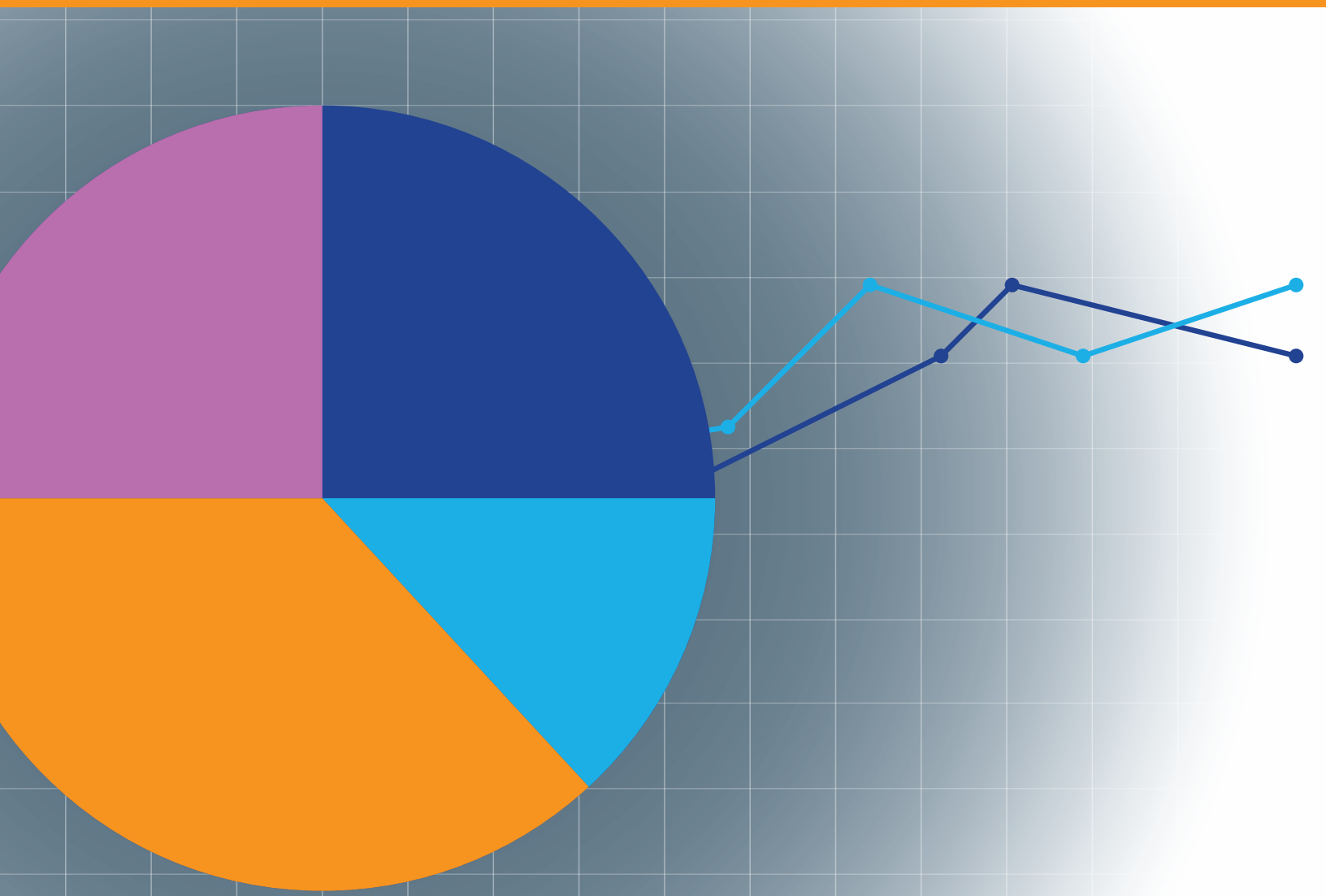
The West Virginia Special Education Technology Integration Specialist (SETIS) Program

2012–2014 Evaluation Report



West Virginia Department of EDUCATION
Office of Research

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2012–2014 Evaluation Report

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Executive Summary

The Special Education Technology Integration Specialist (SETIS) program provides professional development for special education teachers to assist them in achieving proficiency with 21st Century Technology Tools. The program completed its eighth and ninth rounds during the 2012–2013 and 2013–2014 school years, training more than 30 special educators as models, coaches, and mentors of technology integration at schools and within classrooms. This study examines SETIS program implementation, use, and impact across three key stakeholder groups: SETIS candidates, teacher colleagues, and school administrators.

Methods

SETIS candidates were surveyed once using a retrospective pre-post survey conducted at the conclusion of the school year. The majority of the SETIS survey items were dedicated to measuring pre- to postprogram shifts in four different indices: *human capacity, organizational capacity, structural capacity,* and *material capacity*. Teacher colleagues and school administrators, identified and invited by SETIS due to their close working relationships, participated in pre- and postprogram surveys administered at the beginning and ending of the school year. Most of the teacher colleague survey items were grouped into five indices that measure (a) designing and developing digital-age learning experiences and assessments, (b) modeling digital-age work and learning, (c) engaging in professional growth and leadership, (d) promoting and modeling digital citizenship and responsibility, and (e) facilitating and inspiring student learning and creativity. For the purposes of this report, the indices are labeled as *design*, *model*, *engage*, *promote*, and *facilitate*. The school administrator surveys contained standalone survey items.

While prior SETIS evaluation reports examined one cohort only, this study encompasses results from two cohorts: the 2012–2013 cohort and the 2013–2014 cohort. Combining cohorts in this study is justified because no changes had been made to the SETIS program or its evaluation during their two training periods; further an analysis of the data revealed like results for both cohorts. Moreover, the inclusion of both cohorts gives the study larger numbers of surveys and observations to examine, increasing our confidence in the statistical reliability of our findings.

Findings

Evaluation question 1 (EQ1)—*To what extent does the Technology Integration Specialist (TIS) program build the capacity of participating TISs to plan and facilitate (a) teaching and learning, (b) information access and delivery, and (c) program administration?*—is primarily addressed through the SETIS survey capacity indices, with supporting evidence from other survey items.

On the whole, the SETIS cohorts perceived substantial increases in their capacity to plan and facilitate all of the components in EQ1. Each capacity index (human, material, organizational, and structural) yielded statistically significant increases in scores from pre to post program survey results. Additionally, effect sizes for all indices, with the exception of

structural, are considered very large. The strength of these results provides reasonable evidence that the SETIS program equipped its candidates with the capacity necessary to implement technology integration techniques within their schools and classrooms.

To answer EQ2—*To what extent do TISs encounter barriers to successful program implementation (e.g., financial, temporal, relational, etc.)?*—we look at findings from the SETIS survey and the school administrator surveys.

Overall, the SETIS program throughout the years 2012–2014 encountered relatively moderate barriers. From the perspective of the SETIS candidates, a lack of time was their largest barrier followed closely by unreceptiveness of teacher colleagues and/or school administrators. Access to technology tools among SETIS candidates was not an issue, however, computer access for students and internet speed was a concern. The SETIS candidates also identified several things they would change about the program; specifically deadlines on assignments, clearer expectations, and increased program organization. While these may or may not be barriers to program implementation, they should be taken under consideration. Finally, a previous barrier of inadequate awareness about the SETIS candidates and SETIS program among school administrators seems to have been alleviated by programmatic adjustments.

Findings from the SETIS teacher colleague pre- and postprogram surveys, along with the SETIS school administrator pre- and postprogram surveys, were used to address EQ3—*To what extent is the level of technology integration in TIS schools positively impacted through participation in the program?*

SETIS candidate activities that led to positive impacts in classrooms were associated with improved technology integration in classrooms and curriculum, raised technology knowledge among teachers, and enhanced student experiences. Perhaps most importantly, open-ended survey responses from both the teacher colleagues and school administrators evidenced the extent to which the SETIS candidates integrated technology in their schools. Further, data analysis indicates improved technology use among teacher colleagues in the design and model indices.

The fourth evaluation question EQ4—*In what ways have school administrators and teachers leveraged the TIS and the resources provided by the TIS?*—is addressed using many of the same findings discussed in EQ3 in addition to items from the SETIS survey.

Collectively, these data suggest some school administrators and teacher colleagues are more adequately leveraging their SETIS candidates than others. Wilcoxon signed-rank tests revealed positive increases in technology use among teacher colleagues with statistically significant increases in the design and model indices. On the other hand, Wilcoxon signed-rank tests indicated statistically significant reduction when comparing school administrators' preprogram survey intentions to the postprogram survey utilization of their SETIS candidates. Yet, despite these data, open-ended survey results among the teacher colleagues and school administrators portrayed a high level of satisfaction with the accomplishments achieved by working with a SETIS candidate.

The final evaluation question EQ5—*What impact has the TIS program had on students' technology literacy in participating schools?*—relies upon the premise that successful

program implementation along with efficient SETIS and technology resource use leads to higher teacher, administrator, and student technology literacy levels. To address EQ5, we draw insight from the teacher colleague pre- and postprogram surveys and the school administrator pre- and postprogram surveys.

Survey results give evidence that both teacher colleagues and school administrators perceived a rise of technology integration in classrooms and curriculum. Further, the majority of school administrators reported they had observed increased student engagement as a result of technology integration efforts by their SETIS candidate. Analysis of the teacher colleague technology use indices showed statistically significant increases in the design and model indices. This shift in behavior indicates that, as a result of the SETIS program, teacher colleagues who responded to the survey are practicing technology integration techniques and engaging their students using technology resources provided by their SETIS candidate.

Limitations of study

When interpreting results in any study, it is important to consider inherent limitations that may skew findings. Surveys that rely upon self-reported information always have a risk of response bias; respondents may exaggerate or underestimate, may have accurate recall difficulties, and may report information they perceive as socially acceptable. This study relies upon two types of self-reported surveys: a retrospective pre-post survey and two traditional pre-post surveys. There are benefits and drawbacks to each type of survey.

Retrospective pre-post surveys are convenient because they occur once (improving response rates) and the pre-post data are matched at the individual participant level. Some research postulates that response-shift bias (a type of bias created from presurvey overestimation and postsurvey underestimation of one's knowledge, skills, and/or behaviors) is alleviated through using retrospective pre-post surveys (Moore & Tananis, 2009). Conversely, other research argues traditional pretest-posttest types of surveys result in less biased program effectiveness estimates. In a 2011 study, Nimon, Zigarmi, and Allen discovered inflated effect sizes among retrospective pre-post survey items. According to their findings, surveys with before-and-after items presented side by side may introduce types of bias including theories of change, self-presentation, and/or effort justification. Further, to resolve the issues of both response-shift bias and exaggerated effect sizes Nimon and colleagues (2011) recommend administering traditional pre-post surveys with a retrospective pre-post survey. While this solution would alleviate some bias, it was not possible to initiate in this study.

Previous SETIS program evaluation studies exhibited a limitation of small sample sizes. This study, in part due to combining the cohorts from 2012–2013 and 2013–2014, does not have this limitation; the sample sizes of all three stakeholder groups are adequate for us to draw general conclusions about the groups with a certain level of confidence.

Determining response rates among teacher colleagues and school administrators remains impossible due to the fact that the SETIS candidates invite an unknown number of teachers and administrators to participate in the pre-post surveys. However, the inability to match pre- and postprogram survey results among the teacher colleagues and school administrators has been addressed by adjusting the study's methodology. Matching individual pre-

and postprogram survey responses allowed us to measure with more confidence shifts in knowledge, skills, and behaviors at individual and group levels.

Conclusion and Recommendations

In general, survey data from all three SETIS stakeholder groups suggest the 2012–2014 SETIS programs were mostly successful. The greatest impact was observed in capacity building among the SETIS candidates. The four indices of capacity building—human, material, organizational, and structural—all yielded statistically significant and practically important increases from pre- to postprogram survey scores. Among teacher colleagues, the use of Wilcoxon signed-rank tests revealed statistically significant increases in technology use for the model and design indices. While Wilcoxon signed-rank tests also resulted in statistically significant differences between the school administrator pre- and postprogram surveys, the differences uncovered a disparity between school administrators' higher preprogram survey intentions to use SETIS candidates' skills and lower postprogram survey responses about their actual utilization. Despite this lower-than-expected leveraging of SETIS resources, other survey data indicated successes resulting from the SETIS program as noted above.

Study results also suggest that SETIS program staff have adopted previous evaluation study recommendations. Methodology adjustments allow pre- and postprogram survey matching of teacher colleague and school administrator respondents. Also, awareness of SETIS candidates and their services increased among school administrators.

Even with these promising program adjustments, there are several recommendations that may further improve the implementation, utilization, and impact of the SETIS program. These include holding more face-to-face meetings, promoting scheduling that allows teachers and SETIS candidates time to cocreate technology-integrated lesson plans, and encouraging further collaboration between SETIS candidates and their school administrators to better leverage the SETIS candidates and their resources.

Contents

List of Figures

List of Tables

Introduction

The Special Education Technology Integration Specialist (SETIS) program completed its eighth and ninth rounds during the 2012–2013 and 2013–2014 school years. As an expansion of the Technology Integration Specialist (TIS) program, the SETIS program is designed to increase the professional capacity of selected special educators, *SETIS candidates,* to act as models, coaches, and mentors to fellow teachers so that they can fully use statewide technology resources. In addition to training, the program provides SETIS candidates with tools and resources to assist their schools in integrating and using technology to meet West Virginia's Next Generation content standards and objectives. SETIS candidates also work with school administrators to implement county and school technology plans.

This evaluation study was undertaken at the request of the West Virginia Department of Education (WVDE) Office of Special Education as were earlier studies of the SETIS program for the years 2010–2011 and 2011–2012.[1] Similar to prior studies, this study examines the implementation, use, and impact of the SETIS program for school years 2012 through 2014. Unlike earlier studies, this one examines any observable shifts in SETIS candidates' use and impact. The addition of this dimension to the study is possible because, while earlier studies lacked a mechanism for matching pre- and postprogram survey responses of teacher colleagues and school administrators, we modified our methods to make such matching possible.

Five overarching evaluation questions guided our examination of the SETIS program:

EQ1. To what extent does the TIS program build the capacity of participating TISs to plan and facilitate (a) teaching and learning, (b) information access and delivery, and (c) program administration?

EQ2. To what extent do TISs encounter barriers to successful program implementation (e.g., financial, temporal, relational, etc.)?

EQ3. To what extent is the level of technology integration in TIS schools positively impacted through participation in the program?

EQ4. In what ways have school administrators and teachers leveraged the TIS and the resources provided by the TIS?

EQ5. What impact has the TIS program had on students' technology literacy in participating schools?

The study addresses the evaluation questions using surveys of all three major stakeholder groups in the SETIS program: SETIS candidates, teacher colleagues, and school administrators.

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[1] See previous reports: http://wvde.state.wv.us/research/reports2012/WVSpecialEducationTISProgramAdministratorsReport2012.pdf; http://wvde.state.wv.us/research/reports2012/WVSpecialEducationTISProgramTeachersReport2012.pdf; http://wvde.state.wv.us/research/reports2013/WVSETISProgram2011-2012EvaluationReport.pdf

Methods

Beyond one key improvement to the research design—incorporating a method to track and match pre- and postprogram survey responses of teacher colleagues and school administrators—no other changes were made to the evaluation of the SETIS program. Akin to the last evaluation study (Stohr, 2013),[2] we examined the same three stakeholder groups: (a) *SETIS candidates*, defined as special education teachers who were accepted into the SETIS program and received specialized training; (b) *teacher colleagues*, defined as teachers who cotaught with SETIS candidates or with whom SETIS candidates believed they had the greatest influence regarding technology use; and (c) *school administrators*, defined as principals, assistant principals, or other teachers who work in an administrative capacity in the schools where SETIS candidates served. Additionally, we employed the same survey tools: pre- and postprogram surveys administered to teacher colleagues and school administrators at the beginning and conclusion of the school year, and a retrospective pre-post survey administered to the SETIS candidates at the end of the school year. All surveys used a combination of multiple choice and open-ended items.

Participant recruitment also mirrored methods used in prior years. Through the Office of Special Education, the coordinating office for the SETIS program, all SETIS candidates were invited to participate in the retrospective survey. The responsibility to identify and invite teacher colleagues and school administrators to the preprogram surveys was given to the SETIS candidates. The SETIS candidates were provided hyperlinks to the preprogram surveys for their teacher colleagues and school administrators to complete. Via use of our secure online survey platform, those teacher colleagues and school administrators who opted to participate in the preprogram surveys were contacted at the end of the school year and asked to complete the postprogram survey. Thus, we were able to address a prior study limitation by matching pre- and postprogram teacher colleague and school administrator responses. Matching pre- and postprogram survey data increases the precision and power of our tools because we can observe actual shifts in individual responses, which in turn allows us to have greater confidence in any changes observed in aggregate among the groups of teacher colleagues and school administrators.

As previously mentioned, the survey instruments employed in this evaluation study were the same ones described in the most recent previous SETIS evaluation report (Stohr, 2013). Please refer to that report for further details on the surveys. The following are brief descriptions of the surveys used with the three stakeholder groups:

- *SETIS candidate retrospective pre-post survey*. These surveys used both multiple choice (5-point Likert-type scale of disagreement/agreement) and open-ended items to gather self-reported data by asking participants about their opinions, behaviors, knowledge, etc., before participating in the program and after participating in the program. The majority of survey items were dedicated to measuring pre- to postprogram shifts in four different indices: *human capacity, organizational capacity, structural capacity,* and *material capacity*. All capacity indices were

[2] This report is available at http://wvde.state.wv.us/research/reports2013/WVSETISProgram2011-2012EvaluationReport.pdf.

based on definitions found in *Determining Capacity within Systemic Educational Reform* (Century, 1999). The open-ended items asked participants to share their viewpoints on the SETIS program, including the components they found most valuable, suggestions for program changes, and barriers encountered throughout the year.

- *Teacher colleague pre- and postprogram surveys*. Survey items were both multiple choice (including a 4-point Likert-type scale of frequency) and open-ended. Beyond basic demographic information, teachers were asked to self-report their technology practices, with the preprogram survey capturing practices prior to working with a SETIS candidate, and the postprogram survey measuring shifts in those practices as a result of working with a SETIS candidate. Based on the TIS Professional Development Model,[3] survey items were grouped into five indices (International Society for Technology in Education, 2008), including (a) designing and developing digital-age learning experiences and assessments, (b) modeling digital-age work and learning, (c) engaging in professional growth and leadership, (d) promoting and modeling digital citizenship and responsibility, and (e) facilitating and inspiring student learning and creativity. For the purposes of this report, the indices are labeled as *design*, *model*, *engage*, *promote*, and *facilitate*. Open-ended questions allowed respondents to provide a descriptive account of the roles of SETIS candidates, what the respondent hoped to accomplish (preprogram survey) or had accomplished (postprogram survey) by working with a SETIS candidate.
- *School administrator pre- and postprogram surveys*. These short surveys comprised multiple choice (including 5-point Likert-type scales of likelihood and agreement) and open-ended items. The preprogram survey asked school administrators how they anticipated utilizing SETIS candidate services, while the postprogram survey asked administrators to rate how they actually did use SETIS candidate services throughout the school year. Additionally, the postprogram survey included one item asking if administrators thought the presence of a SETIS in their school could be linked to improved student engagement in curricular activities via increased use of technology and technological tools.

While prior SETIS evaluation reports examined one cohort only, this study encompasses results from two cohorts: the 2012–2013 cohort and the 2013–2014 cohort. Combining cohorts in this study is justified because no changes had been made to the SETIS program or its evaluation during their two training periods; further an analysis of the data revealed like results for both cohorts. Moreover, the inclusion of both cohorts gives the study larger numbers of surveys and observations to examine, increasing our confidence in the statistical reliability of our findings.

Data Analysis

Both quantitative and qualitative analysis techniques were used to examine the data collected for this study. To analyze quantitative survey items (i.e., multiple choice questions), we used SAS 9.2 to produce descriptive statistics including frequencies (i.e., percentages), and to calculate and interpret measures of central tendency and dispersion (i.e., means and standard deviations). Statistical significance was established by conducting the Wilcoxon signed-

[3] Based upon the National Educational Technology Standards for Teachers (NETS-T)

rank test using SPSS. The Wilcoxon signed-rank test is a nonparametric statistical hypothesis test that may be used when comparing matched samples to assess whether the mean ranks differ; it is often used as an alternative to the paired-samples *t* test when the data cannot be assumed to be normally distributed (Lowry, 1999 -2012). The Wilcoxon signed-rank test examines the sizes of the differences between two values, such as pretest and posttest data. With this statistical test, the null hypothesis is that the median difference between pairs of observations is zero (Lowry, 1999 – 2012). The null hypothesis is rejected if the test statistic (a *z* score in this case) yields a *p* value of 0.05 or less. A *p* value of 0.05 or less indicates a 95% probability that the survey results were not observed due to chance.

Additionally, effect sizes using Cohen's *d* were calculated. As indicated by its name, effect size measures the magnitude of difference in the mean scores between two measurements, in this study the pre- and postprogram surveys. Further, as a measure of strength between the differences of two mean scores, effect sizes are not affected by sample size. Cohen (1988) classified effect sizes into three categories; small (0.20), medium (0.50), and large (0.80). Later the classification of very large (1.30) was added by Rosenthal (1996) and accepted into use. For the purposes of this study, any effect size lower than 0.20 is considered negligible. Effect sizes were calculated for statistically significant and near-significant survey results only; if a result did not approach statistical significance, then further analyses were not warranted.

Qualitative responses (i.e., responses to open-ended questions) were read, reread, organized, and coded according to broad themes, taking into consideration that respondents sometimes mentioned more than one theme when responding to a question. Although we primarily discuss the results from matched comments in the pre- and postprogram surveys, there are instances when unmatched comments are considered important or impactful to the SETIS program. Therefore, some of the unmatched comments are included in the analysis and discussion of the research study findings. The Results section includes tables comparing pre- and postprogram survey results and descriptions of the themes. The qualitative data included in each of the three surveys (SETIS candidate, teacher colleague, and school administrator) in this study were designed to enrich our data by providing respondents the opportunity to answer questions using their own words.

Results

Evaluation study results are presented by stakeholder group type. First we will review results from the special education technology integration specialist (SETIS) candidate retrospective pre-post survey, followed by the teacher colleague pre- and postprogram surveys and the school administrator pre- and postprogram surveys.

SETIS Candidates Survey

A total of 31 SETIS candidates responded to the surveys during the 2012–2013 and 2013–2014 school years (19 and 12 candidates respectively). These respondents came from 21 counties across the state. Further, while all programmatic levels were represented, high schools and elementary schools were most frequently identified as the SETIS candidates' work

setting. The majority of the candidates reported their role as being a classroom teacher. When asked if, to their knowledge, their school currently employed any other individual who had completed or is currently completing the Technology Integration Specialist (TIS) program, just under 70% indicated *yes*. Additionally, over 70% of the SETIS candidates indicated they had conducted formal staff development related to technology integration at their school within the past year.

Building capacity indices

In response to EQ1—*To what extent does the TIS program build the capacity of participating TISs to plan and facilitate (a) teaching and learning, (b) information access and delivery, and (c) program administration?*—the SETIS candidate survey has sets of items that when aggregated create four *capacity indices*: *human*, *organizational*, *structural*, and *material*. Each of the four capacity sections prompted SETIS candidates to retrospectively consider their level of disagreement/agreement with a statement before (pre) and after (post) participating in the TIS program. Response options were based on a 5-point Likert-type scale, ranging from a low of 1 (*strongly disagree*) to a high of 5 (*strongly agree*).

Human capacity, the first index in the survey, consists of 17 items measuring the intellectual proficiency and will of the SETIS candidates' themselves. To see what, if any, change SETIS candidates perceived in their own human capacity over the course of the program, a pre- and postprogram mean was calculated for each item (see Appendix A, Table 1, page 23). The items, consisting primarily of statements about understanding, use, and integration, each revealed statistically significant increases in the median difference between pairs of ratings.

The second index, organizational capacity, is composed of five survey items centered on the interaction, collaboration, and communication among individuals within the SETIS system (such as other teachers and school administrators). All items in this index yielded statistically significant increases in median difference between pairs of ratings (see Appendix A, Table 2, page 25).

Structural capacity, the third index, includes 17 survey items designed to capture contextual elements such as policies, procedures, and formalized practices—that is, elements that are part of the SETIS program, but have been set in place independently of the program. Each item in this index also produced statistically significant increases in the median difference between pairs of observations (see Appendix A, Table 3, page 26).

The final index, material capacity, measures fiscal and/or other material supports available to people (e.g. SETIS candidates) within a system (e.g. the SETIS program). The material capacity index comprises five items focused on technology resources; once more all items produced statistically significant increases in the median difference between pairs of observations (see Appendix A, Table 4, page 28).

To measure perceived overall growth in capacity resulting from participation in the SETIS program, the items in each of the indices were averaged together to create standardized capacity indices. Illustrated in Figure 1, large increases were observed in all of the indices from pre- to post-SETIS program involvement. The human capacity index showed the most dramatic increase, rising from a preprogram mean score of 2.97 to a postprogram mean of 4.44. Conversely, while still statistically significant, the structural capacity index exhibited the smallest increase. Additionally Wilcoxon signed-rank tests were performed on each item as well as the standardized capacity indices; all differences were statistically significant (see Appendix A, Table 5, page 28).

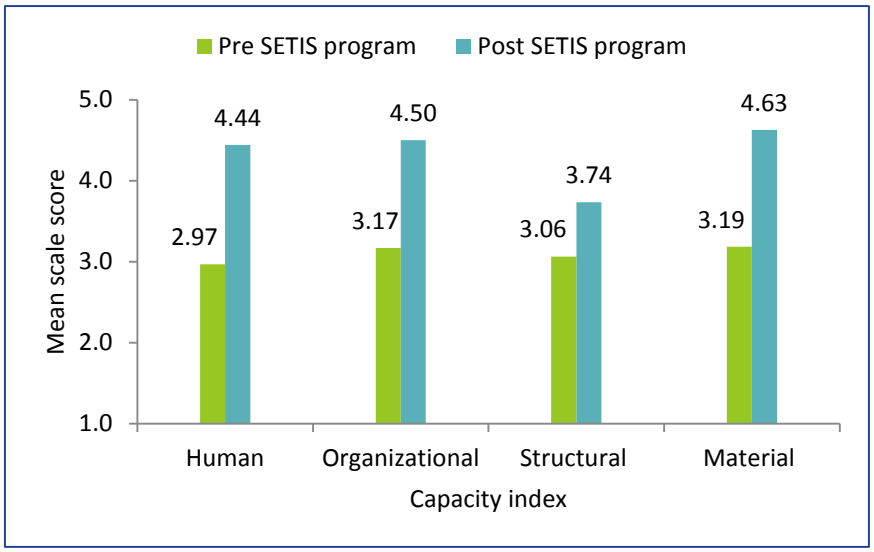

Figure 1. SETIS Candidates' Retrospective Pre-Post Assessment of Growth by Capacity Type

Among all capacity indices statistical testing proved the results were extremely significant. Each index yielded a *p* value of <.0001, supporting a high level of confidence that the results represent a true shift and are not caused by chance.

Effect sizes were computed to measure the magnitude of change retrospectively reported in the pre-post survey indices. Figure 2 illustrates the effect sizes observed for the capacity indices (see individual item results, Appendix A, Tables 1-4). The results show very large effect sizes for the human, organizational, and material indices. The structural index exhibited the smallest effect size, 0.7, which is considered to be a medium effect.

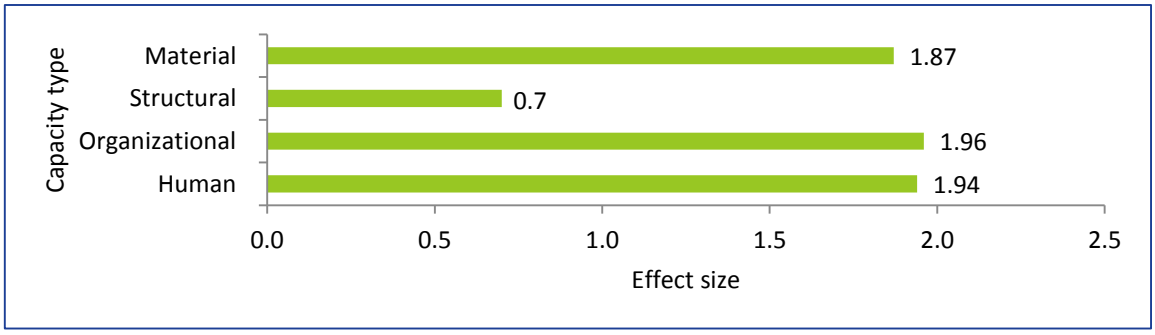

Figure 2. SETIS Candidates' Retrospective Pre-Post Assessment of Growth: Effect Size by Capacity Index

Effect sizes between 0.80 and 1.29 are interpreted to be large; those above 1.30 are considered very large.

Open-ended items

There were five essay-style, open-ended items on the SETIS candidate survey. These questions were meant to capture qualitative information about the SETIS program and enrich the quantitative data discussed above. Most SETIS candidate survey participants responded to all of the open-ended items, producing a response rate ranging from 90% to 93% per item.

The first open-ended item asked participants to identify what they felt were the most valuable aspects of the program. During analysis, several themes emerged. The most prevalent theme was *learning about technology resources/tools*, with 17 of the 29 noting this theme. Two other common themes were *collaborating with other teachers/professional learning communities* (seven of 29) and *practice using new technology tools* (five of 29). For a break-down of all categories, refer to Appendix A, Table 6, page 29.

Next, SETIS candidates were asked to describe any changes they would suggest for the program. Four major themes were identified during analysis: (a) *program/content change*, (b) *time change*, (c) *meeting change*, and (d) *no change* (see Appendix A, Table 7, page 29). Of the 28 responses received, 13 fell into the *program/content changes* theme. Many of these suggestions revolved around the desire for deadlines on assignments, clearer expectations, and increased program organization. Six SETIS candidates indicated they would not change any aspect of the program, and five stated they would like to see *meeting changes* in the form of more face-to-face meetings.

The third open-ended item asked survey participants to name school structures that supported the TIS program and teacher collaboration. The most commonly named support was *administrative* (10 of 29), followed by *none* (eight of 29), *common planning time* (seven of 29), and *professional learning communities* (six of 29). See Appendix A, Table 8, page 29 for the full list of identified supporting structures.

The fourth item asked SETIS candidates to discuss the ways they worked with the administration at their school to address technology-related issues or concerns throughout the school year. While the responses to this question were varied, the three most common themes were (a) *providing specific assistance* (eight of 29), (b) *discussing resource/technology needs* (five of 29), and (c) *other* (five of 29). Notably, only two SETIS candidates indicated that they had not worked with their administrator to address school-level, technology-related issues or concerns. Refer to Appendix A, Table 9, page 30 to see all themes.

Finally, the last open-ended item asked SETIS candidates to list any barriers they may have encountered when implementing what they learned as part of the SETIS program. Of the seven themes identified during analysis, a *lack of enough time* was the most common barrier (nine of 29), followed by *receptiveness of teacher colleagues/school administrators* (seven of 29), *access to and quality of technology*[4] (five of 29), and *none* (five of 29). See Appendix A, Table 10, page 30 for a full description.

[4] This category includes a lack of computer access for students and slow internet connectivity.

Teacher Colleague Pre- and Postprogram Surveys

A total of 51 teacher colleagues responded to both the pre- and postprogram teacher surveys (45 of which came from the 2012–2013 cohort and six from the 2013–2014 cohort). If a teacher colleague completed one survey but not the other, those responses were excluded from analysis. The ability to pair an individual's preprogram survey data to their postprogram survey data allowed us to measure actual shifts in attitudes and beliefs from one point in time to another. Representing 16 counties, the majority of the responding teacher colleagues identified themselves as general education teachers, approximately 40% of whom reported having 16 or more years of experience in the field of education. Further, survey results indicate some of the teacher colleagues cotaught with a SETIS candidate, while other responding teachers worked within the same school as the SETIS candidate.

Technology use indices

The teacher colleague pre- and postprogram surveys were predominately dedicated to survey items inquiring about technology use among the SETIS coteachers and teacher colleagues. These items were designed to address EQ4, *In what ways have school administrators and teachers leveraged the TIS and the resources provided by the TIS?* Each item asks about the frequency (based on a 4-point Likert type scale where 1 = *not usually*, 2 = *sometimes*, 3 = *often*, and 4 = *almost always*) with which teachers employ various teaching strategies, categorized into the following indices: *facilitate, design, model, promote,* and *engage*.

Designed to capture the level of technology teacher colleagues use to facilitate and inspire student learning and creativity, the facilitate index consists of five items. Most of the facilitate item means rose slightly from pre- to postprogram surveys. However, Wilcoxon signed-rank tests did not yield statistically significant results (Table 11, page 31). The next index, design, consists of five items measuring thoughtful planning and implementation of technical assistance and related activities. Mean scores rose for all design items from preprogram levels to postprogram levels, but no results were statistically significant (Table 12, page 32). The third index, model, comprises four items intended to measure teacher colleague modeling of digital-age work and learning techniques/behaviors. All model item mean scores rose from pre- to postprogram survey data and one item (*I use digital resources and tools to communicate with my peers*) showed statistically significant results with a small effect size (Table 13, page 33). After the model index, we have the three-item promote index, which assesses teacher-colleague promotion and modeling of digital citizenship and responsibility. Among these items, pre-post means stayed the same for one item and the other two rose slightly, but did not approach statistical significance (Table 14, page 34). The last index, engage, measured professional development, growth, and leadership activities of teacher colleagues. Mean scores for all of the four items in this index rose from pre- to postprogram surveys and one item *(I model and teach other educators to use digital tools and resources to promote student achievement and learning*) proved to be statistically significant with a small effect size (Table 15, page 35).

After examining the individual items, we performed statistical analysis on the aggregate indices scores. Figure 3 illustrates the shift in pre- and postprogram survey mean scores for each of the technology use indices. Each index demonstrated an increase in mean score from pre- to postprogram surveys. Further, utilizing Wilcoxon signed-rank tests, the design and model indices produced statistically significant results (also see, Table 16, page 35).

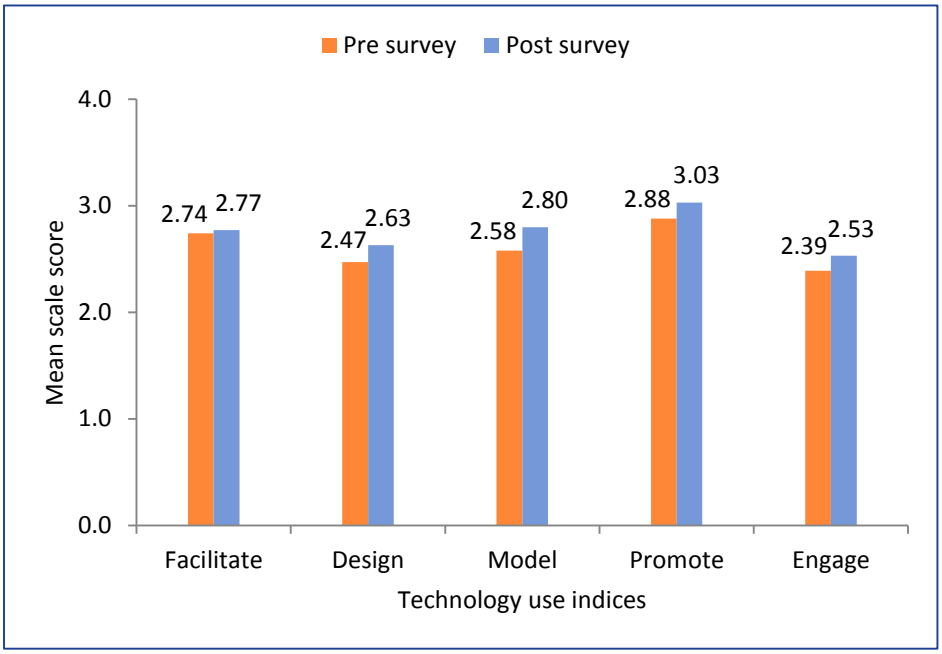

Figure 3. Comparison of Teacher Pre- and Postprogram Survey Mean Scale Scores by Technology Use Index

The two indices that produced statistically significant results, design and model, both yielded small effect sizes.

Open-ended items

Teacher colleagues were asked to respond to three essay-style open-ended questions to provide qualitative data for this study. Analyzing comments from teacher colleagues who provided responses in both the pre- and postprogram surveys, we were able to discern what, if any, changes occurred in attitudes and beliefs regarding the SETIS candidates and SETIS program.

Specifically, for the first of these open-ended items, we looked for any shifts in teacher colleagues' perceptions of the role of the SETIS candidate. Of the 27 paired pre-post responses, seven indicated no change in their view of the SETIS role, 13 articulated more specific roles from pre- to postprogram, one wrote a less specific role definition, two described neutral shifts in their beliefs about the role of the SETIS candidate, and four expressed a negative shift in their perception of the SETIS candidate role.

The second open-ended item in the surveys asked teacher colleagues what they hoped to accomplish by working with a SETIS (preprogram survey) and what they actually accomplished (postprogram survey). Again, analyzing matched pre-post survey responses (n = 27) we discovered that 12 teacher colleagues felt their SETIS candidate met expectations, two reported their SETIS candidate exceeded expectations, five indicated their SETIS candidate made other, unexpected accomplishments, four reported their SETIS candidate did not meet expectations, and four teacher colleagues provided comments that were categorized as *other*.

The third and final open-ended item afforded teacher colleagues the opportunity to provide any additional comments they wished to share about the SETIS program. Of the

matched pairs (n = 5) all comments were positive, typically indicating in the preprogram comments enthusiasm about learning more about the SETIS program and technology integration and expressing satisfaction with their SETIS candidate and the SETIS program in the postprogram survey. Also noteworthy, of the unmatched comments, most teacher-colleague preprogram survey comments conveyed interest and enthusiasm about the SETIS program. The unmatched postprogram survey comments were a mixture of positive and negative remarks, with two teacher colleagues stating they were unfamiliar with the SETIS program.

School Administrator Pre- and Postprogram Surveys

In total, 33 school administrators participated in both the school administrator pre- and postprogram surveys (25 in the 2012–2013 cohort and eight in the 2013–2014 cohort). They represented 17 different school districts. Just over 60% of the administrators identified their role as principal, while 24% identified themselves as teachers with administrative duties, and 15% reported their role as vice principal. Over 90% of the school administrators reported that they were aware a SETIS candidate would be in their school for the upcoming school year (this item was asked in the preprogram survey only).

Use of SETIS candidates

The administrator pre and post surveys focused primarily on answering EQ4: *In what ways have school administrators and teachers leveraged the TIS and the resources provided by the TIS?* These short surveys consist of six (preprogram survey) and seven (postprogram survey) multiple-choice statements and three open-ended essay style items. Unlike the other stakeholder surveys, the school administrator surveys contain stand-alone items only (i.e. the items are not combined to create an index).

The administrator preprogram survey multiple-choice items are phrased to ask administrators how they intend to use their SETIS candidate, while the postprogram survey asks school administrators to report how they actually did utilize their SETIS candidate during the course of the school year. The preprogram survey answer choices use a 5-point Likert-type scale of likelihood (with 1 equaling *unlikely* and 5 equaling *likely*). The postprogram survey choices are also based on a 5-point scale, but this scale measures agreement (where 1 equals *untrue* and 5 *true*). Depicted in Figure 5, the intention was high among school administrators to utilize their SETIS candidate as a resource for their school and classrooms. However, postprogram survey results indicate administrators did not leverage their SETIS candidate to the extent they had originally planned. In fact, Wilcoxon signed-rank tests revealed statistically significant differences from the preprogram survey intention to the postprogram survey utilization of the SETIS by school administrators among all items (see Appendix C, Table 17, page 37). It should be noted the disparity between the intention to utilize and actually utilizing the SETIS candidates may be attributed to a number of factors, including unrealistic expectations or unforeseen barriers among school administrators responding to the preprogram survey.

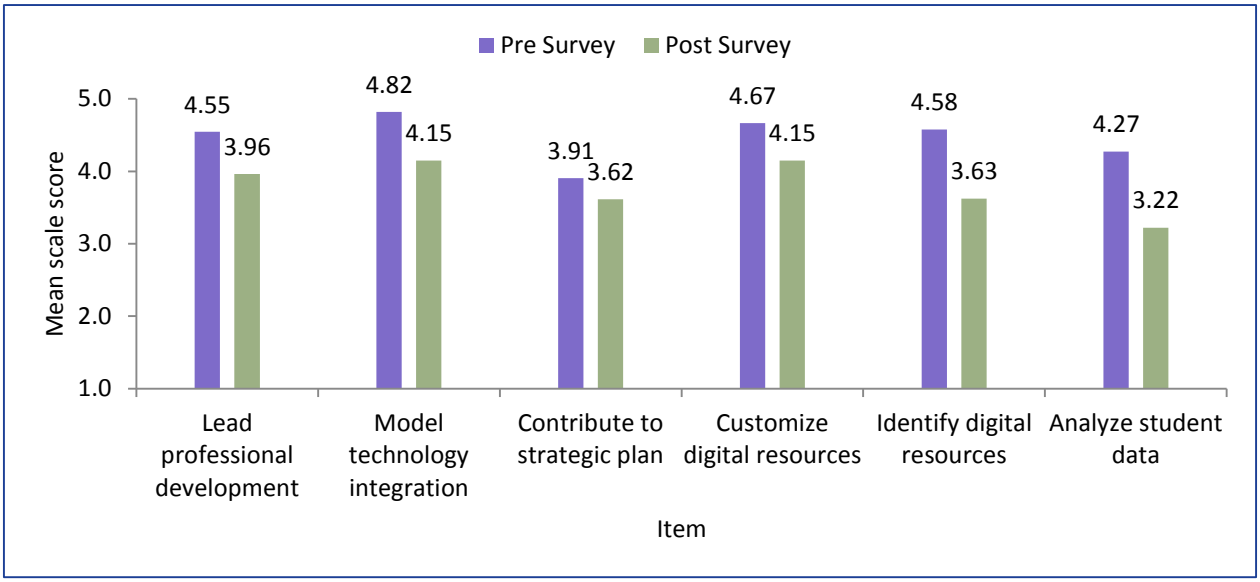

Figure 5. School Administrator Expected and Actual SETIS Candidate Use by Survey Item

The effect sizes for these six statistically significant items ranged from small (Contribute to strategic plan) to very large (Identify digital resources and Analyze student data).

Despite the above results showing areas where school administrators could improve how they leverage their SETIS candidates, the majority of school administrators reported increased student engagement (among all students) as a result of their SETIS candidates' presence in their schools. When asked if they had observed increased student engagement in curricular activities via increased technology use that could be attributed to the presence of a SETIS candidate, most school administrators indicated they had (see Figure 4). Of the 27 school administrators responding to this survey item, just over 50% chose the strongest level of agreement (on a scale from 1 to 5 where 1 equals *untrue* and 5 equals *true*). Also noteworthy, no administrators chose the lowest rating of *untrue*.

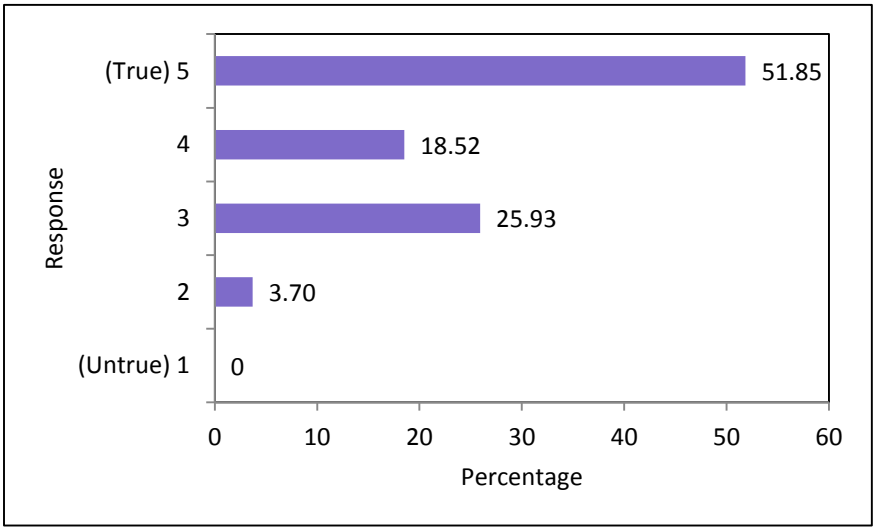

Figure 4. School Administrator Postprogram Survey: Increased Student Engagement via Use of Technology

Of the 27 responding administrators, 70% felt it was *true* (choice 4 and 5) that they observed increased student engagement. While just over 25% indicated neutrality by choosing 3 (interpreted as neither *true* nor *untrue*).

Open-ended items

Similar to the teacher-colleague surveys, school administrators were asked to respond to three essay-style, open-ended questions to provide qualitative data for this study. School administrators were given the opportunity to describe in their own words what they perceived the role of a SETIS candidate to be, as well as what they hoped to accomplish working with a SETIS (administrator preprogram survey) and what they actually accomplished working with a SETIS (administrator postprogram survey). The final open-ended question gave school administrators the option to provide any additional comments they had about the SETIS program.

Among school administrators who provided responses in both the pre- and postprogram surveys, we detected changes in attitudes and beliefs regarding both the SETIS candidates and SETIS program. We assessed comments in response to the first open-ended item for any shifts in school administrators' perception of the role of the SETIS candidates. Of the 16 paired pre-post responses, 10 indicated no change in their view of the SETIS role and the remaining six described more specific roles when comparing pre-to-post responses.

The second open-ended item asked school administrators what they hoped to accomplish by working with a SETIS candidate (preprogram) and what they actually did accomplish (postprogram). Once more, analyzing only matched pre-post survey responses (n = 16) we found that six school administrators believed their SETIS candidate met expectations, four described how their SETIS candidate exceeded them, five reported their SETIS candidate made other unexpected accomplishments, and one felt his or her SETIS candidate did not meet expectations. Of note, among administrators that reported their SETIS candidate met other unexpected accomplishments, most of their preprogram survey expectations involved improvements in student achievement including improved test scores, while their postprogram survey accomplishments often included increased technology integration and improved student engagement.

The final open-ended item provided school administrators the opportunity to share any additional comments they had about the SETIS program. Of the matched pairs (n = 4) all comments were positive. Most preprogram survey comments expressed enthusiasm about utilizing the SETIS candidates to integrate technology at the student, teacher, and curriculum levels; with the postprogram comments typically praising the SETIS candidates and program. The unmatched pre- and postprogram survey comments were mostly positive in nature. However, in one preprogram survey comment, a school administrator expressed a desire for a description of what duties and services a typical SETIS performs.

Discussion

This study examined survey results from the three primary stakeholder groups in the Special Education Technology Integration Specialist (SETIS) program: SETIS candidates, teacher colleagues, and school administrators. The results enable us to address each of the evaluation questions chosen to measure the implementation, use, and impact of the SETIS program.

Evaluation Question 1

Evaluation question one—*To what extent does the TIS program build the capacity of participating TISs to plan and facilitate (a) teaching and learning, (b) information access and delivery, and (c) program administration?*—is primarily addressed through the SETIS survey capacity indices with supporting evidence from other survey items.

Improved capacity of SETIS candidates to plan and facilitate teaching and learning is evidenced by the organizational and human capacity indices and two other survey items. Organizational capacity survey items assessed the ability of SETIS candidates to interact, communicate, and collaborate with others (i.e., teach). This index demonstrated statistically significant median differences in retrospective pre-post survey item pairs. Further, over 70% of the SETIS candidates indicated they had conducted formal staff development related to technology integration at their school within the past year. The human capacity index, measuring the intellectual proficiency and will of the SETIS candidates, provided support for gained capacity among SETIS candidates to plan and facilitate learning. This index also revealed statistically significant shifts in retrospective pre-post responses, exhibiting a very large effect size. Additional evidence of enhanced learning among SETIS candidates can be drawn from the open-ended survey item which asked SETIS candidates to name the most valuable aspect or aspects of the SETIS program. Over half of the responding candidates (17 of 29) cited learning about technology resources/tools as the most valuable aspect of the program.

The material capacity and organizational capacity indices provided a measure for the second part of EQ1—that is, perceived increases in SETIS candidates' capacity to plan and facilitate information access and delivery. Resource access, development, and sharing were each covered in the material capacity index. The material capacity index produced statistically significant median differences in retrospective pre-post responses, and exhibited a very large effect size. Survey items in the organizational capacity index provide additional validation that SETIS candidates experienced enhanced capacity in delivering technology integration to their schools. Additionally, when naming the most valuable aspect of the SETIS program, several individuals identified collaborating with other teachers/professional learning communities (seven of 29) and practice using new technology tools (five of 29) as the most valuable component of the program.

The structural capacity index examined the final component to EQ1, SETIS candidates capacity to plan and facilitate program administration. For the purposes of this survey, the items making up the structural capacity index concentrated on policies and practices SETIS candidates observed at their schools and with their teacher colleagues. While SETIS candidates do not directly change policies, procedures, and formalized practices at their schools, positive impact on these elements may be evident if SETIS candidates are capable of successful program administration. Within the structural capacity index, median differences in retrospective pre-post item responses were not as large as other indices. However, all items in this index remained statistically significant. The overall effect size for the index was medium. These results indicate SETIS candidates are having a positive and meaningful impact on structures within the schools they support.

On the whole, the SETIS cohorts perceived substantial increases in their capacity to plan and facilitate all of the components in EQ1. Each capacity index (human, material, organizational, and structural) yielded statistically significant increases in the median differences in retrospective pre-post survey results. Additionally, effect sizes for all indices, with the exception of structural, are considered very large (see *Limitations of the Study* for a discussion on the magnitude of effect sizes in relation to retrospective surveys). The strength of these results provides reasonable evidence that the SETIS program equipped its candidates with the capacity necessary to implement technology integration techniques within their schools and classrooms.

Evaluation Question 2

To answer the second evaluation question—*To what extent do TISs encounter barriers to successful program implementation (e.g., financial, temporal, relational, etc.)?*—we look at findings from the SETIS candidate and school administrator surveys.

Multiple items from the SETIS survey address this evaluation question. First, as part of the material capacity index, SETIS candidates indicated their access to high quality technology resources (e.g. computers, digital cameras, and whiteboards). Results for this item suggested that access to materials improved. Next, responses to some of the open-ended items shed light on perceived barriers faced by the SETIS candidates. When asked what aspects of the program they would change, many SETIS candidates suggested changes such as pre-set and specific deadlines on assignments, clearer expectations, and increased program organization. Others stated they would like to see more face-to-face meetings. Of note, several SETIS candidates indicated they would not change any aspect of the program. While the responses to this question vary, they are similar to previous SETIS evaluation studies. In other words, most SETIS candidates would like a program with amplified accountability and additional in-person meetings.

One barrier highlighted by an open-ended survey item was the perceived lack of school structures that support the SETIS program and teacher collaboration. Of the 29 responding SETIS candidates, eight felt there were no supports offered by their school. Finally, the last open-ended item asked SETIS candidates to list any barriers they may have encountered when implementing what they learned as part of the SETIS program. Of the seven themes identified during analysis, a shortage of time was the most common barrier (nine of 29), followed by receptiveness of teacher colleagues and school administrators (seven of 29), access to and quality of technology (five of 29), and none (five of 29).

In previous SETIS evaluation studies, one barrier identified was a lack of awareness of the SETIS program and SETIS candidates among school administrators. However, this study's results show over 90% of responding school administrators were aware they would have a SETIS in their school that year. This suggests program adjustments were adopted from prior evaluation study recommendations, resulting in improved communication among SETIS candidates and their school administrators.

Overall, the SETIS program throughout the 2012 to 2014 school years encountered relatively moderate barriers. From the perspective of the SETIS candidates, a lack of time was

their largest barrier followed closely by unreceptiveness of teacher colleagues and/or school administrators. Access to technology tools among SETIS candidates was not an issue, however, computer access for students and internet speed was a concern. The SETIS candidates also identified several things they would change about the program; specifically deadlines on assignments, clearer expectations, and increased program organization. While these may or may not be barriers to program implementation, they should be taken under consideration. Finally, the previous barrier of inadequate awareness about the SETIS and SETIS program among school administrators seems to have been alleviated by programmatic adjustments.

Evaluation Question 3

Findings from the SETIS teacher colleague and school administrator pre- and postprogram surveys were used to address the third evaluation question--*To what extent is the level of technology integration in TIS schools positively impacted through participation in the program?*

When measuring positive impacts of school participation in the SETIS program, open-ended questions from the teacher-colleague pre- and postprogram surveys provided valuable information. First, when teacher colleagues were asked to describe the role of their SETIS candidate in the postprogram survey, many teachers articulated more specific candidate roles. In fact, most of these responses included descriptions of ways in which the SETIS candidate helped them integrate technology into their classrooms and curriculum. Next, looking at what teacher colleagues hoped to accomplish with their SETIS candidate (preprogram survey) and what they actually did accomplish (postprogram survey), we see that nearly half of the teacher colleagues felt their candidate met expectations. Further, two teachers indicated their SETIS exceeded expectations and five reported their SETIS met other, unexpected accomplishments. Again, the majority of the comments described technology integration in the classroom and/or curriculum.

The technology use indices from the teacher-colleague survey were also designed to help answer EQ3. While each index demonstrated an increase in mean score from pre to post-program survey data, Wilcoxon signed-rank tests revealed statistically significant results for the design and model indices only. These results suggest positive improvement in the abilities of teacher colleagues to more thoughtfully plan and implement technical assistance and related activities (design index), as well as increased capacity to model digital-age work and learning techniques and behaviors (model index).

Additional support of positive impact via technology integration at participating schools is found in the school administrator postprogram survey. When asked if they had observed increased student engagement in curricular activities by way of increased technology use attributable to the presence of a SETIS, 70% of school administrators indicated they had. Moreover, in open-ended survey responses administrators frequently noted increased technology integration and use by teachers and students when describing the role of their SETIS candidate and the actual accomplishments achieved through working with them during the school year.

SETIS candidate activities that led to positive impacts in classrooms were associated with improved technology integration in classrooms and curriculum, raised technology knowledge among teachers, and enhanced student experiences. Perhaps most importantly, open-ended survey responses from both the teacher colleague and school administrators evidenced the extent to which the SETIS candidates integrated technology in their schools. Further, data analysis indicates improved technology use among teacher colleagues in the design and model indices.

Evaluation Question 4

The fourth evaluation question—*In what ways have school administrators and teachers leveraged the TIS and the resources provided by the TIS?*—was addressed using many of the same findings discussed in EQ3, in addition to items from the SETIS candidate survey.

As discussed in EQ3, teachers and administrators reported increased technology use in classrooms (with teachers also citing improved technology knowledge) thus supporting the leveraging of SETIS candidates and resources. Data supporting this is found in statistically significant median differences between pairs of observations concerning technology use among teacher colleagues in the design and model indices. Utilization of the SETIS program may also be seen in the shift in perception of the SETIS role by both teacher colleagues and school administrators. Among both stakeholder groups, several postprogram survey responses were more specific in the role description, with the teachers and administrators often citing examples of how they had worked with their SETIS during the school year. Additionally, 70% of school administrators reported observing increased student engagement as a result of technology integration brought about by their SETISs' activities and efforts.

Further evidence of leverage can be detected in open-ended survey items focused on expected and actual use of SETIS candidates and resources. As considered in the EQ3 discussion, a number of teacher colleagues reported their SETIS candidates met or exceeded their expectations throughout the school year and others reported that their SETIS candidates met other unexpected accomplishments. This was true for school administrators as well; they reported their SETIS candidates met or exceeded expectations and/or met other unexpected accomplishments. Contrary to results from these open-ended responses, data analysis of the multiple choice survey items measuring the intention among school administrators to utilize their SETIS candidates paints a different picture. Preprogram survey data show high levels of intent in utilizing the SETIS candidates. However, postprogram survey results indicate administrators did not leverage their SETIS candidate to the extent they had originally planned. In fact, Wilcoxon signed-rank tests revealed statistically significant differences from the preprogram survey intention to the postprogram survey actual utilization of the candidates in a negative direction by school administrators among all items.

Open-ended survey responses from the SETIS candidates provide additional examples illustrating both strengths and weaknesses when it comes to leveraging candidates and the resources they bring to their schools and classrooms. First, when asked to discuss the ways they worked with the administration at their school to address technology-related issues or concerns throughout the school year, the most common themes were providing specific assistance, discussing resource/technology needs, and other. Notably, only two SETIS candidates

indicated that they had not worked with their administrator to address school-level technology-related issues or concerns. Second, when prompted to name school structures that supported the TIS program and teacher collaboration, the most commonly named support was administrative, followed by none, common planning time, and professional learning communities.

Collectively, these data suggest some school administrators and teacher colleagues are more fully leveraging their SETIS candidates than others. Wilcoxon signed-rank tests revealed positive increases in technology use among teacher colleagues with statistically significant growth in the design and model indices. On the other hand, Wilcoxon signed-rank tests resulted in statistically significant reductions when comparing school administrators preprogram survey intentions to the postprogram survey utilization of their SETIS candidates. Yet, despite these data, open-ended survey results among the teacher colleagues and school administrators portrayed a high level of satisfaction with the accomplishments achieved by working with a SETIS candidate.

Evaluation Question 5

The fifth and final evaluation question—*What impact has the TIS program had on students' technology literacy in participating schools?*—relies upon the premise that successful program implementation along with efficient SETIS and technology resource use leads to higher teacher, administrator, and student technology literacy levels. To address EQ5 we draw insight from the teacher colleague and school administrator pre- and postprogram surveys.

Qualitative open-ended survey items from both surveys provided the most compelling evidence to support the premise. When asked about accomplishments and outcomes from participation in the SETIS program, a number of teacher colleagues and school administrators cited increased use of technology in classrooms/schools as an accomplishment. Multiple teacher colleagues described postprogram enhanced student experiences as the most notable accomplishment. Additionally, 70% of school administrators reported observing increased student engagement as a result of technology integration brought about through SETIS activities and efforts. Interestingly, in the preprogram survey it was common for administrators to name improved student achievement as an expected accomplishment and then to cite increased technology integration and student engagement as the actual accomplishment. From these open-ended remarks, it is evident that both teachers and administrators observed not only increased technology use in classrooms, but also enriched student experiences.

All technology use indices (teacher colleague pre- and postprogram surveys), with the exception of the engage index, contain items with reference to students. Examined as individual items, only a few items revealed statistically significant increases in mean survey scores from pre- to postprogram surveys. However, Wilcoxon signed-rank tests revealed positive increases in technology use among teacher colleagues with statistically significant growth in the design and model indices. As discussed in EQ3, these results suggest positive shifts in the abilities of teacher colleagues to thoughtfully plan and implement technical-assistance-related activities (design index), as well as improved capacity to model digital-age work and learning techniques and behaviors (model index).

Survey results give evidence that both teacher colleagues and school administrators perceived a rise of technology integration in classrooms and curriculum. Further, the majority of school administrators reported they had observed increased student engagement as a result of technology integration efforts by their SETIS. Analysis of the teacher colleague technology use indices showed statistically significant increases in the design and model indices. This shift in behavior indicates that, as a result of the SETIS program, teacher colleagues who responded to the survey are practicing technology integration techniques and engaging their students using technology resources provided by their SETIS.

Limitations of the Study

When interpreting results in any study, it is important to consider inherent limitations that may skew findings. While sound research methods are an integral component of high quality studies, eliminating all potential risks of bias is impossible. The limitations of this evaluation study are typical of other similar studies as discussed below.

Surveys that rely upon self-reported information always have a risk of response bias; respondents may exaggerate or underestimate, may have accurate recall difficulties, and may report information they perceive as socially acceptable. This study relies upon two types of self-reported surveys: a retrospective pre-post survey and two traditional pre-post surveys.

Previous SETIS program evaluation studies exhibited a limitation of small sample sizes. This study, in part due to combining the cohorts from the 2012–2013 and 2013–2014 school years, does not have this limitation. The SETIS candidate retrospective survey was completed by 31 SETIS candidates, while 51 teacher colleagues responded to both the teacher colleague pre- and postprogram surveys and 33 school administrators participated in both the school administrator pre- and postprogram surveys. Therefore, the sample sizes of all three stakeholder groups are adequate for us to draw general conclusions about the groups with a certain level of confidence.

Determining response rates among teacher colleagues and school administrators remains impossible due to the fact that the SETIS candidates invite an unknown number of teachers and administrators to participate in the pre- and postprogram surveys. However, a key limitation in previous SETIS program studies—the inability to match pre- and postprogram survey results among the teacher colleagues and school administrators—has been addressed by adjusting the study's methodology. With the incorporation of a mechanism which enables matching individual pre- and postprogram survey responses, it is possible to measure with more confidence shifts in knowledge, skills, and behaviors at individual and group levels.

Retrospective pre- and postprogram surveys are convenient because they occur once (improving response rates) and the pre/post data are matched (the same participants responding to the preprogram survey also responded to the postprogram survey). Certain research postulates that a form of bias called response-shift bias is alleviated through using retrospective pre- and postprogram surveys. Moore and Tananis (2009) define response-shift bias as occurring "when a participant uses a different internal understanding of the construct being measured to complete the pretest and posttest." Simply put, it is common for participants to overestimate their knowledge, skills, and behaviors before exposure to a program or

intervention. However, after the completion of a program, (and caused by what they learned in the program) they may realize their knowledge, skills, and behaviors were not truly as high as they first estimated. Therefore, it is possible for participants to rate themselves lower in a posttest due to a shift in their frame of reference, potentially masking the actual impact of a program. Conversely, other research argues traditional pretest/posttest types of surveys result in less biased program effectiveness estimates. In a 2011 study, Nimon, Zigarmi, and Allen discovered inflated effect sizes among retrospective pre- and postprogram survey items. According to their findings, surveys with before and after items presented side by side may introduce types of bias including theories of change, self-presentation, and/or effort justification. Further, to resolve the issues of both response-shift bias and exaggerated effect sizes Nimon et al. (2011) recommend administering traditional pre- and postprogram surveys with a retrospective pre- and postprogram survey. While this solution would alleviate some bias, it was not possible to initiate in this study.

Recommendations

In general, survey data from all three SETIS program stakeholders suggest the 2012 through 2014 school years' SETIS program cohorts were mostly successful. The greatest impact occurred among the SETIS candidates within the four indices of capacity building—human, material, organizational, and structural—all yielding statistically significant and practically important increases from pre-to postprogram survey observations. Among teacher colleagues, the use of Wilcoxon signed-rank tests revealed statistically significant median differences between pairs of observations in technology use for the model and design indices. While Wilcoxon signed-rank tests also resulted in statistically significant differences between the school administrator pre- and postprogram surveys, the differences uncovered a disparity between the preprogram survey intentions to utilize SETIS candidates and postprogram survey responses about their actual utilization by school administrators. Despite lower-than-expected leveraging of SETIS resources, other survey data indicated successes resulting from the SETIS program.

Study results also suggest that previous evaluation study recommendations have been adopted by the SETIS program. These changes include methodology adjustments to allow pre- and postprogram survey matching among the teacher colleague and school administrator stakeholders as well as improved awareness among SETIS candidates and school administrators. Even with these promising program adjustments, there are several recommendations that may further improve the implementation, utilization, and impact of the SETIS program:

- If logistically possible, consider holding more face-to-face meetings for the SETIS candidate group only. In consideration of the specialized nature of special education content, providing SETIS candidates greater opportunities to work together may help them more effectively implement technology integration in classrooms to benefit students with disabilities in particular.
- At the school level, promote scheduling that allows teacher colleagues and SETIS candidates time to cocreate technology-integrated lesson plans. Given time to thoughtfully plan and collaborate, teachers may be more inclined to incorporate the technological tools and resources the SETIS candidates offer.

- Encourage further collaboration between SETIS candidates and their school administrators to assist administrators in leveraging the SETIS candidates to a fuller extent. With a significant disparity between the preprogram survey intentions and the post-program survey actual utilization of the candidates by school administrators, there is ample opportunity to improve leveraging SETIS candidates and the resources they bring to their schools.

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Appendix A. SETIS Candidate Retrospective Pre- and Postprogram Survey Results

Table 1. Human Capacity Items: Retrospective SETIS Candidate Survey Pre- and Postprogram Means, Wilcoxon Signed-Rank Test and Effect Size

		Pre			Post			Significance of difference		Cohen's	Effect
Item	Item statement	*n*	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*	*d*	size
1	I have a strong understanding of how to use/apply the resources from Thinkfinity.	31	2.65	0.95	31	4.23	0.56	-4.83	<.001	2.06	very large
2	I have a strong understanding of how to use/apply the resources from Curriculum Pathways (SAS).	31	2.61	1.05	31	4.26	0.82	-4.74	<.001	1.77	very large
3	I have a strong understanding of how to use/apply the resources from West Virginia Writes.	31	3.23	1.06	30	4.10	0.80	-4.20	<.001	0.95	large
4	I have a strong understanding of how to use/apply the resources from Acuity.	31	3.29	1.04	31	4.26	0.77	-4.28	<.001	1.07	large
5	I have a strong understanding of how to use/apply the resources from TechSteps.	31	3.00	1.06	31	4.26	0.58	-4.49	<.001	1.49	very large
6	I am able to assess the quality and legitimacy of web resources.	31	3.16	1.04	31	4.61	0.50	-4.57	<.001	1.82	very large
7	I understand the most important issues surrounding legal use/copyright regulations and how they relate to integrating web resources and technology into lesson plans and instruction.	31	2.58	1.03	31	4.45	0.57	-4.86	<.001	2.29	very large
8	I am able to identify the components of a URL and to ensure it is legitimate (e.g., protocol, host, domain, directory, port address, etc.).	31	2.42	0.85	31	4.13	0.62	-4.78	<.001	2.34	very large
9	I have a strong understanding of the core National Educational Technology Standards and Performance Indicators for Teachers (NETS-T).	30	2.43	1.01	30	4.33	0.55	-4.80	<.001	2.39	very large
10	I have a strong understanding of the core National Educational Technology Standards and Performance Indicators for Students (NETS-S).	28	2.43	1.00	29	4.28	0.45	-4.63	<.001	2.44	very large

Table 1 continues next page

Table 1. Human Capacity Items: Retrospective SETIS Candidate Survey Pre- and Postprogram Means, Wilcoxon Signed-Rank Test and Effect Size

		Pre			Post			Significance of difference		Cohen's	Effect
Item	Item statement	*n*	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*	*d*	size
11	I understand how to integrate Web 2.0 tools into instruction (e.g., podcasting, wikis and blogs, social networking, etc.).	30	2.63	1.00	30	4.70	0.47	-4.78	<.001	2.70	very large
12	I integrate digital resources/tools into my work with teachers, students and administrators.	31	3.16	0.90	31	4.71	0.53	-4.80	<.001	2.14	very large
13	I understand how to effectively integrate technology into instruction to improve the quality of students' educational experiences.	30	3.27	0.91	30	4.70	0.47	-4.65	<.001	2.02	very large
14	I have a strong understanding of the county/school acceptable use policy.	30	3.50	0.97	30	4.50	0.57	-4.28	<.001	1.27	large
15	I have a strong understanding of 21st century assessment.	31	3.06	0.96	31	4.52	0.51	-4.64	<.001	1.92	very large
16	I have a strong understanding of how to design and implement project-based learning (PBL) in the classroom.	31	3.13	0.92	31	4.48	0.51	-4.66	<.001	1.85	very large
17	I actively use action research to assess the impact of my teaching on student learning.	31	2.71	1.07	31	4.35	0.55	-4.52	<.001	1.96	very large

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
Scale for means: 5-point Likert-type scale, ranging from a low of 1 (strongly disagree) to a high of 5 (strongly agree)

Table 2. Organizational Capacity Items: Retrospective SETIS Candidate Survey Pre- and Postprogram Means, Wilcoxon Signed-Rank Test and Effect Size

			Pre		Post		Significance of difference			
Item	Item statement	*n*	Mean	*SD*	Mean	*SD*	*z*	*p*	Cohen's *d*	Effect size
18	I model lessons that integrate technology for other teachers in the school.	31	2.77	0.92	4.13	0.76	-4.76	<.001	1.63	very large
19	I collaborate with others within the school to effectively integrate technology into instruction.	31	2.94	1.03	4.52	0.63	-4.81	<.001	1.88	very large
20	I serve as a resource to other teachers regarding the effective use of technology in the school.	31	3.29	0.94	4.65	0.61	-5.00	<.001	1.74	very large
21	I can effectively work with others to assess their learning and information needs (e.g., other teachers, students, administrators, etc.).	31	3.48	0.81	4.65	0.49	-4.88	<.001	1.77	very large
22	I have an ongoing dialogue with other staff members at the school about technology issues and how they can be addressed.	31	3.13	0.96	4.35	0.66	-4.52	<.001	1.52	very large

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
Scale for means: 5-point Likert-type scale, ranging from a low of 1 (strongly disagree) to a high of 5 (strongly agree)

Table 3. Structural Capacity Items: Retrospective SETIS Candidate Survey Pre- and Postprogram Means, Wilcoxon Signed-Rank Test and Effect Size

Item	Item statement	Pre			Post			Significance of difference		Cohen's	Effect
		n	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*	*d*	size
23	The school has set a time and place where staff meet in professional communities of practice to discuss how to effectively integrate technology into instruction.	31	2.87	1.02	31	3.71	0.94	-4.13	<.001	0.87	large
24	Teachers at the school have time to co-plan and/or co-teach lessons that integrate technology into instruction.	31	2.84	1.04	31	3.45	0.77	-2.93	0.003	0.68	medium
25	Staff at the school understand the acceptable use policy.	31	3.48	0.89	31	4.10	0.70	-3.76	<.001	0.78	medium
26	Staff at the school understand key concepts and best practices regarding web literacy.	31	2.90	0.91	31	3.68	0.75	-3.90	<.001	0.95	large
27	Staff at the school understand the most important issues surrounding legal use/copyright regulations and how they relate to integrating web resources and technology into lesson plans and instruction.	31	2.74	0.82	30	3.60	0.86	-4.13	<.001	1.04	large
28	Staff at the school are familiar with the technology components of the school's strategic plan.	30	2.80	0.89	30	3.63	0.96	-3.99	<.001	0.92	large
29	The school has policies and procedures in place that support the use of Project Based Learning (PBL).	31	3.26	0.96	31	3.77	1.02	-3.23	0.001	0.53	medium
30	The school has policies and procedures in place that support the use of technology resources (e.g., Thinkfinity, Acuity, West Virginia Writes, etc.).	31	3.77	0.88	31	4.16	0.64	-2.97	0.003	0.51	medium
31	Staff at the school regularly use Thinkfinity and or Curriculum Pathways (SAS) as a resource in the classroom.	31	3.00	1.06	30	3.40	1.10	-2.81	0.005	0.38	small

Table 3 continues next page

32	Staff at the school regularly use West Virginia Writes or another online writing program as a formative assessment of student writing.	31	3.87	0.81	31	4.19	0.70	-3.16	0.002	0.43	small

Table 3. Structural Capacity Items: Retrospective SETIS Candidate Survey Pre- and Postprogram Means, Wilcoxon Signed-Rank Test and Effect Size

		Pre			Post			Significance of difference		Cohen's	Effect
Item	Item statement	*n*	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*	*d*	size
33	The school has a plan in place to support the implementation of TechSteps.	31	3.58	1.09	31	4.16	0.86	-3.45	0.001	0.6	medium
34	Staff at the school regularly use TechSteps as part of their core content instruction.	31	2.97	1.17	31	3.39	1.20	-2.75	0.006	0.36	small
35	Staff at the school understand the core National Education Technology Standards and Performance Indicators for Teachers (NETS-T).	30	2.80	1.06	31	3.29	0.97	-3.42	0.001	0.49	small
36	Staff at the school understand the National Education Technology Standards and Performance Indicators for Students (NETS-S).	31	2.84	1.00	30	3.37	1.00	-3.64	<.001	0.54	medium
37	Staff at the school understand West Virginia's 21st Century Skills and Tools.	31	3.19	0.87	31	3.90	0.79	-3.95	<.001	0.87	large
38	Staff at the school use Web 2.0 tools for collaboration and instruction.	31	2.74	0.89	30	3.73	0.83	-4.15	<.001	1.17	large
39	Staff at the school frequently integrate digital resources/tools in their teaching.	31	3.16	1.00	31	4.06	0.63	-3.82	<.001	1.1	large

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
Scale for means: 5-point Likert-type scale, ranging from a low of 1 (strongly disagree) to a high of 5 (strongly agree)

Table 4. Material Capacity Items: Retrospective SETIS Candidate Survey Pre- and Postprogram Means, Wilcoxon Signed-Rank Test and Effect Size

			Pre		Post		Significance of difference			
Item	Item statement	*n*	Mean	*SD*	Mean	*SD*	*z*	*p*	Cohen's *d*	Effect size
40	I have access to a variety of high quality technology resources at my school (e.g., computer, digital camera, whiteboard, etc.).	31	3.77	1.15	4.65	0.80	-4.01	<.001	0.9	large
41	I participated in a variety of professional development about integrating technology resources into instruction.	31	3.48	1.09	4.58	0.67	-3.89	<.001	1.23	large
42	I feel I am able to direct staff in my school toward high quality technology resources that are relevant to their information needs.	31	2.87	1.06	4.45	0.51	-4.62	<.001	1.94	very large
43	I have the ability to develop useful technology resources for my school that address our information needs.	31	3.13	1.02	4.52	0.51	-4.65	<.001	1.74	very large
44	I know where to find useful and high quality technology resources that can be integrated into instruction.	31	3.19	1.05	4.71	0.46	-4.72	<.001	1.91	very large

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
Scale for means: 5-point Likert-type scale, ranging from a low of 1 (strongly disagree) to a high of 5 (strongly agree)

Table 5. Standardized Capacity Indices: Retrospective SETIS Candidate Survey Pre- and Postprogram Means, Wilcoxon Signed-Rank Test and Effect Size

		Pre		Post		Significance of difference			
Index	*n*	Mean	*SD*	Mean	*SD*	*z*	*p*	Cohen's *d*	Effect size
Human capacity	31	2.97	0.91	4.44	0.62	-18.82	<.001	1.94	very large
Organizational capacity	31	3.17	0.83	4.50	0.50	-10.64	<.001	1.96	very large
Structural capacity	31	3.06	0.96	3.74	0.99	-14.50	<.001	0.7	medium
Material capacity	31	3.19	1.00	4.63	0.49	-9.71	<.001	1.87	very large

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
Scale for means: 5-point Likert-type scale, ranging from a low of 1 (strongly disagree) to a high of 5 (strongly agree)

Table 6. Summarized Open-Ended Survey Items, Retrospective SETIS Candidate Survey: Valuable Aspects of SETIS Program Participation

Theme	Frequency of comments* SETIS survey (*n* = 29)
Learning about technology resources/tools	17
Collaborating with other teachers /professional learning communities	7
Gained qualification / confidence	2
Face-to-face meetings / hands-on training	2
Using specific technology tools	2
Practice using new technology tools	5
Implementing technology into classrooms	3

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
*Some respondents provided more than one comment; therefore, the frequency of comments may exceed the number of respondents (n).

Table 7. Summarized Open-Ended Survey Items, Retrospective SETIS Candidate Survey: Suggested Changes to the SETIS Program

Theme	Frequency of comments SETIS survey (*n* = 28)
Program/content change	13
Time change	3
Meeting change	5
No change	6
N/A	1

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts

Table 8. Summarized Open-Ended Survey Items, Retrospective SETIS Candidate Survey: School Structures Supporting SETIS and Teacher Collaboration

Theme	Frequency of comments* SETIS survey (*n* = 29)
Administrative support	10
Staff support	4
Common planning time	7
PLC	6
TIS support	1
None	8
Other	2

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
*Some respondents provided more than one comment, therefore, the frequency of comments may exceed the number of respondents (*n*).

Table 9. Summarized Open-Ended Survey Items, Retrospective SETIS Candidate Survey: Addressing Technology Issues/Concerns (SETIS Candidate Support to School Administration)

Theme	Frequency of comments* SETIS survey (*n* = 29)
Provide training/ professional development	5
Membership in school leadership team	2
Discuss resource/technology needs	5
Provide specific assistance	8
Increase technology as a school goal	1
Other	5
None	2
N/A	2

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
*Some respondents provided more than one comment, therefore, the frequency of comments may exceed the number of respondents (*n*).

Table 10. Summarized Open-Ended Survey Items, Retrospective SETIS Candidate Survey: Barriers Encountered by SETIS Candidates

Theme	Frequency of comments* SETIS survey (*n* = 29)
Time	9
Access to and quality of technology	5
Receptiveness of teacher colleagues / school administrators	7
Other duties / responsibilities	2
Funding	1
None	5
Other	3

Data source: SETIS candidate retrospective surveys, 2012–2013 and 2013–2014 cohorts
*Some respondents provided more than one comment, therefore, the frequency of comments may exceed the number of respondents (*n*).

Appendix B. Teacher Colleague Pre- and Postprogram Survey Results

Table 11. Facilitate Items: Teacher Colleague Pre- and Postprogram Survey Means, Wilcoxon Signed-Rank Test

		Pre			Post			Significance of difference	
Item	Item statement	*n*	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*
1	I use information from digital sources to promote learning and engage students in classroom activities.	50	3.14	0.87	51	3.18	0.74	-0.35	0.73
2	I require my students to use digital resources and tools for writing, collaboration, reflection, research, and other assignments.	50	2.66	0.88	51	2.65	0.96	-0.36	0.72
3	I engage my students in real-world issues and authentic problem-solving.	49	3.00	0.74	51	3.04	0.66	-0.58	0.56
4	I require my students to gather information from sources other than their textbooks in order to complete their daily assignments (e.g., podcasts, videos, etc.).	50	2.54	0.87	51	2.61	0.94	-0.68	0.50
5	I require my students to present information and actively teach content to their fellow students and/or community members.	50	2.36	0.97	51	2.39	0.85	-0.19	0.85

Data source: Teacher colleague pre-post surveys, school years 2012–2013 and 2013–2014
Scale for means: 4-point Likert type scale where 1 = not usually, 2 = sometimes, 3 = often, and 4 = almost always
Note: Cohen's *d* effect sizes could not be computed for any individual item results because none approached statistical significance.

Table 12. Design Items: Teacher Colleague Pre- and Postprogram Survey Means, Wilcoxon Signed-Rank Test

		Pre			Post			Significance of difference	
Item	Item Statement	*n*	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*
1	I use a blend of both face-to-face and online environments to deliver instruction to my students.	50	2.30	1.04	50	2.46	1.02	-0.56	0.57
2	I design and/or implement projects that emphasize creative thinking and require students to engage in problem-solving, decision-making and experimental inquiry, using digital resources/tools when appropriate.	50	2.60	0.76	50	2.74	0.81	-1.25	0.21
3	I often design and/or utilize student-centered formative and performance-based assessments using available digital resources and tools (e.g., WV Writes, Acuity, TechSteps, etc.).	50	2.78	0.86	50	2.84	1.05	-0.74	0.46
4	I use digital resources and tools to make assignments for students that are based upon their individual interests, abilities and learning needs.	50	2.50	0.86	49	2.69	0.87	-1.54	0.12
5	I require my students to set personal learning goals and to self-assess their progress toward meeting those goals, using digital resources and tools when available and appropriate.	50	2.18	0.92	50	2.44	0.94	-1.56	0.12

Data source: Teacher colleague pre-post surveys, school years 2012–2013 and 2013–2014
Scale for means: 4-point Likert type scale where 1 = not usually, 2 = sometimes, 3 = often, and 4 = almost always
Note: Cohen's *d* effect sizes could not be computed for any individual item results because none approached statistical significance.

Table 13. Model Items: Teacher Colleague Pre- and Postprogram Survey Means, Wilcoxon Signed-Rank Test and Effect Size

		Pre			Post			Significance of difference		Cohen's	Effect
Item	Item statement	*n*	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*	*d*	size
1	I use digital resources and tools to communicate with students.	50	2.28	0.94	50	2.48	1.11	-0.89	0.37		
2	I use digital resources and tools to communicate with my peers.	50	2.96	0.92	50	3.32	0.74	-2.81	0.01	0.43	small
3	I use digital resources and tools to communicate with parents and the community outside of my school.	50	2.66	0.83	50	2.86	0.90	-1.28	0.20		
4	I customize the available digital resources and tools such as WV Writes, Acuity, TechSteps, etc. to personalize learning for my students.	48	2.42	1.07	50	2.52	1.05	-0.87	0.39		

Data source: Teacher colleague pre-post surveys, school years 2012–2013 and 2013–2014
Scale for means: 4-point Likert type scale where 1 = not usually, 2 = sometimes, 3 = often, and 4 = almost always
Note: Cohen's *d* effect sizes were not computed for any individual item results that did not approach statistical significance.

Table 14. Promote Items: Teacher Colleague Pre- and Postprogram Survey Means, Wilcoxon Signed-Rank Test

		Pre			Post			Significance of difference	
Item	Item statement	*n*	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*
1	I advocate, model and teach my students about safe, legal and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources.	49	3.27	0.84	49	3.27	0.81	-0.61	0.54
2	I offer students opportunities to use digital resources and tools to participate in collaborative projects with students of other cultures that address current problems, issues or themes.	49	2.16	1.07	49	2.45	1.15	-1.43	0.15
3	Students in my class model appropriate online behavior and social interaction through digital activities in my classroom.	48	3.23	0.90	48	3.38	0.87	-0.55	0.58

Data source: Teacher colleague pre-post surveys, school years 2012–2013 and 2013–2014
Scale for means: 4-point Likert type scale where 1 = not usually, 2 = sometimes, 3 = often, and 4 = almost always
Note: Cohen's *d* effect sizes could not be computed for any individual item results because none approached statistical significance.

Table 15. Engage Items: Teacher Colleague Pre- and Postprogram Survey Means, Wilcoxon Signed-Rank Test and Effect Size

Item	Item Statement	Pre			Post			Significance of difference		Cohen's	Effect
		n	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*	*d*	size
1	I participate actively in local communities of practice with my fellow teachers, either online or face-to-face.	49	2.65	0.99	50	2.68	0.83	-0.25	0.80		
2	I participate actively in online/global communities with other educators outside of my local community to gather and discuss resources and ideas related to student achievement and learning.	49	1.94	0.83	50	2.10	0.87	-0.69	0.49		
3	I model and teach other educators to use digital tools and resources to promote student achievement and learning.	49	2.10	0.96	49	2.39	1.00	-1.96	0.05	0.29	small
4	I regularly seek out digital resources, tools and research and evaluate its quality and relevance prior to using it in the classroom.	49	2.88	0.86	50	2.94	0.93	-0.35	0.73		

Data source: Teacher colleague pre-post surveys, school years 2012–2013 and 2013–2014
Scale for means: 4-point Likert type scale where 1 = not usually, 2 = sometimes, 3 = often, and 4 = almost always
Note: Cohen's *d* effect sizes were not computed for any individual item results that did not approach statistical significance.

Table 16. Differences in Technology Use Indices: Teacher Colleague Pre- and Postprogram Survey Means, Wilcoxon Signed-Rank Test and Effect Size

Index	Pre			Post		Significance of difference		Cohen's	
	n	Mean	*SD*	Mean	*SD*	*z*	*p*	*d*	Effect size
Facilitate	51	2.74	0.90	2.77	0.88	-0.56	0.58		
Design	51	2.47	0.90	2.63	0.95	-2.39	0.02	0.18	negligible
Model	51	2.58	0.97	2.80	1.01	-2.80	0.005	0.22	small
Promote	51	2.88	1.07	3.03	1.04	-0.99	0.32		
Engage	51	2.39	0.98	2.53	0.95	-1.12	0.26		

Data source: Teacher colleague pre-post surveys, school years 2012–2013 and 2013–2014
Scale for means: 4-point Likert type scale where 1 = not usually, 2 = sometimes, 3 = often, and 4 = almost always
Note: Cohen's *d* effect sizes were not computed for any index results that did not approach statistical significance.

Appendix C. School Administrator Pre- and Postprogram Survey Results

Table 17. SETIS School Administrator Survey Items: Pre- and Postprogram Means, Wilcoxon Signed-Rank Test and Effect Size

		Pre			Post			Significance of difference		Cohen's	Effect
Item	Item statement	*n*	Mean	*SD*	*n*	Mean	*SD*	*z*	*p*	*d*	size
Share	I plan to ask my SETIS to share/ My SETIS shared what he/she has learned by leading professional development for the other teachers in my school.	33	4.55	0.62	26	3.96	0.96	-2.39	0.017	0.75	medium
Model	I plan to ask my SETIS to model/ My SETIS modeled the integration of technology for his/her coteachers and others within the school.	33	4.82	0.46	27	4.15	1.28	-3.25	0.001	0.74	medium
Assist in plan	I anticipate asking my SETIS to assist/ My SETIS assisted me in developing the school's strategic plan with regard to information and technology needs.	32	3.91	1.03	26	3.62	1.10	-2.00	0.045	0.28	small
Assist teacher	I expect that my SETIS will assist/ My SETIS assisted his/her coteachers in customizing available digital resources and tools such as WV Writes, TechSteps, Acuity, Edmodo, Thinkfinity, etc. to personalize learning for students.	33	4.67	0.54	27	4.15	1.39	-2.84	0.004	0.52	medium
Work with teacher	I will request that the SETIS/ I requested that the SETIS work with teachers to identify digital resources and tools that effectively integrate technology into their current curriculum.	33	4.58	0.56	24	3.63	1.13	-3.11	0.002	1.14	large
Conduct analysis	I will ask the SETIS/ I asked the SETIS to conduct analyses of student data and engage in action research to help me understand the impact of technology integration at my school.	33	4.27	0.88	27	3.22	1.38	-3.37	0.001	0.95	large
Observe	Based on your classroom observations this school year, has the SETIS candidate increased student engagement in curricular activities through increased use of technology.	NA	NA	NA	27	4.19	1.67	NA	NA	NA	NA

Data source: School administrator pre-post surveys, school years 2012–2013 and 2013–2014
Scale for means: Pre survey used 5-point scale of likelihood where the lowest rank of 1 = unlikely and highest rank of 5 = likely. Post survey used 5-point scale of agreement where the lowest rank of 1 = untrue and the highest rank of 5 = true.

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