An Evaluation of Instructional Technology

In U.S. Virgin Islands Schools

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55 Middlesex Street, Suite 216
North Chelmsford, MA 01863
www.sun-associates.com

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1. Summary

In the fall of 2011, Sun Associates was contracted by the Virgin Islands Department of Education (VIDE) to perform an evaluation of progress toward meeting the goals and indicators of the Virgin Islands' 2011 – 2013 Technology Plan. That evaluation is the subject of the following report.

The VIDE technology plan is built around six program goals and is intended to provide guidance as to how VI schools expend funds and implement programs that utilize instructional technology to benefit teaching and learning. The VIDE plan attempts to guide schools toward a vision of technology integration that is in line with current best practice as well as with the U.S. Department of Education's National Technology Plan. As such, the VIDE plan focuses on technology integration (Goal 1), meeting national standards (Goal 2), implementing effective models for teacher professional development (Goal 3), and establishing the technology infrastructure and supports (Goals 4 -6) necessary to achieve Goals 1 and 2. The plan's goals are content neutral in that they focus on the use of technology to support *all* content subject areas. In this way, technology is positioned as a tool to benefit all VI students, teachers, and areas of study. The plan's strategic directions and performance indicators reflect this position and tie performance to meeting national standards and implementing proven and best practice.

A Framework for Looking at Pedagogy and Technology Use

Underlying the plan's goals and indicators is a vision for technology integration that emphasizes the confluence of student-centered pedagogy with student use of technology to support the development of 21st century skills. This orientation is one that meets national perspectives on how best to leverage information technology to support improved student learning. This orientation is shown graphically in Figure 1, below. Here it can be seen that the "ideal" – which is expressed in VI's indicators for Goals 1 and 2 -- Goals 3 – 6 are in place largely to support the attainment of Goals 1 and 2 – exists in the upper right corner of the graphic. This corner contains those implementations/uses of instructional technology that support student-centered learning. The combination of hands-on technology use within a highly student-centered pedagogy results in technology-driven, 21st century learning, and hence the development 21st Century skills.

Performance in this upper-right corner can be visualized as being on a trajectory from the lower left quadrant of Figure 1. In that lower left quadrant are found teacher uses of technologies to support teacher-directed activities such as lecture and teacher-driven discussion. One would typically find the use of the Promethean board to display slides, videos, and images in this corner of the framework.

Between the lower left and upper right, one finds a continuum of activities that increasingly require students to use technology within the context of increasingly student-centered activities.

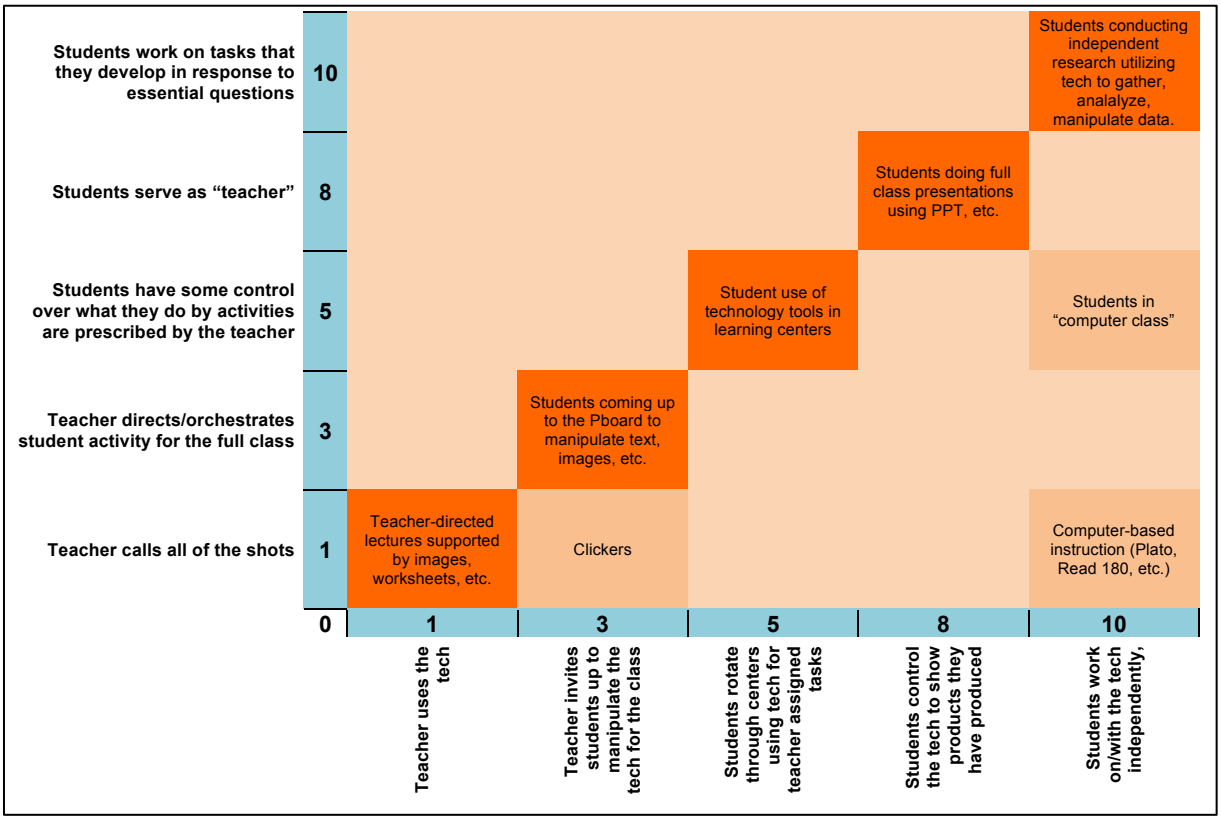


Figure 1 – Pedagogy and Technology Use Matrix

How the Evaluators' Observations Fit the Framework

As noted above, the VI technology plan goals and indicators clearly state that the desired performance exists in the upper right corner of the pedagogy/technology use framework. What the evaluators observed was largely in the lower left corner of the framework. Classroom observations, teacher and student survey data, and teacher and administrator interviews clearly state that the majority of what is happening with regard to technology use in VI schools is teacher-directed. Specifically, most of what was observed and discussed was the use of Promethean boards to display/project static images or videos for students to watch as teachers lectured or led discussions. Of the evaluators' classroom observations, 67% fit into this category of teacher-directed instruction, with the teacher primarily in control of the technology. This data is shown in Figure 2, below. Teacher interview and teacher and student survey data support this finding. In short, VI students, in general, are not routinely engaged in the use of technology as described in the technology plan.

The evaluators note that many teachers and administrators mention using various computer-based instruction (CBI) programs such as Plato, Achieve 3000, Read 180, etc. within schools. Indeed, the evaluators observed many of these systems in use, particularly in St. Croix (STX) district where there are a relatively large number of schools engaged in intervention activities. The evaluators find that the use of these programs tends to be often cited as "technology integration" by administrators and teachers. On the framework above, student use of these programs is seen to be in the lower-right corner. That is, the students *use* the technology, but the activities are highly teacher directed (where the computer is essentially the teacher). Therefore, it must be noted that student use of CBI programs *is not* in line with

the VI technology plan indicators for the reason that students are not engaged creatively or collaboratively in activities that promote 21st century learning. While CBI use may indeed be serving a laudable educational goal (intervention, credit recovery, etc.) as well as perhaps providing students with some *exposure* to technology, it is not *integration* as described by the Goal 1 indicators in the VI technology plan.

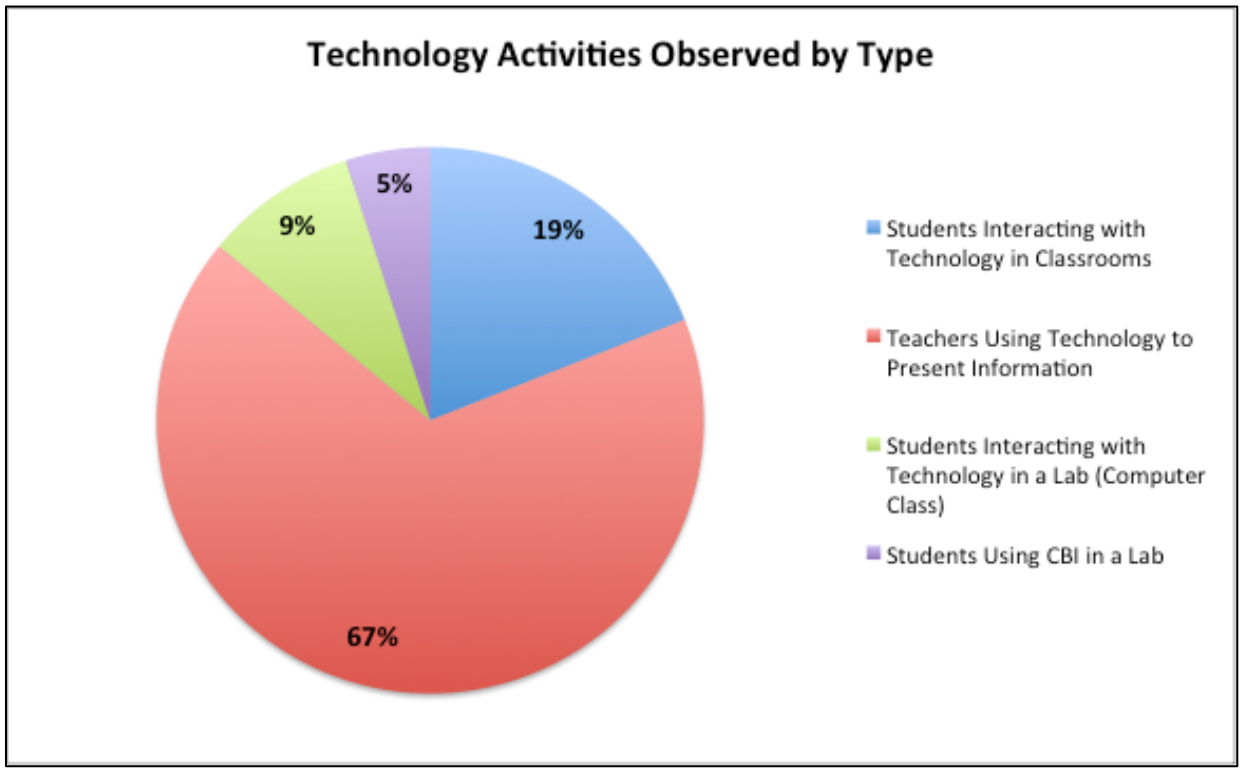


Figure 2 – Evaluators' Observations by Technology Use Observed

The point raised by this discussion is one that lies at the heart of the Virgin Islands technology plan. It is also the overarching theme of the national standards such as NETS-S and NETS-T that 21st century learning is *not* simply about students or teachers "using" technology. Rather, it emphasizes the development of critical thinking, problem-solving, and collaborative skills within a student-centered learning environment that leverages technology tools to support core curriculum competency. This point will be essential for VI educators and administrators – at all levels from VIDE to the classroom teacher – to understand as they coordinate progress toward achieving the purpose of the plan and meeting the plan's indicators. At present, the evaluators do not find this to be the case as district and building staff expressed considerable confusion about the definition of "integration".

The evaluators note that a majority of VI teachers – 67% of observations as shown in Figure 2 - appear to have a basic understanding of how to use the technology devices that they have readily available (Promethean boards and teacher workstations). This is evidenced through their frequent use of these technologies to support existing pedagogies. Nevertheless, this is just a starting point on the path to meeting the Goal 1 indicator. As the Pedagogy and Technology Use matrix (Figure 1) shows, performance that meets the indicator involves greater student use of technology and a significant shift in pedagogy toward a more student-centered approach. The point on the matrix that represents technology

integration in this fashion is at the opposite corner (point 10,10) from the teacher directed uses of technology (point 1,1) currently prevalent in VI classrooms.

Further, the evaluators note that there is evidence that many VI principals have a vision/desire for technology use that comes closer to meeting the technology plan indicators than is currently the case in their schools. The evaluators spoke to every school principal in the territory in an effort to tease out the school leader's vision of what would represent "ideal" student use of technology within his/her school. In nearly every case, that ideal would be represented by a mid-point on the through-line from the lower left to upper right quadrants in the framework. That is, most principals sought a situation where students were "interacting" with the Promethean board (thereby using the technology a bit more interactively and less as a passive projection device). Nevertheless, the evaluators note that the type of activity desired by principals was seen in only slightly less than 20% of the classroom observations. Those cases included students who were invited to the board to manipulate visuals, write on the board (as an electronic whiteboard), or in a few cases create some sort of technology-produced product (e.g., a PowerPoint presentation) outside of a "computer class" where the whole point of the exercise was to produce a technology product.[1] While these activities do involve students with technology in some ways, they fail to emphasize the important learning skills associated with the VI technology plan indicator for Goal 1.

In reference to Goal 2, the evaluators find again that the performance observed in schools, and discussed with teachers and students via survey, interview, and focus group does not meet with the indicator described in the VI technology plan. While VI teachers and students on a whole do demonstrate skills in very basic computer operations, and there is an effort in place in many (but not all) elementary schools to cover these computer basics with all students, there is virtually no progress being made in terms of meeting the NETS standards. As with Goal 1, the evaluators find that this lack of performance is largely due to the fact that teachers – and therefore students - are not engaging in types of instructional strategies that would support meeting the standards.

The evaluators encountered several library media specialists who have undertaken the task of developing information literacy skills – a key and central part of the NETS and 21st century standards – with students. These seem to be isolated and pioneering attempts to teach thinking skills outside of the mainstream classroom, but the effort certainly echoes the spirit of technology plan indicator. *All* teachers must be made aware of the relevant standards and must make efforts to weave these skills into classroom instruction if Goal 2 is to be met.

Goal 3 – professional development – needs to be seen as instrumental in attaining acceptable levels of performance in Goals 1 and 2. Presently, very few teachers seem to have benefitted from any official training that would help them meet the standards (Goal 2) and then transform classroom practice/instruction (Goal 1). There have been some initial attempts to implement appropriate professional development – e.g., the February 2011 technology-integrated curriculum unit training – but these efforts seem to have been few and have been largely unsupported at the school level. In particular, while many schools (elementary and junior high) seem to have piloted some integrated units and made efforts to reposition the "computer teacher" into an individual who focuses on supporting teachers instructionally (versus teaching students computer skills in isolation of the core curriculum), these efforts have largely come to an end in the 2011-2012 school year due to staff reductions, new priorities

[1] While indeed generative of "computer skills" (and therefore part of Goal 2), creating materials with a computer in a computer class is not actually "integration" in the sense of Goal 1. Integration implies the use of technology within some curriculum subject area that is not technology.

for the use of technology devices (e.g., devoting computers to CBI and online testing), and other competing initiatives (e.g., the development of pacing guides that do not include technology activities that support the NETS/21st century standards).

Professional development that has occurred seems to be very much of the "how to" type which emphasizes devices and systems versus teaching skills. Once again, this is not to say that "how to" training is unimportant, but it does little to drive achievement of the Goal 3 indicators.

Finally, another goal that supports Goals 1 and 2 is Goal 4, Infrastructure and Access. Because Goal 4 is in many ways a much more tangible goal than Goals 1 – 3, the evaluators can say that perhaps more progress has been made here than on the other VI technology plan goals. By and large the VI has a rather robust technology infrastructure, albeit one that (like any infrastructure) requires constant attention and maintenance in order to keep performing. Maintenance, support, and the creation of effective and well-communicated policies are key issues and ones that demand continual attention at all levels in the VI (e.g., from VIDE's OIT down to the classroom level). Many teachers use their perceptions of poorly functioning infrastructure (whether this reflects reality or not) and their lack of knowledge about procedures and policies (which speaks to a communication issue originating with VIDE) as excuses for not engaging in the types of activities that would support performance in line with the indicators for Goals 1 and 2. Therefore, it is incumbent upon those who oversee Infrastructure and Access to remove these barriers – which the evaluators find are largely related to ineffective communications – so that teachers can make progress uninhibited by perceived (or actual) problems with the technology.

Recommendations

As noted above, the vast majority of what is currently observed in terms of technology integration in VI schools does not yet reach the level of meeting the indicators for Goals 1 – 3. Nevertheless, it is also clear that there has been some progress made in the two years since the evaluators last conducted a Territory-wide evaluation. At present, the technology infrastructure is considerably more developed than it was two years ago. Wireless is available throughout the district and nearly every classroom has a Promethean board and at least one computer. More importantly, the evaluators have found that basic classroom technology (a computer and a Promethean board) is likely (67%) being used in most classrooms across the Territory. This pattern represents a significant change from two years ago when it was relatively unlikely that classrooms were using any technology. So at least in terms of Goals 1, 2 and 4, some of what is happening in schools is a start toward meeting the indicators. Therefore the evaluators' recommendations revolve around making the most of this forward movement by working to build upon existing success.

First and foremost, the evaluators recommend that VIDE and the districts focus their attention and efforts on creating a more student-centered learning environment in all VI schools. Those relatively few schools where students are encouraged to work in small groups, and ideally to collaborate, should be highlighted as models for the Territory. The same should be the case with the even fewer number of classrooms where teachers have managed to introduce student-centered projects as a way to develop curriculum-based learning. Innovations such as the "technology integrated curriculum units" that were piloted in the 2010-2011 school year and then subsequently all but dropped should be continued and expanded. In secondary schools, where there is actually even more possibility of students taking a

strong role in guiding their own learning, teachers need extensive professional development to weave the key skills of communication, collaboration, and information literacy into their curriculum.

There is another overarching recommendation that if implemented would serve to support the primary recommendation of developing student-centered learning environments. This is to create a cohesive vision for improved learning environments from the top down. The evaluators recommend that VIDE make it a primary priority to pull together the wide array of currently disparate activities and initiatives into a singular unified strategy that can then encompass – by logically connecting – the various initiatives that occur in schools. This recommendation is made in light of what school administrators and teachers often (and repeatedly) describe as a "blizzard of initiatives" that rains down upon schools. Schools are not complaining about the volume of initiatives so much as the fact that a number of these initiatives clearly conflict. In such cases, a variety of things get caught in the crossfire, and technology integration (not to mention student-centered learning) seems to be one. Schools are told to "integrate technology" but are then also given direction to follow a "pacing guide" that specifies adherence to textbooks (thereby undermining the opportunity for projects and various technology-enriched student centered learning activities). Likewise, schools are encouraged to use CBI systems that have no role in classroom instruction and simultaneously take up significant time and technology resources that then cannot be used for more "integrated" activities. Finally, schools are mandated to perform a large amount of computer-based testing (which replaces paper and pencil testing), and therefore cannot use their computer labs for curriculum-based purposes. These are but a few examples that speak to the tremendous lack of coordination of efforts that arrive on school and district doorsteps, all requiring action. Like a non-metaphorical blizzard (or hurricane), the actual response from one (in this case the school and teacher) confronted with such a situation is to hunker down and sit tight and hope for the weather to clear. That is the environment in which technology integration is occurring – or more to the point, not occurring – in VI schools. Given these conditions it is not surprising that activities such as technology infrastructure improvement and professional development are not coordinated.

This environment, characterized by confusion around a disconnected and uncoordinated set of initiatives, has taken a heavy toll on VI schools and their efforts to integrate technology. The responsibility for addressing this problem *has* to come from the top levels of VIDE as this is the origin of the initiatives and the logical place for initiatives to be connected and coordinated. It is clear to the evaluators that the existing lack of coordination is *not* a problem of individual VIDE departments – such as OIT – "misinterpreting" their role, or of districts misinterpreting guidance from the state. Rather, there simply seems *to be little strategic guidance that leverages resources* in a coordinated fashion. As a result, one can encounter a situation – such as that discussed in this evaluation – where student-centered learning can be promoted as a policy and yet schools are allowed to spend millions on technology devices that not only do little to support that policy but in fact act mainly to encourage teachers to work in traditional, teacher-directed ways. Or at the other end of the spectrum, schools that actually wish to use CBI to address AYP/restructuring goals are told that CBI is not encouraged for their school, despite the fact that is being used for such purposes in other schools in the district/Territory. Again, the evaluators stress that the problems here do not lie with the solutions themselves– Promethean boards, CBI, etc. -- but with the need for oversight over how these various solutions fit into a more comprehensive and sustainable plan for improvement.

In conclusion, the evaluators recommend that VIDE – as the ultimate responsibility for the VI technology plan – undertake a thorough review of the existing technology plan and a careful and measured examination of this evaluation report. This review should involve more than just OIT but also

other VIDE offices that have direct responsibility for student instruction and teacher training. Such a coordinated review should examine how pedagogy (specifically student centered learning), student skills, and national standards work should together to drive change in VI schools. If conducted methodically and with input from experts in both the VI and other locations, the evaluators are confident that VIDE will discover that all of these standards and initiatives – e.g., NETS, 21st century learning, and most importantly, curriculum initiatives such as the Common Core – converge on a common point, and that is a radically different way of learning than is currently occurring in the majority of VI schools and classrooms. If the VI is going to be effective in educating its students to meet the cognitive demands necessary for successful participation in the economic world outside of school, then it will need to meet the challenge of this vision. Achieving this will mean achieving the goals and indicators of the technology plan.

2. Introduction

Background to this Evaluation Project

In the fall of 2011, the Virgin Islands Department of Education contracted with Sun Associates to perform an evaluation of Virgin Islands' schools progress toward meeting the goals and indicators of the 2011 – 2013 Technology Plan.

The VIDE technology plan is built around six program goals and is intended to provide guidance as to how VI schools expend funds and implement programs that utilize instructional technology to benefit teaching and learning. The VIDE plan attempts to guide schools toward a vision of technology integration that is in line with current best practice as well as with the U.S. Department of Education's National Technology Plan. As such, the VIDE plan focuses on technology integration (Goal 1), meeting national standards (Goal 2), implementing effective models for teacher professional development (Goal 3), and establishing the technology infrastructure and supports (Goals 4 -6) necessary to achieve Goals 1 and 2. The plan's goals are content neutral, that is they focus on the use of technology to support all content subject areas. In this way, technology is positioned as a tool to benefit all VI students, teachers, and areas of study. The plan's strategic directions and performance indicators reflect this position and tie performance to meeting national standards and implementing proven and best practice.

Data Collection Strategies and Challenges

The evaluators began their work on this program evaluation in October 2011 with meetings in both VI school districts and with VIDE OIT staff. The point of these meetings was to review each district's technology plan with particular attention to the existing indicators. District staff [2] were asked to review the indicators and to offer input on any particular issues or challenges they would like to have covered in the evaluation process. Neither district noted any particular issues and thus the evaluators went about designing data collection instruments to assess progress toward the existing indicators.

During the October meetings and in follow-up teleconferences immediately following each meeting, district staff agreed to provide assistance in facilitating the evaluators' access to each district's schools. This involved creating a memorandum to principals informing them of the date that each school would be visited, a memorandum to teachers district-wide asking them to complete an online survey and to have secondary students complete an online survey, and to recruit a random sample of teachers (K-12) to attend focus groups. Districts were also asked to gather the district Coordinators for a focus group.

These requests for assistance/facilitation resulted in varying degrees of success. While district staff in both districts were accommodating in their desire to provide assistance, it turned out that in St. Thomas/St. John (STTJ) the requested memorandums went out quickly as did recruitment requests for

[2] In STTJ the key staff involved in this review were the Assistant Superintendent for Curriculum and Instruction, the district technology coordinator, several school technology specialists, and members of the district's technical staff. In STX the Director of Curriculum/Assessment/Technology and the district technology coordinator were involved in the review effort.

the focus groups and notifications to take the online surveys.[3] In St. Croix (STX), it took considerably longer to generate the required memorandums due to the requirement that the request for the memo come from OIT and that it be directed to the Insular Superintendent. This created a logistical loop that added two weeks to the process of generating the memos. Furthermore, despite repeated requests by the evaluators, the district did not recruit teachers for focus groups.

Ultimately, the evaluators were able to set up a concrete data collection schedule for both districts. School visits and focus groups commenced on November 1, 2011 and completed on December 2, 2011. The evaluators' school visit and focus group calendar is attached in the Appendix of this report.

The Table 1 provides detail on the evaluators' data collection activities. Copies of data collection instruments are included in the Appendix.

	STX	STTJ
School Visits	15	16
Classroom Observations[4]	105	68
Principal Interviews	14	16
Teachers Focus Grouped	0	15
Coordinators Focus Grouped	7	15
Elementary Teachers Surveyed	86	76
Secondary Teachers Surveyed	20	95
Secondary Students Interviewed	0	974

Table 1 – Data Collected

Variances in the Data Between Districts

The evaluators are aware that there is keen interest in both VI school districts for data particular to each district. To meet this interest, the evaluators will provide survey data specific to each district at the end of this evaluation project. In the following report, wherever possible and when relevant, the evaluators present data broken down and identified by district and grade level.

That said, the evaluators note that a review of the data shows that there are rather few significant differences between STX and STTJ data. This is largely due to the fact that the environment for teaching and technology integration is very similar in each of the two VI districts, and the solutions developed – particularly given how these solutions are commonly funded by the VIDE with Federal funds – are nearly identical between districts. To date, neither district has independently developed unique solutions for training, policies, etc. Hence the situation for technology integration is largely the same in both districts.

Slight variances, which are noted throughout this report, relate to the larger number of elementary schools in STX which are not making AYP and the fact that two schools in STTJ (those on St. John) are geographically slightly more difficult to reach (for district staff performing maintenance, etc.) than are

[3] See the Appendix for a copy of the STTJ memorandum.
[4] Classroom observations typically included teacher discussion or a brief interview. Therefore, each observation also constitutes a teacher interview.

any schools on STX. However, differences between districts are minor and in the opinion of the evaluators, do not create significant differences in data findings from one district to the other.

As noted above, the evaluators were not able to obtain teacher focus group data or student survey data in STX. Nevertheless, the amount of teacher focus group data on STTJ is not great and thus contributes only minor detail to STTJ. The number of teacher interviews and classroom observations is entirely comparable between STX and STTJ, so this serves to negate the loss of teacher focus group data in STX. Student survey data existed on STTJ, but the evaluators note that much of the STTJ student data is invalid (students did not respond to the questions) and only contributes to part of the findings about student technology skills. Teacher data on student technology skills is collected equally from both districts.

3. Findings

What's Working

In the interest of enabling VI schools to build upon their current successes, the evaluators want to start the findings section of this evaluation report by stating "what works" in the VI schools' instructional technology implementation.

The Plan

The evaluators find that the VIDE technology plan contains well-founded goals, strategic directions, and indicators. These plan elements reflect an understanding of current best and proven educational practice. The indicators are well-matched to the goals and should indeed be "observable" as the goals are implemented. The indicators have proven to be well-suited for evaluation.

For the most part, the goals promote a vision for technology integration that is appropriate for VI schools. The vision is strongly rooted in national standards and research-based best practice. As with any vision, it goes farther than what many administrators see as currently feasible, but this is indeed what makes the vision "visionary". Most administrators at least vocally appear to be on-board with the vision and where it is attempting to lead VI schools.

Some Existing Solutions are Effective

It is clear to the evaluators that since the November 2009 evaluation, the VI has made progress in implementing some instructional technology solutions. Notable among these are:

- Promethean boards have been installed in nearly all classroom locations and in many other instructional areas (labs, libraries, special education facilities, etc.). For the most part, these devices are being used at least (and predominantly) as projection devices. To the extent that the boards can be maintained so as to remain functional, teachers are developing a growing familiarity with the devices and are making them a standard instructional tool that supports existing traditional instructional methods.
- EasyTech, observed in use in several St. Croix elementary schools (and stated to be used in that district's junior high schools) has been embraced as a way to meet 21st century skills and technology literacy objectives.
- Wireless local area networks (Wi-Fi) have been established in nearly every school in the Territory. In most cases, the school Wi-Fi supports the use of teacher laptops. These laptops generally are used to drive the classroom Promethean boards and exist as a way for nearly every VI teacher to have convenient access to a computer at most times during the school day. The evaluators observed working Wi-Fi and connected teacher laptops in nearly every VI school, although not in every classroom.
- Computer-based instruction (CBI) solutions are in-place in most schools as a way to address basic skills (reading, math) remediation and credit recovery (at the secondary level). While these solutions do not connect to the plan's technology integration goals (because by nature they are

not integrated with instruction but are rather augmentative to existing instruction), they nonetheless represent a *use* of technology tools and are clearly seen by teachers and administrators as being beneficial to the development many students' basic skills.

Finally, it is noted – and will be discussed in depth in the rest of this report – that across both districts there are examples of exemplary technology integration practice. Further, some schools systemically are showing promise as exemplars of the plan's goals. For example:

- Several elementary computer teachers (e.g., the computer teachers at Lockhart, Markoe, and Ricardo Richards stand out), in each district are notable in terms of creating instructional units that teach concepts from the core curriculum and do so through the integration of technology tools. In these cases, it was also found that attention was being paid to students' information literacy skills. This is a core 21st century skill and is at the heart of the NETS-S standards (plan Goal 2).
- Several librarians are focusing on implementing an information literacy curriculum (e.g., using the TRAILS information literacy assessment[5]).
- Several schools – Arthur Richards stands out – have clearly propagated a vision among teachers for using the Promethean boards interactively with students. In these cases, students in most classes spend time working at the board and manipulating information on it as they would with a giant classroom computer. This stands in contrast to the dominant role of "projector" assigned to the Promethean board in most schools in the Territory.
- Some schools have systemically propagated the use of learning centers. Sprauve and Dober exist as examples of this.
- A few schools have routinely and regularly engaged some students in the sorts of project-based learning activities exemplary of Goal 1 technology integration. Examples exist at Guy Benjamin and Lockhart.

The Primary Challenges

Even with the clear evidence of various successes in its technology integration efforts (as will be further detailed in the remainder of this report), the VI still faces significant challenges in meeting the goals and indicators of the 2011 – 2013 technology plan.

As noted above, the current technology plan reflects an understanding of best practice as it relates to the development of student competencies both in core subject areas and in the use of technology. Goals 1 and 2 specifically incorporate elements of the current NETS standards for students and teachers (NETS-S and NETS-T), focusing on how technology is used to support thinking and learning, and the skills with which students and teachers are able to use the technology resources available to them.

More specifically, the vision articulated through the NETS standards and reflected in the technology plan's goals (primarily Goal 1) is one that emphasizes the development of students' higher order thinking skills and habits of mind within the context of student centered instruction. Collaboration, innovation, and creativity are highlighted as elements of the ideal learning environment. Technology plays a supporting role as a tool for students to use while exploring content and producing work that

[5] www.**trails**-9.org

reflects their learning. As yet, this definition of "technology integration" is one that not well understood by most VI teachers and administrators, for whom teacher use of a Promethean Board or student use of a computer for drill and practice is commonly thought of as technology integration.

First and foremost, there is little broad or systemic evidence that VI schools are currently meeting the intent of Goal 1, Technology Integration. This is largely due to the interpretation of the concept of "technology integration" by VI educators. Instead of understanding the concept of integration to be (as stated in the indicators) largely about the weaving technology tools into a student centered learning environment for the development of higher order thinking skills, most VI teachers and administrators seem to have an understanding of integration as being synonymous with "use". Thus, the sheer act of students – or as is more likely the case, teachers – using a technology device in the classroom (e.g., a Promethean board to project a static visual) is understood as technology integration.

Additionally, while Goal 2 references national standards such as NETS and the Framework for 21st century learning, it is clear to the evaluators that the majority of VI teachers do not yet have a working understanding of the NETS standards. While most do know of the existence of standards (or at least recognize that such standards might exist), they interpret them as computer use skills rather than thinking skills (supported by technology). As with Goal 1, the evaluators believe that teachers' limited understanding on this issue is directly linked to their own technology skills and the absence of pedagogically-focused technology professional development. Specifically, teachers have generally yet to think meta-cognitively about technology use and its value to impact pedagogy and learning. Rather, they are currently at a stage where they mostly see technology as a tool to support existing instructional practice. Until teachers are provided with opportunities to advance their understanding and develop new classroom strategies, it is unlikely that they will really understand or be able to implement the student technology standards.

Work to meet Goals 1 and 2 requires considerable professional development, which is the subject of the plan's Goal 3. Here as well, the evaluators have found little evidence of any widespread or sustained professional development that meets with the Goal 3 indicators. Current professional development efforts related to technology are centered on specific products and thus only perpetuate the notion that technology integration is about the use of specific devices. In virtually no case does technology professional development connect to *pedagogy*. Curriculum Coordinators, who should be leaders in the area of pedagogical professional development seem not to take an active role in helping teachers develop new strategies for incorporating technology tools in core curriculum areas. At the most basic level, the vision for 21st century learning as described in the plan's indicators seems not to exist as a guide for the work of curriculum coordinators or directors of professional development.

In the following sections, the evaluators discuss the findings and data related specifically to each VI technology plan goal. It is important to note that it means relatively little to consider the plan goals and indicators in isolation of each other. For example, the lack of positive findings for Goal 1 (integration) are absolutely related to the fact that few teachers or students have skills that relate to national technology standards (Goal 2); and this is due in no small part to the fact that professional development (Goal 3) is largely non-existent or at least not effectively utilized. Furthermore, lingering problems with technology infrastructure (Goal 4) hinder progress in Goals 1 – 3.

Understanding the NETS Standards

The NETS standards for students and teachers cover a variety of skills and practices that in sum support student-centered learning. They closely parallel standards and frameworks that outline 21st century learning, and when achieved, the NETS standards will result in students, teachers, and learning environments that are indicative of 21st century learning. As ISTE (the organization that has developed NETS) states in its introduction to the 2007 NETS-S (student) standards:[6]

> *As foundational technology skills penetrate throughout our society, students will be expected to apply the basics in authentic, integrated ways to solve problems, complete projects, and creatively extend their abilities. ISTE's NETS for Students (2007) help students prepare to work, live, and contribute to the social and civic fabric of their communities. The new standards identify several higher-order thinking skills and digital citizenship as critical for students to learn effectively for a lifetime and live productively in our emerging global society.*

In the VIDE technology plan, Goal 1 addresses how, and for what educational purposes, students and teachers use technology. The standards referenced in the Goal 1 indicators therefore describe learning activities and attributes of learning environments that reflect the development of 21st century skills. As such, the Goal 1 standards are more about integrating technology into student centered learning environments than about the ability of students and teachers to operate specific technology devices.

In many ways, the second goal of the VI technology plan supports and provides more detail as to what will be done to achieve Goal 1. The standards at the center of Goal 2 set the stage for VI teachers and students to be able to use technology in ways reflective of 21st century learning. This connection is a critical one and grasping it is essential to understanding what is necessary for VI schools to attain both Goals 1 and 2.

[6] http://www.iste.org/standards/nets-for-students.aspx (accessed 1/13/12)

Goal 1 – Curriculum Development and Technology Integration

Improve teaching and learning in all content areas through the use of technology.

Strategic Direction: For teachers and administrators to start integrating technology in ways that support what research describes as "best practice", instruction in VI classrooms needs to become more student-centered and oriented toward the achievement of the NETS-S standards.

- Teachers in all content areas use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments
- Teachers design, and develop in all content areas evaluate authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning in context.
- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others
- Students apply digital tools to gather, evaluate, and use information
- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Figure 3 – VIDE Technology Plan Goal 1

In order to assess the implementation of Goal 1, the evaluators visited all 31 schools for K-12 students in the VI (15 on St. Croix and 16 on St. Thomas). In these schools, 168 classroom observations were conducted, school leaders were interviewed (in all but one school), and numerous teachers, aides, and other staff (e.g., librarians) were interviewed. Beyond these school visits/observations/interviews, the evaluators also surveyed 284 elementary and secondary teachers, 975 secondary students, and conducted focus group interviews of teachers and district-level curriculum coordinators. The resulting wealth of data has supported the evaluators' overall finding for Goal 1 that technology *use* is prevalent among VI teachers, but there has been little progress made in terms of *integrating* technology within the instructional environment for the purposes of developing students' creative thinking, knowledge construction, collaboration, problem-solving, or information evaluation skills, or their participation in authentic learning experiences.

Figure 4, below, represents the evaluators' classroom observations organized as in the Pedagogy/Technology matrix (Figure 1). Using the coding scheme shown in Table 2, the evaluators assigned numerical values to each observation so far as the pedagogy employed in the class

("Pedagogy") and the mode of technology use ("Technology Mode").[7] As seen in Figure 4, the resulting data very much clusters in the lower half of the graph, hewing close to the pedagogies coded as low numbers on the x axis. These are predominantly "teacher centered" pedagogies such as lecture and demonstration. Student-centered activities would be represented on the upper half of Figure 4, and it is clear that there were many fewer such activities observed. Technology-supported, student-centered, activities would occupy the upper right quadrant of the table and indeed this is the least populated section of the table. Once again, this data confirms the survey data where the primary findings are that teachers and students are skilled in the use of technology for presentation and "WWW research" but not so much in collaboration or analysis of what they might find online. This is particularly the case with elementary teachers and students and does not seem to vary much from district to district.

Code	Technology Mode	Pedagogy
0	No technology in use	No instruction occurring
1	Teacher is the only one using the technology. Students watch. (e.g., viewing Promethean board flipcharts, webpages, videos, worksheets, etc. as a full class)	Teacher or computer directing instruction by showing, leading, or changing the direction of discussion/conversation. Teacher or computer is asking students questions. Students answering verbally, in writing, or by response device (e.g., clicker or at computer/Promethean board).
3	Students use technology at the direction/invitation of the teacher. Students manipulate the computer or Promethean board.	Teacher directs and orchestrates student activity for a full class.
5	Learning centers that utilize technology. Students individually rotate through centers, using technology (computers, Promethean boards, etc.) for teacher-assigned tasks.	Students have some control over what they do, but the overall activity is prescribed by the teacher.
8	Students control technology to create and show products that they have created (e.g., students produce and show PowerPoint presentations)	Students presenting and acting as teacher for a full class.
10	Students work independently or in small groups on the computer or with other technologies. (e.g., students conducting independent research and/or working on projects. Students using a CBI package such as Plato)	Students engage with and work on learning tasks that they direct themselves in response to guiding/essential questions.

Table 2 – Observation Coding Scheme

[7] 51 observations were of classrooms where no technology activity at all was occurring. These observations are not included when calculating the percentages by type in Figures 2 or 4.

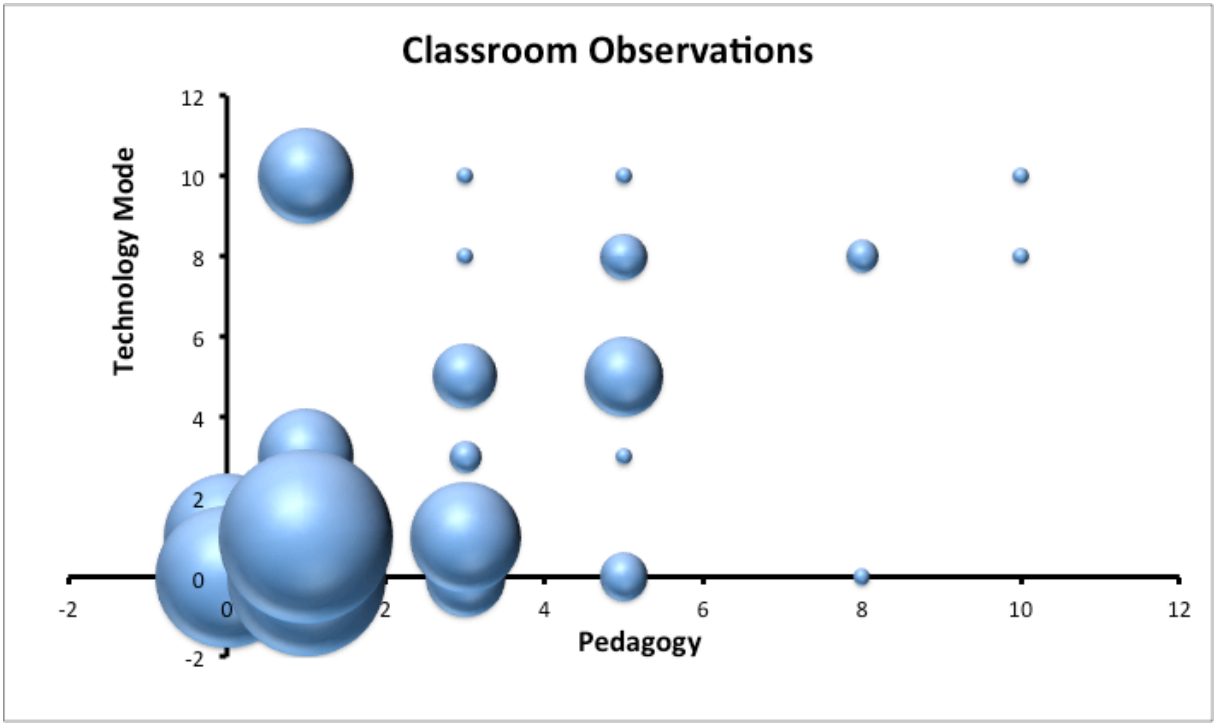


Figure 4 – Classroom observations plotted according to technology mode and pedagogy

As the data in Figure 4 shows, the vast majority of teachers observed were using technology – primarily Promethean boards – to display or project images that supported their lectures/instruction. Typical activities included projecting worksheets created in Activinspire, MS Word, or those found on the web. Of the latter, many appeared to be resources that were obtained online and other electronic media associated with textbooks. It is clear to the evaluators that many teachers had taken the time to create visuals to go with their lectures, and this is backed up by survey data that shows that the majority of VI teachers are reasonably familiar with the basic tools (Word, Activinspire, WWW browsing) necessary to create and acquire such materials.

Figures 5 and 6 provide survey data on the elementary (n = 162) and secondary teachers (n = 115) responding to online survey question 3. This question gathered self-assessment data from teachers as to how many teachers use technology in ways aligned with the ISTE NETS-T standards that relate to Goal 1.[8] The standards correlated roughly to the sub-questions in question 3 as follows:

- Present engaging lessons – NETS-T standards 1a – d and 2a.
- Create formative and summative assessments – NETS-T standard 2d
- Work collaboratively with fellow teachers – NETS-T standards 5a – d
- Use technology to differentiate instruction – NETS-T standards 2b and 2c
- Locate and evaluate information resources – NETS-T standard 3d

Survey data (Figures 5 and 6) shows overall that less than 50% of teachers are using technology in ways described in the Goal 1 indicators. "Presenting engaging lessons" was the use identified by the largest number of (secondary) teachers, at over 60%. The data trends track roughly equivalently between the

[8] http://www.iste.org/standards/nets-for-teachers/nets-for-teachers-2008.aspx (accessed 1/15/12)

two districts, with typically fewer elementary teachers than secondary teachers citing the use of technology for these activities. With elementary teachers, it appears that STTJ teachers are more likely to indicate that they use technology in line with the NETS-T standards than are STX teachers. On the other hand, more STX *secondary* teachers seem to use technology in line with the standards than do STTJ teachers. Observation data supports this finding.

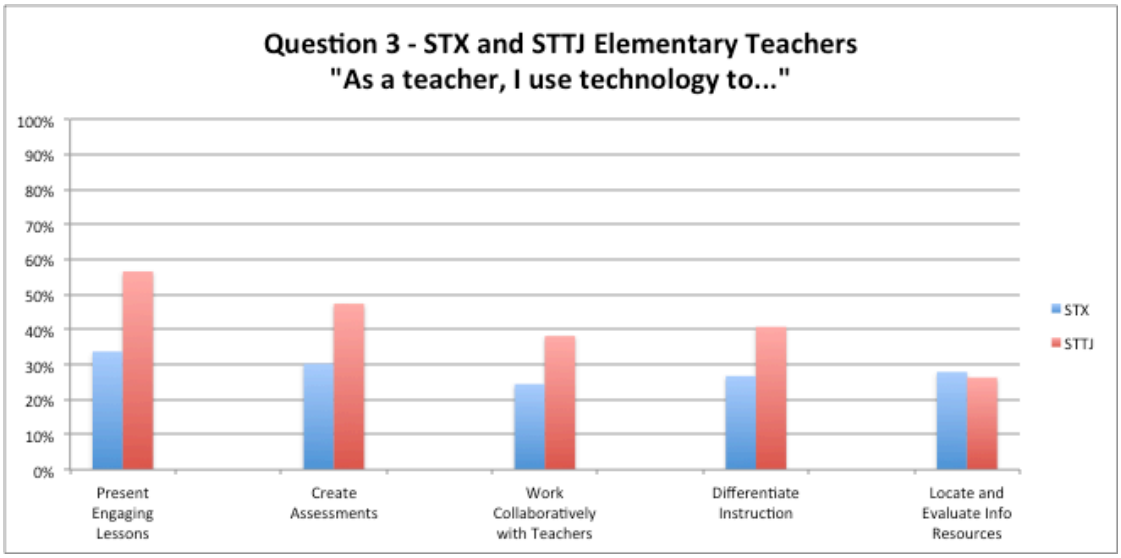


Figure 5 – Elementary teacher response to teacher skills portion of survey question 3

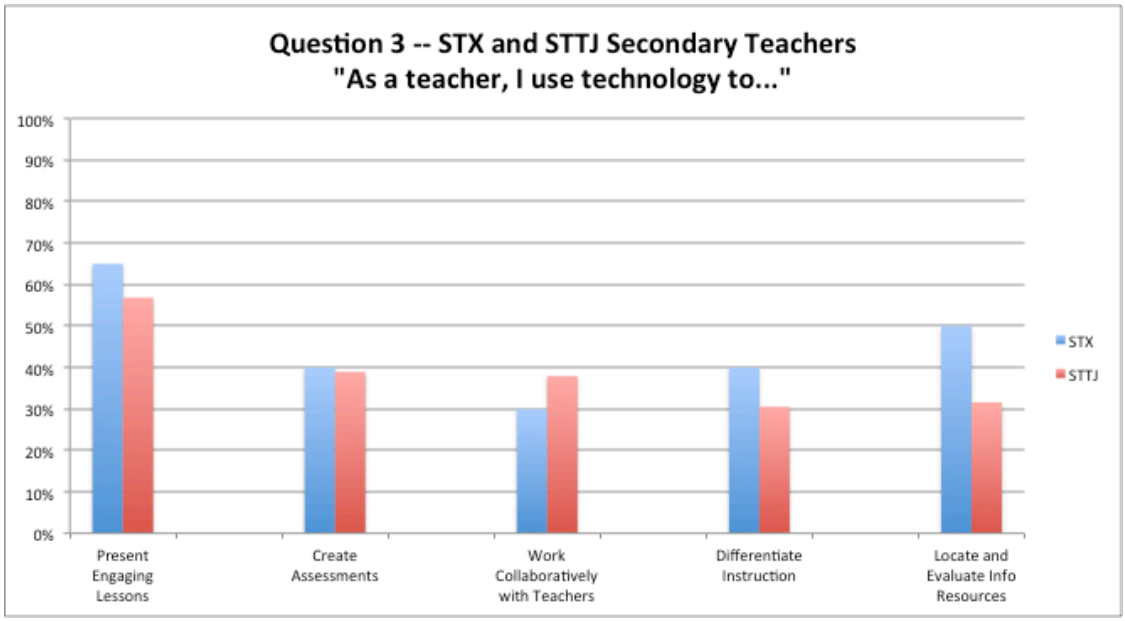


Figure 6 – Secondary teacher response to teacher skills portion of survey question 3

Figures 7 and 8 show teacher survey data on how their students use technology within the course of their instructional day. This data shows that there are relatively low percentages of students engaged in the various types of technology-infused activities that support 21st century learning.

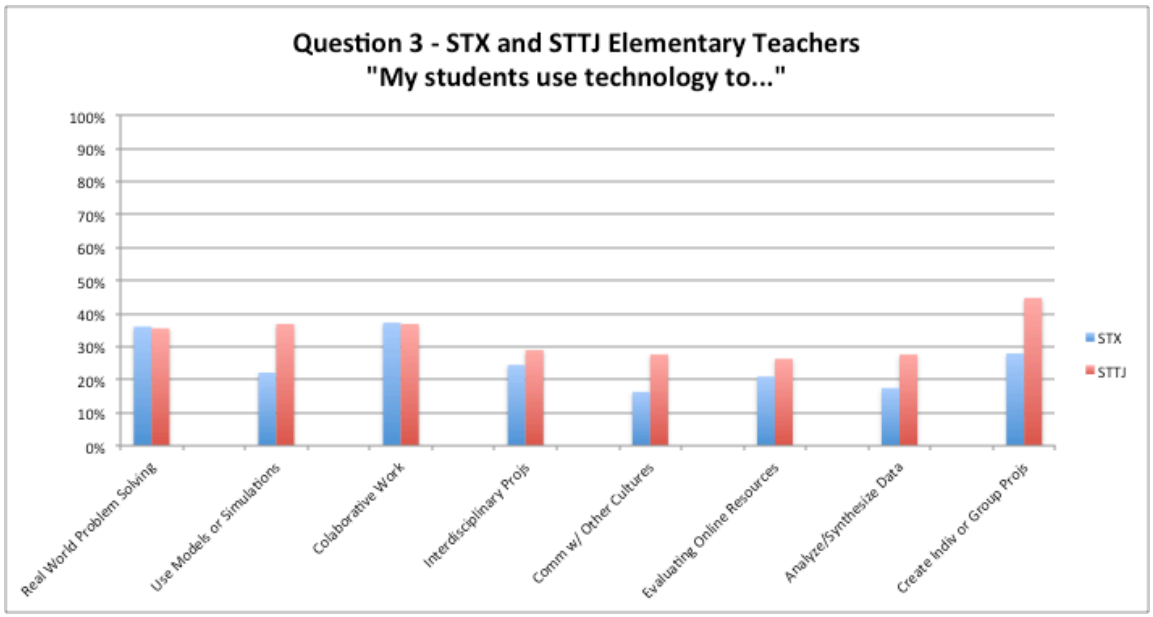


Figure 7 – Elementary teacher perceptions of how their students use technology

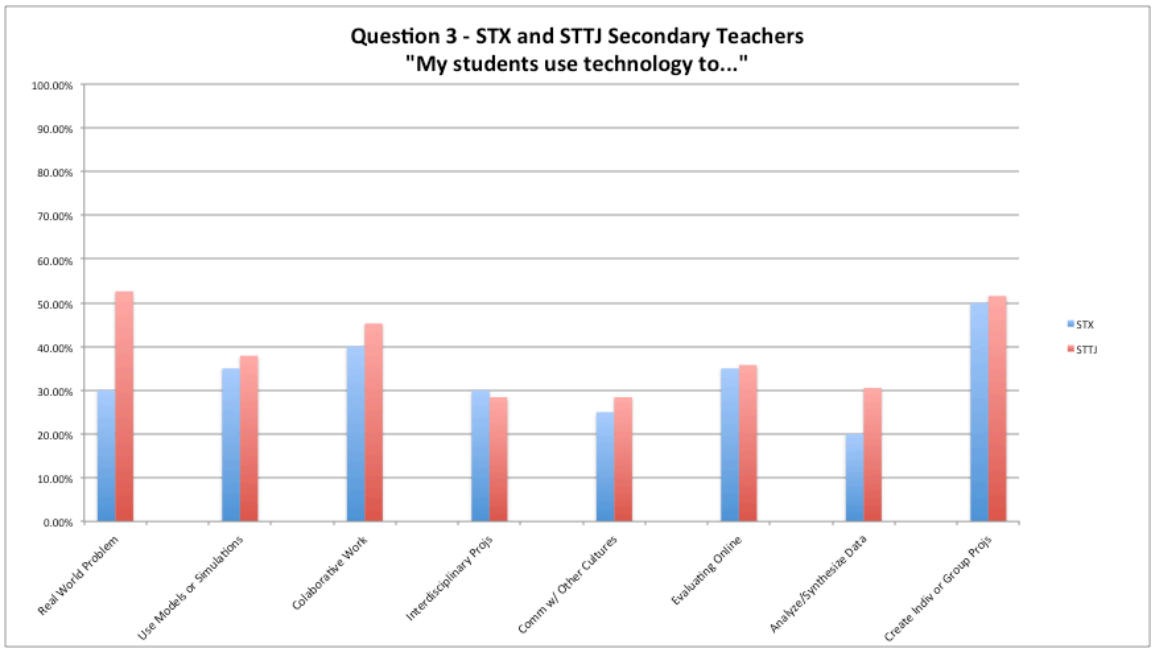


Figure 8 – Secondary teacher perceptions of how their students use technology

The evaluators note that even when teachers said that they were engaging in some of these activities generative of 21st century learning, the vast majority of the examples provided by survey respondents to back up these responses are of questionable connection to the intent Goal 1. For example, a strong response – one which *does* align with Goal 1 - of how technology might be used to present "engaging lessons" is:

> *I use video, online presentation tools: Prezi, Google apps to show my students good examples of student projects*. (STTJ secondary teacher)

I provide animated diagrams and illustrations of models and concepts by using my laptop and LCD projector with white screen on a daily basis. (STTJ secondary teacher)

Yet most responses were much more in line with the following types of examples that do not support Goal 1:

I try to incorporate the Internet as much as I can with my lessons. (STX elementary teacher)

Most lessons are presented on a Promethean flip chart. (STTJ elementary teacher)

I use different educational websites that have drills that are able to help students understand the lesson more and provide creative activities. (STTJ secondary teacher)

In relation to the sub-question about using technology to "differentiate instruction", typically fewer teachers said that they use technology for this purpose than for creating engaging lessons (under 40% in all districts/grades for the former versus over 50% in all districts/grades for the latter). Their examples, however were more aligned with the Goal 1 indicators than was the case for other teacher skill sub-questions in question 3. Whereas most of the other sub-questions centered around the words "Promethean board", in the sub-question about differentiated instruction, responses were typically along the lines of:

Students use the computer to take a comprehension quiz on their individual reading levels. (STTJ elementary teacher)

Use different computer programs to give my students the opportunity to work at their level; they also have access to listening to stories if they can't read on their own (STTJ elementary teacher)

All project and lesson involves providing students with different avenues to acquiring content; to processing critical thinking, creating, and more. (STTJ elementary teacher)

[They use] different flip charts for different abilities, different website for different abilities, (STX elementary teacher)

There are several educational websites that allow for the practicing of skills on multi-levels. (STX elementary teacher)

Assign different level of task in creating a newsletter. (STX elementary teacher)

The evaluators note that many of these examples of using technology to support differentiated instruction would fall on the right side – student centered pedagogies - of the Pedagogy and Technology Use Matrix (Figure 1). This is in contrast to the vast majority of the observations that fall on the left side (teacher-centered pedagogies) of the matrix. To the extent that students are given more individual authority in how they use technology in these tasks, the activities could move to the *upper right* corner of the matrix, which is the ultimate intent of VIDE technology plan Goal 1.

The evaluators find that the inclusion of technology-supported "centers" reflects a both a level of teacher technology skills and awareness of technology-supported classroom pedagogy that meet with NETS standards for teachers. In particular, centers are illustrative of standard 2, sub-standard c which states:

> *Teachers customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources.*

In several schools – notably in Sprauve and Dober in STTJ - teachers were observed setting up classes where students rotated through various activities for a 60 to 90 minute block. In one school, second grade students were observed working in four small groups. One group was working independently at classroom computer running Starfall Learning or Razkids, another group was listening to an audio book and completing worksheets, another group was working in Read 180, and finally a fourth group was reading with the teacher discussing and responding to questions. Notable in this example is the fact that not all groups or students were engaged in the use of technology. Rather, technology was being used as a tool to support specific learning activities, as is consistent with the NETS standards.

In another example, fifth grade students were engaged in similar activities. Here, one of the groups of students was working at a reading center where they were using web-based software resources aligned with their textbook. Several teacher survey comments also mention similar activities as examples of differentiated instruction:

> *Doing group work using the computers in one group; using the Promethean board in the next group; and listening to a cassette player in another group* (STX secondary teacher)

> *Students are grouped heterogeneously in centers. Small group instruction.* (STTJ elementary teacher)

These examples stand as strong evidence that at least a subset of VI teachers are currently developing classroom activities aligned with Goal 1 of the technology plan. Ideally, through implementation of the recommendations provided at the end of this report, this small minority will grow to include teachers in all classrooms throughout the territory.

Focus group data also supports these findings. In STTJ teacher focus groups,[9] the evaluators asked about teacher perceptions as to the impact of technology on student learning, with particular emphasis on 21st century skills such as communication, collaboration, and creativity. When questioned, teachers predominantly came to the point that technology "engages" or "motivates" students. Mention was also made of technology's ability to differentiate instruction by offering different modalities for reaching a child.

> *The student is more engaged in the learning process because of the tech. They are able to interact with the Promethean Board. The teacher is able to differentiate. Because of the greater engagement, you get more rigor and the instruction is more relevant.* (STTJ elementary teacher)

[9] As noted in Chapter 2, due to failure to communication problems in St. Croix, there were no teacher focus groups conducted in that district.

You have to try different things with different students. Some won't do the Read 180, but they love Achievement Technologies. The technology helps focus students. It's the only thing they like to do. This day in age, you have to keep up with what they do. (STTJ secondary teacher)

If you have students just using Excel, they can verify their info immediately. Plus it connects to the real world and students are more motivated. Also using the Promethean, you can present to a whole class. You can model on the Promethean board what you expect kids to do. You can get everyone's attention. I can get online games and it gets everyone's attention. (STTJ elementary teacher)

When pressed specifically for how technology supports 21st century skills, teachers generally came up either blank or disagreed that technology does support these skills with their students.

What I've noticed is that the students interact with the tech it actually captures their focus. Put them on a game and they will run with it. Tech keeps their focus more than a traditional lecture. Now the measurement in terms of their learning, that's another thing. I don't think that the tech increases learning. I don't think so. (STTJ elementary teacher)

They love the interaction and repetition. But in reference to thinking skills, after they read their literature stories, cause and effect is very very difficult for them. Technology doesn't do anything to address that. If they can't pick the answer, they just shut down. (STTJ secondary teacher)

It doesn't address the higher order thinking skills. We need to do this, and instead we try to find some software, and it doesn't do this. The kids try to find shortcuts. Technology is not geared toward that higher order stuff. (STTJ elementary teacher)

The evaluators probed for information on teacher technology integration skills with principals. Twenty nine one-to-one principal interviews were conducted over the course of data collection. In these interviews, the principal opinion was that technology integration was spotty and not at the level or scale that would be desired. Principals felt that some of their teachers are comfortable with technology and do "use" it, but that there are many other teachers who are not currently using technology for a variety of reasons.

If Goplan is any indication, my teaching staff is pretty good with tech; in terms of integration, they can do a lot more. Need more practice. Most do ok with their Promethean boards. (STX elementary principal)

Overall I would have to say that the majority of teachers here are not comfortable using the tech. We have a few teachers who use their Promethean boards and laptops in purposeful ways. They've been on Promethean World and know how to create lessons. But that's just a handful. Most use them like overhead projectors. (STX elementary principal)

Another challenge is to make primary teachers more comfortable with lesson planning and with the use of tech. We have gotten our intermediate teachers on-board, but we need to do more with the primary teachers. When I do walkthroughs of primary teachers, their issues are fear.

Fear that the kids will destroy the equipment or lose data. They still have not developed skills that meet the teachers' standards. (STX elementary principal)

There's a number of teachers who are using the technology. However I would like to see 100% more often. I would like to see the technology be a real integral part of the education we are providing. Not just hit and miss. Children and teachers interacting. Parents coming in and interacting from home. I would like to see people more excited about technology. Using it to teach what's going on. And not just lukewarm about it. Or folks using the technology minimally. (STTJ elementary principal)

We're getting there. We have a high number of teachers that use tech to integrate. Unfortunately we don't have as much tech as we'd like to have. But we have quite a bit. For those who have it in their classrooms, they really use it. Those who have it in their classrooms, and their students use it, when they go to a different classroom you can see a big difference in performance (negative) and attitude. (STTJ secondary principal)

Note that for most of these principals – and this theme was nearly universal in the principal interviews – "technology integration" was defined first and foremost as use of the Promethean board. Many principal interviews started with a report on how many Promethean boards were working versus not working. It is clear that technology integration for these principals revolves around the board. Therefore, it is not surprising that the number one issue raised by principals, in response to the question about the "overall state of technology integration" in their school was that teachers would and could do more integration if only there were not so much broken infrastructure. Typical comments:

I think as we try to integrate tech more we have bought software, but the machinery we have is old and it doesn't support the sw we have bought. For example we bought a Successmaker license, but only 12 of the laptops (we use it on) work consistently. Teachers would like to utilize the boards, but a lot of times for some reason the service isn't working. So we need continued maintenance. (STTJ elementary principal)

Most of the rooms I visit I've seen the majority of the teachers use the Promethean board as an excellent gateway into the world outside of the classroom. It's great for whole group learning. But when you want to break it down into smaller groups the problem is that there's not enough computers in the room. There's some, but a lot is old. Each year we get access to new programs and different platforms for teaching, but our hardware is old, don't have enough hard drive space, limited number of computers, etc. (STX elementary principal)

When I go to principals' meetings I hear about all of the challenges about broken equipment. But we just try anyway and try for consistency as much as we can…So I'm not sure if we do more, but most of us have similar challenges that would keep us from moving forward and meeting the goal that we're expected to meet. But we've set a goal at [this school] and are trying to meet it. But a lot of issues need to be resolved by the district. (STX elementary principal)

I think that if we had our equipment maintained often, we'd have a better grasp of integration in our school. There wouldn't be a lot of interruptions such as moving from room to room to make sure that Promethean boards are running, moving labs, etc. (STX secondary principal)

Infrastructure readiness and maintenance will be discussed further in the findings related to VIDE technology plan Goal 4 (Infrastructure), but suffice to say here that "broken equipment" and insufficient infrastructure are cited by VI teachers and administrators as prevalent barriers for technology integration. Nevertheless, the evaluators feel that it is important to put these comments into context. Specifically, it appears to the evaluators that while there are certainly issues related to periodic building-specific Internet outages (which everyone seems to acknowledge in most all cases are addressed and remedied quickly), and in many buildings the Promethean boards are in poor condition (as many are over three years old at this point), much of what is stated as being "broken" could be readily addressed within buildings if simple procedures were put into place. The evaluators found that for the most part "broken" meant missing cables and remotes to Promethean boards, burned out projector bulbs, and improperly or uninstalled software. This position was summed up by a teacher survey comment stating:

> *Computers that freeze constantly, unable to get on the internet, upgrading systems, learning new and ever changing software are major irritations. In order for use of technology to "blossom" on school campuses, every school needs at least one person whose responsibility is solely devoted to maintaining and training. No money...think about the money that's lost when computers sit and can't be used because "it's not working". Sometimes it's just a loose screw.* (STTJ elementary teacher)

Goal 2 – Technology Literacy

Ensure that all students, teachers, administrators, and staff will be technology literate as clearly defined and outlined by the International Society for Technology in Education's (ISTE) National Education Technology Standards (NETS) categories.

Strategic Direction: VI students need to master core technology competencies so as to successfully participate in the sorts of learning environments that foster the development of 21st century skills. Subsequently, VI teachers and administrators must receive support in developing the vision for how technology supports the development of technology literacy within the context of the core curriculum. Moving away from the model of stand-alone "computer class", of course, first requires the development of a vision for how technology supports student learning and the teaching of 21st century skills.

- Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practice
- Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society
- Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resource
- Students understand human, cultural and societal issues related to technology and practice legal and ethical behavior
- Students demonstrate a sound understanding of technology concepts, systems, and operations

Figure 9 – VIDE Technology Plan Goal 2

Teacher Technology Skills

As stated above in the section on Goal 1 (Technology Integration), VI teachers seem reasonably well versed in the operation of those technologies they have available in their classrooms – teacher laptops and Promethean boards – but do not fare as well in the skills involved in integrating those technologies into the types of student-centered, project-based, learning activities called for in Goal 1. The VIDE technology plan indicators for Goal 2 set performance standards for teacher skills in using technology in "work processes representative of an innovative professional in a global and digital society."

Survey data on teacher self-assessment of these skills is shown in Figures 10 and 11 below. One a scale of 1 to 4, with 1 being not skilled and 4 being highly skilled, "Conducting WWW Research" is the item

rated highest by both elementary and secondary teachers. Similar values were found for "creating presentations". In other words, teachers themselves ranked their own skills close to what the evaluators observed. VI teachers can locate resources – mostly static images and worksheets – and then proceed to project these on their Promethean boards for students to view.

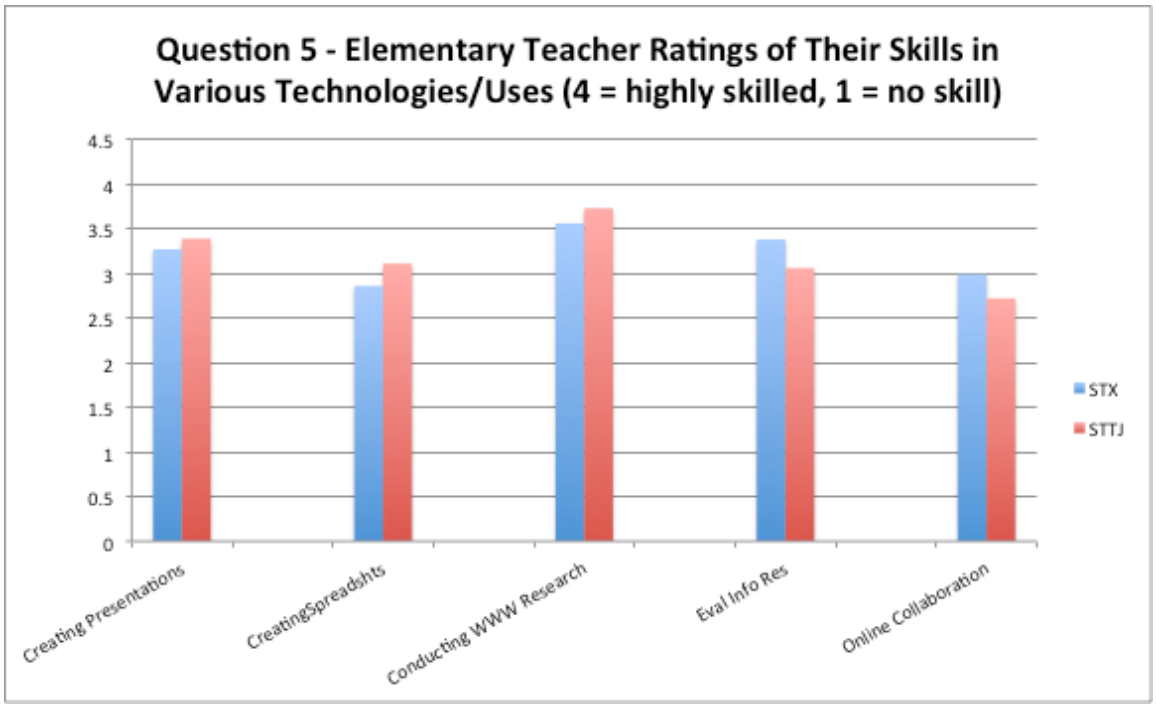


Figure 10 – Elementary Teacher Skill Self-Assessments

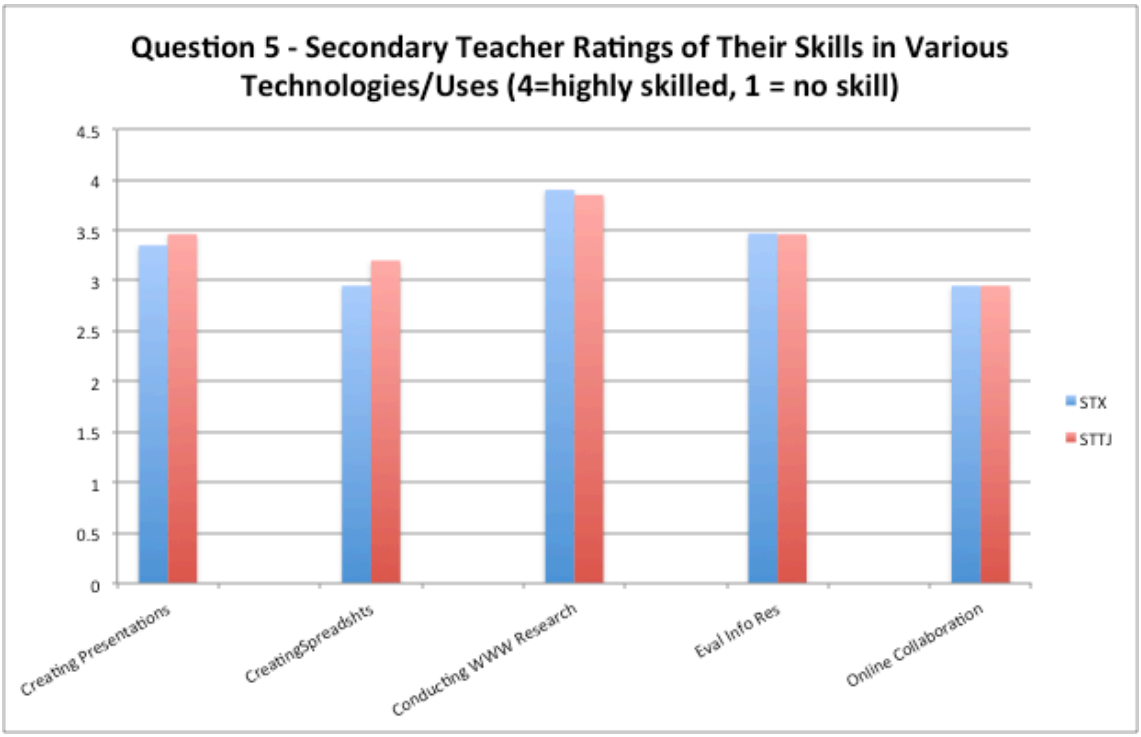


Figure 11 – Secondary Teacher Skill Self-Assessments

Student Technology Skills

The NETS for students (NETS-S) as discussed above, center around six main standards for how students should use technology to perform various thinking and learning tasks. These standards are:

- Creativity and Innovation
- Communication and Collaboration
- Research and Information Fluency
- Critical Thinking, Problem Solving, and Decision Making
- Digital Citizenship (ethical technology use)
- Technology Operations and Concepts

For the purposes of the Goal 2 indicator, the evaluators mostly consider evidence relating to performance in the Digital Citizenship and Technology Operations and Concepts standards. The other NETS-S standards have been considered in Goal 1.

As illustrated by the data in Figures 12 and 13, below, teachers surveyed indicated that their students had relatively low skill levels in using technology. This pattern echoes what was discussed earlier in this report relative to Goal 1, technology integration.

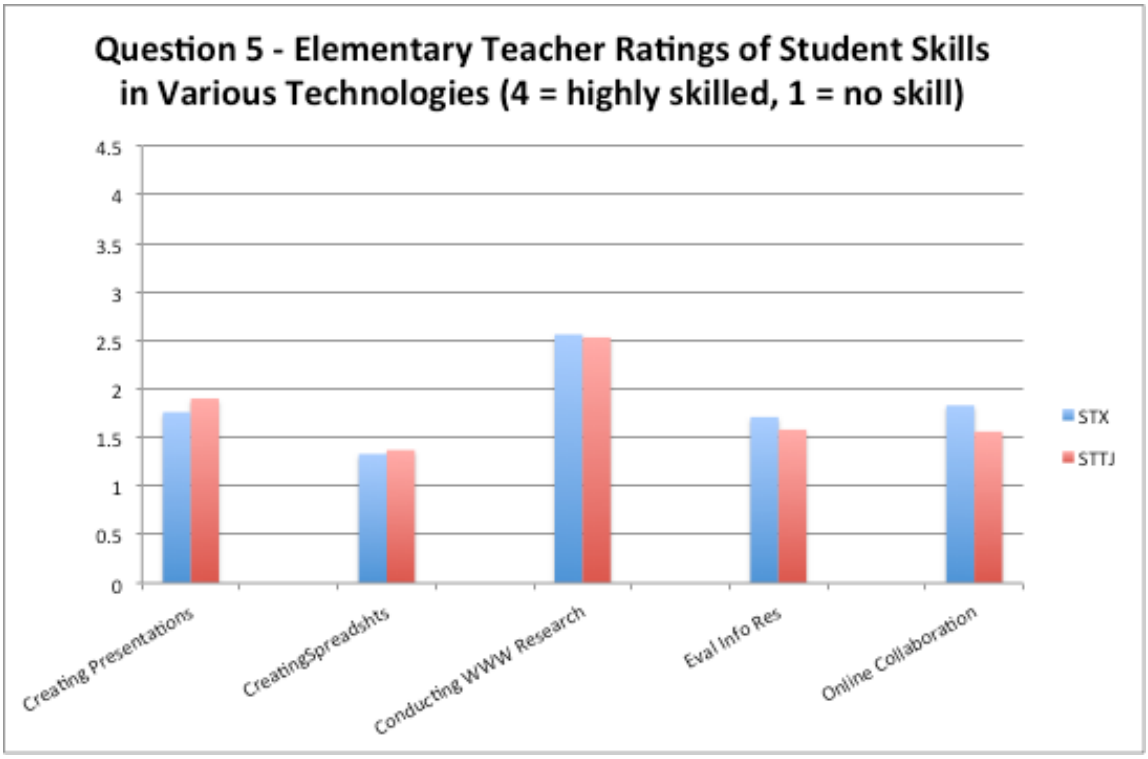


Figure 12 – Elementary teacher response to student skills portion of survey question 5

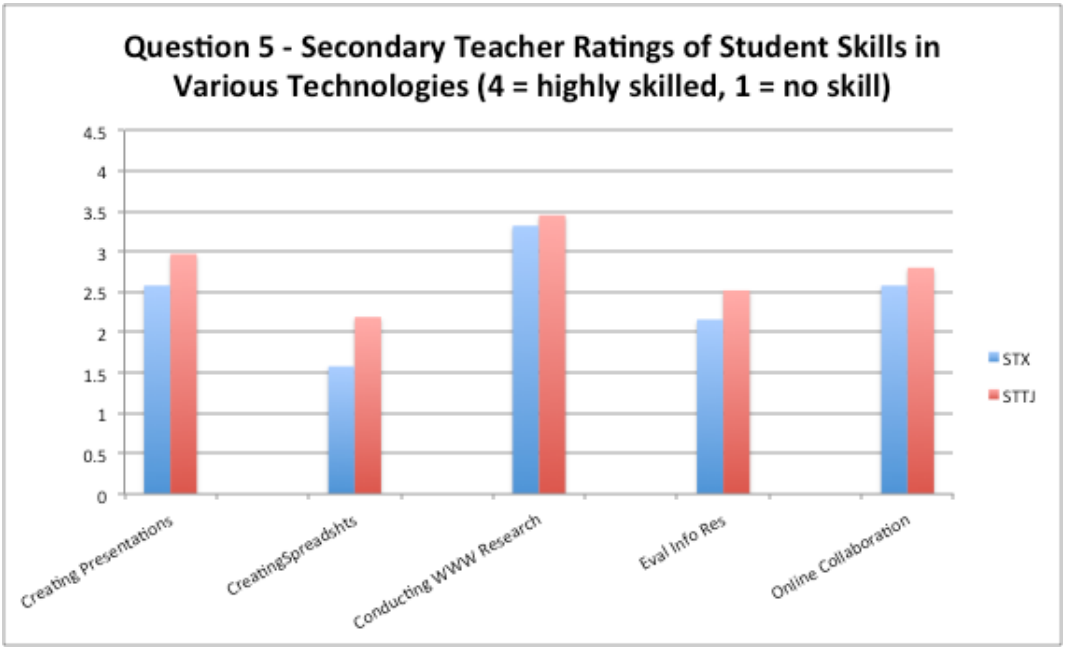


Figure 13 – Secondary teacher response to student skills portion of survey question 5

Figures 12 and 13 show that most elementary students are perceived of by their teachers to have relatively low skill levels in the types of technology skills covered in Goal 2. Secondary students are reported by their teachers to be similarly skilled.

The evaluators surveyed STTJ secondary students (n = 975) as to their perceptions of their own technology skills. This data, contrasted with data gathered from these students' teachers is shown below in Figure 14.

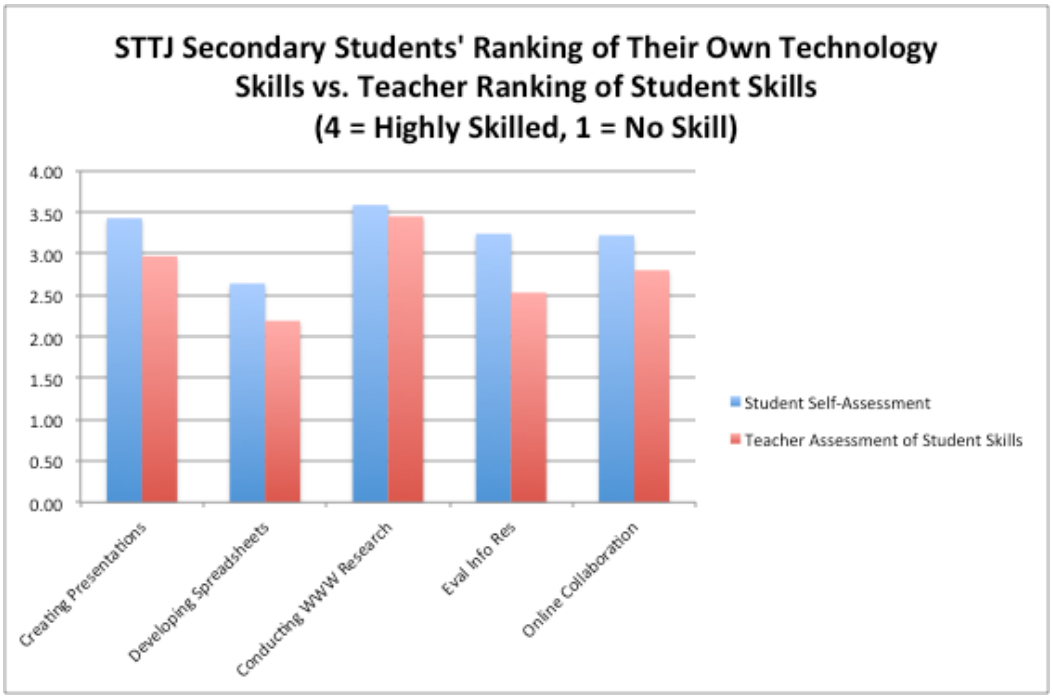


Figure 14 – Response to question 6 in the secondary student survey

The evaluators note that there are some specific efforts in place to address the "technology concepts, systems, operations" components of Goal 2. Here, the evaluators find that the main mechanisms in place in VI schools to address these are the "computer skills class". In both VI school districts, many – but not all – elementary students participate in some type of computer skills class at various points in their elementary careers. The degree of participation seems to vary considerably from school to school. In some schools, students go to computer class all year at least once a week, for at least grades 3 – 6. Some schools have such classes for students K-6. In these computer classes, with few exceptions (discussed below), students are typically taught a curriculum identified by the school computer teacher. Typically, this curriculum centers around the use of basic technology tools such as word processing, presentation creation, and WWW browsers. There is also usually a component of "parts of the computer" woven into this particularly in early grades. Despite the very basic orientation of this curriculum, there seems to be little or no attention paid to developing typing skills. Teachers anecdotally report that their students do not have typing skills, and the evaluators can confirm this through observation. Students at all levels were observed employing "hunt and peck" strategies. In several cases, students were observed to be frustrated, through lack of typing skills, when interacting with CBI and the various basic applications (e.g., PowerPoint) they encountered in their computer classes. Teachers indicated that some students had received typing training at some times, but this was inconsistent due to changing demands for the use of the computer lab and computer teacher time.

The evaluators find that in many schools – particularly elementary schools in STX– computer class has been largely eliminated due to the unavailability of the computer lab for use by anything other than CBI. In a number of STX schools, the mandate to use CBI (e.g., Plato) has relegated the lab to full time use by CBI and the computer teacher to the role of CBI proctor. It seems likely that this is an unintended consequence of initiatives targeted at intervention (or helping schools meet AYP), but the fact remains that this consequence is having a negative impact on the only hands-on exposure to technology (beyond interacting with a keyboard to type in responses to multiple choice questions) that these students had.

Still, there is even inconsistency in the unintended consequences faced by schools. Several STX schools *have* been able to find ways to meet the CBI initiative *and* to preserve computer class. It is not altogether clear how this has happened, but what is clear is that the successful solutions developed in some schools have not been shared with other schools. In other words, a lack of sharing between schools inhibits the implementation of best practice.[10]

It should be noted that computer class is a much more consistent and prevalent feature of STTJ schools. Perhaps due to the greater number of schools making AYP, and hence the relative lack of invasive intervention strategies, STTJ schools have managed to preserve a basic computer skills curriculum for more students. It is also in STTJ where more traction was made in terms of piloting the technology integrated curriculum units with technology teachers serving as co-teachers to classroom teachers. Nevertheless, with the advent of statewide staff cuts (which has impacted both districts), it seems that STTJ is back to where it was in 2009 in terms of how these computer teachers work (whether or not they have the new title of "Technology Integration Specialist").

[10] This lack of sharing of solutions and lack of coordinated work to develop solutions to common problems is a consistent finding in VI schools. This will be discussed further in the findings – and recommendations – for Goal 3, Professional Development.

The district is aware that we have no computer teacher and they have not sent me one. The one I had last year is also an elem teacher. So I put the computer teacher in 5th grade. She's better in the classroom. They need to send me a computer teacher. (STTJ elementary principal)

I want another [technology specialist], not to have a lab per se, but a person who can go around to teach teachers how to integrate tech in their subject area. Someone who can sit in that class and help teachers use it when they don't feel comfortable. I think that would improve the teaching and learning. Also, it would help all students learn basic things that they don't need to go to a lab to do. If all teachers required their students to use PowerPoint, then the students could learn how to do that in their class and not just in a computer class…. Ms. [x], the computer teacher could do this now, but then we'd need someone to take her class. And they won't allow her to be without students because of the budget crunch. (STTJ elementary principal)

Last year X was the technology integration teacher, not in the classroom, but this year they moved her back to Computer Teacher…in the classroom. We were told that everyone had to have a class, so we were instructed to put everyone back into the classroom…and that meant getting a computer teacher vs. integration specialist. We were just following instructions. (STX elementary principal)

In previous years, the Learning.com product "EasyTech" has been used in elementary and secondary (junior high schools) as a bottom line way of insuring that students receive somewhat systematic exposure to foundation technology skills. This was noted in the evaluators' 2009 report. Currently though, use of EasyTech has waned. The evaluators find that EasyTech is currently in use in a small number of St. Croix elementary schools (two school principals mentioned it in interviews) and that the district has given some attention to integrating EasyTech activities into the curriculum pacing guides.

Hopefully with the pacing guides and insuring that the coordinators work together and the technology coordinator is involved in the writing of the pacing guides, this integration will happen. We just got through using the EasyTech to integrate tech with SS, Science, Math and Reading. (St. Croix district administrator)

STTJ teachers and administrators report that EasyTech "will be" used at the 8th grade level as an assessment vehicle for demonstrating that "all students are technologically competent" by 8th grade.[11] It was stated that district policy is now such that the VIDE-supported licenses for EasyTech are to be used in secondary schools and not at elementary schools (that is, elementary schools are no longer licensed to use the software).

EasyTech has been taken away from us. The state now pays for the subscription, but since testing only occurs at 8th, they made it something that only 8th graders can get. (STTJ School Technology Specialist)

At the time of data collection (November, 2011), the evaluators did not observe any students in either district using the product. It seems that there are two issues at play here. One is that districts have been

[11] It is likely that this same use in 8th grade is also intended in STX schools, but the evaluators were unable to verify this by talking to district administrators or teachers.

unwilling or unable to pay for the EasyTech software licenses themselves and therefore must rely upon VIDE to support access to the product. This has limited use to 8th graders at the smaller number of junior high schools (relative to the large number of elementary schools in both districts). Second, and perhaps more to the point, is the fact that schools and district administrators appear to be rather confused about just what licenses they have, how those licenses are to be used, or who pays for them. Once again, the evaluators find that communication of policies and procedures is spotty and not at all clear. This allows schools and districts to resort to "I don't know" mode and thereby avoid implementing potentially important systems.

Goal 3 – Professional Development

Provide all school personnel with sustained professional development in the use of technology to enhance teaching and learning in a measurable and cost-effective way.

Strategic Direction: VI teachers must be provided with professional development related to reconceptualizing their pedagogical approaches and rethinking the role of 21st century learning skills within the curriculum. Technology integration could be promoted and improved through the re-casting of schools' existing computer teachers as support personnel for classroom teachers working to weave meaningful technology experiences into the core/mainstream/classroom curriculum.

- Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources
- Teachers design, develop, and evaluate authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS•S
- Administrators develop, inspire and facilitate among all stakeholders a shared vision of purposeful change that maximizes the use of digital-age resources in support of the school's learning goals
- Teachers and administrators participate in training in distance learning and online applications.
- Building level administrators develop and sustain a digital-age learning culture that provides a rigorous, relevant and engaging education for all students
- Building level administrators promote an environment of professional learning among all staff, which educates and supports teachers in the use of technology to enhance student learning, as described in NETS-T and NETS-S

Figure 15 – VIDE Technology Plan Goal 3

In surveys, interviews and focus groups, VI teachers and administrators commonly noted the need for more technology professional development. For example, when asked how their administrators could help support technology integration in their schools, many teachers offered comments such as:

> *I believe our administrators could do more to help us para-educators. We are lacking the support, for instance in my case I did a PowerPoint presentation at the University of the Virgin Islands but never had an opportunity to get the training at the school. I would like to know how to create or develop spreadsheets. I would like to develop technology skills to use the Promethean Board.*
>
> *I believe my administration should do what ever is necessary to bring a full understanding of technology to "all" staff and student population. Some ways, in which they can accomplish this*

goal, are by having technology workshops and making sure that every individual has access to their own technological tool. (STTJ Elementary Teacher)

[By] providing in house workshops so that teachers can collaborate and learn about the different ways to use technology in lessons (STTJ Elementary Teacher)

The administration could further support technology integration by having teachers share (more often) ideas, etc. that they have utilized. (STX Secondary Teacher)

Provide more training that is relevant to what they expect us to do. Then the training needs to be ongoing not just a one shot deal that takes 1.5 hours or less. People need time to absorb information, to use it and make sure that it is understood and then to go back and ask specific questions. (STX Secondary Teacher)

By having more hands-on professional development where the teachers are actively engaged in learning the technology related to their specify subject area. (STTJ Secondary Teacher)

[By] Providing EdTech PD opportunities that meet the current needs of the teachers in the school. Allow the school much more input to decide upon what EdTech programs/services it desires, i.e., State or District currently selects and instructs most of what the schools HAVE to follow and use. (STTJ Secondary Teacher)

For their part, while some administrators offered the opinion during interviews that their teachers needed was more professional development, most stuck with their opinion (noted above, and discussed further in the next section) that the greatest need was for more and better equipment. While teachers also noted the need for more reliable, maintained, equipment, many paired these hardware-related comments with calls for more training in how to use the equipment.

I really need someone onsite to help the teachers when they get stuck. Ms. Francis is only one person and she has to monitor Successmaker. It's humanly impossible for her to be in the classroom to be the type of support that I want her to be. Someone to just walk the teachers through to do what they know they want to do. (STTJ Elementary Principal)

I believe that the trainings need to be more job embedded. Sometimes we send teachers to a workshop (e.g., on Promethean), and they have fun at the workshop but it doesn't translate to what they do when they get back here. I sense that they're a bit uncomfortable using the tech. (STX Elementary Principal)

This last point is also notable in that it underscores the fact that most of the requests for professional development were for the "how-to" type. Teachers and principals asked for more Promethean board training, help with CBI programs (such as Successmaker, Plato, etc.), and various other hardware and software tools. There seems to be a presumption on the part of both teachers and administrators that "how-to" training is what is needed to move teachers ahead in their integrated use of technology. This notion is in keeping with VI teachers and administrators' overall orientation that integration is about using/operating technology tools rather than about learning new ways to support learning.

In fact, fewer than 30% of elementary teachers and fewer than 40% of secondary teachers report having received training in ways to use technology to support teaching activities including as differentiated instruction, formative/summative evaluation, and analysis of information resources. Among secondary teachers, responses were consistently stronger in STTJ, than in STX, while elementary responses were roughly comparable between the two districts. This data is shown in Figures 16 and 17.

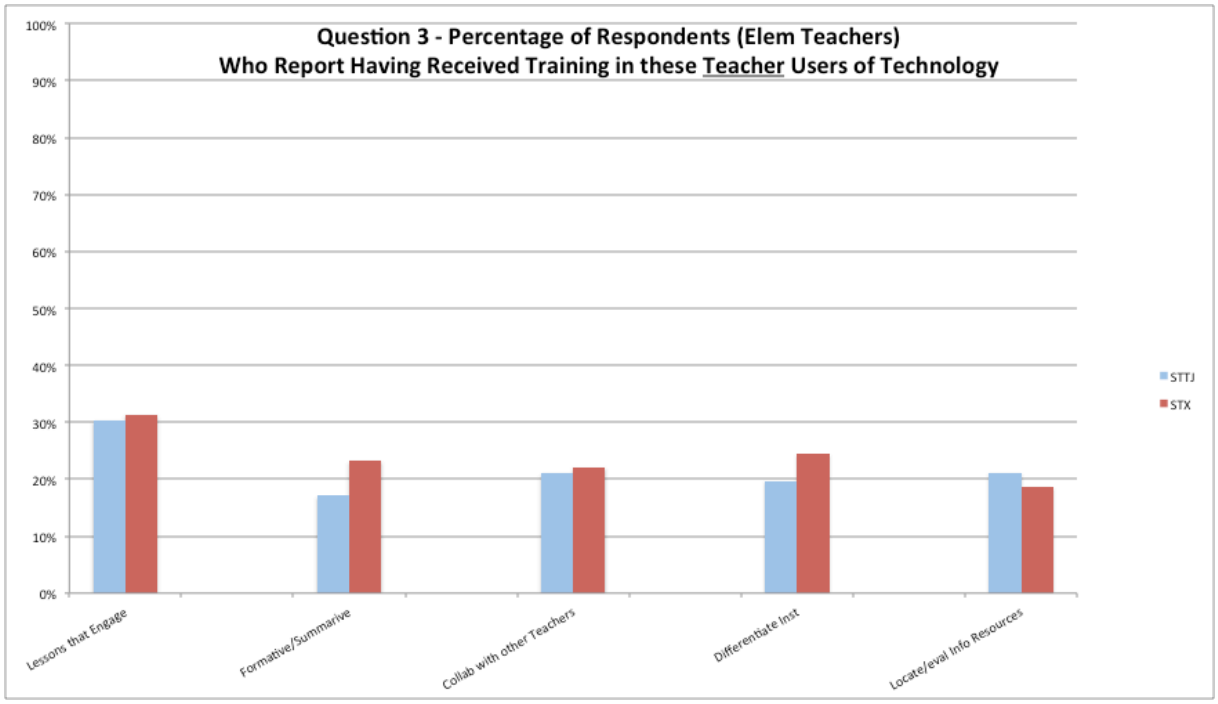


Figure 16 – Elementary teachers reporting training in teacher/instructional uses of technology

The evaluators note that the STX secondary teacher data on "training received" runs counter to the companion data on "teaching practices" (Figure 6). It would appear that even though STX teachers have had *less* training in these practices (according to their self-report data), they actually engage in the practices *more* often than their STTJ counterparts. For example, in STX, only 25% of teachers say that they have received training in using technology to differentiate instruction, but 40% says that they do it. In STTJ, the percentages of teachers receiving training in a technique and teachers practicing that technique are roughly equal. This would seem to call into question the validity of STX teacher responses to survey question 3. The evaluators believe that a number of STX secondary teachers typically discount the training they have received. This is a point that could have been clarified if the evaluators had been able to specifically ask STX teachers about this at a focus group, but as noted earlier, those focus groups did not occur.

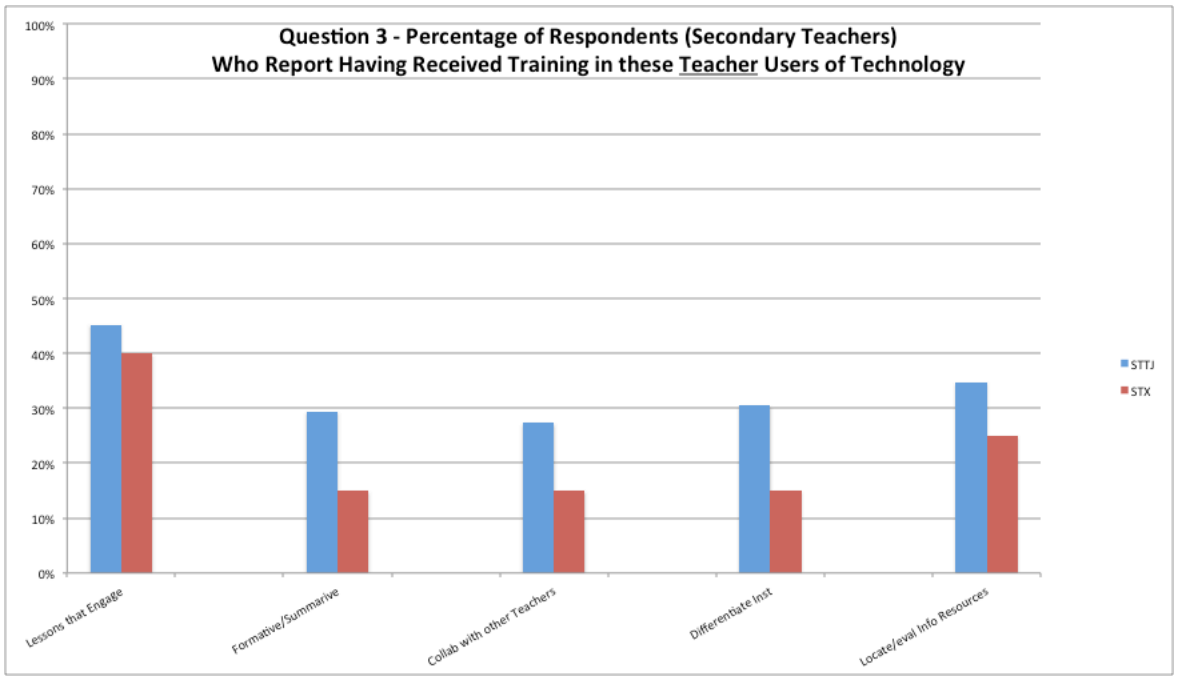


Figure 17 – Elementary teachers reporting training in teacher/instructional uses of technology

Teachers were also surveyed as to whether they had received training in ways to incorporate technology into classroom activities. In this category were questions about using technology to support student collaboration, interdisciplinary project work, and the use of simulations and models, as described in the technology plan's Goal 1 indicators. Again the data shows that generally fewer than 30% of teachers report having had these kinds of professional development opportunities. This data is shown in Figures 18 and 19, below.

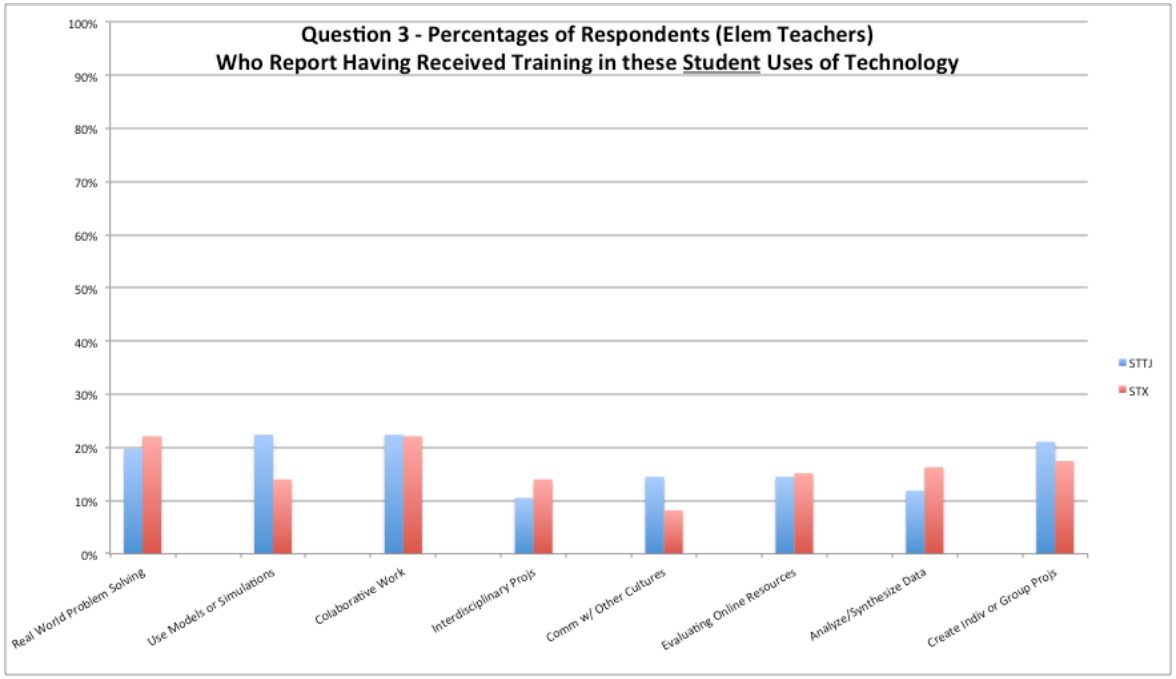


Figure 18 – Elementary teachers reporting training in supporting student uses of technology

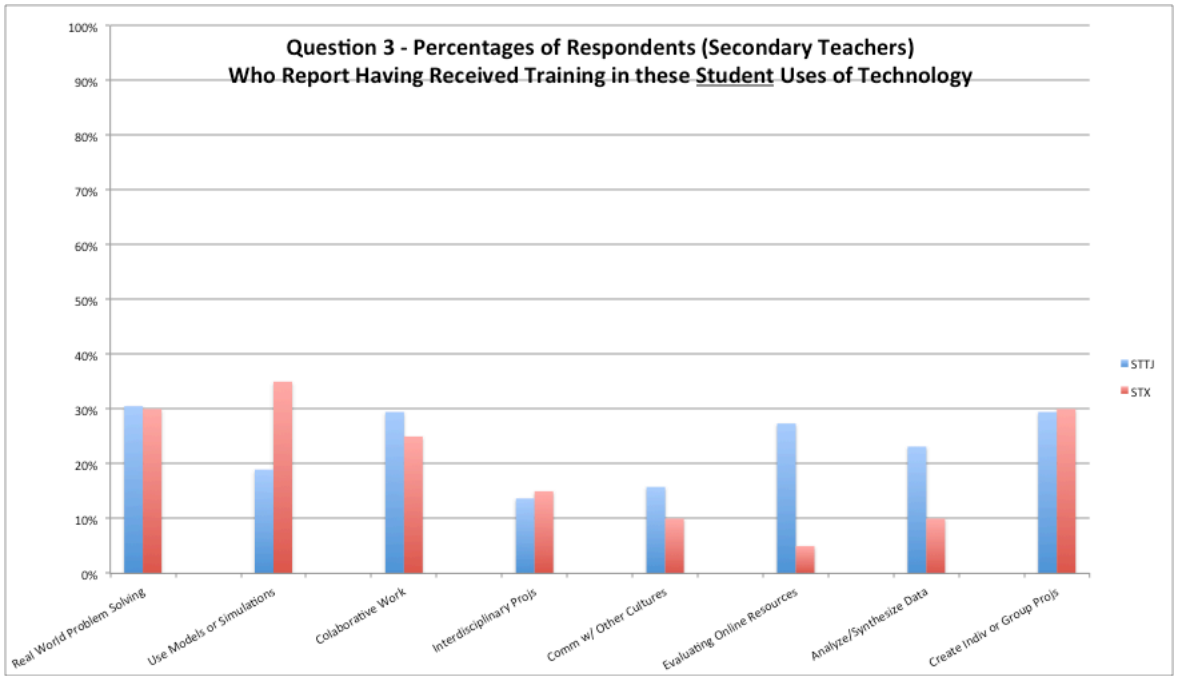


Figure 19 – Elementary teachers reporting training in supporting student uses of technology

This data shows that in general, the *least common* training offered is training to elementary teachers in supporting student uses (integration) of technology that support the NETS standards. The categories teachers were queried in all relate to the NETS-S standards, discussed above in Goal 2 that in turn support the types of technology integration discussed in Goal 1. In general, secondary teachers report receiving more training – in all topics – than their elementary counterparts. Teacher perceptions of training received seem comparable between districts. There does seem to be less training offered to STX secondary teachers than STTJ secondary teachers or STX elementary teachers.

> *I do intervention in math and reading for k-6. I am unaware of some of the online sources for supplementary materials or ideas for Soar to Success. I do just a little math activities for students' multiplication practice and for automaticity.* (STX elementary teacher)

> *I am very limited with technology, therefore not comfortable doing much with the students* (STTJ elementary teacher)

Finally, given its highlighted importance as an action item in the 2011-2013 VIDE and district technology plans, the evaluators queried teachers and administrators in both districts as to the status of the professional development in "technology-infused curriculum units" that was offered in both districts in February 2011. Evidence was sought as to whether the teachers trained in these units had actually taught them or if (more to the point) other teachers had been introduced to the pilot units. Here the evaluators found that while the units had been taught in a few schools in each district (approximately six schools in STTJ and that number or slightly more in STX) immediately following the professional development, there was no concrete evidence that the units were being currently taught in Fall 2011 or that they would be later in the 2011-2012 school year. In fact, during evaluator interviews of principals, where there were several direct questions about professional development for technology integration, the February 2011 technology-infused curriculum unit training never came up unless the evaluators asked

directly about it. Even then, in only three cases (out of 30 principals interviewed) were principals able to speak to what had happened within their schools related to the training. In one case, a principal noted that the teacher who had attended the training had been reassigned from the classroom (moving from science to guidance). In another school, the computer teacher retired and therefore took her knowledge of the professional development activity with her. In another case, a principal stated that while her teachers were receptive to one of the science units developed, it did not fit in last year's curriculum sequence and thus might be tried again this year. This principal also stated that since there was no official evaluation or follow-up by the district for the training, her teachers questioned whether or not it was important or "mandated".[12] Apparently the lack of a clear mandate undercut this school's incentive to engage with the activities intended by the professional development.

This last point illustrates another of the evaluators' findings related to technology professional development. It appears that principals, and to a lesser extent teachers, are aware of a constant stream of technology-related professional development initiatives. During the Fall 2011 data collection period, the evaluators heard frequent mention of Edline and something called "GoPlan" training. These would appear to be the most recent initiatives targeted for training by VIDE and district staff. Nevertheless, it was not clear that the majority of administrators actually knew what Edline or GoPlan were, why there were important (other than that there were "mandates" for schools), or how information on these things would transfer beyond the small number of teachers involved in the training from each school. In other words, it is clear that principals are very compliant about sending staff to (or themselves attending) training activities that are required, but there is very little sense that schools come to "own" what is offered at these activities and sessions. For VI schools, VIDE and district mandates come and go with little or no consequence or explanation to schools as to how these initiatives weave into, support, and are driven by other initiatives. There is no coherent narrative at any level that expresses *why* initiatives (professional development or otherwise) need to happen and why failure to commit is simply not an option. In this way, even professional development becomes just one more thing, flying by, in the "blizzard" of uncoordinated initiatives.

[12] The evaluators are aware of one district meeting in STTJ held in April 2011 to follow-up the technology infused curriculum unit training. While not an "official" evaluation activity, this meeting did at least query principals and school technology specialists as to whether or not they had implemented the pilot units as promised and attempted to get some information on implementation plans for the 2011-2012 school year. It is not definitely known whether any similar meeting occurred in STX, but the evaluators have no evidence that any follow-up ever occurred in that district.

Goal 4 – Infrastructure

Provide reliable, stable, secure and state of the art equipment and service to all schools, administrative offices, and activity centers anywhere and anytime.

STRATEGIC DIRECTION: Maintaining and making needed improvements to the current technology infrastructure should remain central to the efforts of VI technical and support staff. The process by which technical support is provided must be clarified and communicated to school staff at all levels. Administrators themselves must understand the system and be able to support teachers in obtaining needed technical assistance.

- Reliability of network services increases.
- Percent of uptime vs. downtime at district and school levels improves.
- Percent of VI educational personnel that use ETAN increases.
- School personnel indicate improving satisfaction with technology service and support.
- Adequate budget for emergency network repairs and implementing actions and solutions are available.
- Districts and schools provide adequate access to technology team to implement repairs and upgrades.
- Diagrams and blueprints of the network are available and current.
- Territory, district, and school technology personnel meet to clarify roles, responsibilities, and positions and to document conclusions.
- Territory, district, and school technology personnel develop and distribute policies for network use, including user groups established with specific permissions and restrictions at the server level.
- Student to computer ratio shall improve
- Every instructional and administrative area in schools will be connected to the LAN/WAN.
- Every computer in schools will have an Internet connection that can support the use of high quality digital learning resources.
- Network policies are completed and distributed.
- Internet connection (broadband speed) from every computer that can support the use of high-quality digital learning resources.
- Every school has a computer projection device or display unit per instructional area
- Every school has 2-4 video conferencing units, depending on ability of school to demonstrate effective use in the classroom.
- Every teacher has a computer/laptop.

Figure 20 – VIDE Technology Plan Goal 4

The VIDE technology plan devotes considerable attention to the development and maintenance of its technology infrastructure. The plan includes very specific actions and a detailed "checklist" of performance indicators. While the vast majority of these actions are to be conducted under the centralized authority of VIDE OIT (and to a much lesser extent, district-based technicians), the overall *impact* of these infrastructure-related actions has considerable bearing on the real as well as perceived ability of teachers and students across the Territory to meet the performance indicators associated with all of the other goals of the VIDE plan. In other words, while the point of the VIDE technology plan is not to build technology infrastructure per se, the technology infrastructure underlies and determines the viability of the entire plan.

The evaluation provides a fair amount of data about the technology infrastructure currently in place and offers perspective on teachers' and administrators' perceptions of that infrastructure. Figures 21 - 24, below, summarize data from the evaluators' online survey questions related to technology access and technical support. When asked if they "largely" to "never" had adequate access to technology for teaching and learning, between 60% to 80% of elementary teachers indicated that they had "somewhat" or "largely" enough access. Numbers for secondary teachers were similar although slightly higher, indicating greater satisfaction. The data shows that STTJ elementary teachers were the least satisfied group surveyed (only 60% were somewhat/largely satisfied). STX elementary teachers were the most satisfied (80% somewhat/largely). Secondary teachers in both districts were equally satisfied (70% somewhat/largely).

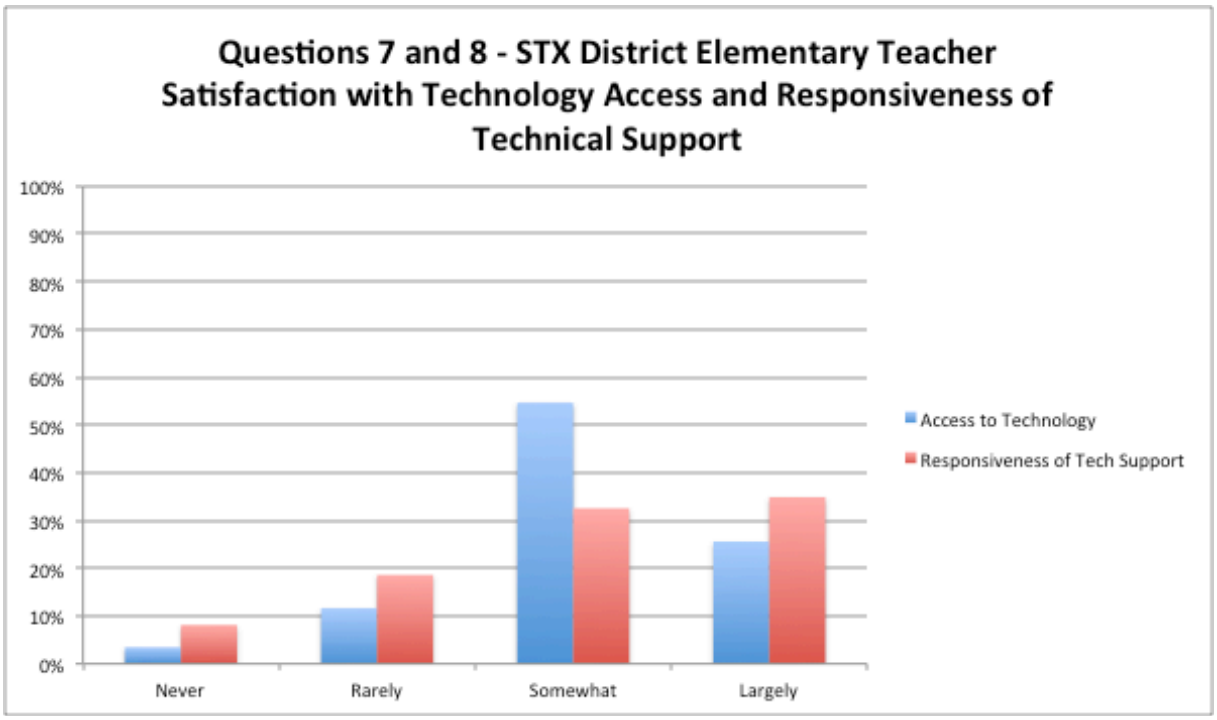


Figure 21 – STX elementary teacher satisfaction with access to technology and technical support

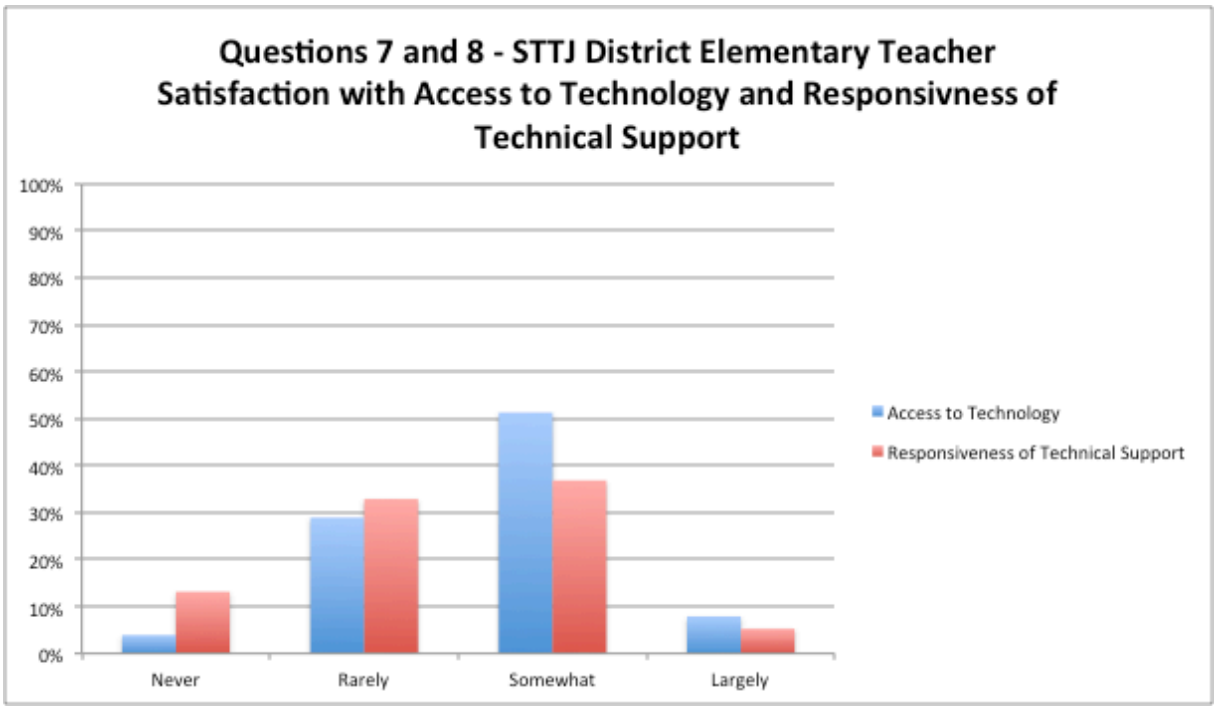


Figure 22 – STTJ elementary teacher satisfaction with access to technology and technical support

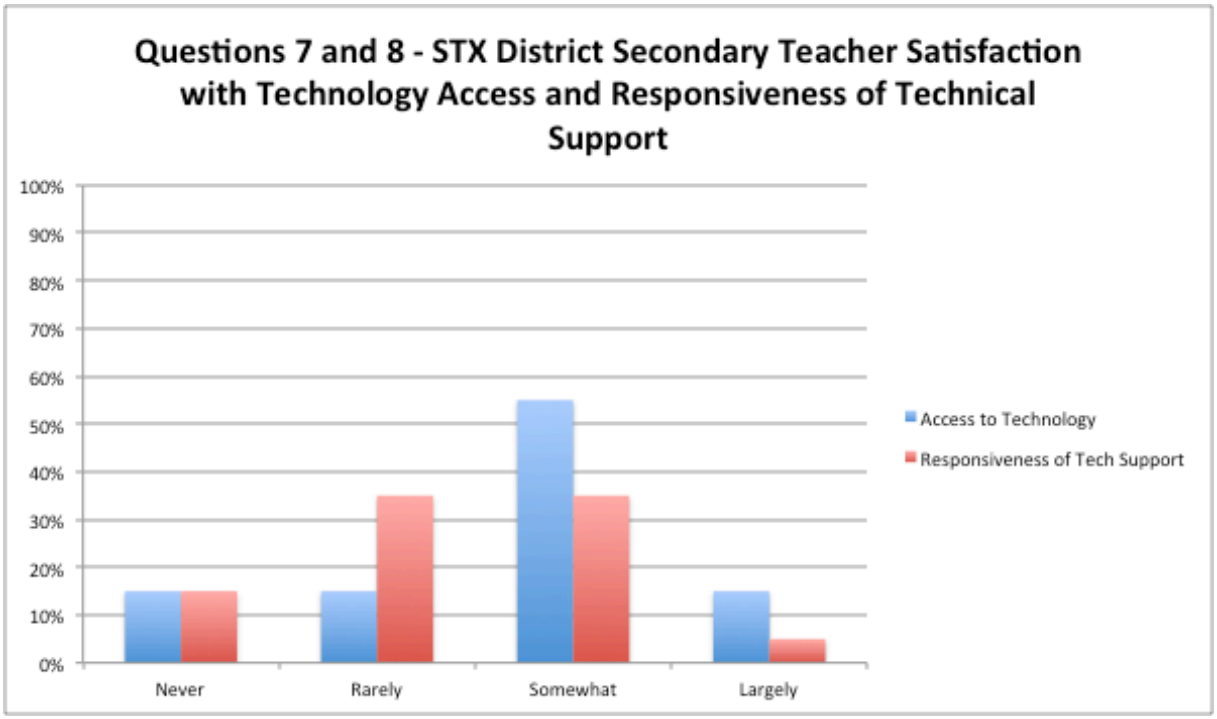


Figure 23 – STX secondary teacher satisfaction with access to technology and technical support

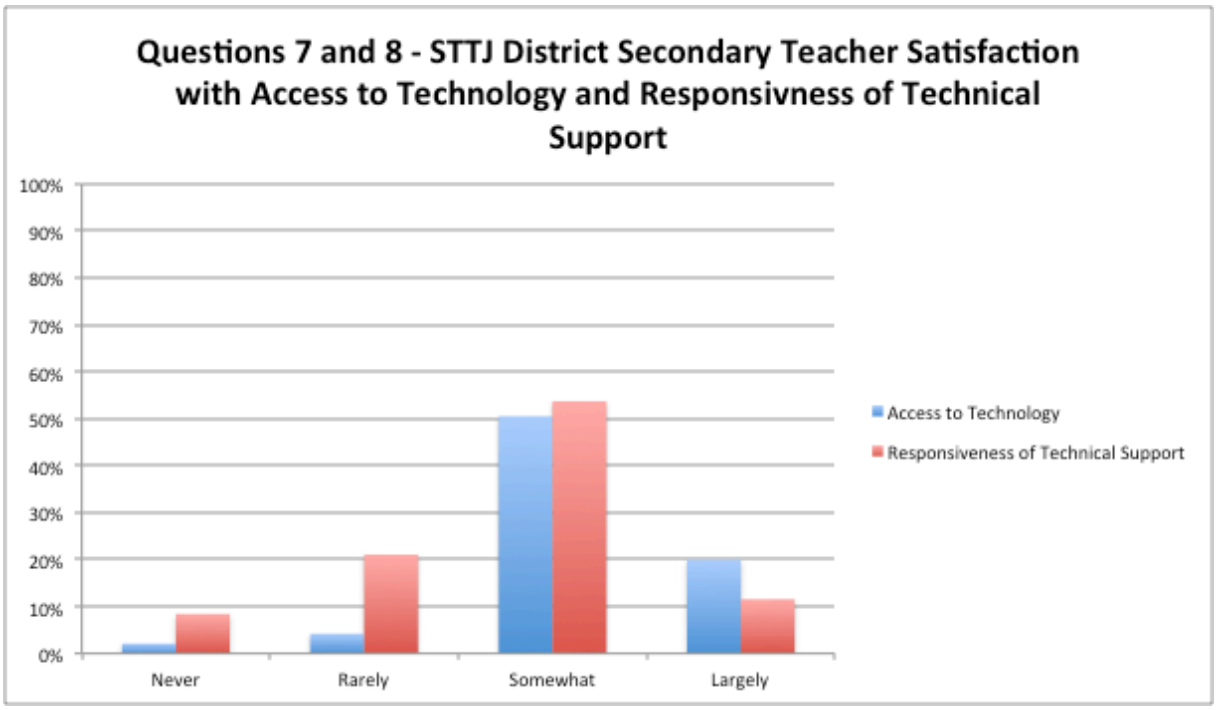


Figure 24 – STTJ secondary teacher satisfaction with access to technology and technical support

In reviewing the data, the evaluators find that issues around access and tech support tend to cluster around the following:

Unavailability of Promethean Boards

Given the high profile afforded to Promethean boards in VI schools, it is not surprising that teachers and administrators are quite vocal when they do not have access to a functional board. While it seems that some teachers in some schools do not have Promethean boards in their rooms, this number appears (through observation) seems to be relatively small. The evaluators found boards installed in most classrooms and labs and often in many flexible use spaces (libraries, teacher work rooms, etc.). This overall prevalence no doubt highlights those places where there boards are not available. Since most administrators have mandated the use of Promethean Boards in their schools, obvious problems result when boards are not available.

> *Our special ed. director says we are supposed to use a white board when holding IEP meetings but I don't have one.* (STX elementary teacher)

More problematic are the relatively large number of installed boards that are not functional. From observations and discussions with teachers, this number seems to be growing. While several years ago the problem with boards was that they were not fully installed (e.g., software was not installed), the problem now seems to be that a large number of boards are failing, due to burned out (or nearly burned out) projector bulbs. In nearly every school visited there were three or four (sometimes more in larger schools)
projectors that no longer worked. In those schools with classrooms more open to the environment, a lack of adequate air conditioning seems to have accelerated failures. Teachers report that bulbs are expensive (upwards of $250 each) and procedures for acquiring replacement bulbs are obscure. Several

elementary teachers spoke of using their personal funds to purchase bulbs. One teacher had her family in the states buy a bulb and send it to her as she knew of no other way to regain access to her Promethean board.

One secondary school visited on St. Croix had just completed an inventory of its Promethean boards prior to the evaluators' visit. In this school, of the 32 installed boards, four were non-functional, and 12 others were missing the various cables necessary to connect them to the teachers' computers. In other words, 50% of the boards in this school were unusable. While seemingly a bit higher than average, this is a failure rate that many schools in the VI are approaching.

A commonly attributed cause for board failure and/or degradation of performance is "dirty filters". Apparently the dust filters in the Promethean projectors, when clogged, cause the projector to dim and the bulb to quickly burn out. This problem is accelerated in the VI's tropical climate. While this problem seemed to be well-known to teachers in all schools, there also seem to be no clear procedures for fixing the problem other than to "call the district technician" to come clean the filter. With just one technician per district, responsible for hundreds of boards, it is clear that this is an untenable solution. Nevertheless, the evaluators heard no other solution to what is clearly a well-known, pressing, and on-going problem. At the current failure rate and no developed solution it could well be that a majority percentage of the Territory's Promethean boards will be out of service by the end of *the current school year*.

Given that most of the boards were installed at the same time (two years ago) they are therefore reaching (or have recently reached) the end of their manufacturer's warranty. Unfortunately, it seems that the boards are not destined to perform beyond the warranty period without some sort of extended maintenance program. Again, teachers and administrators in VI schools (or the evaluators) are not aware of any plans or procedures coming from the district or VIDE to address this growing problem. Further, there is no evidence that Promethean has taken any ownership of the problems, despite the very large installed base of equipment in VI schools. The evaluators cannot underestimate the severity of this problem related to lack of forward planning for the maintenance of what are now the primary (and very visible) technology devices in VI schools. If Promethean boards continue to fail without a clear and effective plan for stopping their decline, the undermining of VI teacher confidence in instructional technology will be dramatically destructive.

Finally, in a related matter, the evaluators note that Promethean board user support for Activinspire and Promethean Planet is problematic. While many teachers have not tried to update Activinspire and/or make considerable use of Promethean Planet, instructional technology specialists in both districts report that Promethean policies make it difficult/impossible to download older versions of Activinspire once newer versions (that require updated Promethean boards) are released. As teachers upgrade their computers, or seek new features, they require new software that increasingly cannot be downloaded. Therefore, VI teachers are discovering that their Promethean boards are subject to planned obsolescence apparently by the Promethean company. Further, it appears that access to Promethean Planet is limited to a single instructional unit download unless a current, paid, subscription to Promethean Planet is held.[13] These subscriptions are limited and expiring, thereby cutting VI teachers off from what some are only starting to realize is a valuable resource for their teaching. Both of these issues are of course

[13] This is what the evaluators were told by several school technology specialists. This information has not been independently confirmed, but it is still problematic if this is what teachers/specialists *believe*.

beyond the control of individual teachers and require VIDE to work with the Promethean company to reach satisfactory terms that benefit teachers and students. The evaluators are unaware of any such negotiations to date.

Lack of computers or access to computers

The evaluators observed most elementary classrooms in both districts having several (often around three) classroom computers *beyond* the teacher workstation that is typically connected to the room's Promethean board. Nevertheless, during many observations computers were seen often not to be in use. When asked, teachers tended to state that classroom computers were "old" machines and were not functional and/or not connected to the Internet. Given that most elementary classroom computers (those that were observed being used) are used for CBI and various online tutorial programs (e.g., Starfall, Razkids, BrainPop, etc.), network connectivity is necessary.

> *My students don't have much of an opportunity to use technology on a typical day because there is only one computer that works in my class. They have computer class twice a week for 45 minutes, but I'm not sure how much time they get to use the computers there. They should be able to use it when doing classwork and homework. The other computers aren't working because my classroom is very hot, because there isn't any air conditioner in here.* (STTJ elementary teacher)

This situation is not limited to elementary schools, as it seems to often be the case that secondary classrooms have *fewer* classroom computers.

> *I have computers that are not set up and I have asked MANY TIMES for help. They put in the internet but NOTHING was done to computers for my students. My smart board (Promethean Board) was removed from my room over the summer and I don't know why. Therefore little or no opportunities for my students. My students get information for me from THEIR SMART PHONES.* (STTJ secondary teacher)

> *Students are required to use technology to do research and type work. This is usually done at home due to the fact that there is no available technology in the classroom.* (STX secondary teacher)

> *[I would like to]have an area in each classroom with minimum 2 computers available for students to work everyday and do research.* (STX secondary teacher)

As will be discussed below, having functional classroom computers is largely a maintenance problem. The few district technicians available in either district tend to focus on building-wide network problems (Internet outages) and Promethean board problems. Attending to broken classroom computers is by necessity farther down the list of priorities. Teachers speak of "taking their computers to the curriculum center" for repair, and often waiting very lengthy periods of time for the computers to come back, if at all. Even here, it seems that priority is given to fixing teacher laptops (understandably so given the high priority for teachers to have access to one working computer for their Promethean board and their own use).

Equally problematic in some schools is the fact that in a number of schools there simply is not enough computer lab space to serve the students.

I wish that we had the resources to allow our students daily access to technology. Our school is equipped with only 1 lab and we have close to 500 students to service. (STX elementary teacher)

This problem seems to be exacerbated by the fact that particularly in STX elementary schools there is high demand for lab time in order to run the various online assessments and CBI interventions (e.g., Plato). When a school has a single lab and the need to run the majority of students through that lab weekly for intervention, there is not much time available to use the lab for something else. As one principal said:

They have bought into a lot of online programs for students who need intervention. They are about to go live w Achieve 3000, Successmaker, Plato…so we have a lot of interventions, but they are all online and all require a computer and we just don't have it. There are but so many ways that we can fix a schedule so that everyone gets a chance in the lab. At some point the hardware and software needs to come together. Even if they give us laptops, the wireless is down, and there aren't enough drops in the rooms. (STX elementary administrator)

Teachers also point out the high demand that CBI places on labs and on computer teacher time. School computer teachers in many schools are now nearly entirely devoted to proctoring online assessments and CBI. This means that in many STX schools, there simply is no technology class happening for students this year. Combined with the fact that due to workforce reductions the computer teachers have to be tied to classes of students (and cannot focus their work on assisting teachers with classroom integration), this is a significant problem.

Students in grades 3 through 6th that were selected by the scores on the PLATO Learning Environment pre-test come on a daily basis to the lab. Students selected by their classroom teachers in grades 2 through 6th come every day to login to Successmaker. A schedule is being created to incorporate EasyTech to our students in grades 3 through 6th. During the After-School Tutorial, which take place Mondays-Thursday, students from the 5th and 6th grade levels get to use technology to assist them in homework, projects, and PLATO prescriptions. (STX elementary teacher)

It is based on a schedule created by the administrators. Example; 4th grade comes into the lab at 8:00. I get students from all three 4th grade classes to do PLATO. There is an area where 4th graders selected for Successmaker go to and login to that program. The PLATO students stay for the 45 minutes class while the Successmaker students are grouped in 1st and 2nd group. Once the Successmaker group 1 complete 20 minutes of Reading or 15 minutes of Math they then go back to their classroom and the students in group 2 of Successmaker login to Successmaker and do their 20 minutes in Reading or 15 minutes of Math. I receive the other grade levels in the same manner except 2nd grade. Second graders selected from the 3 classes, group 1 and group 2, only come to login to Successmaker. (STX elementary teacher/technology specialist)

Even when labs are available – and most secondary schools have more than one computer lab – there is a new infrastructure problem this year that prevents some of these labs from working.

My classroom does not have a Promethean board or computers. My department's lab is not presently connected to the Internet. (STTJ secondary teacher)

Right now we are having issues with the new state policies. We are only allowed 3 machines on a port, whereas before we could have more. So machines can't be connected and can't update. With wireless, some can get on some can't. It's beyond the district…it's state issues. …Before this new policy came into place we were buying our own switches to connect computers. But the state isn't coming out and putting in more drops…and it's hampering programs that students need to be online. (STTJ secondary administrator)

We have about 725 computers here. Bought for credit recovery and to Teenbase, which is a reading program. We can't use those now. (STTJ secondary administrator)

This problem seems to exist mostly at secondary schools or in schools where labs have been established where they were not originally located when buildings were originally cabled. School staff in previous years installed "switches" to expand single network drops into multiple machine sub-networks. Starting this past summer, changes in the VIDE firewall have prevented these switches from working and have therefore disabled the labs that depended upon them. While this alone represents a problem in terms of student access to these computers, it also highlights another problem; that is, the fact that schools often feel out of control in terms of being able to administer their own environments. Schools feel that changes that happen at the system (VIDE) level are not well-communicated and therefore often leave them hanging. Examples of this are the multiple departmental labs (English and Math) at STTJ high schools that are no longer functional this year. Similar situations were found at elementary schools (on a smaller scale) in both districts.

Network and User Account Problems

As noted earlier in this chapter (Goal 1) a number of teachers routinely commented that the Internet "doesn't work". While the evaluators found – through observation and speaking to principals - that in most cases true Internet outages are generally resolved quickly, the impression nonetheless persists among many teachers that they cannot get to the Internet because it is "broken". Upon closer examination, these problems can be seen to relate to various causes other than a full Internet outage.

I am frustrated when the wireless network isn't working, the passwords are changed and no- one knows. I have a few computer issues I don't know how to solve. I have internet drops that aren't activated. (STTJ elementary teacher)

Over the summer of 2011, VIDE changed vendors for its ISP services. Apparently this switch was abrupt, and given that it happened over a summer when most teachers and administrators were away, teachers returned to school to find that the ways to access the Internet had changed. While this alone should not represent a significant problem, this is a problem for many VI teachers. Chronic communication problems in VI schools – such as late communication, incomplete communication, failure to take responsibility for issuing or reading communications, etc. – result in a situation where teachers (and many administrators) were unaware of new procedures, usernames, and passwords. The result is that this past fall has been plagued by teachers who cannot log in to their desktops and/or get through the VIDE firewall. Processes for logging in a lab of students have changed, and what had been routine has now to be relearned. As one can imagine, the ensuing disruption has not been appreciated by teachers and provides fuel for those who wish to take the road of avoiding technology because "it's broken".

Without a doubt, changes in username and password policies – even if the changes ultimately lead to a more secure Internet for VI schools – have generated considerable dismay among teachers and technology specialists in both districts. Further, the issues discussed above relating to elimination of non-managed switches are also related to the change in ISP.

Another area where network issues conflate with policy and communications is in the on-going (definitely evident in the evaluators' previous work in VI) problem related to blocked sites in the VIDE firewall. Comments such as the following are typical in teacher surveys and interviews:

> *Unblock useful websites.* (STX secondary teacher)
>
> *Too many blocks on sites that are educational learning tools* (STX secondary teacher)
>
> *The Department of Education technology offices is in need of revamping the sites and sources that are blocked when using their server. Students are blocked from viewing or using images from websites. These images help students to create visually powerful presentation. Taking away the students power to use images is retarding their creative thinking*. (STTJ secondary teacher)
>
> *Even instructional videos have been blocked with the new filtering system; I'm trying to work around it though.* (STTJ secondary teacher)
>
> *Too many of the important sites are blocked by the department; it has turned into a site to access e-mail and nothing more.* (STTJ secondary teacher)
>
> *Too many websites are blocked. YouTube has educational videos that other educators have downloaded. teachers should have access.* (STTJ secondary teacher)

In fact, the evaluators can confirm – again, through observation – that sites that some teachers note as blocked (e.g., YouTube) are in fact *not* blocked. Some teachers in both districts were clearly observed using YouTube in the classroom. It may be that these sites were blocked once, but those blocks have been removed. Or it may be that many teachers are simply unclear as to how to request that a block be removed. It is clear that the new firewall has rigorous key word filtering and there are a number of words that trigger unintended blockages – e.g., "blood", "breast", or "game". Several teachers reported that sites that previewed fine one day were blocked overnight so that they could not be accessed the next day. It seems that often when a teacher encounters a block, s/he does not know how to request that the block be removed, or there is no time to request the removal before the lesson involving the block is run. These are typical problems encountered by *any* teacher anywhere who needs to deal with CIPA-mandated firewalls, but the lack of clear communication and policies in VI schools tend to exacerbate these problems for novice technology-using teachers. Too often it seems that teachers try something once and then when unsuccessful they simply report that the Internet is "down" and cannot meet their needs.

In short, the problem with blockages – and with network access in general – seems to be mostly one of clear and consistent communication both to and from schools.

Maintenance

Access to technical support – technicians – is also a considerable problem for VI schools. While there clearly are technicians who support school technology, and these technicians are generally perceived of as being competent, it is clear that the biggest problem is that there is not enough technician time to address the various problems that develop on a daily basis in VI schools. As the following representative comments show, this is a uniform situation across both districts.

> *I think our tech team does a good job but they are understaffed. Also, we need a full time tech person on St. John. Ideally we could have a full time tech person to support teachers using technology in their classrooms.* (STTJ elementary teacher)
>
> *Technical support can be improved by having our own technician at the school.* (STX secondary teacher)
>
> *Teachers should be allowed to solve simple computer problems without having to wait on a technician.* (STTJ elementary teacher)
>
> *For years I have asked for a "technology coordinator" for every school campus. Someone who can fix, upgrade and train. This is important. The responsibility falls too often on the computer teachers who are already responsible for over fifteen computers in a lab setting. Computers require a lot of attention and maintenance. Many times teachers are unable to use their computers because they are waiting for one of the district's technicians to come to the school, which can take from 1 week to 1 month or longer. There are also older model computers that can be used to help build basic skills that need someone to give them a little bit of attention and will work again.* (STTJ elementary teacher)

As that last comment notes, school computer teachers/instructional technology specialists tend to be the front line for all school-related technical problems. While it appears that for the most part these school staff do not mind serving in this role (whether or not it is actually the best use of their time), their time is limited due to instructional responsibilities *and* their ability to address issues is limited. Current changes in the ISP have resulted in a loss of network administration privileges for many computer teachers (particularly at elementary schools where there are not network specialists on staff). Computer teachers who were once able to reset passwords or usernames or install certain software packages now need to wait for dedicated technical staff. Even more disturbing is the report that district technicians who at one time had network administration privileges no longer can exercise such privileges. Numerous stories exist of district technicians who have had to defer to (wait for) OIT staff, or perhaps outside vendors, to make relatively simple changes to server-based software or user accounts.

One result of the scarcity of maintenance technicians and the removal of responsibility/authority for network issues at the school level is that many teachers and administrators have adopted an attitude of hopelessness. Too many teachers seem to have given up trying to get their issues addressed and instead just say that they'll "sit back and wait" for someone else to sort out the problems. Even simple solutions – such as going out to buy batteries for Activotes or a teacher stopping by the Curriculum Center to pick up a replacement audio cable for his Promethean board – are therefore put on hold due to teacher frustration at the lack of a more permanent, systemic, solution. Unfortunately, students are the ones

trapped in the middle, unable to use the technology tools and resources that the VIDE technology plan intends to provide for them.

4. Recommendations

The findings discussed in the previous chapter give rise to a series of recommendations for VIDE and VI schools in their efforts to make instructional technology a more viable tool and pathway for teaching and learning. Those recommendations are presented in this chapter.

To offer some context for the following recommendations, the evaluators note that while the overall point of the recommendations – and indeed the VIDE technology plan – is to move classroom practice more toward student-centered uses of technology to support and develop 21st Century learning (the upper right corner of the matrix shown in Figure 1, repeated below), these recommendations need to be implemented strategically. This means that recommendations apply to and need to be adopted by different "levels" within VI's educational organization. For example, so much of what could or should happen in schools is actually controlled by policies and resources that are out of schools' hands and rather are under the control of districts or the VIDE. On the other hand, what gets done with resources on a day to day basis is within the hands of schools and teachers. Therefore, *jus*t changing VIDE behavior or *just* changing teacher behavior/knowledge will have little impact. There needs to be a strategic coordination of all of the pieces of technology integration - from top to bottom - for change to actually occur.

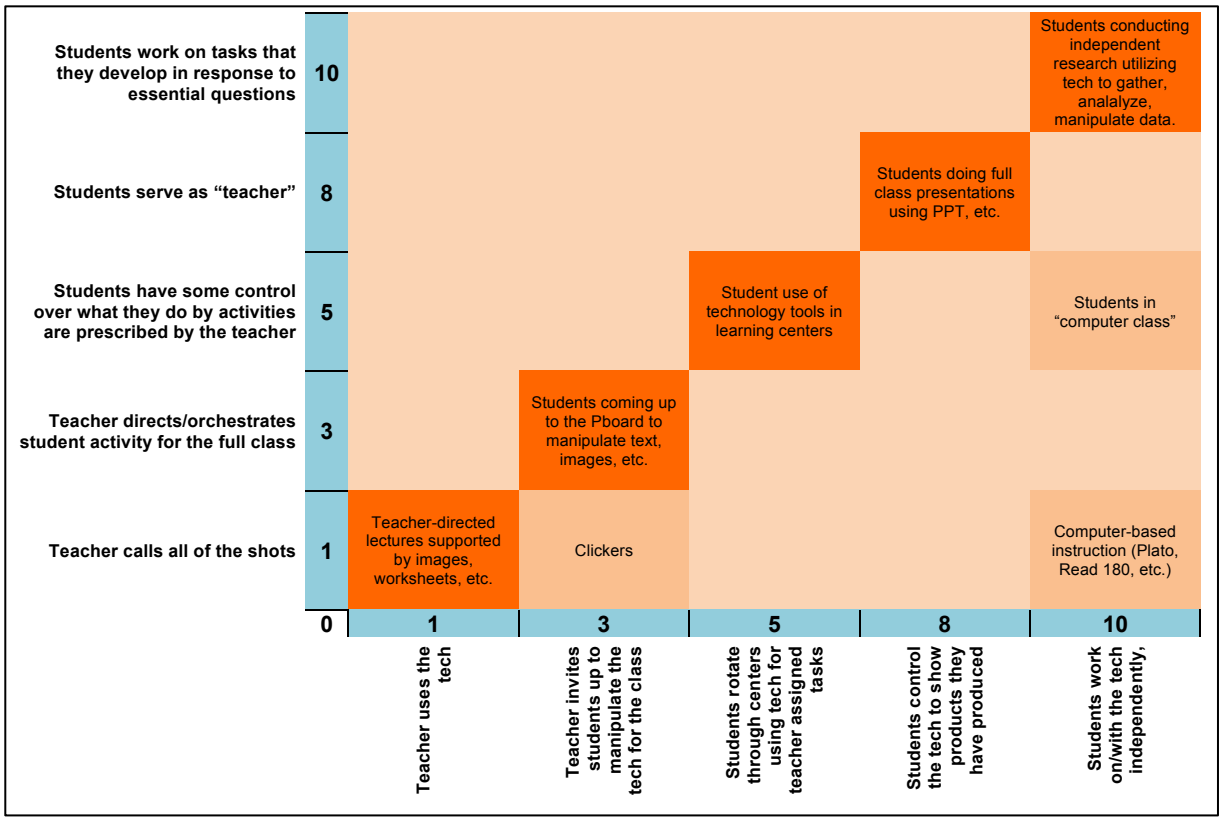


Figure 1 – Pedagogy and Technology Use Matrix

As an overarching point (again, for context), the evaluators feel that this need for strategic coordination and true collaboration between the levels of the VI educational organization often goes unmet. This is what happens when individual initiatives are taken out of context. An example of this is the promotion in the current technology plan of NETS standards without consideration of the equally important NETS "Essential Conditions".[14] It is clear from the evaluators' data that knowledge of the standards exists at VIDE level (at least within OIT) as well as within districts (by district instructional and technology leadership). But when those who know the standards simply express the wish that teachers and students "meet the standards" without actually building the instructional environments (the "essential conditions") that would support standards implementation, it is clear that implementation does not and will not occur. Worse yet, when VIDE, districts, or school administrators present teachers with *conflicting* initiatives, without any discussion of how to reconcile these conflicts, an untenable situation is created. The evaluators find, as has been discussed in the previous chapter, that such conflicts are frequent and well-recognized in VI schools. The end result is that teachers tend to operate under their own, personal priorities (which may or may not align with any of the goals of the VIDE technology plan) and/or to "lay low" and simply let the confusion pass them by. Naturally, this type of approach undermines progress in meeting the technology plan indicators and does not result in a situation where students are meeting the vision of the VIDE technology plan.

The evaluators cannot realistically expect that a single evaluation report and set of recommendations for improving the integration of instructional technology will change the overall environment for VI schools. Still, instructional technology is an excellent window through which to view how change can be driven by specific practices, tools, and resources such as those highlighted in the VIDE technology plan. The indicators for the VIDE technology plan – particularly those related to Goal 1 – strike at the core vision for what VI schools, or any well-performing school system – would want for its students. This is why meeting the technology plan indicators has importance that goes well beyond just maximizing the use of a particular set of teaching and learning tools.

Department level (OIT, VIDE)

Without a doubt, VIDE sets the parameters and provides the bulk of the resources for what ultimately happens in VI classrooms. Therefore, first and foremost, VIDE has the responsibility to *communicate the vision* for technology integration and 21st century teaching and learning. This vision should be the organizing framework for all decisions, purchases, and policies made by the department.

Just to be clear, the vision for student-centered learning needs to emphasize the placing of tools and resources in the hands of students who can then use these tools to engage in the information gathering, analysis and synthesis activities that constitute learning. This vision has strong implications for VI teachers in that it requires them to shift their role from directing learning to facilitating the creation of knowledge. Teachers working in student-centered learning environments will need to spend more time thinking about how to help individual students reach broad learning outcomes than they will "telling" students what they need to know and do on a daily basis. VI schools will need to be facile in helping students master the use of the various hands-on, 1-1, technology devices and tools that are a necessity in a student-centered learning environment. And of course, VI students will need access to these tools, something that is not currently the case. In fact, this vision for student-centered learning is something that is presently quite "visionary" for VI schools, but it is at the core of the goals and indicators of the

[14] http://www.iste.org/standards/nets-for-students/nets-for-students-essential-conditions.aspx (accessed 1/18/12)

current technology plan. Likewise, it is what underlies national initiatives such as Common Core and it is what best practice says will help address current VI issues such as AYP, the drop-out rate, and basic skills development. Therefore, the sooner the VI solidifies its vision and begins to effectively communicate it to schools, the sooner real progress can be made in addressing a whole range of pressing issues in VI schools.

The responsibility to communicate the vision has two significant components that cannot be overlooked by the department. First, VIDE must coordinate this vision with other initiatives and policies transmitted to schools. At present, it seems that VIDE does not have a comprehensive view of how 21st century skill development fits within the constellation of other desired outcomes such as improved achievement in basic skills (i.e., the AYP issue), improved student retention/graduation rates, improved math and science (STEM) skills, and meeting national curriculum standards (Common Core). In fact, *all* of these initiatives and outcomes are complementary, but figuring out how they fit strategically together is a challenge. Nevertheless, as leader of VI schools, VIDE must assume the responsibly for coordinating and communicating these initiatives across the territory

Second, VIDE needs to act on its coordinated vision by insuring that the technology it supports (purchases) is that which fulfills the vision. A specific example of this *not* happening is the proliferation of Promethean boards within VI schools. A more controlled implementation, which theoretically would have been possible given that the funds for purchasing the devices originated as Federal funds through VIDE, would not only have prevented some problems related to maintenance and support but would also have allowed VIDE and the districts to develop ways to encourage teachers to use these devices to support student-centered versus teacher-centered pedagogies. As it is, the proliferation of Prometheans has served to solidify teacher-centered instruction while giving most school administrators (and teachers) the impression that technology integration is occurring through teacher Promethean board use. In short, VIDE needs to be sure that it understands the longer term impact of the technology-related decisions that it makes *within the context of its overall vision for student learning*.

Communication is critical to this notion of implementing a strategic, coordinated, vision. For VIDE, this will mean that district leaders need to be *continually involved* in the decision-making process. This will allow districts to develop the trust required to believe that they are true collaborators in the development of decisions that impact their districts and schools. This in turn will ease communications because districts will be at the table when decisions are made and will allow districts to have first-hand information and input as to strategic directions and decisions. Presently, too much communication seems to come as directives that can be ignored (or delayed) because the right people "didn't get the memo". Over time, this breakdown in communication results in a lack of trust, which further undermines the effort.

While this point about communication really applies to the broad, over-aching, vision of VIDE, it can also be applied to specific instructional technology efforts. VIDE OIT should coordinate its efforts on both larger visionary issues as well more mundane, yet still important, issues such as changes in vendors and modifications of technology policy. Doing this would mean holding regular meetings with districts. While some such coordination no doubt happens now, much more should occur and it should be regular and routine. It may take some time to establish this coordination, and the trustful communication it will give rise to, but it is clearly OIT's responsibility to take the initiative to make this happen. OIT should convene a Territory-Wide instructional technology committee and hold regular (monthly) meetings. These meetings must focus on shared communication and proactive policy development. They must not

be allowed to degenerate into meetings where only complaints are voiced. It will be difficult to make this happen given the lack of trust (and time) at both the departmental and district levels, but without such coordination, it will be more difficult to rebuild the trust that is essential to forward progress.

Finally, one obvious benefit of trusting, communicative, coordination at all levels (within VIDE divisions first and then between VIDE and districts) will be that decisions can be made proactively versus as reactions. Over time, this will allow all parties to "catch up" and to operate in forward-planning mode and not largely in reaction to crises as they emerge.

Maintenance and Support

Responsibility for the ongoing maintenance and support of technology should largely reside at the district level versus the state level. For this to happen, the state (OIT) needs to provide resources to districts to hire technicians and then to empower those technicians to actually provide maintenance and support. This means that OIT needs to find ways to more effectively communicate information on the requirements related to technical infrastructure (firewalls, user accounts, passwords, equipment and networking standards, etc.). OIT should take a strong role in setting policy, but not in actually implementing that policy at the district/school level.

One thing that OIT should focus attention upon is negotiating advantageous agreements with vendors that sell equipment and services for schools. The evaluators recommend that these efforts start with developing new terms with Promethean, a company that appears to currently have VI schools at its mercy. Promethean needs to be brought to the understanding that millions of dollars of its equipment is installed in VI schools and that there is an obligation to working out some long-term arrangement to support this equipment and its users. This arrangement cannot just be to "buy new stuff" once the existing equipment is out of warranty. Surely better terms can be negotiated with Promethean in the interest of some sort of continuing relationship with the VI and a positive image with the other states that use Promethean products and that are aware of VI's experience.

District level

All of what was stated above about the need to coordinate initiatives and improve communication and collaboration around a strategic vision at the Territory level also applies to districts. While district initiatives may start with directions and policies that come from VIDE, once the initiatives are lodged within districts, the same degree of coordination – and clear communication – needs to occur in moving these things out to schools.

Issues of trust are also extremely important between districts and their affiliated schools. The evaluators find that schools are equally mistrustful of policies and communications that come from the district as they are from VIDE or OIT. This situation must change if schools are to benefit from the decisions that relate technology use and implementation that the district indeed controls. Just as it is recommended that VIDE OIT hold regular technology committee meetings with the districts, districts should hold such meetings with schools (with instructional technology specialists, computer teachers and/or principals). While some technology meetings do happen in each district, the evaluators hear from schools that these meetings are not well attended (perhaps because the wrong individuals are invited from schools) and often focus more on technical subjects than on policy.

This last point raises another issue, which is the fact that in districts the discussion about technology is often relegated to one of technical detail ("how to") and not focused on policy and/or matters related to pedagogy. Technology at the district level (much as is the case at the Territory level) is simply not integrated within teaching and learning. This orientation clearly has to change if *teachers* are expected to view technology as integrated with learning versus as a separate subject to learn. An example of this is the difficulty that teachers have understanding that technology integration is part of a shift to student-centered learning and not just an add-on to existing teacher-centered instruction. So when communicating to schools about how technology integration is to occur, districts need to connect with school staff who have the broad issues of teaching and learning as their focus. In some cases, this may be the school technology specialist (i.e., computer teacher); but in most cases, the evaluators believe that this communication point might better be a principal or assistant principal. Districts need to develop clarity on this issue. This will also involve educating school staff around *why* issues of technology might not best be dealt with by the computer teacher. Schools should be involved in this decision (as to who represents technology from the school), but one way or the other the decision has to be made. At present, it is too often the case that important issues relating to technology's role in teaching and learning are communicated to school staff who have no ability to act on those issues within the school.

Keeping with the idea that technology integration is something that impacts *all* curriculum areas and that all curriculum areas have a responsibility to weave the development of 21st century skills into their subject area learning, districts need to engage the Curriculum Coordinators in meaningful integration of technology. The evaluators find that in both districts, Curriculum Coordinators seem to take a hands-off attitude toward technology. Mirroring the apparent structure at VIDE, "technology" at the district is held as a stand-alone "subject" that has its own coordinator who deals with "technology". Unfortunately one person cannot integrate anything alone, and therefore technology remains un-integrated. Furthermore, the evaluators find that the vast majority of Curriculum Coordinators in each district are largely unaware of the VIDE technology plan indicators, the NETS standards, or best-practice for developing 21st century learning skills. As a result, the Coordinators, who should be a powerful vehicle for modeling, encouraging, and generally educating school staff (at least at the elementary level where district-based Coordinators seem to hold the most sway) appear to do little to facilitate technology integration. This situation should be addressed through an overhaul of the Coordinator role/knowledge at least as it relates to instructional technology integration.

The current role – or really lack thereof – of Curriculum Coordinators in terms of expressing a vision for technology as a key element of a student-centered approach to learning highlights the primary need for districts and schools to develop a meaningful understanding of student-centered learning. At present, districts do not seem to understand what student-centered learning is, or how to achieve it. While there is talk of student-centered learning, it appears to exist as just one more named initiative that is uncoordinated with other priorities or initiatives. Hence it is understood by schools to be part of the "blizzard of initiatives" such as testing, technology integration, pacing guides, "rigor and relevancy", curriculum work, etc. that befall them. Instead student-centered learning should be seen as a primary way to transform learning and thereby achieve many other learning goals (such as the mastery of core curriculum content). Districts have to do a better job at solidifying, communicating, strategically implementing this vision. A good start would be to engage relevant parties – administrators, curriculum heads, technology staff, and of course teachers – in a focused discussion of the matter and then to follow this discussion with on-going training, support, and assessment. This is what it means to be "strategic".

This is how the blizzard of initiatives will be connected in a proactive meaningful way versus the disconnected chaotic situation that seems to be the current state of affairs.

Professional Development

As part of the coordination of efforts discussed above, districts need to do a much better job of providing meaningful professional development around technology integration and the development of 21st century skills. While "how to" training is continually necessary, it should not be the only type of professional development available from the district. Districts need to develop a *comprehensive strategic plan* for professional development that places "how to" technology training within a context of other training that explains "why" one would choose to use various technologies. This training would best take the form of curriculum study and design. It would focus on developing teacher skills within the context of the core curriculum and actual instructional units that fit the curriculum frameworks, pacing guides, and other district priorities that need to be reflected in schools.

Most importantly, the professional development needs to be targeted at teachers and/or individuals who are instructional leaders in their buildings. It cannot be "just computer teachers" who may have virtually no leverage in their schools. Further, the training has to be sustained. It cannot be a handful of sessions that target individuals of low instructional impact in their buildings and that then just stops when something else more important needs to be addressed. In other words, professional development will have the greatest impact if the training is part of the highly coordinated, strategic, initiative described above.

Maintenance and Support

Districts need to appoint more technicians and to establish a regular rotation of technicians into schools. Schools should be able to expect that a technician will visit their school at a particular time for enough time to deal with technical issues. There appears to be a particular need for regular technician visits to St. John schools (not just when problems are reported, but proactive visits to insure proper maintenance of equipment and the network). This naturally implies that there are a sufficient number of district technicians so that a realistic schedule can be created. VIDE support will be required to make this happen, but the evaluators recommend that the VI spend funds on more technicians *rather than* more equipment. More equipment simply digs a deeper hole for maintenance and support.

Building Level

Once again, the communication and coordination recommendations made for VIDE and districts also apply at the relevant scale for individual schools. Principals need to work with their teachers to insure that there is a clear understanding of how technology can best improve teaching and learning and how district and school mechanisms work to support this vision for student-centered learning. Fortunately, the evaluators believe that most schools do have good systems for insuring unity and focus on school priorities. Thus the onus is really on the "higher levels" (VIDE and the districts) to guide school priorities and to put into place the supports that can be used by schools to realize these priorities.

For example, one way that school principals currently operationalize priorities is through the teacher evaluation process. Principals set clear expectations for what needs to happen in teacher observations

and for the most part teachers tune their performance to these expectations. In terms of technology integration, if principals only think of technology integration as a teacher "using her Promethean board", then this is what teachers will assume is necessary to demonstrate their technology integration skills. To change this cycle, *principals* need to be educated on what really constitutes technology integration by the indicators of the VIDE technology plan. This is a district responsibility.

Likewise, there is much that principals can do to prioritize and reward teacher professional development. Changes in teaching schedules to create common planning time would do much to provide teachers with the time they need to productively collaborate and share and therefore develop innovative and effective technology integration practices. For this to happen, principals must receive the directive from the district and must be showcased and rewarded when they demonstrate initiative to make change in their schools. The district is again responsible for setting expectations, and creating the structures for supporting and encouraging principals.

Despite the fact that so much of what happens in schools ultimately depends on district action, it is also true that schools can take the initiative to develop solutions and to advocate for the district to pay attention to these solutions. Doing this involves developing a culture within schools where schools look for solutions instead of simply identifying – and often just being besieged by – problems. There are clearly examples of VI schools where such a positive, problem-solving, culture exists. Some schools have clearly identified building-level trainers, and staff who can assist other staff in simple trouble-shooting. These schools should be rewarded, and that too is a district responsibility.

Maintenance and Support

Schools can take some actions to improve maintenance and support. One way to do this is offer more in-school professional development that highlights how to solve simple problems that do not require district (or OIT) technicians. Schools for example could learn how to clean the filters on their Promethean boards as a way to extend bulb life. Teachers could be educated around how to access online resources (lesson plans, Promethean Planet, etc.) so that they can do more to help themselves integrate technology. In secondary schools, groups of students could be trained to perform basic maintenance and troubleshooting in service of the whole school. Currently there are isolated examples of these sorts of solutions in some VI schools. These successes should be spread to *all* schools. Doing so involves sharing from school to school. As noted above, the district could do much to facilitate such sharing, if it were a priority.

Classroom Level

At the risk of being redundant, the evaluators must note that although the classroom is ultimately where changes in technology-integration practice will be most visible, it is not until teachers are provided with the proper structures, support, tools, incentive, and time (essential conditions) that they can realistically be expected to meet the indicators on the VIDE technology plan. Therefore, everything that has been stated above needs to be put into play before one could reasonably expect to see change in the classroom. The evaluators firmly believe that for the most part VI teachers are trying to do what they think is best and are trying to do the most with what they have. Where not enough is happening in the classroom, the cause for this lies with teachers not being provided with the proper resources, supports, or knowledge. Some teachers have simply given up, but most teachers just don't know how to do anything

different than they currently do. Those who are not covered by either of those statements exist as the small number of shining examples that the evaluators certainly found in VI schools.

Just to recap, VI teachers need to:

- Develop a meaningful, operational, understanding of student-centered learning. They need to understand that student-centered does not simply mean that students are performing tasks that they have been directed to perform by teachers (e.g., "Go to the Promethean board and solve that problem."). But rather student-centered learning involves students in an engaging, independent, curious, creative pursuit of knowledge that is *facilitated* by teacher experts. This facilitation happens through the construction of guiding questions and learning activities that allow students to explore and develop expertise with content and concepts. It's about opening opportunities for students to explore and discover what might happen and not about telling them what will or will not happen.

- Understand that technology is primarily a tool for analysis, collaboration and communication. This is what 21st century skills are all about. Technology within the educational environment is not simply a tool for production or display and should not be portrayed as such to students. By doing so, VI teachers are inadvertently limiting their students and doing a significant disservice to them and their ability to succeed in the world beyond school. For example, students in stateside schools who are using devices such as iPads are not doing this just to have more 1-1 access to word processors (or other tools for performing rote tasks) on a smaller device. Rather, these technologies are being put into student hands so that students can independently communicate, access resources, and engage in learning collaborations both inside and outside the school walls. Students outside the VI are regularly using these "disruptive technologies"[15] with the specific intent of changing the traditional teacher-student dynamic. Such technology uses are clearly well beyond *current* VI teacher understanding. Thus, changing this understanding will require that many teachers move beyond their current knowledge-base which is rooted in decidedly 20th century technologies and teaching practices.

[15] See the Best Practices research summary in the Appendix of this report.

5. Appendices

Data Collection Calendar

STTJ	Date/Time
Ulla Muller	November 16 – 8am
Cancryn	November 16 – 11am
Elementary Teacher Focus Group	November 16 – 3:30pm
Ivanna Eudora Kean	November 17 – 8am
E. Milliner-Bowsky	November 17 – 1pm
CAHS	November 18 – 8am
Lockhart	November 18 – 1pm
Gladys Abraham	November 29 – 8am
BCB	November 29 – 11am
Secondary Teacher Focus Group	November 29 – 3:30pm
Julius Sprauve	November 30 – 9am
Guy Benjamin	November 30 – 12pm
E. Benjamin Oliver	December 1 – 8am
Leonard Dober	December 1 – 11am
Joseph Gomez	December 1 – 1pm
Coordinator/Administrator Focus Group	December 1 – 3:30pm
Joseph Sibilly	December 2 – 8am
Jane E. Tuitt	December 2 – 11am
EWAA	December 2 – 1pm

STX	Date/Time
Claude O. Markoe	November 2 – 8am
Alexander Henderson	November 2 – 11am
Eulalie Rivera	November 2 – 1pm
Secondary Teacher Focus Group (scheduled, canceled by district)	November 2 – 3:30pm
Evelyn Williams	November 3 – 8am
Arthur Richards Jr. HS	November 3 – 11am
Charles Emanuel	November 14 – 8am
Alfredo Andrews	November 14 – 11am
Ricardo Richards	November 14 – 1pm
Elementary Teacher Focus Group (scheduled, canceled by district)	November 14 – 3:30pm
Lew Muckle	November 15 – 8am
Central HS	November 15 – 8am (2nd evaluator)
Juanita Gardine	November 15 – 11am

Pearl B. Larsen	November 15 – 1pm
Coordinator Focus Group	November 15 – 3:30pm
Woodson	November 17 – 8am
Elena Christian	November 17 – 12pm
Complex	November 18 – 8am

Memorandum to Schools (STTJ)

GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES
DEPARTMENT OF EDUCATION
St. Thomas/St. John School District
Office of the Insular Superintendent
1834 Kongens Gade
Charlotte Amalie, St. Thomas, U.S. Virgin Islands 00802
Tele (340) 775-2250 ext 8500 Fax (340) 775-7381

MEMORANDUM

TO: Principals

XC: Jeanette Smith-Barry, Insular Superintendent

FROM: Michael Harrigan, Deputy Superintendent

SUBJECT: Territory-wide evaluation of instructional technology with Sun Associates – surveys, focus groups, and school visits

DATE: November 2, 2011

This memo is to inform you that during the month of November, the district will be participating in a **territory-wide evaluation of instructional technology**. This is a required process initiated by VIDE and is part of the territory's responsibility for receiving federal education funds.

Schools will need to support the evaluation through participation in the following activities:

- **Teacher survey**
  An online survey will be available for teachers to begin taking on November 3, 2011. The purpose is to examine teacher practices and beliefs related to instructional technology integration. Teachers will receive an email with the survey web address, but we ask that you notify your teachers that the survey is part of this evaluation and encourage them to participate.

- **Teacher Focus Groups**

One teacher from each school will be selected to participate in an after-school focus group on November 16 (elementary teachers) or November 29 (secondary teachers). We will be contacting these teachers directly with information about the focus group.

- **Student surveys**
  An online survey will be available for students to begin taking on November 3. The purpose is to gather information on how instructional technology has impacted students' education.

- **School visits**
  As was briefly discussed at the PLCs, the evaluators hired by VIDE for this project, Sun Associates, will conduct partial-day "walk-through" visits according to the schedule below. Teachers do not need to plan any special activities for the evaluation walk-through, as the goal is to observe activities on a typical day. The evaluators will want to see the entire school (not just the computer labs).

  On the day/time that your school is visited, please allocate time for a brief (30 minute) interview with the evaluator. **The schedule of your school's visit appears below.** The point of this interview will be to gather information about what you, as principal, perceive as the successes, challenges and issues related to instructional technology use in your school. This will be your opportunity to provide information that could benefit your school and the district at large.

  School visit schedule: territory-wide evaluation of instructional technology with Sun Associates

School	Date/Time
Ulla Muller	November 16 – 8am
Cancryn	November 16 – 11am
Ivanna Eudora Kean	November 17 – 8am
E. Milliner-Bowsky	November 17 – 1pm
CAHS	November 18 – 8am
Lockhart	November 18 – 1pm
Gladys Abraham	November 29 – 8am
BCB	November 29 – 11am
Julius Sprauve	November 30 – 9am
Guy Benjamin	November 30 – 12pm
E. Benjamin Oliver	December 1 – 8am
Leonard Dober	December 1 – 11am
EWAA	December 1 – 1pm
Joseph Gomez	December 2 – 8am
Joseph Sibilly	December 2 – 11am
Jane E. Tuitt	December 2 – 1pm

Please note that none of these evaluation activities will disrupt classes or require teachers to be out of their classrooms during the instructional day.

My office will be following up with you individually in the near future. I strongly encourage your support and participation in this important activity. It is through this work that all of our teachers and students can increase their access to important technology, training and curriculum resources.

Thank you.

Online Surveys (links)

Teacher Surveys - http://www.sun-associates.com/usvi/2011eval/closed_teacher.html

Student Survey - http://www.sun-associates.com/usvi/2011eval/closed_student.html

Principal Interview Questions

1. Could you describe for me what you feel to be the overall state of "technology integration" among your teachers? (*Probe for teacher skills in both technology and pedagogy. Probe to see if they have any recollection of/connection to the curriculum integration work that we did last year*)

2. What are the major challenges you and your teachers face in terms of making progress in integrating technology with teaching and learning, and what do you see as your primary role in meeting/addressing these challenges? (*this will naturally lead to the "what do you need" issue/response and that's ok*)

3. In your opinion, what's the typical balance I will find in classrooms in this school between teachers using tech to present and students using tech to explore, create, collaborate?

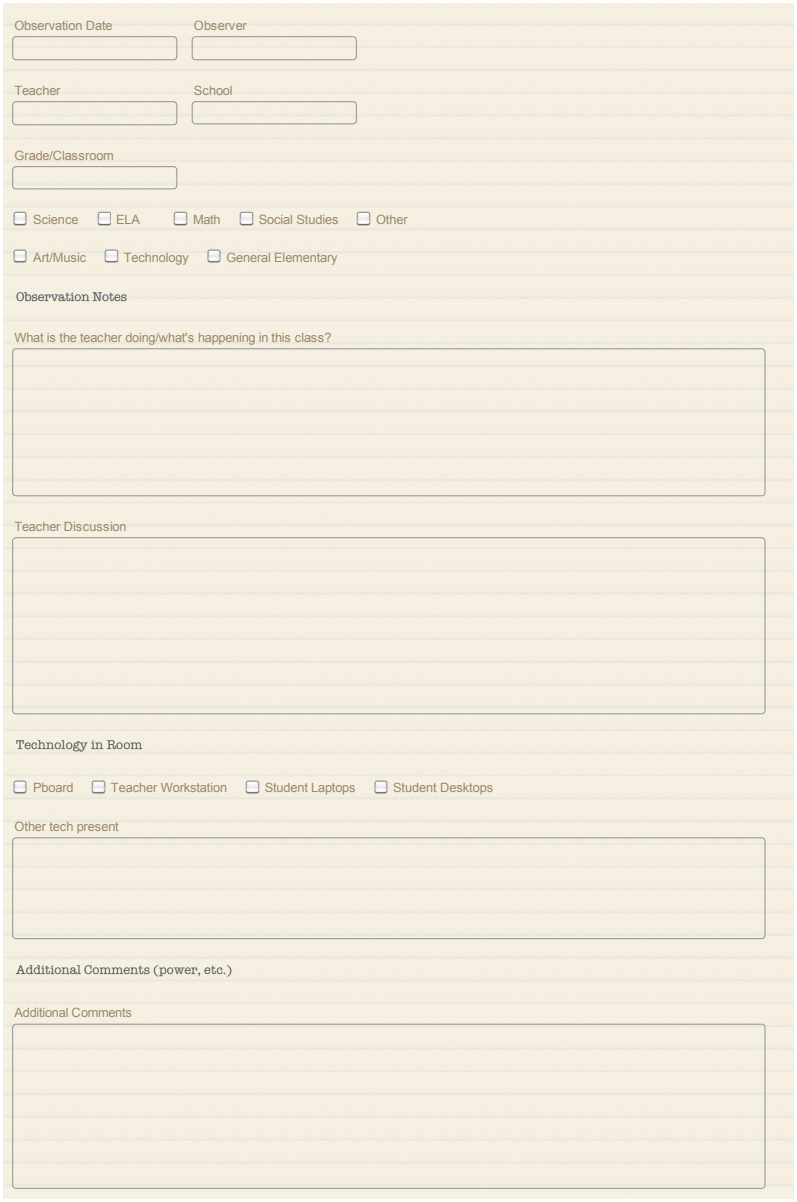
4. What's the balance between students using tech in labs and students using tech in classrooms /the extent to which tech use is integrated into daily student work (*avoiding the word curriculum here, but the point would be to exclude drill and practice "back of the classroom computer station" stuff)*

5. What sorts of technology professional development do your teachers have? (*probe for the balance in this between technical information and pedagogy*)

6. What's the role of the computer teacher/technology specialist in this school? (*probe for the balance in this person's function between "computer skills teacher" and professional developer for teachers…and then the balance in that PD function between techie and pedagogy*)

7. Anything else?

Classroom Observation Protocol



Observation Date

Observer

Teacher

School

Grade/Classroom

☐ Science ☐ ELA ☐ Math ☐ Social Studies ☐ Other

☐ Art/Music ☐ Technology ☐ General Elementary

Observation Notes

What is the teacher doing/what's happening in this class?

Teacher Discussion

Technology in Room

☐ Pboard ☐ Teacher Workstation ☐ Student Laptops ☐ Student Desktops

Other tech present

Additional Comments (power, etc.)

Additional Comments

Teacher Focus Group Questions

1. Describe what technologies you (as teacher) use in the classroom on a typical day.

2. How do you think using these tools impacts your teaching? Or in other words, what do you see as the VALUE that these tools/technologies bring to student learning?

3. What technologies do students typically use, and how do you think these impact learning? (what kinds of things can students do better, what new skills do they develop, etc.)

4. What sorts of student learning skills are supported by their use of technology? (*see if anyone mentions NETS or 21st Century skills or something like that. Also, be very attentive to whether or not they are describing STUDENT use of tech versus students watching TEACHERS use tech. If possible, probe them on this difference)*

5. To what extent are projects (either individual or collaborative) part of what student do in your classroom? What role (if any) does technology play in student projects?

6. What would you like to be able to do with technology (or have your students do with technology) that you haven't been able to do? What benefit would doing this bring to students?

7. In what ways are you – as a classroom teacher – supported in your use and integration of technology? (*probe here for PD, and the relationship with the building tech specialist/computer teacher)*

8. What could your principal do to facilitate greater use of technology in your classroom?

Coordinator Focus Group Questions

1. Please describe your role – the role of the curriculum coordinator – in supporting the integration of instructional technology at the classroom level.

2. Can you give me an example – based on your personal experience, i.e., something that you've seen JUST THIS YEAR– of what you would consider a positive example of technology integration from a teacher working in your curriculum area? (*the "just this year" part is important as we don't want theoretical things about what someone once did somewhere. We want to push them to tell us something that actually recently happened*)

3. Are you familiar with the ISTE NETS-S standards? If so, can you paraphrase a couple of the standards? (probe that we're trying to get their read on the overall tone/point/orientation of the standards… And that will be that students know how to use technology as a tool for 21st C learning….collaboration, communication, analysis, etc.).

4. With those standards in mind (*and I may need to actually provide the answer if no one got it*), what specific examples can you give me of how the curriculum area you are responsible for works to support those standards.

5. What else, in your opinion, do teachers need in order to be able to meet those standards? (*probe for pd, hw/sw, time, policies, etc*.)

6. What would you – as a curriculum coordinator and therefore district administrator – like to see as an outcome of this evaluation effort?

NETS Standards (links)

NETS for Students - http://www.iste.org/standards/nets-for-students/nets-student-standards-2007.aspx

Essential Conditions - http://www.iste.org/standards/nets-for-students/nets-student-standards-2007.aspx

NETS-S Profiles - http://www.iste.org/standards/nets-for-students/nets-for-students-2007-profiles.aspx

NETS for Teachers - http://www.iste.org/standards/nets-for-teachers/nets-for-teachers-2008.aspx

Best Practices Research Summary

Most instructional technology implementation efforts focus their efforts around a few key areas. In our experience, these areas most often are:

- Technology Integration into the Curriculum and Instructional Environment
- Technology Access/Infrastructure
- Technology Professional Development
- Technology Literacy and Standards

As a way of establishing what's possible or ideal in each of these areas, we find that it's useful to review how the relevant research describes "best practice". Concise summaries of the research that defines best practice is presented below. There is also a bibliography for the various reports and papers cited in each section.

Finally, working on the assumption that a picture is worth a thousand words (at least for visual learners), we have highlighted a few video clips from Edutopia (www.edutopia.org) that demonstrate how different educators have implemented elements of these best practices within their schools and districts. These videos clearly demonstrate another important fact associated with the implementation of "best practice" in any of these areas; and that is that there is not just "one way" of implementing any of these practices. Practically, any implementation effort - even those flagged as exemplary -- is at best a compromise between what could be and what needs to be as based on local instructional needs, priorities, and challenges. Therefore every implementation will look somewhat different. This is a fact that all strategic planners must take care to consider.

Best Practice in Technology Integration

Technology integration must be driven by the goals of the curriculum and by an understanding of how students can best learn the content and concepts of the curriculum.

Studies have shown that, when integrated meaningfully into curriculum and instruction, technology can positively impact student learning and achievement. Decades of research has shown drill and practice programs to be effective in reinforcing basic skills and boosting student performance in specific areas. (Boster, Meyer, Roberto, & Inge 2002) Likewise, students using simulations and video footage can gain deeper and more flexible knowledge of mathematical and scientific concepts. More recently, research has shown that, when integrated into curriculum-based student-centered classroom activities, tools such as word processors, spreadsheets, databases, modeling and presentation software can promote the development of such 21st century skills as communication, collaboration, and analytical thinking.

Key to the success of any intervention is the matching of the appropriate tool to the task at hand. If, as mentioned above, a teacher's objective is raise test scores in a discrete area such as math facts, an appropriate tool would be one that offers opportunities to memorize and be drilled on those facts until

secure. If instead the curriculum calls for conceptual understanding and the ability to apply principles of physics related to force and movement, an entirely different type of tool would best meet that need. Further, the impact of being able to place that tool in the hands of the student to manipulate, explore, and discover, will contrast sharply with the impact of that same tool used by a teacher to "present" information to a whole class of students.

"Meaningful integration" of technology, then, refers to the process of matching the most effective tool with the most effective pedagogy to achieve the learning goals of a particular lesson. Each tool brings different opportunities to the learning environment and involves a different set of skills on the part of teachers and students. Each can play a unique role in the learning process when used at the appropriate time, under the most appropriate learning conditions. It is simply the degree to which a particular technology's capabilities are matched to the expected learning outcomes and supported by appropriate pedagogy that will determine the impact that technology has on learning and achievement.

When considering the range of available technologies and their potential impacts on learning, an important distinction can be made between two categories of technology tools, "Type I" and "Type II". (Maddux, Johnson and Willis, 2001) With Type I applications, students essentially learn "from" the technology. The computer acts as a tutor and serves to increase students' basic skills and knowledge, as is the case in the drill and practice reference above. Type I technologies use can be effective in helping teachers present and students acquire basic factual knowledge. They can be easily incorporated or "added on " to traditional instruction, in a whole-class setting or through individual student computer use.

Alternatively, students and can learn "with" computers—where technology provides a flexible tool that can be applied to a variety of goals in the learning process and can promote the development higher order thinking, creativity and research skills (Reeves, 1999; Ringstaff & Kelley, 2002). Type II technologies are those that engage students in communication, hypothesis testing, and interactive information sharing, as is the case with many so-called "Web 2.0" applications. More common tools such as word processors, database and spreadsheet applications can be categorized as Type II tools also, when used in ways that involve personal engagement with authentic tasks.

Also sometimes referred to as "disruptive technologies" (Christiansen 1997) Type II applications, have proven to be powerful agents of change in the classroom when teachers learn to adapt their instructional practice to the design and capabilities of these "cognitive tools" (Jonasson & Reeve 1996). Matching the tool with the most effective pedagogy means shifting teachers' role from being providers of information to being providers of opportunities. Teachers must facilitate student exploration of ideas and questions in ways that engage them actively and centrally in their own learning. Type II technology-supported classrooms have the potential to become more learner-centered, and to promote engagement with subject matter in a way that is authentic and powerful.

One instructional model that has been shown to make particularly effective use of technology to facilitate technology-supported 21st century skill development is Project Based Learning. (Boss, S. & Krauss, J., 2007) Broadly defined as a systematic teaching method that engages students in developing knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks, project based instruction presents significant challenges to most teachers and requires extensive professional development to be successful. (Wiske,

Sick, and Wirsig, 2001). Implications for professional development will be discussed in greater detail in later sections of this report

Best Practice in Technology Access

The selection of technology tools must be driven by the goals of the curriculum and an understanding of effective pedagogy.

The technology infrastructure in a district or school provides the foundation upon which all educational and administrative technology efforts must rely. By virtue of its design and functionality, a school's infrastructure largely dictates what is and is not possible for teachers, students, administrators and parents to do with the equipment they have. Likewise, the number, type, location, and flexibility of technology tools in a school building will either enable or prevent the kinds of integral uses of technology that are described in the research on 21st century learning skills.

As discussed earlier in the section on technology integration, the selection of technology tools for a particular learning task must be driven by the goals of the curriculum and an understanding of effective pedagogy. A similar statement can be made about decisions related to technology infrastructure and access. If, for example, the science curriculum's lab activities call for outdoor/off-site data collection and real-time data analysis, then adequate numbers of laptops or handheld devices are what need to be planned for. Alternatively, if students need only to be able to type as a final stage of their writing, then a lab of desktop machines may suffice. If a large high school facility needs to be able to simultaneously stream video and allow students to access distance learning courses, then its network must support high bandwidth activities.

It is increasingly common to find reports and policy papers that espouse the use of particular technology tools and enumerate the resources that "should" be available in "21st Century Classrooms" (e.g., SETDA, 2009). Generally, the lists include high bandwidth connectivity, low ratios of students to computers, various multimedia tools, and a wide array of peripherals tools. Nevertheless, the evaluators contend that it is essential that all equipment and infrastructure decisions be driven by the specific learning goals of the school, district, and overall Territory rather than by a list put together outside of the district.

Best Practice in Technology Professional Development

Teachers who participate in regular, hands-on training that addresses important issues of curriculum and pedagogy in addition to the typical technical "how-tos" are those most likely to use technology in ways that promote higher order thinking in the classroom.

As discussed in the Technology Integration section above, integrating technology in meaningful ways involves matching instructional tools with curricular goals, desired student outcomes and instructional practice. Choosing the "right" tool for a learning task requires not only familiarity with the kinds of tools available, but also depends upon an understanding of *how* those tools can support the development of desired knowledge and skills. As with any tool selected for any purpose, the choice of what technology

to use and how to use it must be guided by a set of beliefs---a vision-- for how learning is best supported.

Over the years, many studies have documented the pivotal role of technology professional development in enabling schools to realize the value of investments in technology. (Office of Technology Assessment, 1995; Coley, Cradler, & Engel, 1997; Silverstein et al., 2000; Sandholtz, 2001) Teachers who participate in regular, hands-on training that addresses important issues of curriculum and pedagogy in addition to the typical technical "how-tos" are those most likely to use technology in ways that promote higher order thinking in the classroom. (National Center for Education Statistics 1999). Likewise, schools whose professional development program regularly exposes teachers to new ideas and ways of teaching--***with or without technology***-- are those whose classrooms exhibit evidence of research-based best practice.

Introducing Type I technologies--those that replicate the role of the teacher or serve to support the existing instructional paradigm --can be achieved with relatively straightforward "how to" training in many cases. As add-ons to the traditional teaching process, these tools don't "disrupt" or require changes in pedagogy for their use. Type II tools, on the other hand, bring challenges and exciting opportunities for moving classrooms toward becoming more learner-centered. As such, the need for professional development around the integration of these Type II tools is tremendous.

A necessary first step for a professional development program aimed at integrating Type II technology is to provide teachers with a vision for the kinds of learning environments they are being encouraged to create. They must be provided opportunities to see reformed pedagogy "in action" and to develop their own understanding of the value that these new (often challenging and threatening) teaching methods can bring. (Linn, Slotta, & Baumgartner, 2000) Student-centered lessons and curriculum units must be provided as samples, and the teaching of those units modeled for teachers. To be successful, technology professional development must equip teachers with the knowledge and skills to be able to:

- Address curricular objectives in a student-centered manner
- Develop essential questions for inquiry
- Assign develop projects that fit instructional objectives, whether or not there is any technology involved.
- Facilitate team learning, provide effective feedback to students, address unexpected questions, adjust timelines in the midst of projects
- Relate students' own ideas and perspectives to curricular content

Needless to say, changing teacher pedagogy and beliefs about learning requires a sustained commitment on the part of administrators as well as from the teachers themselves. In many cases, traditional didactic forms of instruction have remained the norm in schools even after extensive professional development, primarily because of the many and varied demands on staff. (Means and Olson 1995) Recognizing the scope of the challenge associated with transforming classrooms is essential to this endeavor if technology is truly to be integrated into curriculum in ways that meaningfully impact student learning and achievement.

Best Practice in Technology Literacy and Standards

Integration of technology skills and content area learning are at the heart of the latest revision of the ISTE-NETS standards for students.

Meeting curricular goals through authentic, student centered learning activities presents many challenges to traditional instruction. Teaching students proper and effective use of technology tools in that context can be even more difficult. Current studies suggest, however, that it is in combining the elements of reformed pedagogy and the appropriate integration of technology that students can gain valuable 21st century learning skills. (Partnership for 21st Century Schools, 2009)

Essential to the development of "technology literacy" is the ability of teachers to embed technology use into students' regular classroom work. "Computer class", where students learn to type or learn their way around the basic components of a computer is, in fact, antithetical to the way that research suggests developing students' 21st century skills. No longer must technology be a course unto itself, or be "taught" by someone other than the classroom teacher. Instead, technology use must be driven by the goals of the curriculum (be they content, concept, or skills) and must be employed by students in ways that allow for exploration, discovery and the development of understanding. As students use technology to analyze information, collaborate with peers, communicate their knowledge, and create projects, they are developing technology proficiency as part of their overall education. Integration of technology skills and content area learning are at the heart of the latest revision of the ISTE-NETS standards for students.

In recent years, in response to the creation of technology literacy standards and the NCLB mandate that all students be technology literate by the end of grade 8 (in 2012), a wide array of "solutions" have been put forth by the education technology industry. In some cases, the individualized learning system (ILS) approach has been applied to the task of teaching students the "how-to" of computer use. In other cases, entire curricula have sprung up that purport to "teach technology literacy" through achievement of framework based content. Here, the evaluators advise caution with respect to purchasing such a "solution" designed to be implemented in a lab by a computer teacher. This model truly contradicts the recommendation that teachers learn to create student-centered classroom environments that engage students actively in the development of learning, thinking, and real-world technology skills that will serve them as 21st century citizens.

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Best Practice Videos

Integration

Turning on Technology: Using Today's Tools to Study Yesterday's

A field trip from Ferryway School, near Boston, to the nation's oldest ironworks is captured with the latest tech.

Learning Landscape: Kids Monitor Terrain with Tech

Students at this Minnesota elementary school use new technology to study the ancient ecology of a vast prairie wetland.

A Product of Learning: Representing Their Work Through Tech

A school uses technology to help provide top-of-the-line education for all students.
YES Prep Demonstrates Successful Team Teaching

In middle school, teachers pair up in the classroom to integrate their subjects.

Transformed by Technology: High Tech High Overview

A network of K-12 public charter schools uses rigorous projects and portfolio assessments to revolutionize learning.

Common Sense: An Overview of Integrated Studies

More collaboration, critical thinking, and knowledge retention are the fruits of an integrated curriculum.

Access

Mary Scroggs Elementary School: A Wired Education

Computers and multimedia are seamlessly woven into the curriculum at Mary Scroggs Elementary School.

Professional Development

Teacher Support: A Culture of Professional Development

Sherman Oaks Community Charter School, in San Jose, California, provides an unusual amount of support for its faculty, including 90 minutes of collaborative planning time each day.

YES Prep Demonstrates Successful Team Teaching

In middle school, teachers pair up in the classroom to integrate their subjects.

An Introduction to Teacher Development

New models for preparing educators in training focus on practical tips and feedback.

Technology Literacy and Standards

Much of the literature on technology-supported curriculum is interwoven with the issues of technology literacy and standards. In particular, the video above (Turning on Technology: Using Today's Tools to Study Yesterday's) addresses ISTE NETS-S.

The ISTE website (http://www.iste.org) can provide additional examples.