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Improving Elementary School Quality Through the Use of a Social-Emotional and Character Development Program: A Matched-Pair, Cluster-Randomized, Controlled Trial in Hawai'i

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Abstract

BACKGROUND—School safety and quality affect student learning and success. This study examined the effects of a comprehensive elementary school-wide social-emotional and character education program, Positive Action, on teacher, parent, and student perceptions of school safety and quality utilizing a matched-pair, cluster-randomized, controlled design. The Positive Action Hawai'i trial included 20 racially/ethnically diverse schools and was conducted from 2002–2003 through 2005–2006.

METHODS—School-level archival data, collected by the Hawai'i Department of Education, were used to examine program effects at 1-year post-trial. Teacher, parent, and student data were analyzed to examine indicators of school quality such as student safety and well-being, involvement, and satisfaction, as well as overall school quality. Matched-paired *t*-tests were used for the primary analysis, and sensitivity analyses included permutation tests and random-intercept growth curve models.

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RESULTS—Analyses comparing change from baseline to 1-year post-trial revealed that intervention schools demonstrated significantly improved school quality compared to control schools, with 21%, 13%, and 16% better overall school quality scores as reported by teachers, parents, and students, respectively. Teacher, parent, and student reports on individual school-quality indicators showed improvement in student safety and well-being, involvement, satisfaction, quality student support, focused and sustained action, standards-based learning, professionalism and system capacity, and coordinated team work. Teacher reports also showed an improvement in the responsiveness of the system.

CONCLUSIONS—School quality was substantially improved, providing evidence that a school-wide social-emotional and character education program can enhance school quality and facilitate whole-school change.

Keywords

school quality; school climate; social and emotional learning; character education; randomized experiment; matched-pair

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A safe, healthy-learning environment promotes student success, and quality schools generally deliver more admirable citizenry. A healthy school environment is a productive, nurturing, supportive, and positive climate.[1] Unfortunately, all too often students are exposed to unsafe learning environments,[2] and school quality could be enhanced. For example, many schools could do more to increase family and community involvement[3] and promote a positive school climate.[4] To solve these and related burgeoning problems, policy makers, practitioners, and researchers have sought to develop strategies for strengthening school quality to positively impact student outcomes.

School quality includes a safe environment, involvement and satisfaction among individuals, student support, continuous improvement, open communication, standards-based learning, professionalism, and team work. Policymakers have made numerous efforts to affect school quality and mitigate problem behaviors, such as substance use and violent behaviors. During the last 2 decades, for example, the Safe and Drug-Free Schools and Communities Act and the Gun-Free Schools Act have been enacted to attempt to prevent violence in and around schools.[4] Although many policies mandate school-level plans and programs, many other policies provide only guidelines, and schools may have limited resources and personnel to adequately improve school quality. Furthermore, reform efforts that have confined themselves to the school have reported few results,[5] and policies may have limited influence when they focus only on specific problem behaviors and do not address other multifaceted, underlying influences such as students' sense of self and social attachment.[6]

Beyond policy, practitioners and researchers have used additional approaches seeking to increase school quality. Although some programs have shown promise, similar to policy approaches they have often focused on specific problem behaviors and have had limited results.[7,8] During more recent years, a movement has occurred toward more integrative, comprehensive programs that address co-occurring behaviors and involve families and communities,[9,10] such as some social-emotional and character development (SECD) programs.[11]

SECD programs, comparable to social and emotional learning,[12,13] can be effective when implemented comprehensively and with fidelity.[11,14] Some SECD programs coincide with a trend toward facilitating whole-school change and improving entire school quality. One example of such a program currently being used nationally is the Positive Action (PA)

program. The PA program is a comprehensive, school-wide SECD program designed to improve academics, student behavior, and character.[15]

Extant Positive Action Empirical Studies

Two of the first studies[16,17] that examined PA utilized quasi-experimental designs and matched-control comparisons to examine archival School Report Card (SRC) data on achievement and disciplinary outcomes. Overall, the studies reported beneficial effects on student achievement (eg, math, reading, science) and problem behaviors (eg, suspensions, violence rates) and provided preliminary evidence regarding the effects of PA on school-level outcomes. Subsequently, to increase the likelihood that observed posttest differences were due to the intervention, Snyder and colleagues[18] utilized a randomized design (ie, the randomized trial described herein) to examine SRC data, collected by the Hawai'i Department of Education (HDE), on academic achievement, absenteeism, and disciplinary outcomes. Substantial effects were found at posttest, with improved results at follow up. At 1-year post-trial, intervention schools scored better on standardized tests for reading and math; better in state test scores for reading and math; and intervention schools reported lower absenteeism and fewer suspensions and retentions. Overall, the research demonstrates that PA can concomitantly and positively affect school-level outcomes of achievement and negative behaviors.

Utilizing student and teacher self-report data from 2 randomized trials (Hawai'i and Chicago), Beets and colleagues[19] and Li and colleagues[20] examined the preventive benefits of PA on rates of student self-report and teacher reports of student substance use, violence, and voluntary sexual activity. Overall, results indicated lower rates of substance use, violence, and sexual activity among students attending PA schools. In summary, the prior PA-related research provides substantial support for SECD education and its ability to improve multiple behavioral domains. However, to date, no study has examined the PA program's influence on overall school quality.

The purpose of the current research is to (1) build upon previous work[18] by using archival school-level data and a randomized design and (2) be the first study investigating the impact of PA on school-level indicators of school quality, thereby examining the ability of a SECD program to create contextual, whole-school change. The following hypotheses were proposed: (1) intervention schools would demonstrate improved overall school quality as compared to controls and (2) teacher, parent, and student reports on school quality would show that intervention schools demonstrated improvements on multiple indicators of school quality, such as safety and well-being, involvement, and satisfaction.

METHODS

Sample and Design

The PA Hawai'i trial was a matched-pair, cluster-randomized, controlled trial, conducted in Hawai'i elementary schools during 2002–2003 through 2005–2006, with a 1-year follow-up in 2007. The trial took place in 20 public elementary (K-5th or K-6th) schools (10 matched-pairs based on characteristics such as percentage free or reduced-price lunch, school size, ethnic distribution, and standardized test scores) on 3 Hawai'ian islands and is described in more detail elsewhere.[18] The state is 1 large school district with a recognized need for improvement (ie, low standardized test scores and a high percentage of students receiving free or reduced-price lunch).

Intervention and control schools were similar on matching indicators at baseline, with a racially/ethnically diverse student population and mean enrollment of 544 students (SD = 276.4). Intervention schools were offered the PA program free of charge and control schools

were offered a monetary incentive during the randomized trial and the program upon completion of the trial. Three of the 10 control schools chose to receive the program after the formal trial; they were treated as controls at the follow up to this study, as anecdotal evidence suggests that they did not fully implement the program, and it is likely that schools need several years to fully implement a comprehensive program to see substantial benefits.[19,20]

Program Description

The PA program (http://www.positiveaction.net), first developed in 1977 and revised since then as a result of process and outcome evaluations, is grounded in a broad theory of self-concept,[21–23] is consistent with ecological theories such as the Theory of Triadic Influence,[6] and is described in detail elsewhere.[15–17] The full PA program consists of K-12 classroom curricula, of which only the elementary curriculum was used in the present randomized trial; a school-wide climate development component, including teacher/staff training by the developer, a PA coordinator's (principal's) manual, school counselor's program, and PA coordinator/committee guide; and family- and community-involvement programs. This study did not include the more intensive family kit or the community-development component of PA.

The sequenced elementary curriculum consists of 140, 15- to 20-minute lessons per grade, per academic year, provided by classroom teachers. When fully implemented, the total time students are exposed to the program during a 35-week academic year is approximately 35 hours. Lessons cover 6 major units on topics related to self-concept, physical and intellectual actions, social/emotional actions for managing oneself responsibly, getting along with others, being honest with yourself and others, and continuous self-improvement. The classroom curricula, school-climate kit, and other components of the program each encourage and reinforce the 6 units of PA.

Prior to the beginning of each academic year, teachers, administrators, and support staff (eg, counselors) attended PA training sessions conducted by the program developer. The training sessions lasted approximately 3 to 4 hours for the initial year, and 1 to 2 hours for each successive year. Booster sessions, conducted by a project coordinator and lasting approximately 30 to 50 minutes, were provided an average of once per academic year for each school, and were intended to increase implementation fidelity.

Multiple measures of program implementation in the PA Hawai'i trial suggested that there was some variability in school-level implementation between intervention schools, with small improvements across years. Implementation was adequate for each indicator; however, results indicated that intervention schools could have implemented PA with greater fidelity (see references 18 and 24 for more detail). Furthermore, control schools reported implementing more types of SECD-related programs than intervention schools, and control schools reported offering ample instructional time devoted toward SECD-related activities.

Data and Measures

Archival School-Level Indicators—Archival school-level data were obtained from the HDE Accountability Resource Center Hawai'i as part of the state's school quality survey (SQS) accountability system,[25] which is intended to support schools in generating their self-reports for accreditation and standards implementation.[26] Data were collected from teachers, parents, and students every 2 years, starting in the spring of the 2000–2001 academic year (ie, the academic year prior to the PA Hawai'i trial) to 2006–2007 (ie, at 1-year post-trial),[26] as PA schools continued to implement the program. Specifically, the SQS was designed to

provide information on indicators of schools' performance and the survey queried teachers, parents, and students for their opinions of school quality. The 9 SQS school-level indicators included (1) safety and well-being; (2) involvement of parents, students, and teachers; (3) satisfaction of parents, students, and teachers; (4) quality student support; (5) focused and sustained action; (6) responsiveness of the system; (7) standards-based learning; (8) professionalism and capacity of the system; and (9) coordinated team work. Corresponding classroom- and student-level data were unavailable. School-level quality is an appropriate measure of program effectiveness because the PA Hawai'i trial tested a school-wide implementation of the program, whole schools were randomized to condition,[27] and the program was expected to improve school climate.[15]

Each indicator was comprised of 1 or more sets of questions[28] as shown in Table 1. Each question set contained individual items (up to 12 items per question set), with answers ranging from "strongly agree" to "strongly disagree." The items in each question set were similar for teacher, parent, and student surveys, with the wording of items varying slightly as appropriate for each respondent group. Sometimes the number of items in each question set differed by respondent group. For example, in the safety question set, in addition to the 3 teacher items, students were asked 2 extra items, and parents were asked 3 extra. Occasionally, a particular item was included in more than 1 question set; therefore, 2 indicators subsume the same item. The school-level indicator outcome units were "percent positive response"; that is, the school-level percent of responses that were either "strongly agree" or "agree." Alpha reliabilities for the overall score of the 9 indicators were 0.93, 0.95, and 0.91, for teachers, parents, and students, respectively. There were no missing data for any of the school-level SQS indicators. Average individual response rates across years as reported by the HDE were 78.7% (SD = 9.8), 20.8% (SD = 4.6), and 91.3% (SD = 5.0) for teachers, parents, and students, respectively.

The archival SQS data utilized in the present analysis were collected from schools with a different student body each academic year, and intervention schools, over time, had increasing exposure to PA. For example, the archival school-level SQS data collected for PA schools during the 2006–2007 academic year represented schools with students who were exposed to the intervention for up to 4 years compared to none during the 2000–2001 academic year.

Analyses

To address the multiple testing problem,[29] attributable to multiple hypothesis tests, and to control for Type I error, school-quality composite (SQC) scores were created for teachers, parents, and students by calculating the average of all SQS indicators for each respondent group. Analyses were conducted utilizing a similar approach to previous research.[18] The primary analysis included matched-paired *t*-tests, Hedges' adjusted *g* as a measure of effect size,[30,31] and percent relative improvement (RI). As an exploratory analysis, these analyses were conducted for each of the 9 indicators for teacher, parent, and student data. To assess the resiliency of results, permutation tests and random-intercept growth curve analyses were performed using the SQC score outcomes for teachers, parents, and students, and these served as sensitivity analyses. The random-effects growth curve models provide statistical control beyond randomization for potentially confounding, unmeasured variables.

Primary Analysis

First, matched-paired *t*-tests of difference scores were calculated to examine change in SQC score by condition for teachers, parents, and students. For each school-level outcome, a difference score [1-year post-trial (2007)—baseline (2001)] was calculated for each pair of intervention and control schools and a paired *t*-test was performed. The difference in means

affords an unbiased estimate of the true average intervention effect in a randomized trial.[27] As an exploratory analysis, this technique was also performed for each of the 9 indicators for each respondent group.

Next, effect sizes were calculated for the 3 SQC score outcomes by subtracting the mean difference of control schools from the mean difference of PA schools and dividing by the pooled 1-year post-trial standard deviation. Again, as an exploratory analysis, this was calculated for each of the 9 indicators. Hedges' *g* has some positive bias; therefore, Hedges' approximately unbiased adjusted *g* was calculated. The adjusted *g* is an appropriate effect size calculation when the sample size is small.[30] Effect sizes were examined at posttest and at 1-year post-trial and were interpreted as small (0.2), moderate (0.5), or large (0.8).[32]

In addition, the RI was calculated as an indicator of effect size that may be more interpretable and understandable to practitioners. RI is the posttest difference between groups minus the baseline difference between groups, divided by the control group posttest level; that is, $[(PA_{mean}–C_{mean})_{posttest} – (PA_{mean}– C_{mean})_{baseline}]/C_{meanposttest}$ expressed as a percentage.

Sensitivity Analysis

Subsequently, for each of the SQC score respondent groups, to avoid reliance on *t*-test assumptions alone, permutation tests were conducted with Stata v11 permute, which estimates p values based on Monte Carlo simulations (Stata Corp., College Station, TX). Both paired *t*-tests of differences and permutation models have demonstrated good performance in randomized trials when the number of pairs is small.[33]

Finally, random-intercept growth curve models were conducted with Stata v11 xtmixed[34] to represent all observations and to model school differences. The random-intercept mixed linear models can be expressed as follows:

$$Y_{ij}=\beta_{0j}+\beta_1(\text{condition}_j)+\beta_2(\text{year}_{ij})+\beta_3(\text{year}_{ij}\times\text{condition}_j)+\zeta_j+\varepsilon_{ij}$$

where Y_{ij} is the estimated SQC score outcome; the β_{0j} represents the fixed effect, or mean intercept for schools; the ζ_j represents the random effect; and the ε_{ij} represents the level-1 residual. This statistical approach provides a more complete analysis of the 4 waves of available data and takes into account the pattern of change over time. The random-intercept model allows the intercept to vary between schools, and can indicate whether some schools tend to have, on average, better performance at baseline while other schools fare worse. The random coefficient was fixed, reflecting similar intervention effects for all schools. Each growth curve involved 80 observations (4 waves × 20 schools at posttest). Although this sample size is at the lower end of some suggested guidelines, it is adequate as a sensitivity analysis, as different views exist regarding appropriate sample size.[35] For each respondent group, from baseline through 1-year post-trial, a likelihood-ratio (LR) test was performed to test whether a quadratic term for time was significant. The LR test results showed that a quadratic model did not provide a significantly better fit for the data for any respondent group; thus, a linear model was utilized.

RESULTS

School-Level Raw Means

No significant differences ($p \leq .05$) existed between intervention and control schools on SQC scores at baseline. Raw means for the SQC scores are shown in Figure 1 with state averages reported for comparison. Among all respondent groups, study schools were below

state averages at baseline. At 1-year post-trial, as PA schools continued to implement the program, PA schools exceeded control schools and state averages. Thus, although all SQC score differences between PA and control schools favored controls at baseline, a cross-over occurred, with PA schools outperforming control schools at 1-year post-trial.

Matched-Paired *t*-tests and Effect Sizes

Between baseline and 1-year post-trial, intervention schools' SQC scores increased among all respondent groups, while control schools exhibited a decrease (Table 2). At 1-year post-trial, teacher, parent, and student reports indicated that PA schools had significantly higher SQC scores as compared to control schools. The permutation models corroborated the results of the matched-paired *t*-tests, with PA schools demonstrating significantly higher ($p < .001$) SQC scores as reported by teachers, parents, and students. Effect size calculations demonstrated large treatment effects.

The exploratory analysis for each of the 9 indicators for teacher, parent, and student data revealed that intervention schools consistently outperformed control schools on nearly all the 9 indicators of school quality (the only exception was teacher reports of standards-based learning; Table 3).

Mean differences between baseline and 1-year post-trial indicated that PA schools exceeded control schools on all outcomes among all respondent groups, demonstrating that PA schools had greater improvement than control schools in school quality. Overall, at 1-year post-trial, intervention schools had significantly better outcomes on the majority of respondent indicators of school quality. Nearly all effect sizes were moderate to large.

Random-Intercept Growth Curve Models

The intraclass correlation coefficient (ie, proportion of the total outcome variation that is attributable to differences between schools) for the unconditional means models[35] were .48, .54, and .30 for teacher, parent, and student SQC scores, respectively. From baseline through 1-year post-trial, the random-intercept models' Year × Condition interactions for all respondent groups substantiated results of the matched-paired *t*-tests and permutation models, indicating higher SQC scores in PA schools (Table 4). The interactions for the teacher ($B = 2.63$, $p < .001$), parent ($B = 1.52$, $p < .001$), and student ($B = 1.78$, $p < .001$) models were all statistically significant.

The results indicate about a 2 percentage point superiority per year for the PA group compared to control schools due to the intervention, or a 14% advantage across the 7-year period.

DISCUSSION

This research, using a matched-pair, cluster-randomized, controlled trial, builds upon previous studies on the ability of a SECD program to positively improve a variety of outcomes, including academic achievement and negative behaviors.[16–20] The study is the first to demonstrate that PA can enhance school quality. More exactly, as demonstrated by matched-paired *t*-test and permutation models, PA schools outperformed control schools in SQC scores and most individual indicators of school quality as reported by teachers, parents, and students. Furthermore, random-intercept growth models substantiated these results and indicated that PA schools demonstrated significantly greater growth in SQC scores. In fact, school-level means of SQC scores for all respondent groups showed that PA schools, which were below state averages at baseline, exceeded state averages at 1-year post-trial.

These results are noteworthy as many of the schools had lower academic achievement at baseline and were in low-income areas with high racial/ethnic diversity. In addition, the current research indicated large effect sizes on the SQC scores reported by teachers, parents, and students, which were likely the result of several important characteristics of PA (see reference 15 for more detail), such as the program's comprehensive approach and ability to assist students and adults to gain not only the knowledge, attitudes, norms and skills that they might gain from other programs but also improved values, self-concept, family bonding, peer selection, communication, and appreciation of school.

Limitations

This study has some limitations. First, after completion of the randomized trial, SQS data were only procurable at 1-year post-trial as PA schools continued to implement the program; therefore, effects were not examined at posttest, immediately after the formal trial. Second, only 20 schools participated in the study; however, a successful matched-pair design can improve statistical power,[36] and statistically significant differences between treatment and control schools were detected. Third, a limited number of observations were available for the growth curve models, whereas a large sample is desirable[37] to strengthen the accuracy of the estimates, although various points of view exist as to what represents an adequate sample size.[35] The current sample was large enough to compare these models as a sensitivity analysis to the primary analyses. Fourth, data regarding the school-quality indicators used were not available to the researchers at the student or classroom level, which precluded the ability to explore variation in reports of school quality between students within schools or within students across years. Although, with random assignment, student characteristics should be about the same in the intervention and control groups, and because every student's score is utilized to calculate a school's mean score, the study's design and analysis provide a good test for intervention effects.[27] With a larger sample of schools or with school-quality reports available from individual teachers, parents, and students, future research could examine school quality as a specific mechanism to explain the effects of PA, for example, as a mediator for positive student outcomes. Fifth, although the randomized trial included adequate implementation of PA,[18] insufficient cases prohibited the examination of implementation as a covariate. Sixth, although the school-quality indicators utilized in the current research were quite inclusive, other indicators may be used to measure school safety and quality and, if available, can inform results.[38] Seventh, as is typical regarding parent surveys, response rates were poor; however, teacher and student response rates were good and corroborate results. Finally, as with all other similar studies, results are generalizable only to schools willing to implement a comprehensive SECD program.

Conclusion

Despite these limitations, this study adds to the extant literature on SECD programming by being the first to examine the influence of PA on school safety and quality. Schools, facing increasing concern about safe and healthy-learning environments, are often expected to shield students from nefarious outside forces. Although PA has a strong classroom-based program, it also seeks to facilitate school-climate change by including components that extend to the whole school, families, and communities. The current study elucidates the ability of a comprehensive, school-wide SECD program to enhance school safety and quality as reported by teachers, parents, and students.

IMPLICATIONS FOR SCHOOL HEALTH

Learning and success take place in safe, quality schools. As schools continue to address unsafe settings, the current study lends insight regarding how SECD-related programs may be used as a tool by school health professionals to facilitate safer learning environments with

more involved families and students. Although more research is needed to examine SECD-related programs' effects on school quality, the current research supports the hypothesis that these programs can generate whole-school change and improve school safety and quality. This study shows improvements in school quality were made by relatively underperforming schools. Implementing programs in such settings, with sustained efforts, can lead to substantial improvements in the areas with the greatest need for progress. Furthermore, given the intensive nature of the intervention in the current study, the research suggests that programs should be long-lasting and comprehensive, involving all stakeholders including school leaders, teachers, students, families, and communities.

The current research, along with the increasing related empirical evidence, suggests that students, families, schools, and communities would benefit from increasing concentration on enhancing youths' social learning skills and character development. The present findings add to the literature that demonstrates SECD programs can improve academic achievement and an array of positive behaviors. These findings also suggest that schools, districts, states, and the federal government should consider policies directed toward, and allocating funding for, effective, research-based SECD-related programs.

Human Subjects Approval Statement

The research presented herein was approved by the Oregon State University and University of Illinois at Chicago institutional review boards.

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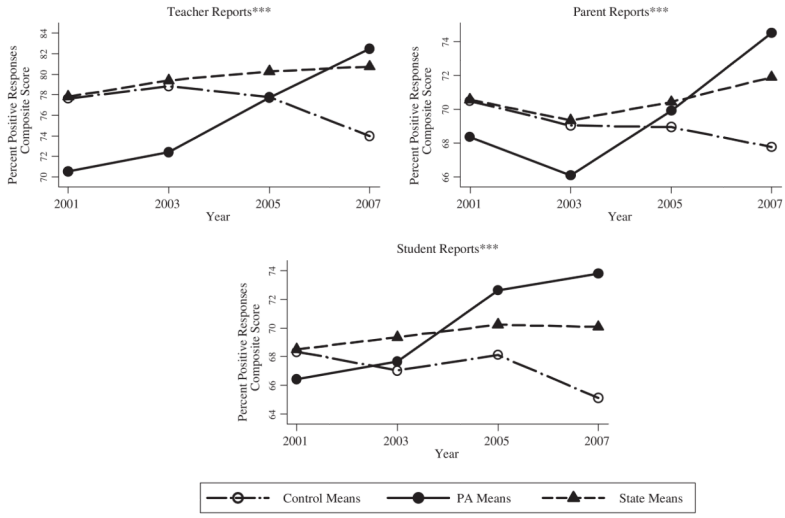

Figure 1. School-Level Means for Teacher, Parent, and Student School-Quality Composite Scores Hawai'i Randomized Trial Occurred 2002–2003 to 2005–2006

Random-intercept growth curve models: *p < .05; **p < .01; ***p < .001; all 2-tailed tests of significance

Table 1

School-Quality Survey Indicators, Question Sets, and Example Items*

Indicator (% Positive Response)	Question Set	Number of Items			Item Examples
		T	P	S	
1. Safety and well-being	1A. Safety	3	6	5	"I feel free from threats, bullying and harassment at school." "Most of the students in our school follow the school rules."
	1B. Well-being	4	4	6	"Students get along with each other at my school." "My teachers care about me and treat me with respect."
2. Involvement of parents, students, and teachers		4	8	3	"At my school, I have opportunities to help make decisions that affect me (for example, school rules, student activities)." "Someone in my family helps me check my homework regularly."
3. Satisfaction of parents, students, and teachers		6	10	10	"Overall, I am satisfied with the quality of this school." "I like the kinds of things I am learning at school."
4. Quality student support	4A. Environment that promotes high expectations for student learning and behavior	11	12	11	"Our school environment promotes learning." "Someone takes care of me if I get hurt or sick at school."
5. Focused and sustained action	5A. Vision, school purpose (mission)	4	4	3	"I know what my school's goals are." "My teachers expect me to do quality work."
	5B. Culture of continuous improvement process	3	2	0	"The school continually seeks ways to improve teaching and learning to promote student achievement." "I am involved in the school improvement process."
6. Responsiveness of the system	6A. Parent and community engagement	5	7	0	"There is open communication among administrators, teachers, other school staff, and parents." "I encourage and welcome parents to visit my classroom."
	6B. Public responsibility and accountability	1	1	0	"The school keeps our community stakeholders informed about what goes on at the school."
7. Standards-based learning	7A. Curriculum(what is being taught)	6	5	7	"Our school has high standards-based performance expectations for all students." "My teachers help me to understand what I am expected to know and be able to do."
	7C. Assessment (how assessment is used)	5	2	4	"I can show what I have learned in different ways (for example, projects, portfolios, presentations)." "I have learned to evaluate my own work and keep track of my progress."
8. Professionalism and capacity of the system	8A. Staff	1	1	1	"My teachers are well prepared and know what they are doing."
	8B. Professional development	1	0	0	"Staff are encouraged to enhance their personal and professional skills."
9. Coordinated teamwork	9A. Leadership	5	3	3	"I can freely express my opinions or concerns to the school staff." "At my school, I have opportunities to help make decisions that affect me (for example, school rules, student activities).
	9B. Resource management and development	2	3	1	"There are enough resources available to the school to sustain its educational programs (for example, money, equipment, staff)." "At school, students have access to computers for their school work."

[*] T = teacher survey, P = parent survey, S = student survey. Adapted from the Hawai'i Department of Education.[25,26] Responsiveness of the system student data were not collected. One item example was provided if a question set included 2 or more items; 2 examples were provided if a question set included 2 or more items.

Table 2

Baseline Measures, Matched-Paired *t*-tests of Difference Scores, Effect Sizes, and Relative Improvements for Teacher, Parent, and Student School-Quality Composite Scores

	2001 (Baseline)					2007 (1-Year Post-Trial)								
	Control		*Positive Action*			Control		*Positive Action*						
Outcome (% Positive Responses)	**Mean**	**SD**	**Mean**	**SD**	**p***	**Mean**	**SD**	**M_{diff}†**	**Mean**	**SD**	**M_{diff}†**	**p‡**	**ES§**	**Relative Improvement‖**
Teacher reports														
School-quality composite score	77.63	12.05	70.52	9.61	.162	73.99	11.98	−3.65	82.47	5.40	11.95	.006	1.61	21.1%
Parent reports														
School-quality composite score	70.48	9.17	68.36	6.91	.566	67.76	6.92	−2.71	74.51	6.60	6.15	.007	1.26	13.1%
Student reports														
School-quality composite score	68.35	3.70	66.44	6.36	.421	65.13	5.77	−3.23	73.76	9.21	7.32	.015	1.31	16.2%

* Two-tail *t*-test; 18 degrees of freedom.

† Mean difference = 1-year post-trial – baseline.

‡ Two-tail paired *t*-test difference of differences score; 9 degrees of freedom.

§ Hedges' *g* effect size (unbiased adjusted *g*) of mean difference.

‖ Relative Improvement = $[(PA_{mean} - C_{mean})_{posttest} - (PA_{mean} - C_{mean})_{baseline}]/C_{mean\ posttest} = (M_{diff\ PA} - M_{diff\ C})/C_{mean\ posttest}$.

Table 3

Baseline Measures, Matched-Paired *t*-tests of Difference Scores, Effect Sizes, and Relative Improvements for Teacher, Parent, and Student Reports of School-Quality Outcomes

	2001 (Baseline)					2007 (1-Year Post-Trial)								
	Control		*Positive Action*			Control		*Positive Action*						
Outcome (% Positive Responses)	**Mean**	**SD**	**Mean**	**SD**	**p***	**Mean**	**SD**	**M_{diff}†**	**Mean**	**SD**	**M_{diff}†**	**p‡**	**ES§**	**Relative Improvement‖**
Teacher reports														
Student safety and well-being	84.30	12.74	76.40	11.03	.155	75.16	13.16	−9.14	85.98	8.88	9.58	.003	1.60	24.9%
Involvement	85.30	10.56	79.20	9.14	.184	81.36	9.61	−3.94	90.94	7.43	11.74	.005	1.75	19.3%
Satisfaction	64.30	25.97	50.20	21.99	.207	56.70	24.34	−7.60	70.32	11.09	20.12	.011	1.40	48.9%
Quality student support	78.80	14.01	67.40	9.83	.050	70.34	12.70	−8.46	79.78	7.53	12.38	.001	1.91	29.6%
Focused and sustained action	74.10	13.10	70.10	12.07	.487	74.04	14.81	−0.06	81.78	6.06	11.68	.108	0.99	15.9%
Responsiveness of the system	83.20	13.43	73.90	10.05	.097	76.19	13.65	−7.01	85.70	5.87	11.80	.001	1.71	24.7%
Standards-based learning	85.80	6.61	83.70	4.98	.471	88.37	3.56	2.57	88.07	4.99	4.37	.563	0.42	2.0%
Professionalism and system capacity	65.20	12.12	62.20	12.20	.588	73.18	13.98	7.98	77.11	6.40	14.91	.324	0.61	9.5%
Coordinated teamwork	77.70	14.62	71.60	10.38	.296	70.55	11.20	−7.15	82.59	7.25	10.99	.007	1.84	25.7%
Parent reports														
Student safety and well-being	74.00	9.44	70.00	7.26	.302	70.76	7.94	−3.24	78.08	4.74	8.08	.001	1.66	16.0%
Involvement	68.40	6.79	68.80	3.05	.867	65.35	6.91	−3.05	72.95	5.68	4.15	.020	1.09	11.0%
Satisfaction	70.80	13.52	66.00	13.00	.429	65.60	12.00	−5.20	74.97	9.64	8.97	.014	1.25	21.6%
Quality student support	72.80	9.70	68.10	7.71	.246	69.09	7.94	−3.71	75.68	6.82	7.58	.004	1.46	16.3%
Focused and sustained action	57.70	10.17	55.30	9.88	.599	54.81	10.16	−2.89	64.40	10.33	6.70	.008	0.90	21.9%
Responsiveness of the system	72.60	6.90	71.30	7.01	.681	69.35	7.30	−3.25	72.57	7.93	1.27	.253	0.57	6.5%
Standards-based learning	77.40	8.96	76.90	6.61	.889	74.99	6.71	−2.41	80.80	8.08	3.90	.013	0.81	8.4%
Professionalism and system capacity	81.10	10.93	81.70	9.27	.896	85.17	6.22	4.07	86.97	6.12	5.27	.694	0.19	1.4%
Coordinated teamwork	59.50	12.85	57.10	8.60	.629	54.76	10.60	−4.74	64.14	10.30	7.04	.021	1.08	21.5%
Student reports														
Student safety and well-being	64.30	5.10	63.20	6.00	.664	60.28	7.98	−4.02	70.17	9.90	6.97	.016	1.17	18.2%
Involvement	58.20	8.99	56.70	12.76	.764	50.60	8.03	−7.60	68.65	16.42	11.95	.021	1.45	38.6%
Satisfaction	74.01	8.62	70.90	6.45	.373	69.20	7.79	−4.81	71.27	10.74	0.37	.409	0.53	7.5%
Quality student support	66.10	4.33	63.30	6.27	.261	60.74	8.18	−5.36	69.45	9.91	6.15	.019	1.21	18.9%

	2001 (Baseline)					2007 (1-Year Post-Trial)								
	Control		*Positive Action*			Control		*Positive Action*						
Outcome (% Positive Responses)	**Mean**	**SD**	**Mean**	**SD**	**p***	**Mean**	**SD**	**M_{diff}†**	**Mean**	**SD**	**M_{diff}†**	**p‡**	**ES§**	**Relative Improvement‖**
Focused and sustained action	58.10	8.54	60.90	13.31	.583	67.19	6.81	9.09	75.69	9.80	14.79	.326	0.65	8.5%
Standards-based learning	74.70	5.12	73.90	4.18	.706	72.67	6.51	−2.03	78.39	8.90	4.49	.111	0.80	9.0%
Professionalism and system capacity	84.80	6.55	82.50	6.69	.447	80.53	5.73	−4.27	87.72	6.06	5.22	.026	1.54	11.8%
Coordinated teamwork	66.60	8.25	60.10	9.42	.118	59.79	9.05	−6.81	68.75	8.99	8.65	.019	1.64	25.9%

* Two-tail *t*-test; 18 degrees of freedom.

† Mean difference = 1-year post-trial – baseline.

‡ Two-tail paired *t*-test difference of differences score; 9 degrees of freedom.

§ Hedges' *g* effect size (unbiased adjusted *g*) of mean difference.

‖ Relative improvement = $[(PA_{mean} - C_{mean})_{posttest} - (PA_{mean} - C_{mean})_{baseline}]/C_{mean\ posttest} = (M_{diff\ PA} - M_{diff\ C})/C_{mean\ posttest}$.

Table 4

Random-Intercept Growth Model Estimates for Teacher, Parent, and Student School-Quality Composite Scores

	Teacher Reports: School Quality Composite Score		Parent Reports: School Quality Composite Score		Student Reports: School Quality Composite Score	
	B	**SE**	***B***	**SE**	***B***	**SE**
Fixed effects						
Intercept	79.14***	3.07	70.71***	2.15	68.88***	1.96
Year	−0.57	0.45	−0.41	0.30	−0.43	0.35
Condition (0 = control; 1 = *Positive Action*)	−11.60**	4.33	−5.44†	3.04	−4.15	2.77
Year × Condition	2.63***	0.63	1.52***	0.43	1.78***	0.50
Random effects						
School-level variance	51.74	19.61	26.83	9.98	12.04	5.91
Residual variance	39.56	7.28	18.50	3.38	25.14	4.59

† p < .10;

** p < .01;

*** p < .001; all two-tail.