	19%

Policy Implications and Recommendations

Based on these findings, the following policy and recommendations are offered:

1. Partnerships among school districts and university require cross-disciplinary approaches that foster growth in teachers' content knowledge and pedagogical skills.
2. School reform is a slow process, and school/university partners must promise long-term commitments to sustain systemic change.
3. Successful school reform must be systemic…including administrators, teachers, union leaders, parents, higher education partners, and community members.
4. The National Science Foundation and other Federal agencies need to provide funding to research the impact of programming on student achievement.
5. Teacher Leadership is a necessary component of school reform.
6. Reform efforts must coordinate curriculum, classroom practice, and student assessment with the district adopted science courses of study and statewide assessments.
7. Districts seeking to improve both science education and student proficiency scores need to become actively involved in TAPESTRIES (and/or similar) programs, and districts must follow the examples of Toledo and Springfield and provide funding to help maintain and further refine these effective educational innovations.

Conclusion

In summary, this partnership is not a test carried out by a small number of university faculty in a few chosen classrooms. It is a local systemic change program with considerable numbers of individuals and it has had a significant impact. Over 5 years, the program involved nearly 1000

teachers (72% of the total elementary teachers), over 20,000 elementary students, hundreds of parents and community members, 100 principals and assistant principals, and over 60 university faculties in the colleges of education and arts and sciences at two universities. The TAPESTRIES program made significant gains in achieving its goals of improving teaching and learning and has helped the districts continue to move in a striking manner beyond the initial grant-funded phase. Superintendents of both school districts and the school board of TPS elected this past year to finance the continuation of the program from their own budgets when the NSF funding ended. This decision is not one to be taken lightly considering the budgetary constraints in Ohio at this time.

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Appendix

Table 1. *4th Grade Proficiency Scores Before and After Implementation of TAPESTRIES Program (1996-2002)*

		Before TAPESTRIES, 1996-1998		During TAPESTRIES, 1998 – 2002			
Code	School	M	SD	M	SD	df	t
100	Arlington	208.09	29.93	211.16	29.46	395	-1.031
111	Elmhurst	215.89	31.84	220.22	27.72	313	-1.285
110	Edgewater	212.93	31.78	208.29	30.89	226	1.099
130	Larchmont	198.42	33.41	201.19	30.04	309	-0.755
150	Riverside	189.09	28.65	190.16	31.17	558	-0.416
156	Spring	166.67	30.41	171.27	30.61	602	-1.825
112	Fall Meyer	218.76	28.26	218.86	27.74	258	-0.027
104	Burroughs	202.23	33.10	218.65	29.93	443	-5.463***
159	Walbridge	199.98	28.90	202.36	28.73	452	-0.862
162	Westfield	178.20	28.23	180.07	29.12	353	-0.591
160	Warren	161.01	26.82	172.27	28.46	199	-2.752**
131	Lincoln	189.52	27.02	176.06	31.58	298	3.563***
134	McKinley	195.19	29.18	193.07	29.21	575	0.843
132	Longfellow	205.27	30.60	212.32	32.83	828	-3.158**
149	Reynolds	190.10	30.69	189.73	28.62	457	0.132
163	Whittier	203.14	32.94	192.44	31.86	830	4.692***
102	Beverly	234.15	30.68	227.18	34.90	226	1.593
103	Birmingham	186.71	27.68	199.97	35.93	296	-3.376***
105	Chase	180.18	29.58	176.23	28.24	253	1.088
106	Cherry	181.42	28.04	177.32	29.90	427	1.414
107	Crossgates	211.36	32.29	210.86	39.25	317	0.121
109	ES Central	183.81	28.36	190.28	29.39	452	-2.360*
114	Franklin	198.56	30.92	197.72	25.24	296	0.257
115	Fulton	171.97	29.06	173.32	30.60	405	-0.444
116	Garfield	190.89	32.42	189.64	31.54	348	0.358
119	Glenwood	168.91	27.83	172.90	27.42	476	-1.525
121	Hale	168.74	27.98	181.08	91.87	639	-2.085*
123	Harvard	221.87	31.11	227.36	33.93	247	-1.290
124	Hawkins	215.84	30.45	207.27	32.67	451	2.773*
127	Keyser	181.91	29.94	206.49	33.31	455	-8.070***
129	Lagrange	181.93	33.17	174.07	29.64	315	2.220*
135	Mt Vernon	184.99	28.16	189.65	29.48	335	-1.466
136	Marshall	191.70	30.99	185.88	30.39	386	1.833
138	Navarre	185.69	33.22	189.43	30.31	375	-1.138
139	Newbury	187.94	27.82	199.71	38.36	351	-3.139**
140	Oakdale	190.34	29.66	193.07	36.69	460	-0.832
141	Old Orchard	199.79	38.54	204.53	32.64	409	-1.351
142	Ottawa River	210.89	28.93	106.97	33.43	188	0.845
145	Pickett	166.56	26.51	162.06	27.44	528	1.864
148	Raymer	195.32	33.98	188.07	31.09	517	2.513*
152	King	169.75	26.43	167.68	28.21	469	0.792
154	Sherman	166.47	28.81	171.66	28.75	569	-2.059*
157	Stewart	165.96	28.13	173.79	26.61	373	-2.740**

*p < .05. **p < .01. ***p < .001.

Green background indicates schools with improved scores.
Yellow background indicates schools with declining scores.

Table 2. *6th Grade Proficiency Scores Before and After Implementation of TAPESTRIES Program (1996-2002)*

		Before TAPESTRIES, 1996-1998		During TAPESTRIES, 1999 – 2002			
Code	School	M	SD	M	SD	df	t
100	Arlington	193.05	21.79	197.59	21.11	479	-2.301*
111	Elmhurst	211.60	20.00	205.59	22.28	308	2.427*
110	Edgewater	187.88	18.80	202.38	19.66	168	-4.852***
130	Larchmont	193.86	25.37	193.28	18.96	252	0.203
150	Riverside	174.41	20.34	179.10	21.37	486	-2.413*
156	Spring	172.97	21.82	177.41	23.29	608	-2.380*
112	Fall Meyer	189.31	20.40	197.94	19.24	231	-3.312**
104	Burroughs	189.50	22.36	193.27	18.96	419	-1.872
159	Walbridge	186.43	21.88	191.55	20.32	404	-2.394*
162	Westfield	185.33	20.61	180.99	19.87	302	1.849
160	Warren	167.06	16.08	178.33	20.87	157	-3.706***
131	Lincoln	177.64	21.05	175.58	21.89	216	0.588
134	McKinley	180.41	24.97	184.28	21.39	559	-1.932
132	Longfellow	196.40	20.85	204.10	21.53	757	-4.927***
149	Reynolds	186.01	19.92	187.72	19.87	380	-0.829
163	Whittier	187.40	22.45	188.95	20.27	809	-1.028
102	Beverly	211.63	23.39	205.11	24.59	273	2.167*
103	Birmingham	180.57	23.94	180.30	20.35	267	0.098
105	Chase	176.65	20.90	179.02	19.75	218	-0.861
106	Cherry	174.36	18.66	179.13	22.02	299	-2.028*
107	Crossgates	199.76	23.40	196.34	24.35	266	1.141
109	ES Central	182.25	21.26	185.60	22.16	402	-1.521
114	Franklin	187.73	19.87	191.28	22.05	292	-1.431
115	Fulton	168.09	19.92	178.71	20.79	331	-5.017***
116	Garfield	179.81	21.49	184.63	19.72	336	-2.148*
119	Glenwood	172.46	20.53	176.67	21.87	436	-2.020*
121	Hale	169.94	21.35	174.00	19.49	582	-2.394*
123	Harvard	196.85	25.48	203.47	21.77	246	-2.186*
124	Hawkins	194.16	23.55	194.43	20.73	484	-0.135
127	Keyser	176.69	21.61	187.77	19.02	391	-5.350***
129	Lagrange	180.05	22.15	192.06	24.46	241	-3.854***
135	Mt Vernon	185.61	18.71	181.76	21.31	388	1.834
136	Marshall	176.61	21.70	181.68	23.16	337	-2.056*
138	Navarre	185.17	19.31	180.59	23.59	362	2.000*
139	Newbury	178.22	21.70	182.98	22.16	297	-1.832
140	Oakdale	188.10	22.60	198.25	22.95	399	-4.387***
141	Old Orchard	193.10	25.92	192.47	24.35	415	0.257
142	Ottawa River	204.40	20.73	192.88	25.98	152	2.894*
145	Pickett	162.20	19.36	173.45	17.62	477	-6.599***
148	Raymer	189.03	23.38	184.67	24.32	481	1.955
152	King	167.97	20.59	177.37	17.79	387	-4.785***
154	Sherman	169.72	23.29	172.90	20.20	501	-1.602
157	Stewart	165.63	18.90	175.63	17.48	312	-4.825***

*p < .05. **p < .01. ***p < .001.

Green background indicates schools with improved scores.
Yellow background indicates schools with declining scores.

Table 3. *Group Differences in Achievement by School Implementation Level for Paired Schools*

	Low Implementation			High Implementation			
School	M	SD	School	M	SD	df	t
Larchmont	194.9	20.1	Edgewater	201.3	20.0	197	-2.16*
Spring	177.3	22.0	Riverside	181.2	21.0	529	-2.10*
Burroughs	193.3	19.9	Fall Meyer	195.8	18.4	330	-1.15
Westfield	180.7	20.5	Walbridge	190.3	22.0	356	-4.17***
Whittier	188.4	20.9	Reynolds	190.7	19.5	563	-1.24

*p < .05. **p < .01. ***p < .001.

Table 4. *4th Grade Correlation of Student Performance and PD Hours of the Teachers*

Correlations

		SSS_4 Scaled Science Score, 4th grade	PD
SSS_4 Scaled Science Score, 4th grade	Pearson Correlation	1.000	.060**
	Sig. (2-tailed)	.	.000
	N	10502	10428
PD	Pearson Correlation	.060**	1.000
	Sig. (2-tailed)	.000	.
	N	10428	10433

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5. *6th Grade Correlation of Student Performance and PD Hours of the Teachers*

Correlations

		SSS_6 Scaled Science Score, 6th grade	PD
SSS_6 Scaled Science Score, 6th grade	Pearson Correlation	1.000	.094**
	Sig. (2-tailed)	.	.000
	N	9699	9699
PD	Pearson Correlation	.094**	1.000
	Sig. (2-tailed)	.000	.
	N	9699	9699

**. Correlation is significant at the 0.01 level (2-tailed).